Infinity Garden Village (Wragley Way)

ENVIRONMENTAL STATEMENT
Volume 3
Appendices and Figures to the Main Technical Studies

June 2019



Hallam Land Management

BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

ENVIRONMENT

Hallam Land Management Ltd
South Derby Growth Zone
Derby
Phase 1 Geo-Environmental Assessment

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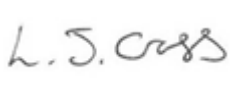
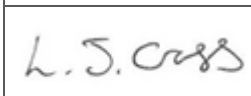
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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY	
Site Address	Land off Wragley Way, Derby, DE24 3DZ.
Site Setting	The site is located between the A50 (southern boundary) and Wragley Road (northern boundary). The site comprises numerous arable fields with Ashlea Farm located to the east of the site which is made up of a farm house, yard, numerous barns, a small livestock pen and four chicken sheds with associated feed silos. Three overhead electricity lines and two gas mains are known to be present on site. A housing estate is present o the north of the site beyond Wragley Way, with the second phase of the housing development currently being constructed immediately north of the site at the corner of Deep Dale Lane and Wragley Way.
Site History	Historical mapping dating from 1881 to 2014 has been reviewed as part of this assessment. Throughout this period of history the site has remained undeveloped agricultural land.
Published Ground Conditions	Information published by the BGS indicates that the north central and eastern area of the site is underlain by the Lacustrine Deposits (clay) (Unproductive Strata), with Head deposits (clay, silt, sand and gravel) (Secondary Undifferentiated Aquifer) mapped across the south central area. No superficial deposits are mapped across the west and southern area of the site. Made Ground is mapped in numerous small areas across the site, typically mapped near roads and the housing development to the north of the site. Bedrock geology is indicated to comprise the Gunthorpe Member (Mudstone) across the central and western area of site, with the Branscombe Mudstone Formation (mudstone & siltstone) mapped beneath the far east of the site (both Secondary B Aquifers). A fault is indicated to cut north west to south east across the east of the site. A number of small surface water features cut across the site.
Regulatory Setting	Significant potential on-site and off-site sources of contamination have not been identified from a review of available regulatory information.
Geotechnical Setting	Due to the nature of the development and the mapped geology, it is considered likely at this stage, that a foundation solution transferring loads to the more competent Gunthorpe Member (Mudstone) or the Branscombe Mudstone Formation below the site will be required. Stabilisation of the shallow Lacustrine Deposits may also be considered a suitable solution.
Contamination Sources	On the basis of the available information, significant potential on-site sources have not been identified at the site. Agricultural processes undertaken at the site may have given rise to localised soil and/or groundwater contamination. Any unrecorded Made Ground deposits have the potential to generate elevated concentrations of hazardous ground gasses. Significant potential off-site sources of contamination have not been identified.
Recommendations	A detailed intrusive investigation should be conducted to confirm the conceptual site model and inform upon geotechnical constraints with regards to foundation design.
This summary should be read in conjunction with BWB's full report (ref. SDGZ-BWB-XX-00-YE-RP-0001_Ph1_P1) and reflects an assessment of the Site based on information received by BWB at the time of production.	

CONTENTS

EXECUTIVE SUMMARY iii
1. INTRODUCTION 1
Instruction 1
Objectives 1
Scope of Works 1
2. THE SITE 3
Site Location 3
Site Description 3
Potential Constraints to Ground Investigation 5
3. PUBLISHED GROUND CONDITIONS 6
4. SITE HISTORY 9
Previous Investigation Reports 10
5. REGULATORY SETTING 12
Permits Consents and Authorisations 12
Landfilling and Waste Management 12
6. GEOTECHNICAL APPRAISAL 13
7. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT 15
Introduction 15
8. ENVIRONMENTAL LIABILITY ASSESSMENT/DEVELOPMENT CONSTRAINTS 18
Statutory Liability 18
Third Party Liability 18
Public Relations 19
Development Implications 19
9. CONCLUSION AND RECOMMENDATIONS 20
Conclusions 20
Recommendations 20
10. REFERENCES 21

FIGURES

Figure 2:1 Site Location Plan
Figure 3:1 Superficial Deposits
Figure 3:2 Bedrock Deposits

TABLES

Table 3:1: Published Ground Conditions
Table 4:1: Key Points of Development History
Table 4:2: Key Points of Surrounding Area Development History
Table 6:1: Ground Related Constraints & Opportunities
Table 7:1: Preliminary Conceptual Site Model

APPENDICES

Appendix 1: Site Photographs
Appendix 2: Ordnance Survey Historical Maps
Appendix 3: Groundsure Report
Appendix 4: CIRA Risk Classification

1. INTRODUCTION

Instruction

1.1 BWB Consulting (BWB) was instructed by Hallam Land Management Ltd (the Client) to carry out a Phase 1 Geo-Environmental Assessment. Details of the project brief are included in BWB proposal reference 20190410/R1/NTH2136/RPD dated April 2019.

1.2 The site is proposed for the development of a residential dominated scheme with private gardens, areas of public open space and highways infrastructure. The development also includes a primary school, and land proposed for mixed use (light industrial and commercial use).

1.3 No proposed development plan has been provided for review as part of this assessment.

Objectives

1.4 This report has been completed to present pertinent information into the environmental risks and liabilities associated with the site. It has been completed to fulfil the requirements of a preliminary risk assessment in accordance with BS10175: 2011+A2:2017 'Investigation of Potentially Contaminated Sites Code of Practice' and CLR11 'Model Procedures for the Management of Contaminated Land'. The objectives of the report are:

- To assess historical activities at the site with respect to their potential impact on the site environment;
- To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities;
- To assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact the subject property;
- To review existing site investigation and remediation information available for the site;
- To develop a preliminary Conceptual Site Model (CSM); and
- To assess potential environmental liabilities associated with the site.

Scope of Works

1.5 The Scope of work included:

- Site visit to inspect ground conditions and access points;
- Review of the following information:
  - Historical Ordnance Survey Mapping (**Appendix 2**);
  - Groundsure Report No. HMD-214-5963299 & HMD-214-5963300 (**Appendix 3**);
  - British Geological Survey (BGS) exploratory hole records (www.bgs.co.uk);

- British Geological Survey (2001) 1:50 000 Scale Loughborough Sheet 141 Solid and Drift;
- 1st Line Defence Detailed UXO Risk Assessment;
- MAGIC Maps (www.magic.defra.gov.uk/MagiCMap).

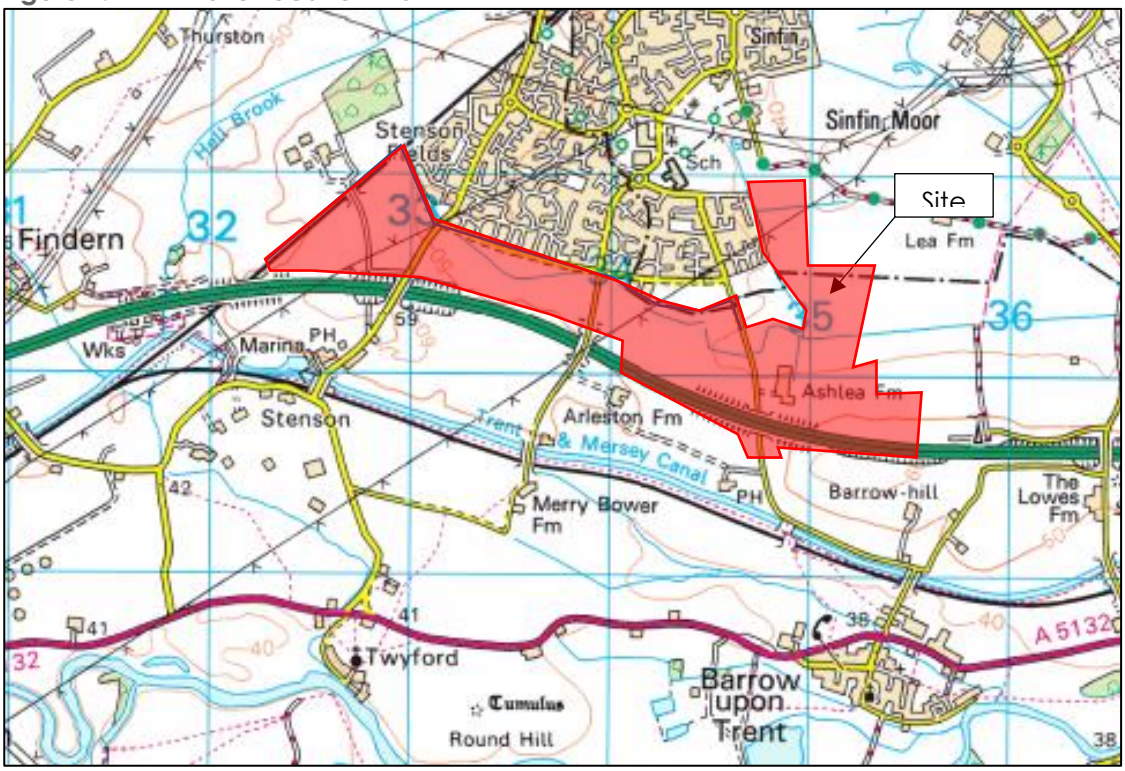
- Provide a summary of key risks that require further investigation in order to control the identified risks; and
- Produce a geo-environmental desk study (this report) providing qualitative contamination risk assessment and ground-related constraints to the proposed development.

2. THE SITE

Site Location

2.1 The site is located off Wragley Way, Derby, DE24 3DZ, located at national grid reference 434000, 330292. The location of the site is shown in **Figure 2:1.**

Figure 2:1 Site Location Plan



Site Description

2.2 The layout of the site with the main features is presented as **Drawing 1.** Photographs from the site inspection are presented in **Appendix 1.**

2.3 A site walkover of the site area was completed on 26th April 2019 by a representative of BWB.

2.4 The description the site has been split into four areas (Areas 1-4) which are detailed on **Drawing 1**.

Area 1

2.5 Area 1 comprised the western fields of the site, Stenson Road runs along the eastern boundary of the fields with a railway forming the western boundary, an access track cuts east to west across the centre of the fields providing access to an off-site farm. The fields comprise arable farmland, which currently have varying types of crop planted. An overhead electricity line runs along the western boundary with electrically pylons running southwest to north east.

2.6 The site was noted to rise slightly from east to west.

2.7 A pond and recently developed housing estate are located immediately north of the site with the A50 forming the southern boundary.

Area 2

2.8 Area 2 is bound by Stenson Road to the west, Arleston Lane to the East and Wragley Way to the north. The fields are made up of arable farmland, again planted with varying types of crop. Mature hedgerows and tree lines run between fields.

2.9 The area topography was noted to be generally flat with limited changes to levels.

2.10 Some minor fly tipped wastes were noted in a lay by to the east of the site, this is considered more likely down to littering rather than fly tipping offences.

2.11 A high pressure gas main is understood to run down the western boundary of the fields, this is denoted by the presence of marker posts within the hedgerow.

2.12 A housing estate is present to the north of the site beyond Wragley Way.

Area 3

2.13 Area 3 is bound by Arleston Lane to the west and Deep Dale Lane to the east. Again, the fields are made up of arable farmland planted with varying types of crop. Mature hedgerows and tree lines run between fields.

2.14 The area topography was noted to be generally flat with limited changes to levels.

2.15 Electricity pylons cut from southwest to northeast through the site.

2.16 A housing estate is present to the north of the site beyond Wragley Way, with a housing development currently being constructed immediately north of the site.

Area 4

2.17 Area 4 is bound by Deep Dale Lane to the west and comprises numerous arable fields both to the north and south of the A50. Ashlea Farm is located centrally to the area and comprises a farm house, yard, numerous barns, a small livestock pen and four chicken sheds with associated feed silos. The fields comprise arable farmland, varying crops were noted to be planted.

2.18 The area topography was noted to be generally flat with limited changes to levels. Levels were noted to rise towards the A50 located to the south of the site.

2.19 A two high pressure gas mains are understood to cross the site from the western to eastern boundaries). These gas lines are denoted by the presence of marker posts within the hedgerow and are understood to run parallel to the A50 crossing the existing railway line, Stenson Road, Arleston Road and Deep Dale Lane.

Potential Constraints to Ground Investigation

2.20 Soft ground covers almost all of the site, where possible tracked machines will be required for use during any instructive site investigation works.

2.21 Due to the presence of overhead and underground services on the site, mobilisation times must take into account any correspondence / permissions that will be required to near the stakeholder's assets.

3. PUBLISHED GROUND CONDITIONS

3.1 The anticipated ground conditions for the site and controlled waters vulnerability is discussed within **Table 3:1** below.

Table 3:1: Published Ground Conditions

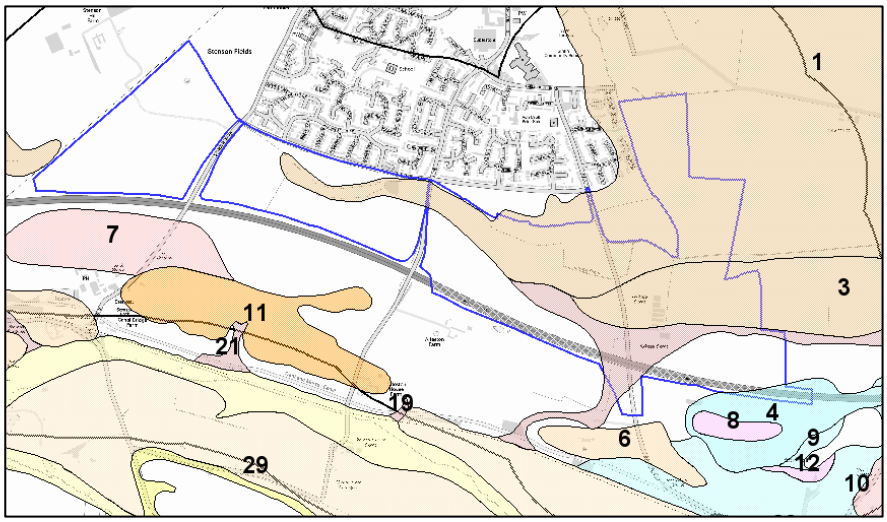
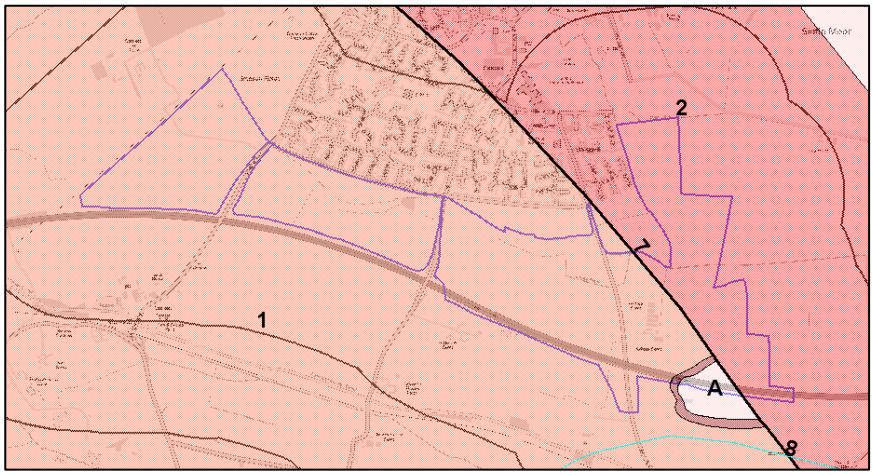
Subject	Summary
Geology	Information published by the BGS indicates that the north-central and eastern area of the site is underlain by the Lacustrine Deposits (clay), with Head deposits (clay, silt, sand and gravel) mapped in the south central area. No superficial deposits are mapped across the west and southern area of the site as shown in **Figure 3:1** below. **Figure 3:1 Superficial Deposits**  *No. 1 &4: Lacustrine Deposits and No. 3: Head Deposits.* Made Ground is mapped in numerous small areas across the site, typically near roads and the housing development to the north of the site. In relation to road. The Groundsure Report lists a "void" 230m northwest of the site, from historical mapping this appears to be an infilled pond now covered by a small area of mature trees. Bedrock geology is mapped to comprise the Gunthorpe Member (Mudstone) across the central and western area of site, with the Branscombe Mudstone Formation (mudstone & siltstone), Edwalton Member (Mudstone) and the Cotgrave Member (Sandstone) mapped beneath the far east of the site. A fault is located to cut north west to south east across the east of the site. **Figure 3:2** shows the bedrock geologies and the inferred location of the fault.

	Figure 3:2 Bedrock Deposits  *No. 1: Branscombe Member, No. 2: Gunthorpe Member and No. 5: Inferred fault.* BWB have completed numerous phases of intrusive site investigation across the eastern area of site and the wider land. Investigation works completed to the north of the site (west of Deep Dale Lane recorded topsoil to 0.85m below ground level (bgl), overlying the Lacustrine Deposits to 2.0m bgl, however these were found to be locally absent, overlying the Branscombe Mudstone to 2.8m with the Gunthrope Member beneath. Investigation works completed on an adjacent site, to the east of Deep Dale Lane recorded very similar ground conditions, with the Lacustrine Deposits found to be absent across the central and eastern extents. Numerous historical BGS logs are located on site, most of which are associated with the construction of the A50. A selection of boreholes are summarised below: • Ref: SK33SW337 located to the west of site recorded topsoil to 0.5m over stiff friable red brown clay with grey green mottling (Gunthorpe Member); • Ref: SK33SW197 located centrally recorded topsoil to 0.8m over yellow brown silty sandy clay (Lacustrine Deposits) to 1.2m overlying firm to stiff red brown mottled green silty clay (Gunthorpe Member) to 2.3m with weak weathered siltstone beneath (possibly Branscombe Member). • Ref: SK33SW202 located to the east of site recorded topsoil to 0.9m overlying soft to firm mottled grey and light brown sandy clay (Lacustrine deposits) to 2.0m overlying firm to stiff red brown mottled green silty clay (Gunthorpe Member).
Hydrogeology	The EA classifies the Lacustrine Deposits as an unproductive strata, with the Head deposits as a Secondary Undifferentiated Aquifer. The bedrock geology beneath the site is classified as Secondary B Aquifers, with the exception of the Cotgrave Sandstone which is a Secondary A Aquifer. There is one licenses discharge consent located 225m south west of the site, this is listed for the Ragley Boat Stop for discharge of final / treated effluent to a soakaway. No active groundwater abstraction wells are located on site or within 1km of the site boundary.

	There are no pollution incidents listed within 250m of the site that is considered to have a detrimental impact upon the groundwater's beneath site. The site is not indicated be within, or within close proximity to, an EA groundwater Source Protection Zones. Based on previous investigations carried out by BWB, groundwater is anticipated between 1.7m and 3.1m bgl.
Surface Waters	There are numerous "inland rivers" mapped on site, commonly named as the Barrow Drain. The Trent and Mersey Canal and Stenson Marina are located approximately 210m south of the site. There are three entries for licensed discharge to surface water with 65m of the site, two relate to discharge of sewage via a pumping station to the Sinfin Brook located immediately north of the site with the third listed as miscellaneous effluent from a housing development located 65m north of the site. These entries are dated 2011 and 1970 respectively, with only one remaining active, and are therefore not considered to represent a risk to the site environs. There are no licenced surface water abstractions within 500m of the site. There are no pollution incidents listed within 250m of the site that are considered to have a detrimental impact upon the surface water features on site. The north east area of site is located within a Zone 2 and 3 flood area. There is no water quality data for any surface water features within 1km of the site.
Ground Gas & Radon	The site is not within a Radon affected area. At this time, the limited thicknesses of Made Ground are not considered a significant source of ground gas generation. The natural deposits beneath the site is considered as having a low potential to generate ground gases.
Mining and Mineral Extraction	The Groundsure Report lists that no coal mining or mineral extraction activates have been undertaken within 1km of the site boundary, however, historical mapping indicates a number of sand and/or gravel pits have been in operation within 250m of the southern boundary.

4. SITE HISTORY

4.1 Historical Ordnance Survey (OS) mapping for the site area has been reviewed. These maps and plans date from the 1881 OS County Series to the current 2014 OS Plans. The historical plans reviewed have been reproduced in **Appendix 2**. The key points of the historical development of the site and surrounding area are summarised below in **Tables 4:1** and **4:2.**

Table 4:1: Key Points of Development History

DATES	ON SITE	SIGNIFICANCE
1881 - 1955	The site is shown to comprise farmland denoted by field boundaries. A small track runs north to south in the western fields providing access to a neighbouring farm. A small ***pond*** feature is mapped to the north west of the site, from 1924 this is labelled as "Risers".	No significance.
1970 - 2014	From 1967 Ashlea Farm is mapped in the east of the site, numerous **TANKS** are mapped within the farm yard area. The A50 was constructed along the southern boundary between the late 1980s / early 1990s, unfortunately all maps are either incomplete or are missing from this time. Numerous **EMBANKMENTS** and **CUTTINGS** are mapped along the route of the A50. By 2002 an additional **TRACK** is mapped providing further access to a farm located offsite to the west. The pond feature is no longer mapped from 2010 and is assumed infilled.	The tanks represent a potential source of contamination, based upon the land use these may have held **PETROLEUM PRODUCTS** or **AGRO-CHEMICALS**. Given the year the farm yard was constructed it is likely that **ASBESTOS** products will be present within the fabric of the buildings. The construction of the A50 may have led to **MADE GROUND** being created / imported across the site which could be a source of **HAZARDOUS GROUND GASES**. The infilled pond, either by natural silting or landfilling, could represent a source of **HAZARDOUS GROUND GASES**.

Table 4:2: Key Points of Surrounding Area Development History

Dates	On Site	Significance
1881 - 1972	The land surrounding the site is predominately for agricultural uses. Two small ***ponds*** are located between 25m and 150m south of the site, the ***Trent and Mersey Canal*** located approximately 450m south of the site and a **RAILWAY LINE** (Midlands Railway) is located immediately west of the site,	The sewage works may represent a risk of heavy metals, inorganics, asbestos, PCBs and micro-organisms, although due to the age of the development the risks to the site are understood to be low. None of the other historical land uses are believed to

	with an old **MARL PIT** is located 400m west. An **OLD SAND PIT** is mapped 500m southeast of the site from 1889. From 1920 an **OLD GRAVEL PIT** is mapped approximately 150m south of the site. 1954 plans indicate a **SEWAGE FARM** adjacent to the northern boundary. No further significant changes have been noted.	represent a significant risk to the site environs.
1980 - 2014	By 1980 a large ***residential development*** has been constructed immediately north of the site. No further significant changes have been noted.	No significance.

4.2 An aerial photograph included within the Groundsure Report, dated 1st June 2018, shows the site to comprise its current form with the majority of the site made up of arable land with numerous road dividing the site and Ashlea Farm to the east of the site. The Aerial image shows a housing development under construction to the north of the site, BWB understand this development is nearing completion.

Operational / Company Records

4.3 No operational records have been reviewed as part of this assessment.

Previous Investigation Reports

4.4 BWB completed the following reports at or immediately surrounding the site;

- Phase 1 Geo-Environmental Assessment Report by BWB Consulting Ltd for Hallam Land Management, reference NTH2136/01/V1/East, dated January 2014;
- Phase 1 Geo-Environmental Assessment Report by BWB Consulting Ltd for Hallam Land Management, reference NTH2136/01/V1/West, dated January 2014;
- Phase 2 Geo-Environmental Assessment Report by BWB Consulting Ltd for Hallam Land Management, reference NTH2136/02/V1/East, dated February 2014;
- Phase 2 Geo-Environmental Assessment Report by BWB Consulting Ltd for Hallam Land Management, reference NTH2136/02/V3/West, dated December 2014;
- Phase 1 Geo-Environmental Assessment by BWB Consulting Ltd for Wilson Bowden Developments Ltd, reference IPI-BWB-ZZ-XX-RP-YE-0001_DS_P1, dated August 2017;
- Ground Investigation – Factual Report for Infinity Park Plot A & B by BWB Consulting Ltd for Wilson Bowden Developments Ltd, reference IFI-BWB-ZZ-XX-YE-RP-0002_FR_P1, dated December 2017;

- Ground Investigation Report (Plot B) by BWB Consulting Ltd for Wilson Bowden Developments Ltd, reference SDGZ-BWB-XX-XX-RP-CE-0001-GIR, dated December 2018; and
- Minerals Assessment by BWB Consulting Ltd for Wilson Bowden Developments Ltd, reference: IPI-BWB-ZZ-XX-RP-YE-0004_MA_P1, dated February 2019.

Phase 1 Reports

4.5 The Phase 1 Reports contained much of the same information contained within this report and will therefore not be repeated here.

Phase 2 Reports

4.6 Typically, all intrusive ground investigations completed by BWB confirmed the published ground conditions with varying thickness of topsoil overlying locally absent Lacustrine Deposits over the mudstone deposits of the Gunthorpe Member or Branscome Member. The investigation completed in December 2018 recorded deposits of the Cropwell Bishop Formation along the south east boundary running along the A50. This material was noted to be too weak to core and recommended that the material could be excavated via conventional methods.

4.7 No significant sources of contamination have been previously identified. Localised marginally elevated arsenic and barium where recorded in the eastern area of the West field off Deep Dale Lane (offsite), with Asbestos Containing Materials (ACMs) recorded at surface level within the same field and the field to the East of Deep Dale Lane. This material was observed within fly tipped waste but not within the shallow soils.

4.8 Gas monitoring completed in the west field classified the site as an NHBC Green Light site, with no significantly elevated ground gas monitored.

4.9 Each Phase 2 Report states that the Lacustrine Deposits were not considered a suitable founding material, with a ground improvement or stabilisation solution recommended.

4.10 Concrete classification across the wider areas has been classified as Design Sulphate Class DS-1 and ACEC Class AC-1s.

Minerals Assessment

4.11 This report covered the area of land beneath the new proposed junction with the A50 and road way providing access to the neighbouring Infinity Park development.

4.12 The report aimed to assess whether the anticipated sand and gravel deposits beneath the site would be considered a minable mineral resource. Following a review of available published and BWB's own data it was considered that any sand and gravel deposits present on site was not in significant quantities to be considered an economically viable resource.

5. REGULATORY SETTING

5.1 The Planning Portal for South Derbyshire Council was reviewed on 26th April 2019. Numerous planning applications were viewed that have been historically made immediately surrounding the site, which included;

- Ref: 9/2017/1391, Stenson Marina for the demolition of a building and development of an office, lounge, shower facility, store and installation of a deck and cesspool; and
- 9/2016/0849, Harrys Farm, Stenson for the erection of a new poultry house;

5.2 Both applications were granted, however the permission for the Marina development included conditions in relation to verification of gas protection measures and soakaway drainage design.

Permits Consents and Authorisations

5.3 A full listing of permits, consents and authorisations including discharge consents, pollution incidences and other environmental information included in the Groundsure® Report, is presented in **Appendix 3.**

5.4 The following pertinent features have been identified which have the potential to have a detrimental impact on site.

- There are seven entries of pollution incidents located on site. These relate to pollutants from cars, specific, construction & commercial wastes, vegetable cuttings and other wastes. All entries listed a minor impact to land; and
- Several industrial actives are listed as present on site, these relate to electrical features and tanks.

Landfilling and Waste Management

5.5 A full listing of EA, BGS and Local Authority recorded landfills are provided in the Groundsure® Report presented in **Appendix 3.**

5.6 The following facilities have been identified which have the potential to have a detrimental impact on site.

- 160m northeast of the site: Sinfin Moor Park for inert, industrial and household waste. This entry is dated 14th July 1977 and last recorded in March 1982.
- 260m south of the site: Stenson Road for inert industrial wastes. This entry is dated 20th July 1977 and last recorded in December 1985

5.7 It is possible that ground gas emanating from the landfill could migrate towards the site, however, ground gas monitoring conducted at the site has not identified elevated gas concentrations.

6. GEOTECHNICAL APPRAISAL

6.1 The Groundsure Report, site history, current site setting and geology setting have all been considered in order to provide an indication of the potential ground related constraints and opportunities in the context of the proposed development as set out in **Table 6:1** below.

Table 6:1: Ground Related Constraints & Opportunities

POTENTIAL CONSTRAINT / OPPORTUNITY	EXPLANATION	POTENTIAL MITIGATION OPTIONS
Topsoil	Topsoil is likely to be encountered across the site.	The development is likely to incorporate open landscaped areas and gardens. Testing of the existing topsoil materials will be required to ensure it's safe for reuse. Any surplus topsoil may be sold as a commodity should it be chemically suitable.
Preliminary Foundation Solution	The proposed development is anticipated to be a residential dominated scheme with public open spaces, highways, primary school and light industrial units.	Any Made Ground present on site is likely to be highly variable in nature and is unlikely to be a suitable founding medium. The Lacustrine Deposits may be compressible, therefore foundations should be locally deepened through this stratum. Shallow spread foundations may be suitable across the site where component strata is recorded within 3.0m of ground level. If the above is not economically viable then ground improvement or a piled foundation solution transferring loads into the underlying mudstone bedrocks may be utilised. Similarly, depending on the performance requirements of the floor slabs, lightly loaded ground bearing floor slabs maybe acceptable. However where higher loads are required then ground improvement or a suspended solution may need to be considered.
Buried Obstructions	Obstructions are likely to be limited to beneath existing buildings.	All relic underground structures should be removed

		with the subsequent voids filled with engineered fill.
Trees	Mature trees are located sporadically within the hedgerows.	Mature trees are likely to remain in-situ, therefore foundations should be design with their presence in mind. The cohesive soils are indicated to have a very low to low shrink-swell potential, the volume change potential of the material should be assessed and shrink/ heave precautions adopted where necessary.
Drainage and Soakaways	Given the predominately cohesive nature of the soils underlying the site, in addition, the water table has been identified at shallow depths on surrounding plots. Therefore, soakaway drainage is unlikely to be suitable.	None.
Enabling Works	Overhead electrical cables and underground gas mains are present on site.	Discussions with the service stakeholders will be required to discuss any works required to re-direct or to develop around any services present.
Ground Hazards	The risk associated with Shrink-well, landslides, dissolution features, collapsible ground and running sands are all indicated to be negligible to low risk. Compressible ground is indicated to be a moderate risk.	A moderate hazard rating has been indicated in relation to compressible deposits. This alludes to a significant potential for compressibility problems probably associated with soft lacustrine deposits, and has implications for the bearing capacity of soils underlying the site. BWB's previous investigations have confirmed the soft nature of these deposits and their likeliness to collapse when excavated.
UXO	Information provided to BWB have indicated that the site is a high risk for the presence of UXO's. Therefore a third party Detailed UXO Report has been commissioned and will be reported under a separate cover.	Any additional mitigation measures to be confirmed by the appointed third party.

7. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Introduction

7.1 The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.

7.2 The following sections discuss all the identified potential on and off site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors such as human health and/or controlled waters from the data gained from the desk study. At this stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.

7.3 Three impact potentials exist for any given site; these are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

7.4 All three impacts need to be considered in a risk assessment.

7.5 A Source, Pathway, Receptor analysis has been undertaken for the site based on the information provided in the preceding sections. This is presented as **Table 7:1** and further information about the risk classification scheme is included within **Appendix 4.**

7.6 **Sources (S);** These are potential or known sources of contamination that may relate to a former land use or present site feature or process (e.g. fuel storage tanks).

7.7 **Pathways (P);** A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development.

7.8 **Receptors (R);** Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

Table 7:1: Preliminary Conceptual Site Model

SOURCE	PATHWAY	RECEPTOR	CON	PROB	RISK	MITIGATION/INVESTIGATION
S1: On site: localised contamination – Contamination associated with localised Made Ground and farming, most notably agrochemicals and fuel storage areas. Potentially infilled ground (near roads and ponds).	**P1:** Direct contact, incidental ingestion and inhalation of particulates.	**R1**: Construction/services personnel	Md	Lw	M/L	A ground investigation is recommended in order to assess current concentrations of organic and inorganic contaminants within soils and groundwater at the site that are likely to impact construction workers and future site users via ingestion, direct contact, and inhalation pathways. If present, it is likely that these contaminant linkages will be easily severed through remediation/mitigation measures such as the provision of a hardstanding surface layer, capping layers in areas of soft landscaping, ground gas/vapour protection measures and PPE.
		R2: Future site users (Residents)	Md	Ul	L	
	P2: Vertical migration of contaminants in the soil leachate following by lateral migration of contaminated groundwater.	**R3:** Underlying Secondary Aquifers	Mi	Lw	L	
		R4: Surface water features	Mi	Lw	L	
	P3: Direct contact.	**R5:** Water utility pipes	Mi	Lw	L	Organic compounds in the shallow soils could taint the water supply. A ground investigation and subsequent laboratory analysis should be undertaken to inform the design of new services. The Local Water Authority should be provided with a copy of this Report and any subsequent risk assessment relating to potable water supply pipes for their review and comment.
		R6: Buried structures/ foundations.	Mi	Lw	L	Sulphates and low pH in the ground could accelerate the degradation of buried concrete structures (e.g. foundations). Ground investigation should include an assessment of the concrete design class.
	P5: Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation or explosion.	**R1**: Construction/ services personnel	Sv	Ul	M/L	Gas assessments completed across a plot of land immediately north of the site has not identified any significantly elevated ground gases. However, a ground gas assessment in line with guidance detailed in CIRIA 665 and BS8485: 2015 should be undertaken to confirm the gassing regime beneath this site.
		R2: Future site users	Sv	Ul	M/L	

SOURCE	PATHWAY	RECEPTOR	CON	PROB	RISK	MITIGATION/INVESTIGATION
S2: Offsite localised contamination issues within shallow soils – Known heavy metals to the north of site.	**P2:** Vertical migration of contaminants in the soil leachate following by lateral migration of contaminated groundwater.	**R3:** Underlying Secondary Aquifers	Mi	Ul	VL	Elevated concentrations were found to be marginal and in isolated hotspots. BWB consider it unlikely that these hotspots could impact upon this site, however this could be confirmed as part of a detailed ground investigation.
		R4: Surface water features	Mi	Ul	VL	

VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

KEY: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely

Pollutant Linkage Assessment Summary

When considered in the context of the conceptual site model and the historical activities that have taken place, the proposed development is considered to pose a **MODERATE / LOW** risk to human health.

The risk posed to controlled waters is predominantly considered to be **LOW** due to the limited sources of contamination identified.

It is recommended that a ground investigation be undertaken to quantify the identified pollutant linkages and assess likely mitigation measures.

8. ENVIRONMENTAL LIABILITY ASSESSMENT/DEVELOPMENT CONSTRAINTS

Statutory Liability

8.1 The contaminated land regime has implications for those who cause or knowingly permit land to be contaminated, or who own or occupy land that is contaminated.

8.2 Contaminated land is defined in Section 78A(2) of Part IIA of the Environmental Protection Act 1990 as:

'Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under land, that:

a) Significant harm is being caused or there is a significant possibility of such harm being caused; or
b) Significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused.

8.3 Harm is defined in Section 78(4) of the Environmental Protection Act 1990 as:

'Harm to the health of living organisms or other interference with ecological systems of which them form part and, in the case of man, includes harm to property'.

8.4 Once an area of land has been identified as contaminated land, appropriate persons will be identified as being responsible for the cost of cleaning up the land by the enforcing authority. The appropriate person will be liable for all or part of the remediation of the land. Two classes of appropriate person have been identified:

- Class A appropriate persons are those who cause or knowingly permit the pollutants to be in, on or under the land.
- Class B appropriate persons are the owners(s) or occupier(s) of the land.

8.5 Where no Class A appropriate persons can be identified, then Class B appropriate persons may become liable.

8.6 Based on the information available regarding the site, the potential for Statutory Authority action based on 'pollution of controlled waters' or 'significant harm' as defined by Part IIA of the Environmental Protection Act 1990 is considered to be **LOW**.

Third Party Liability

8.7 Based on the information contained in this report, it is the opinion of BWB that the potential for legal action by surrounding landowners, based on the potential for contamination to migrate off-site, is considered to be **LOW**.

Public Relations

8.8 The likelihood of public relations being tarnished due to contamination issues at the site are considered to be **LOW to MODERATE**. This is based upon potential upset of local residents for developing open, green land.

Development Implications

8.9 Several overhead and underground services are known to be present on site, discussions with the stakeholders will be required to confirm if the services could be redirected or the proposed development needs to incorporate these into the final layout.

8.10 Significant quantities of surplus topsoil are likely to be generated as part of this assessment.

8.11 Due to the nature of the development, it is considered likely that a foundation solution will be required, transferring loads to the weathered bedrock below the site. Foundations may require local deepening depending on the thickness of Made Ground or compressible Lacustrine Deposits.

8.12 Consideration will, however, need to be given to the presence of a geological fault running through the western part of the site. The ground conditions in this part of the site will need to be fully understood to assess any potential for differential settlement.

8.13 It is recommended that the requirement for earthworks and potential for re-use of or disposal of waste is established at an early stage in the project.

9. CONCLUSION AND RECOMMENDATIONS

Conclusions

Environmental

9.1 The site is currently undeveloped agricultural land. With the exception of agricultural processes, historical mapping has not identified any additional former industrial processes which have been undertaken at the site.

9.2 Information published by the BGS indicates that the north central and eastern area of the site is underlain by the Lacustrine Deposits (clay), with Head deposits (clay, silt, sand and gravel) mapped across the south-central area. No superficial deposits are mapped across the west and southern area of the site.

9.3 Made Ground is mapped in numerous small areas across the site, typically mapped near roads and the housing development to the north of the site.

9.4 Bedrock geology is mapped to comprise the Gunthorpe Member (Mudstone) across the central and western area of site, the Branscombe Mudstone Formation (mudstone & siltstone) mapped beneath the far east of the site with the Eswalton and Cotgrave Member formations mapped to the south of the site. A fault is located to cut north west to south east across the east of the site.

9.5 It is considered that the agricultural processes undertaken on-site may have given rise to elevated concentrations of contaminants, including hydrocarbon compounds, pesticides and herbicides. Any deposits of Made Ground have the potential to generate elevated concentrations of hazardous ground gasses.

9.6 In addition, the onsite surface water courses are considered to be potential receptors for any on-site derived contamination.

Geotechnical

9.7 Due to the nature of the development and the mapped geology, it is considered likely at this stage, that a foundation solution transferring loads to the more competent weathered bedrock will be required. Stabilisation of the shallow Lacustrine Deposits may also be considered a suitable solution.

9.8 A geological fault is also mapped in the western part of the site.

Recommendations

9.9 On the basis of the above and the proposed development comprising more sensitive residential end use, school and light industrial units, a detailed intrusive investigations should be conducted to confirm the conceptual site model and inform upon geotechnical constraints with regards to foundation design. Specific consideration should be given to the presence of a geological fault located in the western part of the site and the extent and thickness of compressible lacustrine deposits.

10. REFERENCES

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15. Environment Agency 2008, Updated technical background to the CLEA model Science Report – SC050021/SR3

16. Environment Agency 2008, Human health toxicological assessment of contaminants in soil Science Report – SC050021/SR2

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18. Environment Agency 2008, A review of body weight and height data used within the Contaminated Land Exposure Assessment model (CLEA) Project SC050021/ Technical Review 1

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21. NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008.

DRAWINGS

Drawing 1: Site Layout



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

- DENOTES THE SITE BOUNDARY
- DENOTES AREA 1
- DENOTES AREA 2
- DENOTES AREA 3
- DENOTES AREA 4

Rev	Date	Details of issue / revision	Drw.	Rev
P1	29.04.19	FINAL ISSUE	LC	RPD

Issues & Revisions

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Client

HALLAM LAND MANAGEMENT LTD

Project Title

LAND OFF WRAGLEY WAY, SOUTH DERBY GROWTH ZONE

Drawing Title

SITE LAYOUT PLAN

Drawn:	L. Cross		Reviewed:	R. Parker-Dunn	
BWB Ref:	NTH2136	Date:	29.04.19	Scale@A3:	NTS

Drawing Status

FINAL

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
SDGZ-BWB-00-XX-DR-YE-0001_Ph1	P	1

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APPENDICES

Appendix 1: Site Photographs

Project Number: NTH2136
Project Name: Land off Wragely Road, Derby
Photographs



Photo 1—Typical view of the site with overhead power lines in the distance.



Photo 2—Typical access gate found across the site.

Project Number: NTH2136
Project Name: Land off Wragely Road, Derby
Photographs



Photo 3—Arleston Lane—incline to the bridge over the A50.



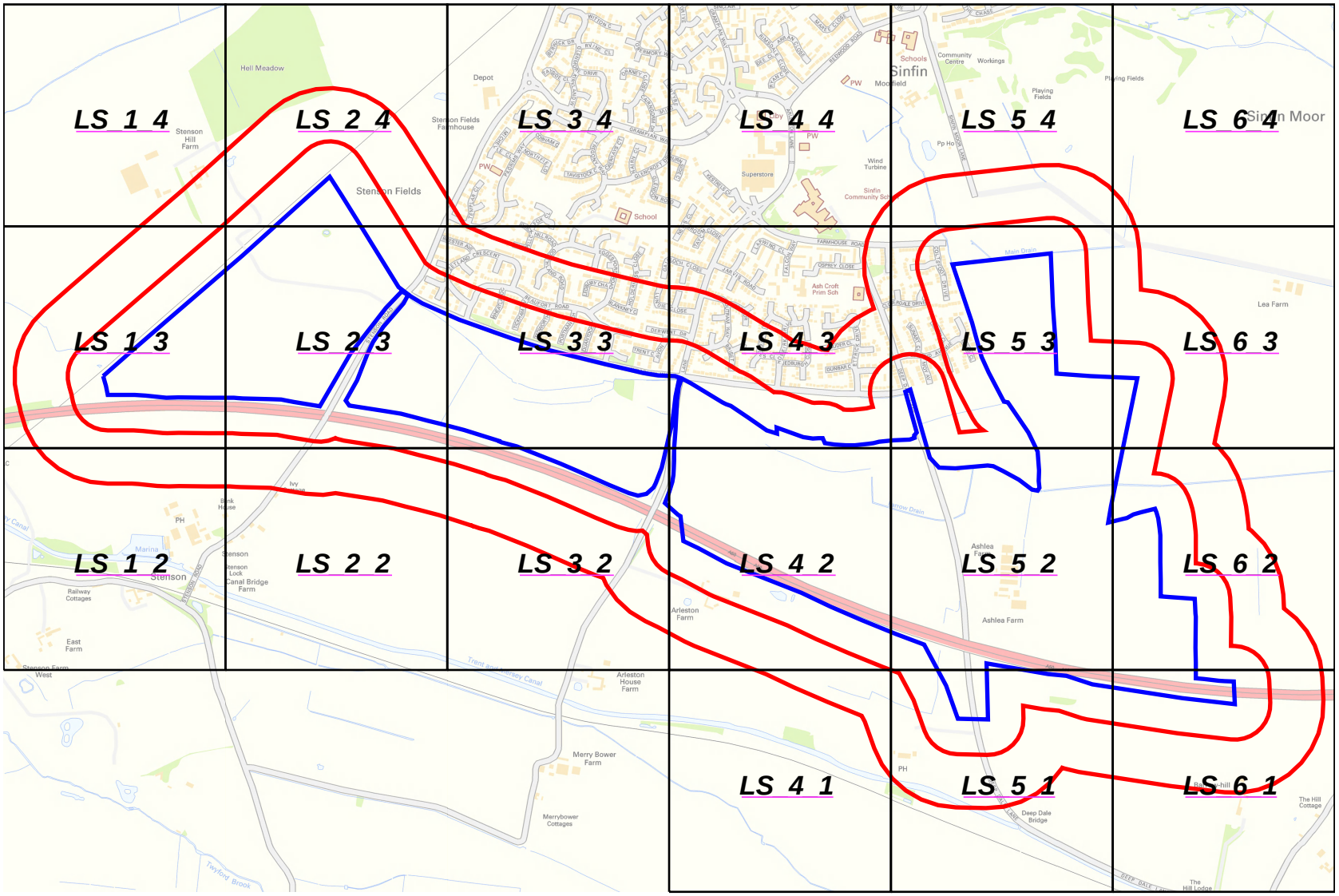
Photo 4—Pond and new housing estate to the northwest of the site.

Project Number: NTH2136
Project Name: Land off Wragely Road, Derby
Photographs



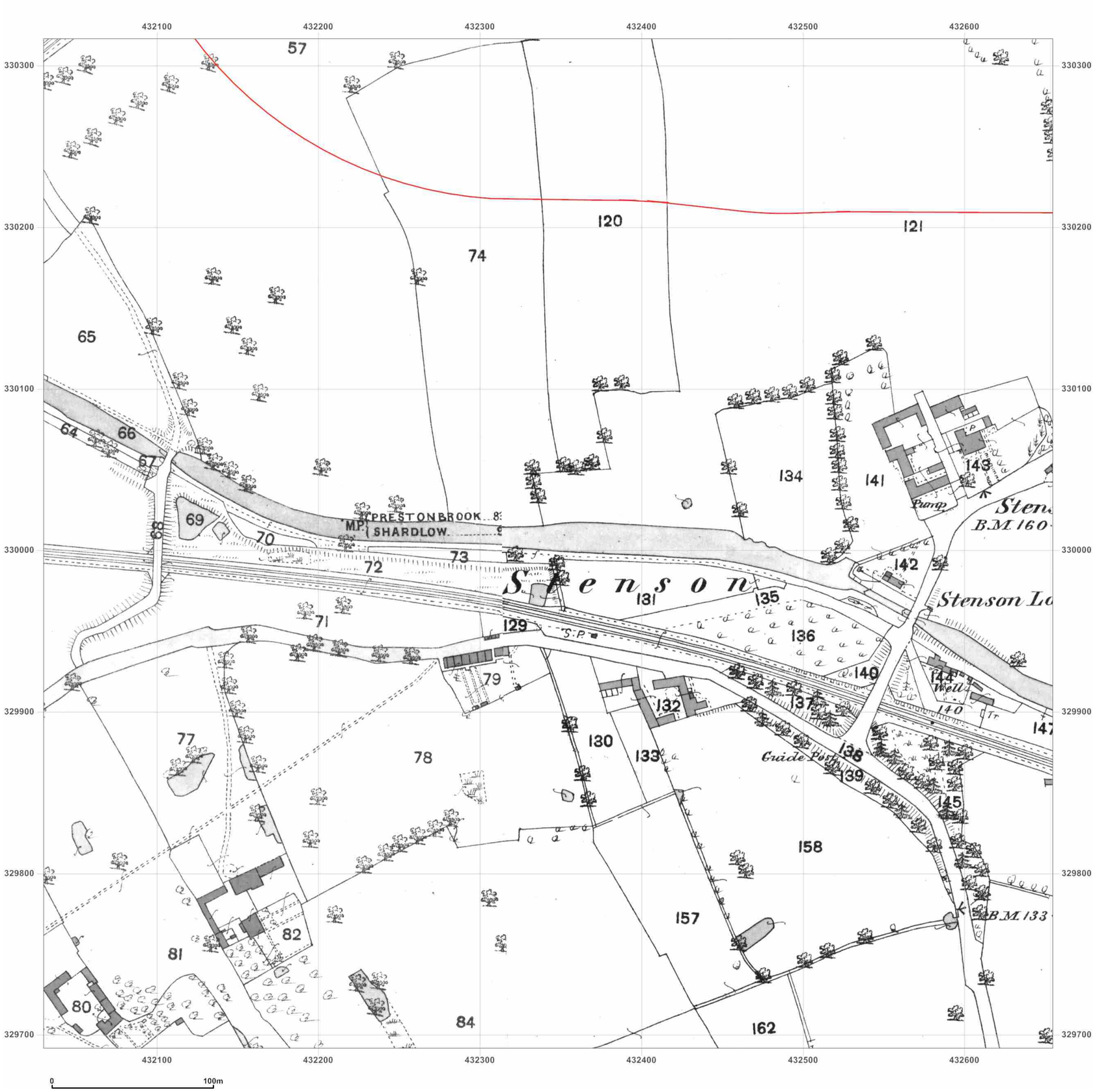
Photo 5—View of A50 bridge from Deep Dale Lane.

Appendix 2: Ordnance Survey Historical Maps



Groundsure INSIGHTS

1:2500 Scale Grid Index



Groundsure INSIGHTS

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Wragley Way, DERBY, DE24 3AP

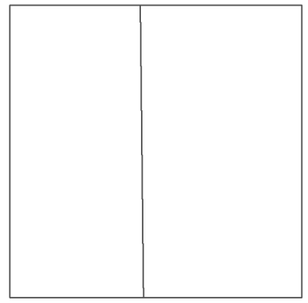
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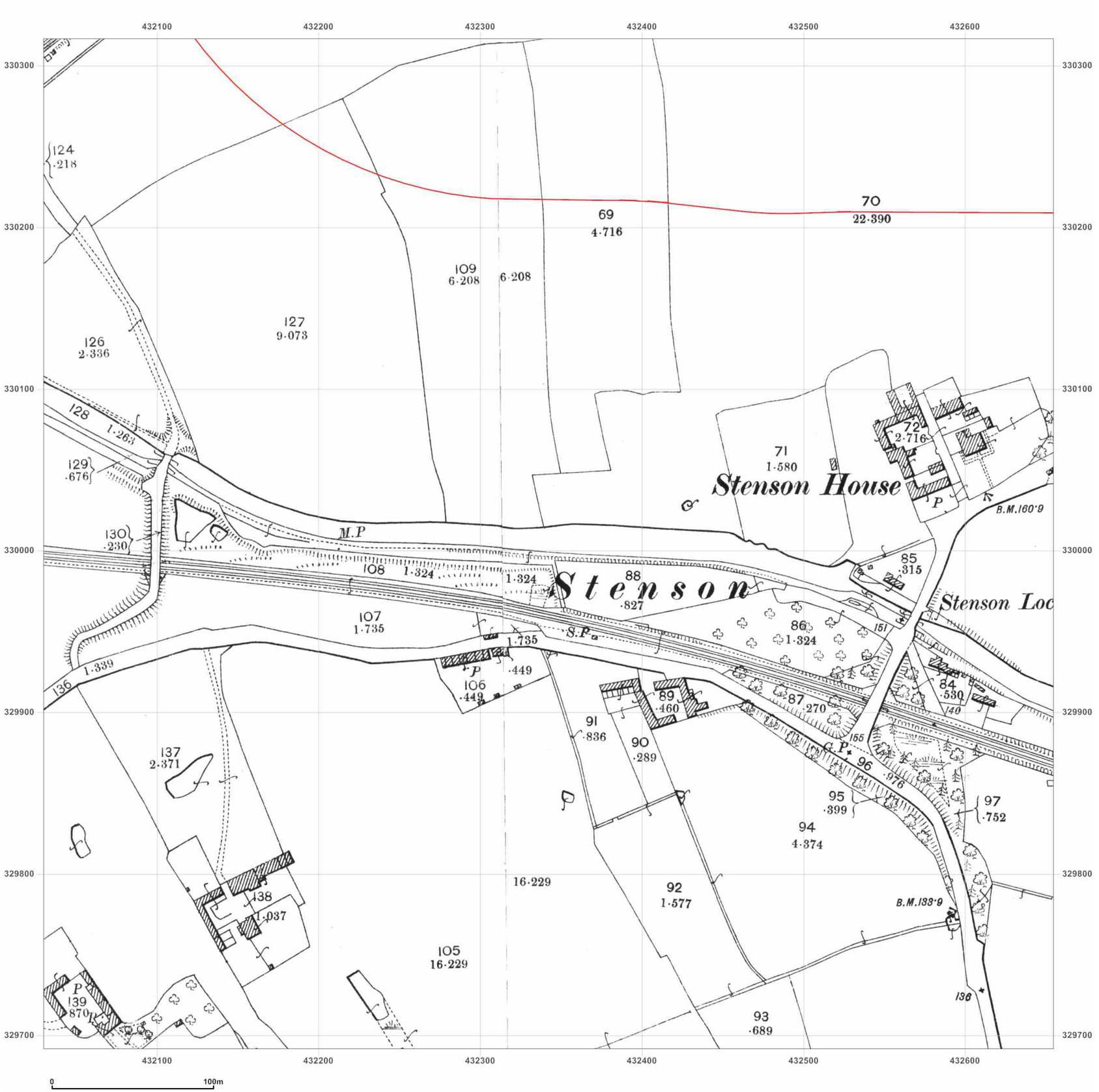
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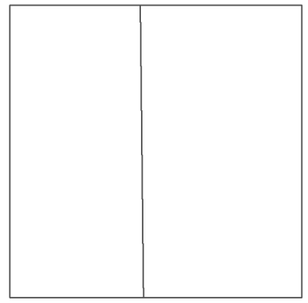
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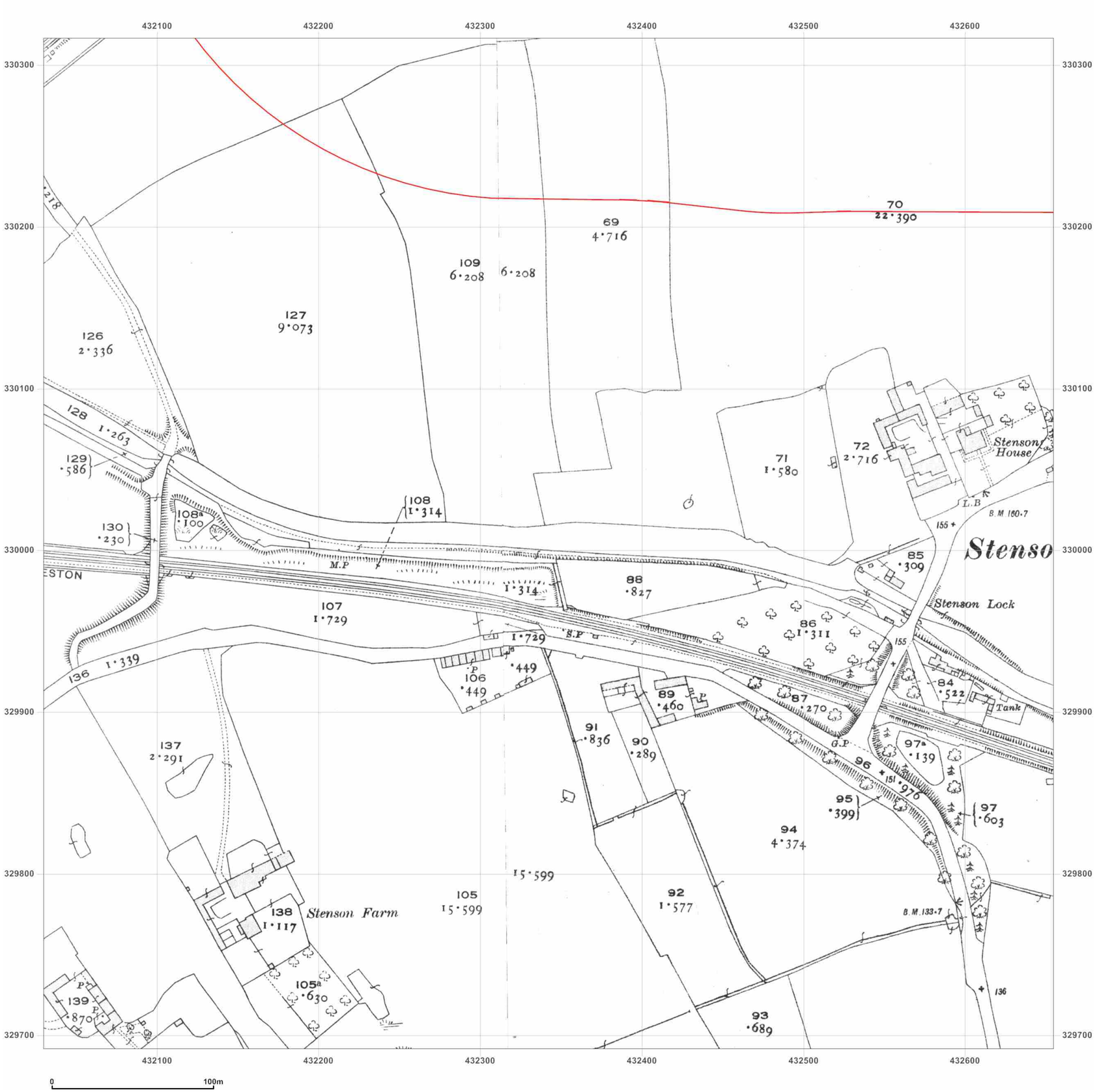
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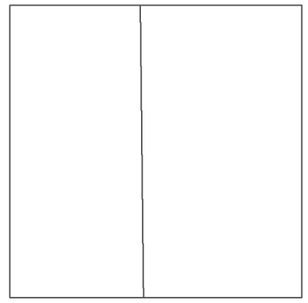
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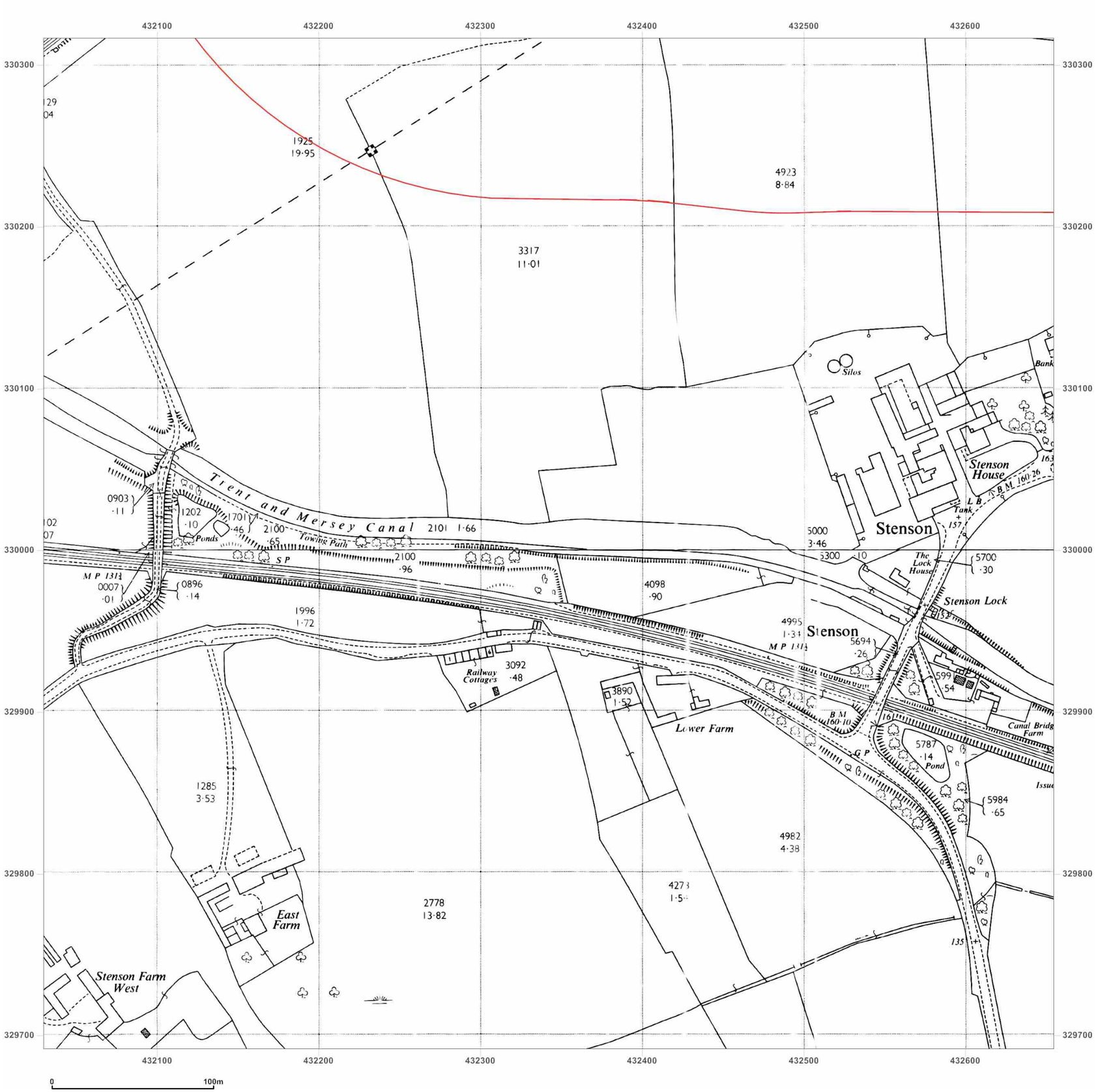
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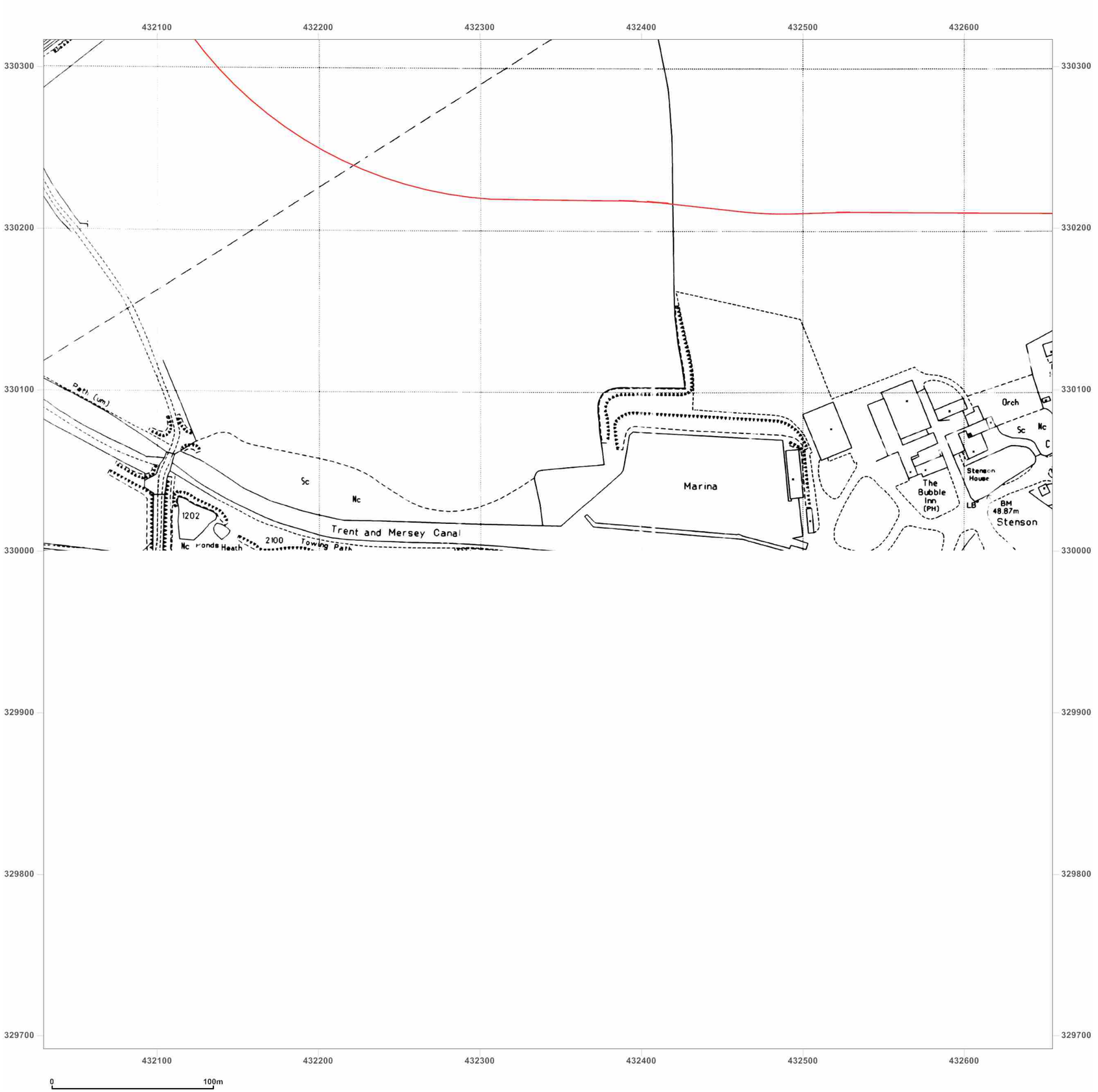
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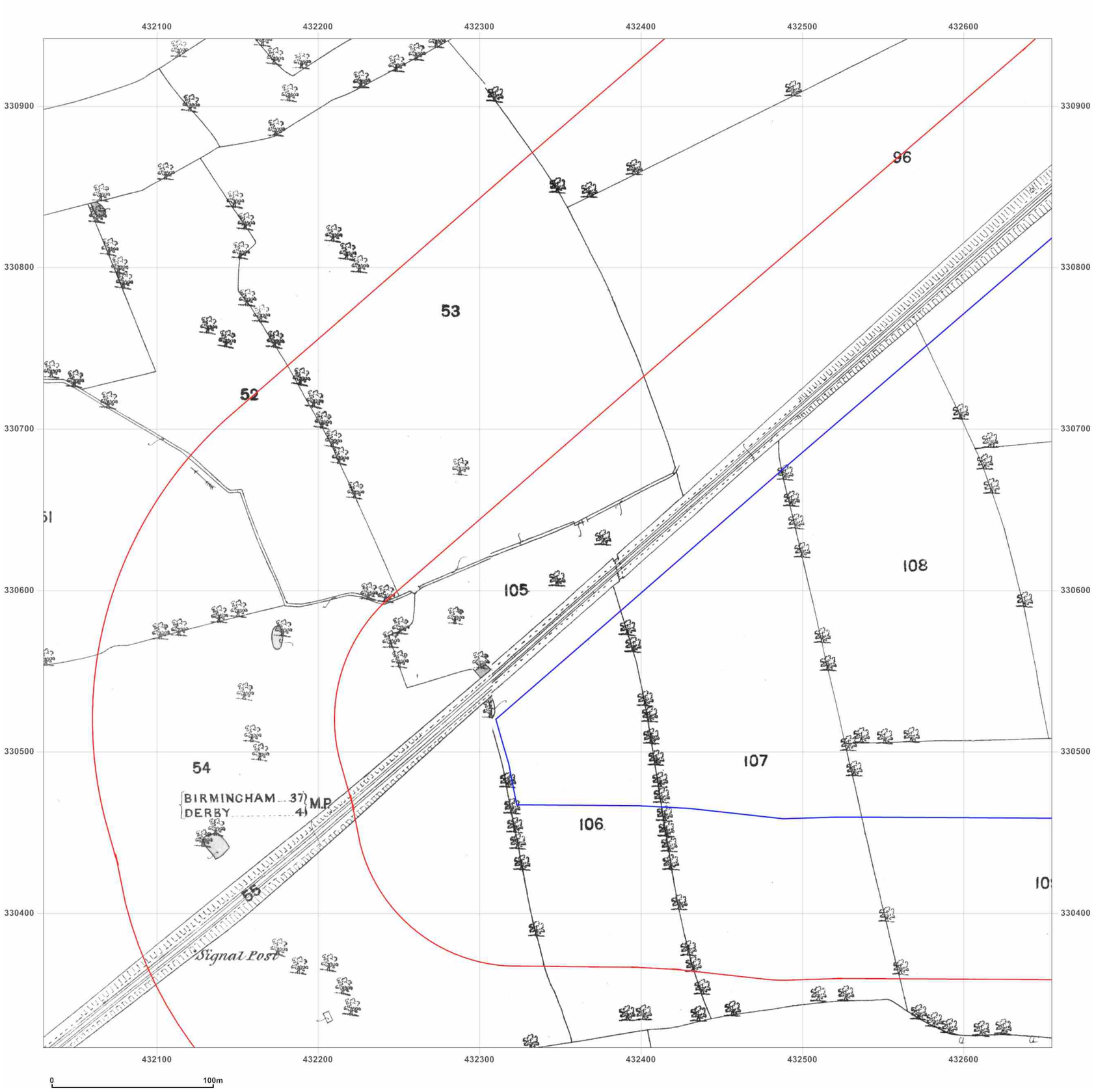
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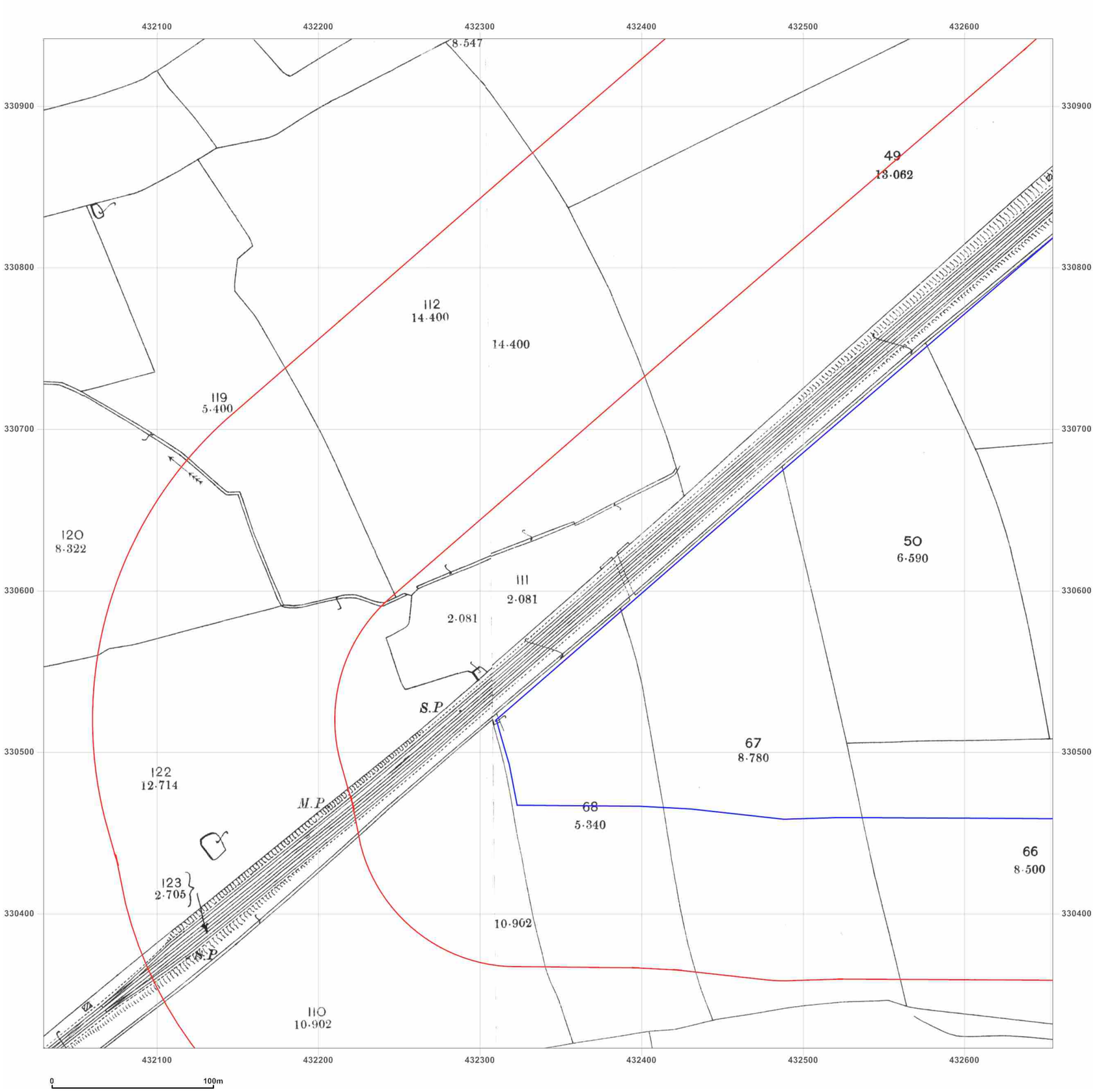
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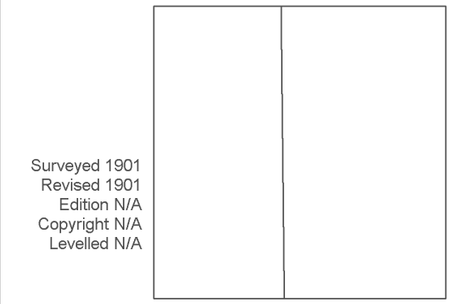
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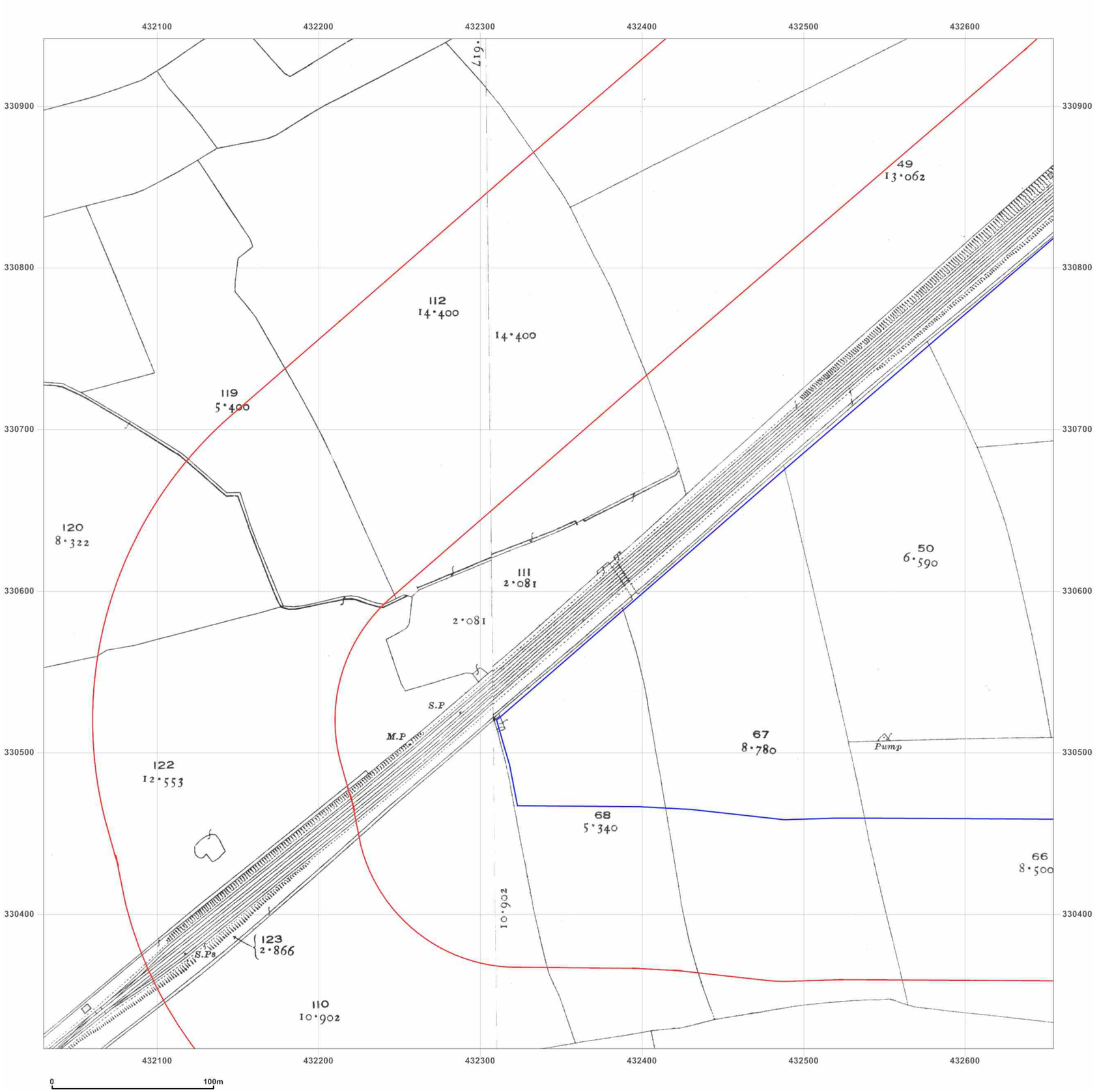
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Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1922
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

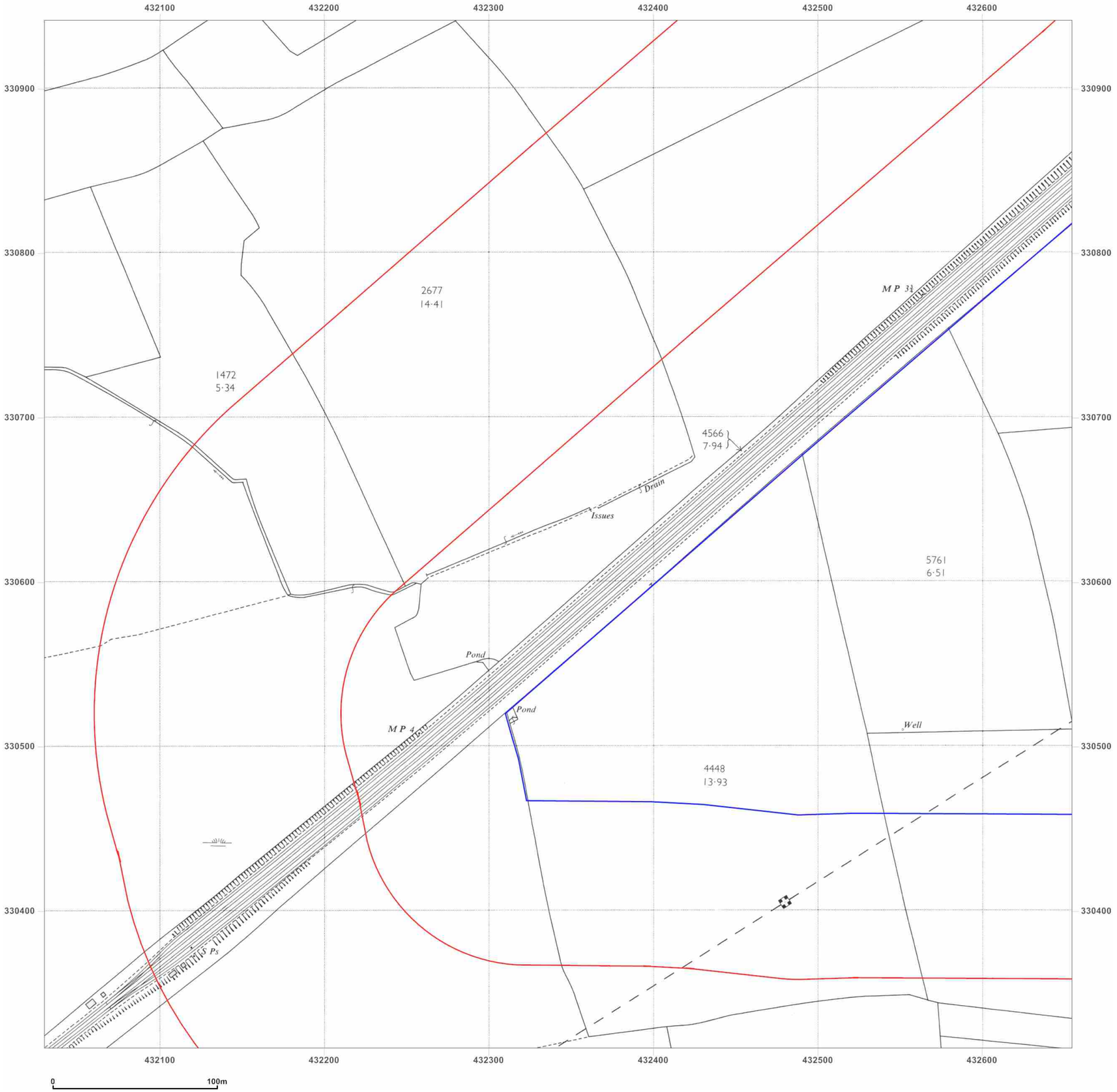
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_3
Grid Ref: 432342, 330629

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

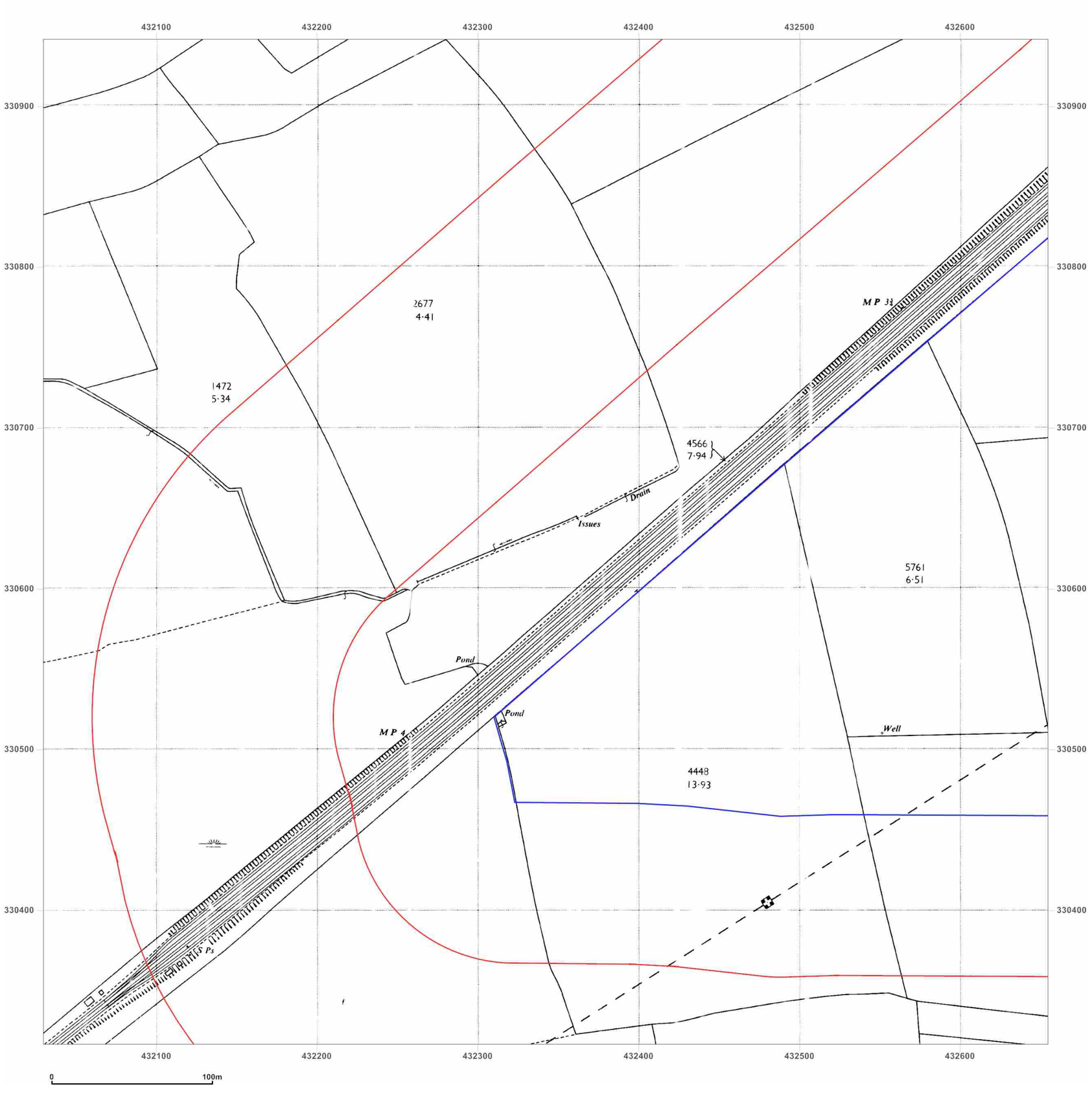
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_3
Grid Ref: 432342, 330629

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

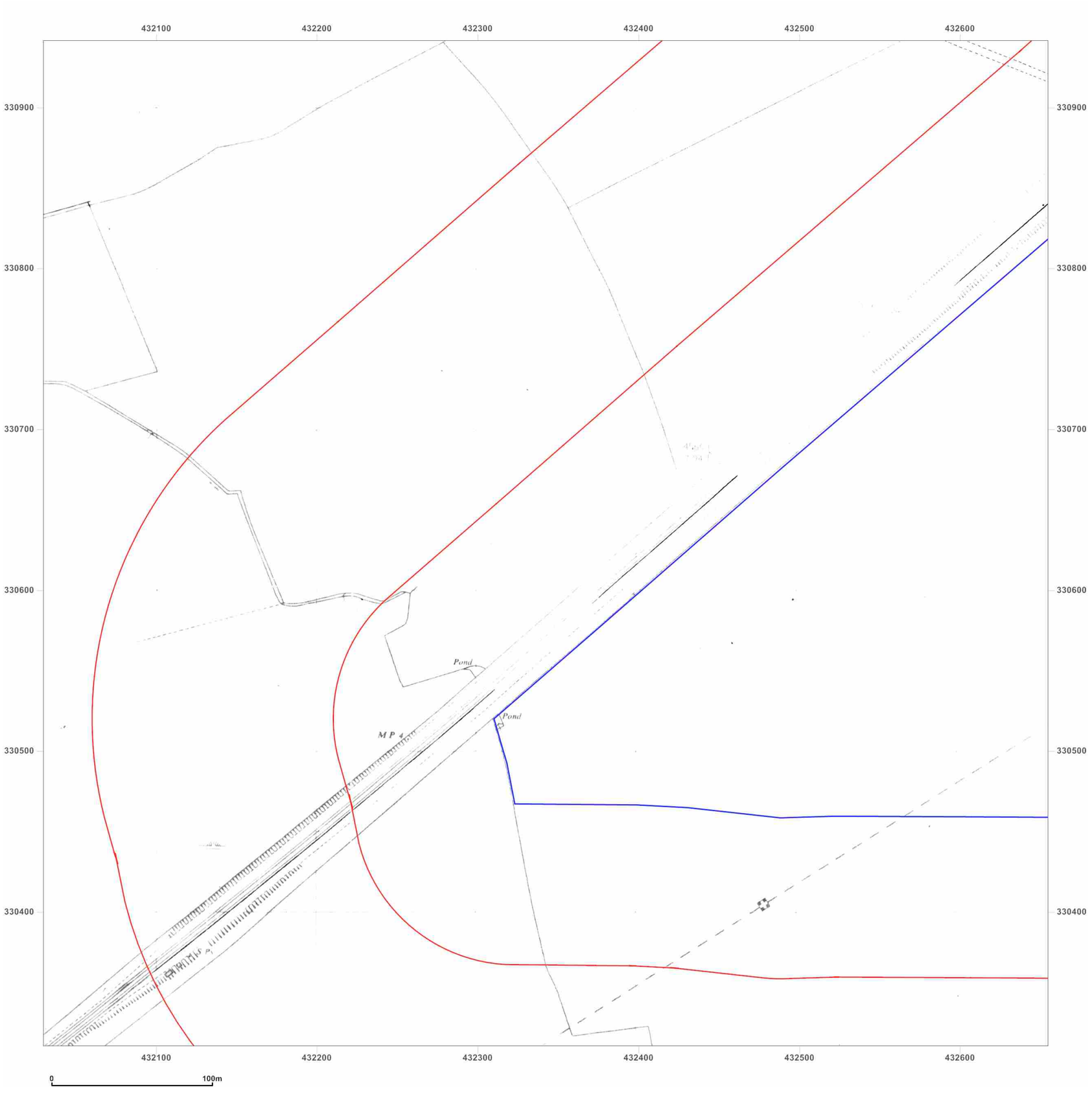
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_3
Grid Ref: 432342, 330629

Map Name: National Grid

Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1990
Edition N/A
Copyright 1990
Levelled 1967

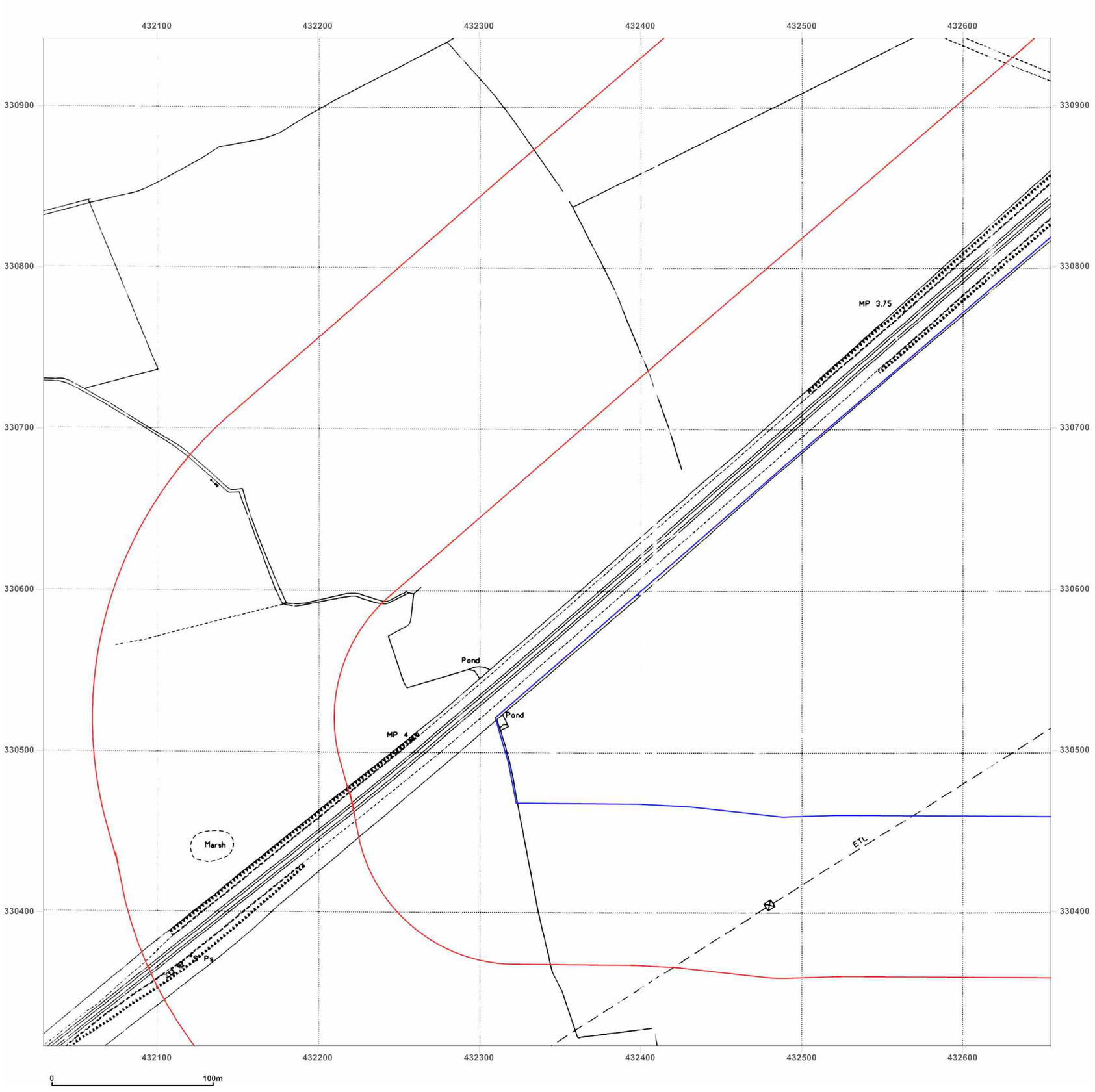
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_3
Grid Ref: 432342, 330629

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

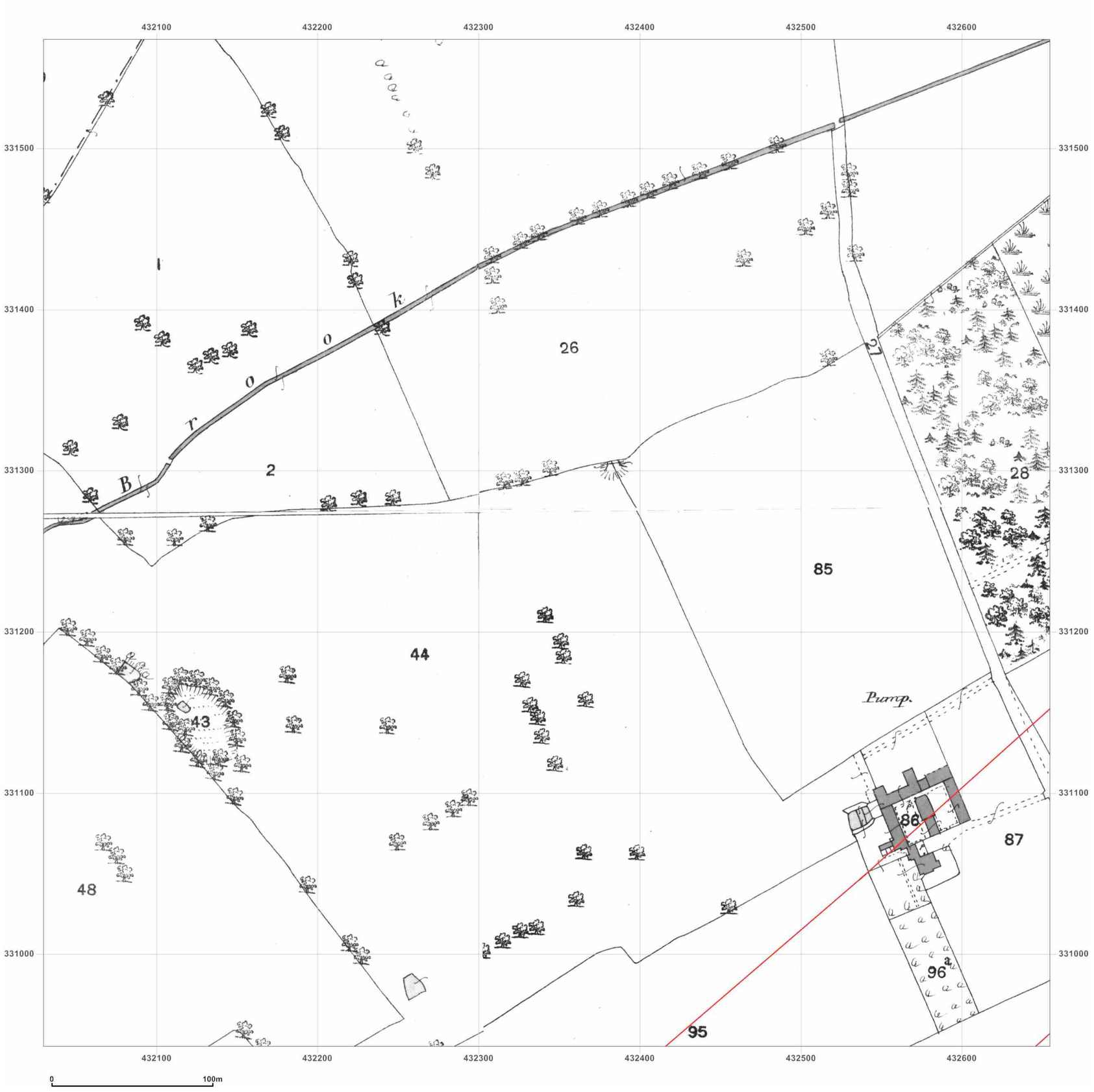
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

Map Name: County Series
Map date: **1881-1883**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

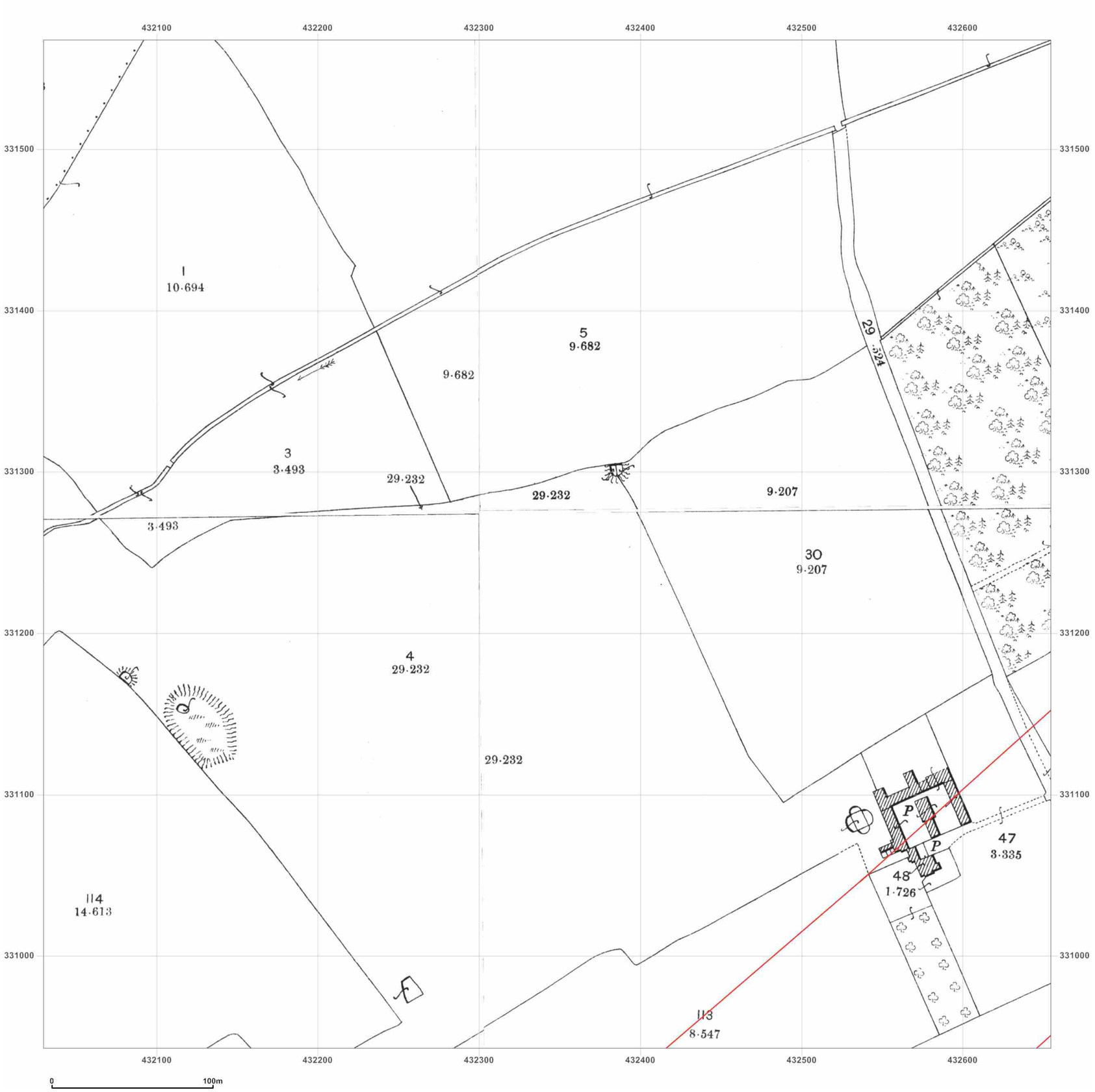
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

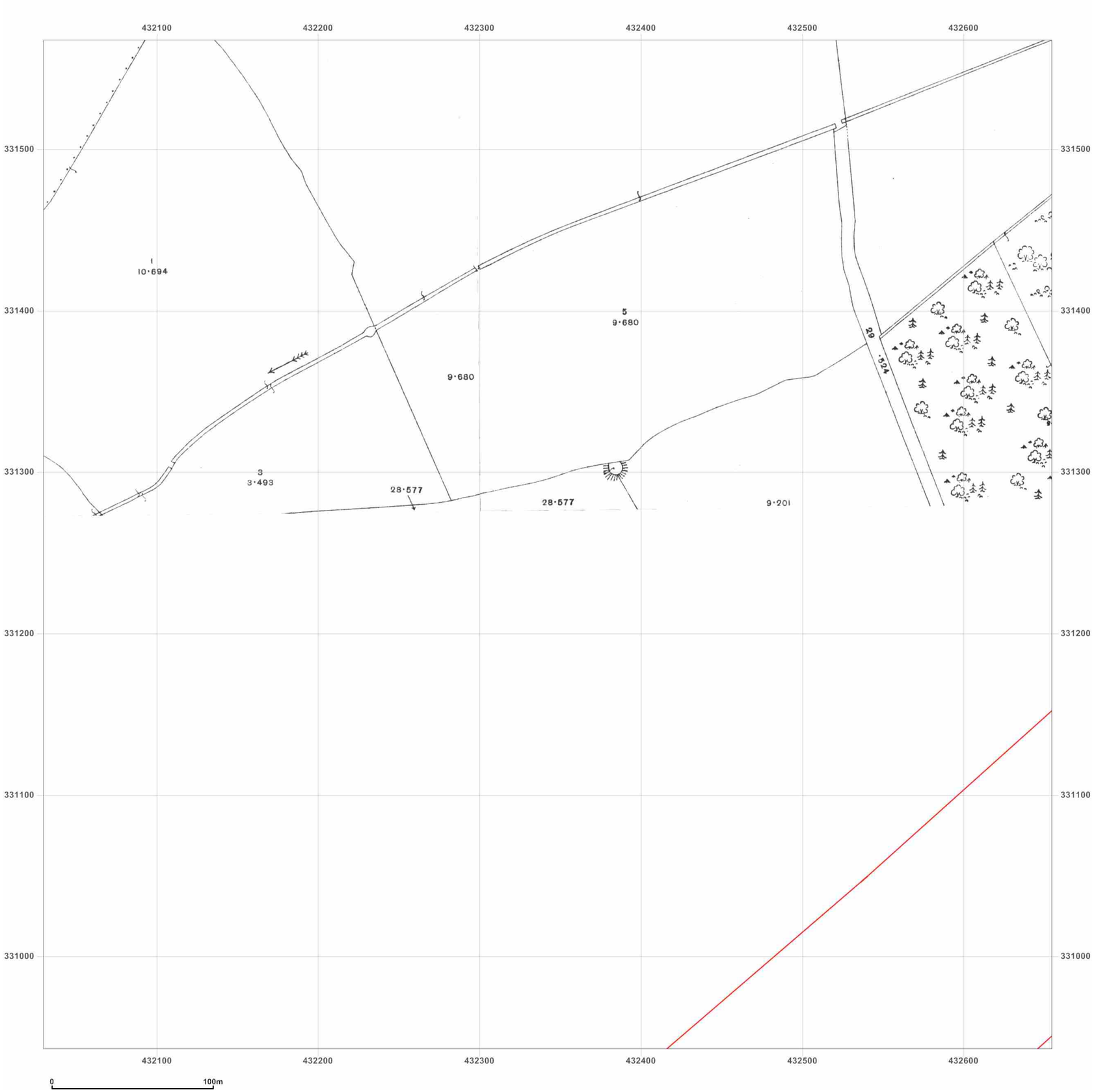
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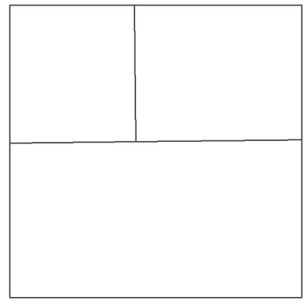
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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

Map Name: County Series
Map date: **1914**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

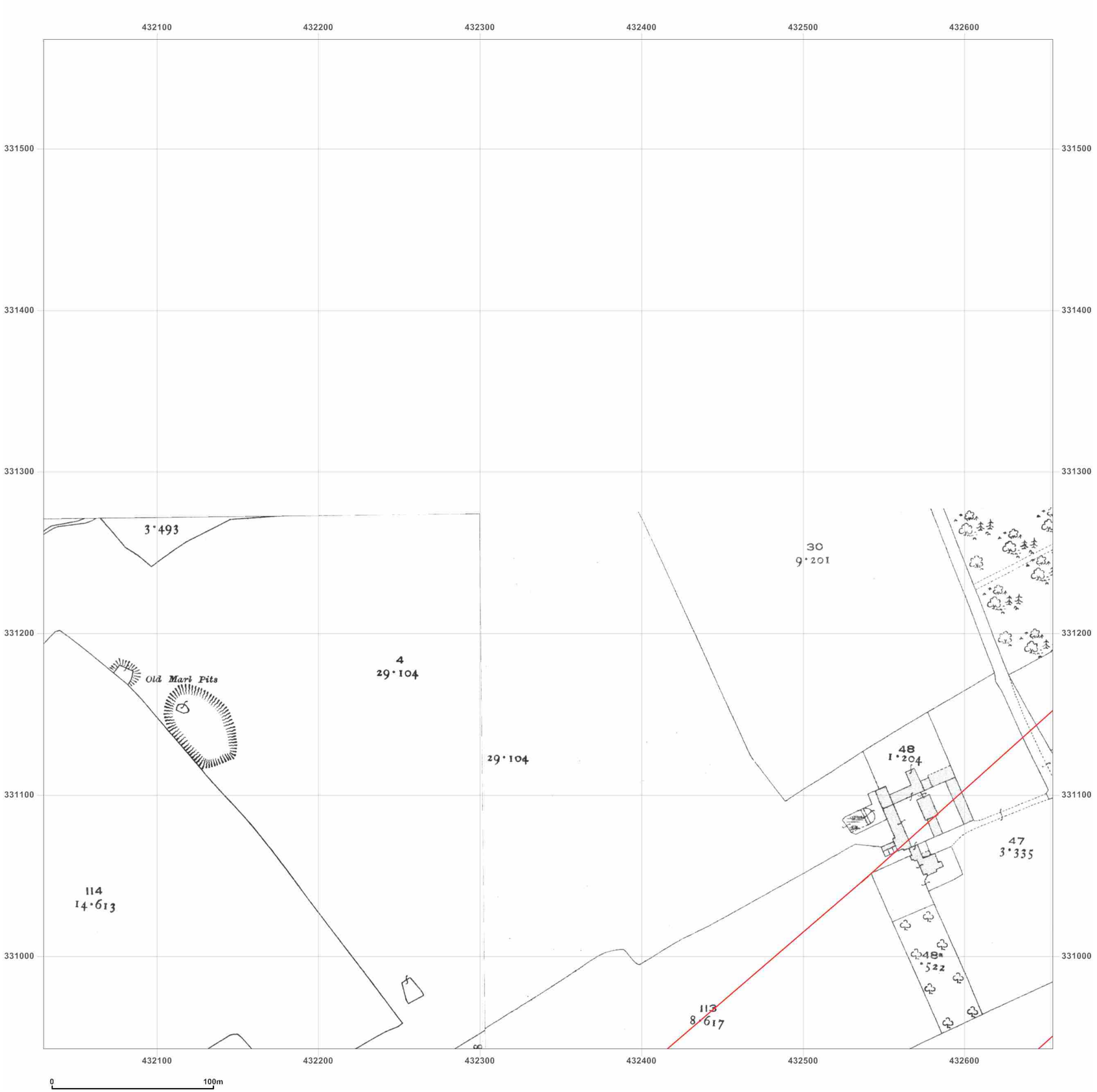
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

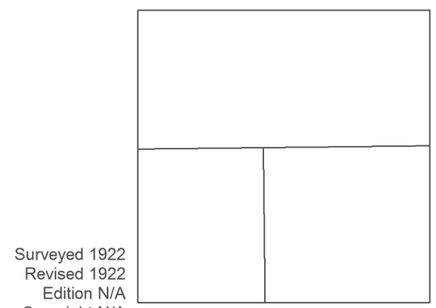
Map Name: County Series

Map date: **1922-1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Surveyed 1922
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

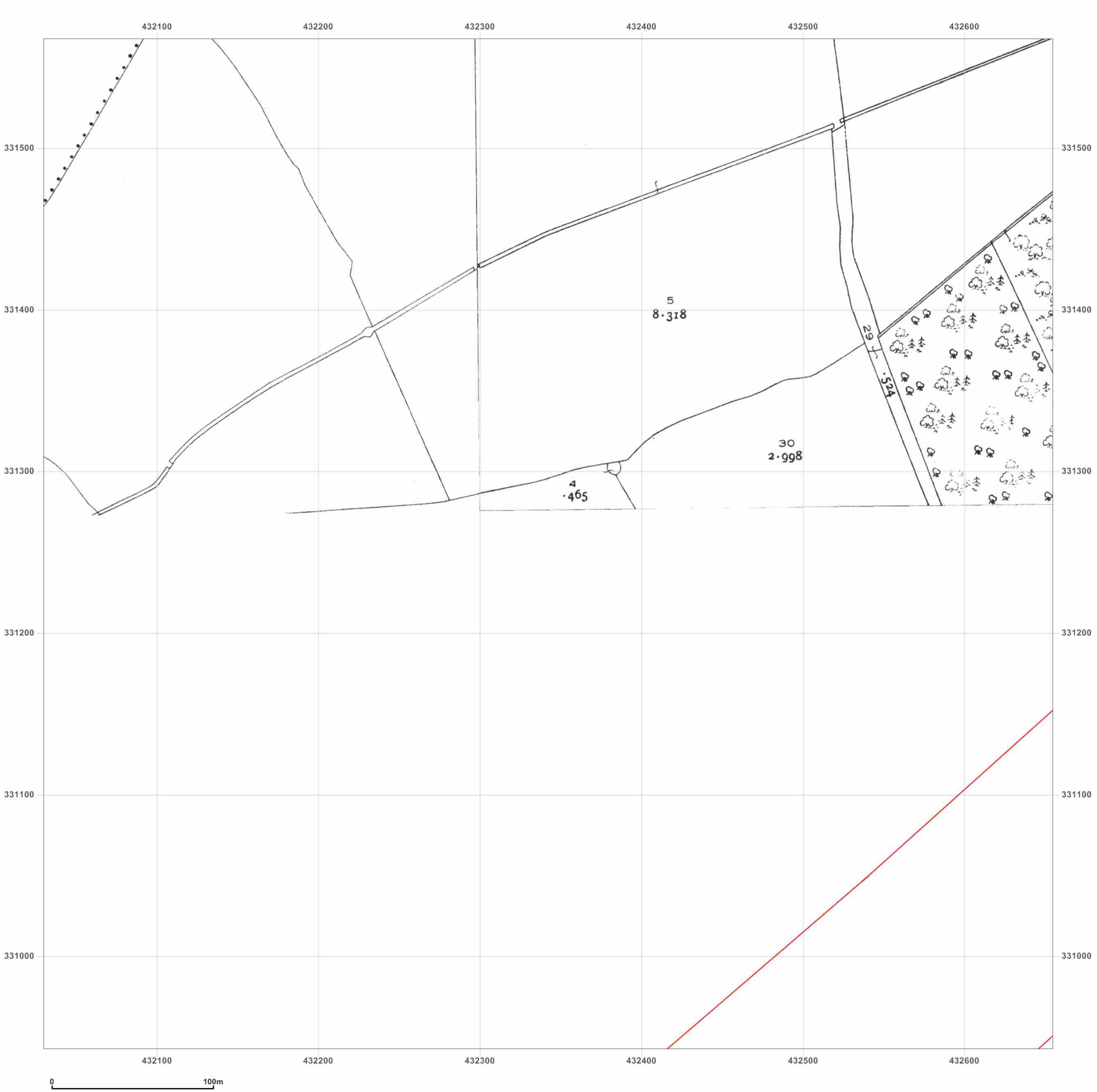
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Site Details:

Wragley Way, DERBY, DE24 3AP

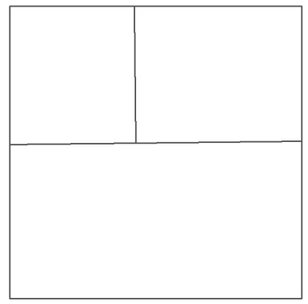
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Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



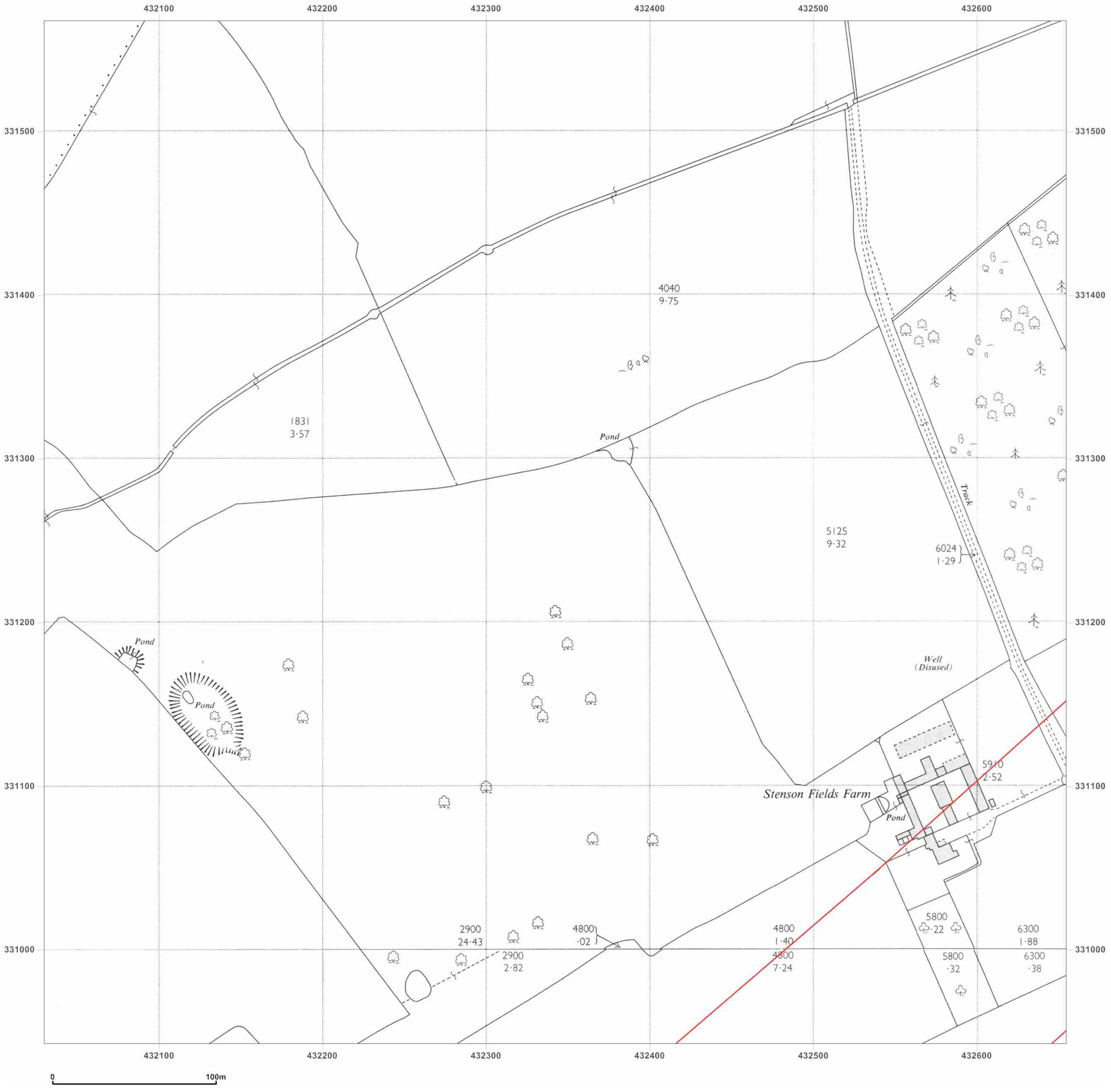
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

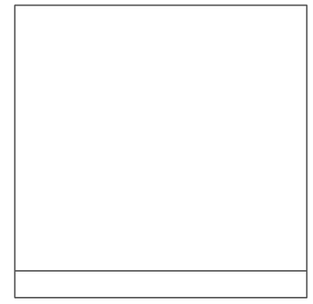
Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

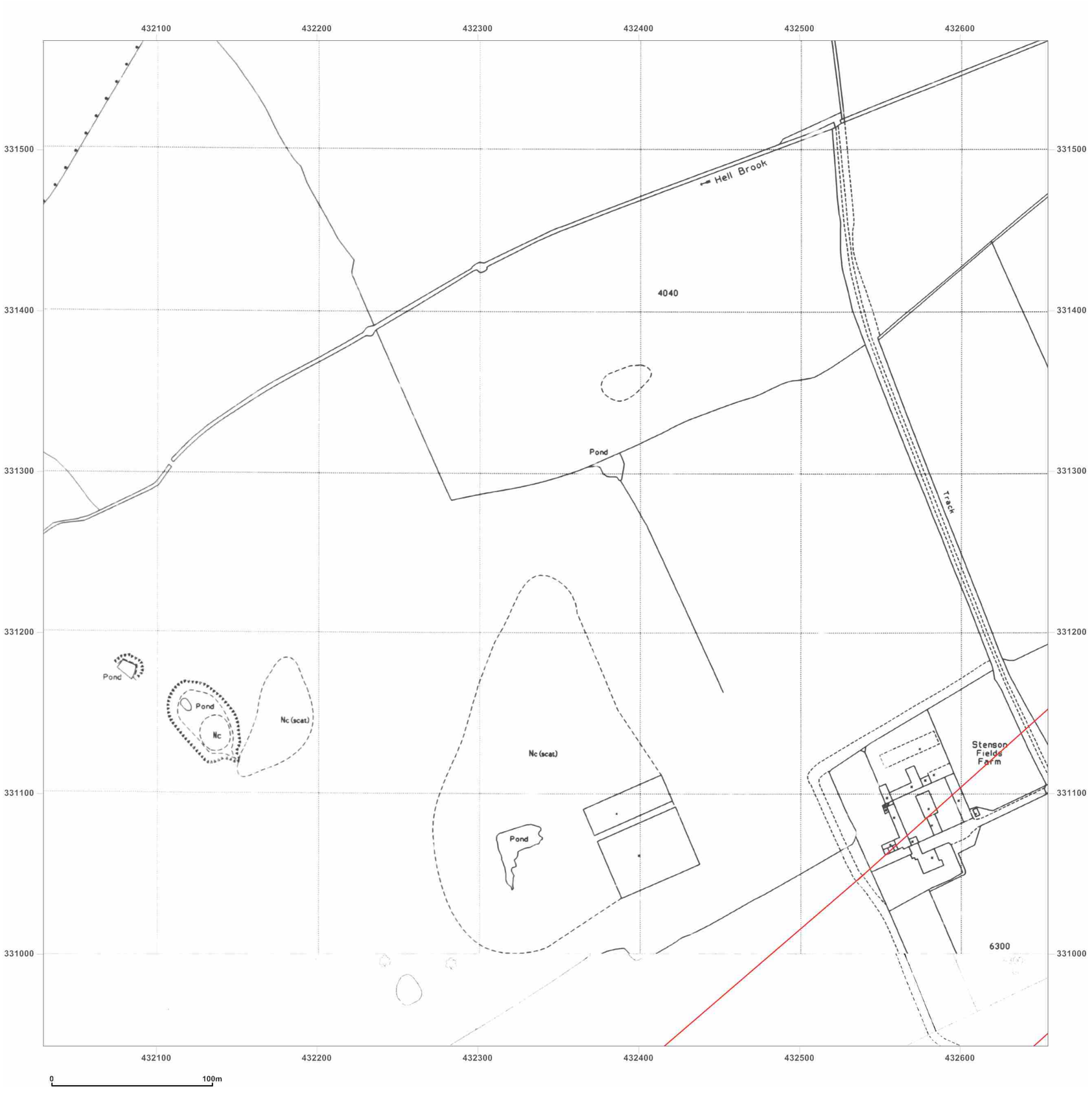
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_1_4
Grid Ref: 432342, 331255

Map Name: National Grid

Map date: **1990-1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed 1967
Revised 1990
Edition N/A
Copyright 1990
Levelled 1967

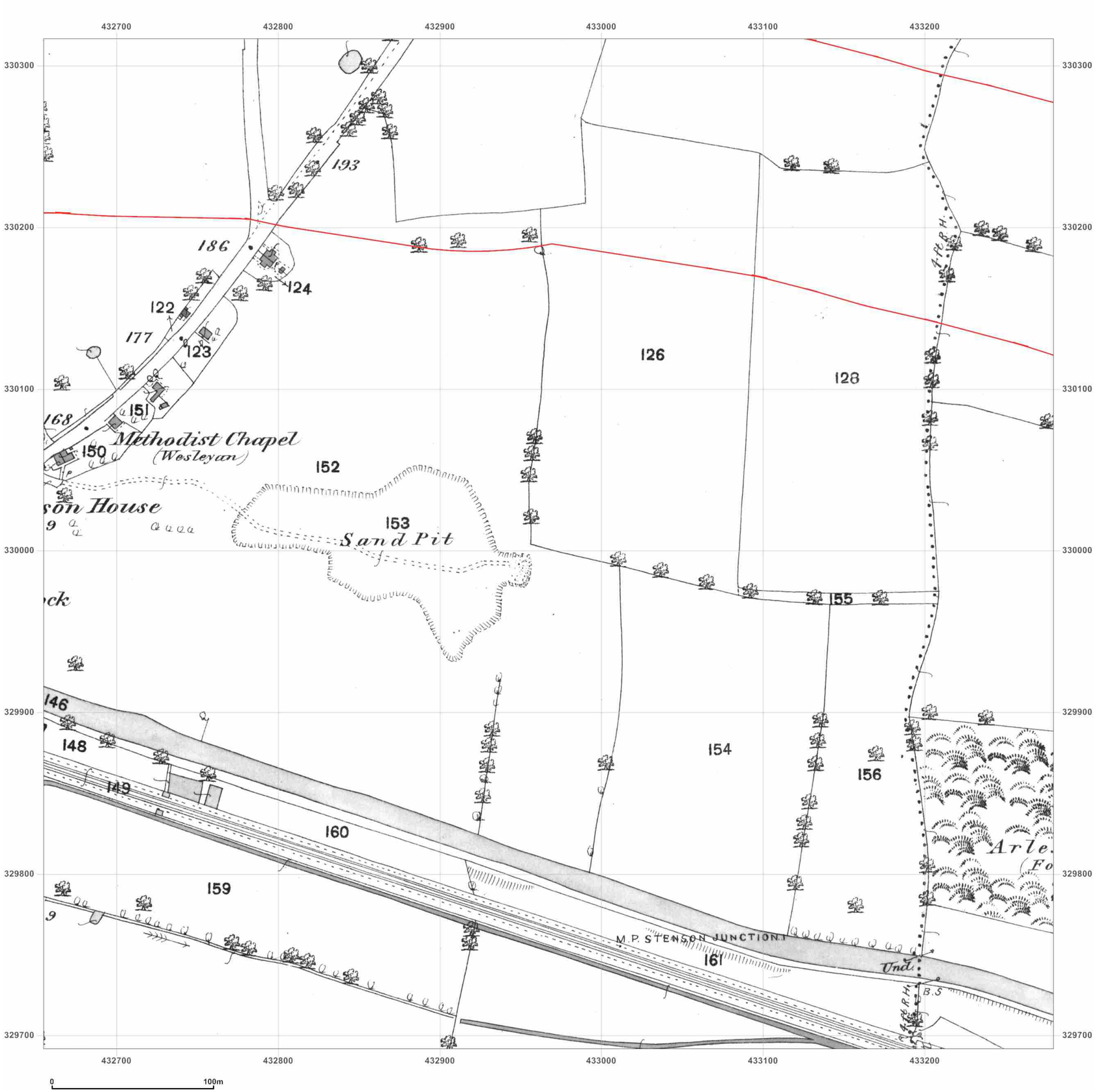
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

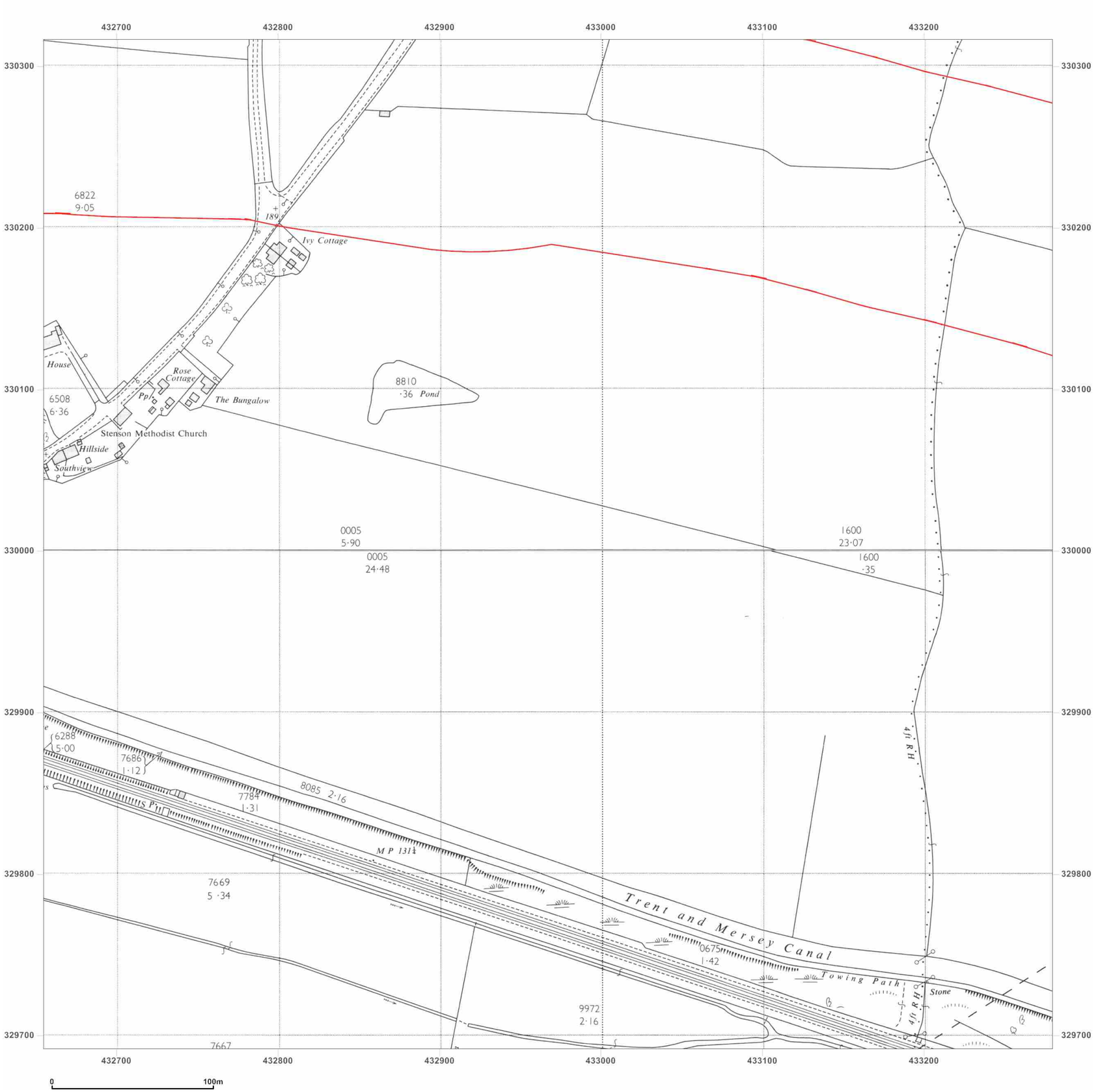
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1969
Levelled 1967

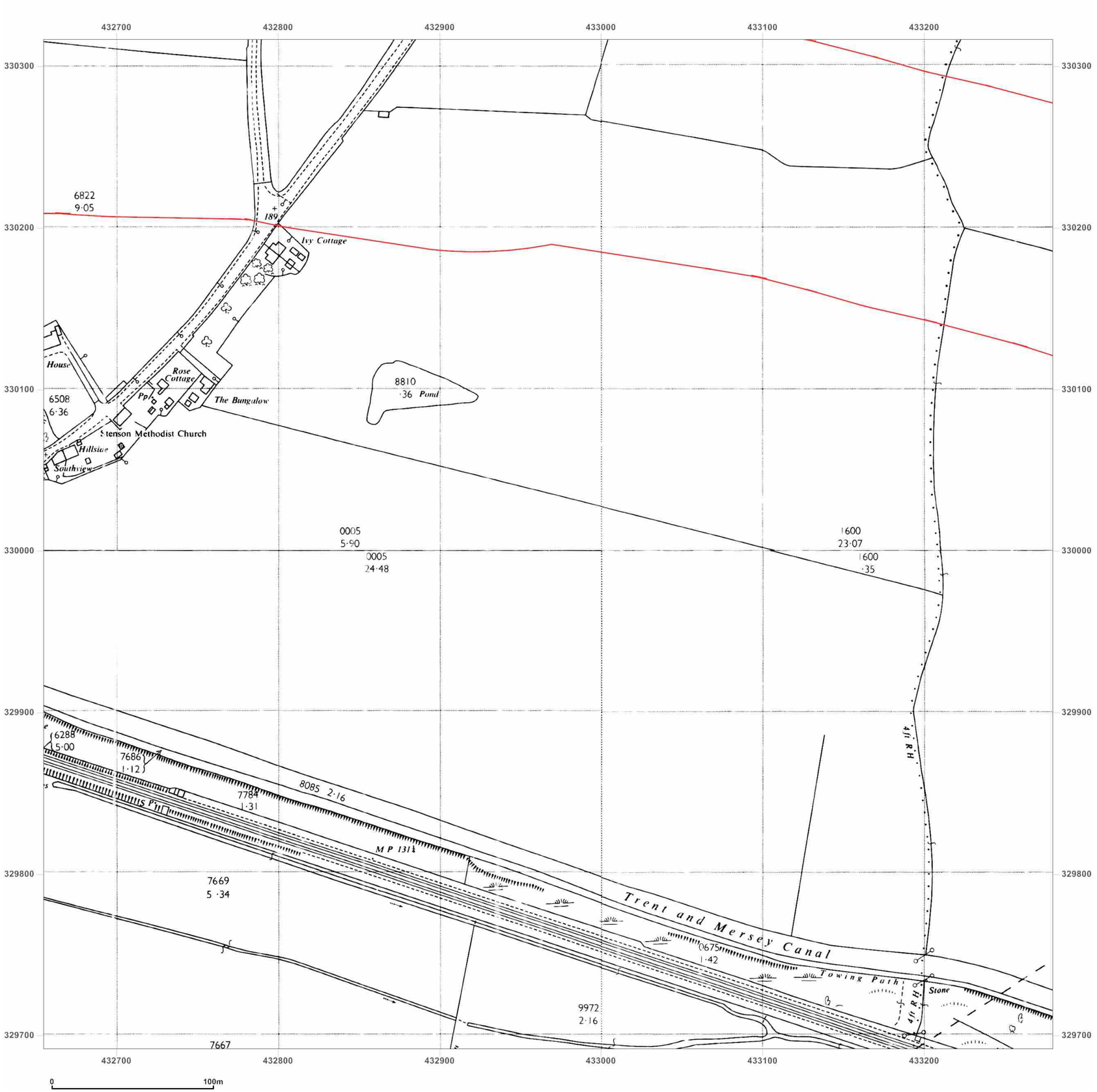
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: National Grid

Map date: **1968-1969**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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

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

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

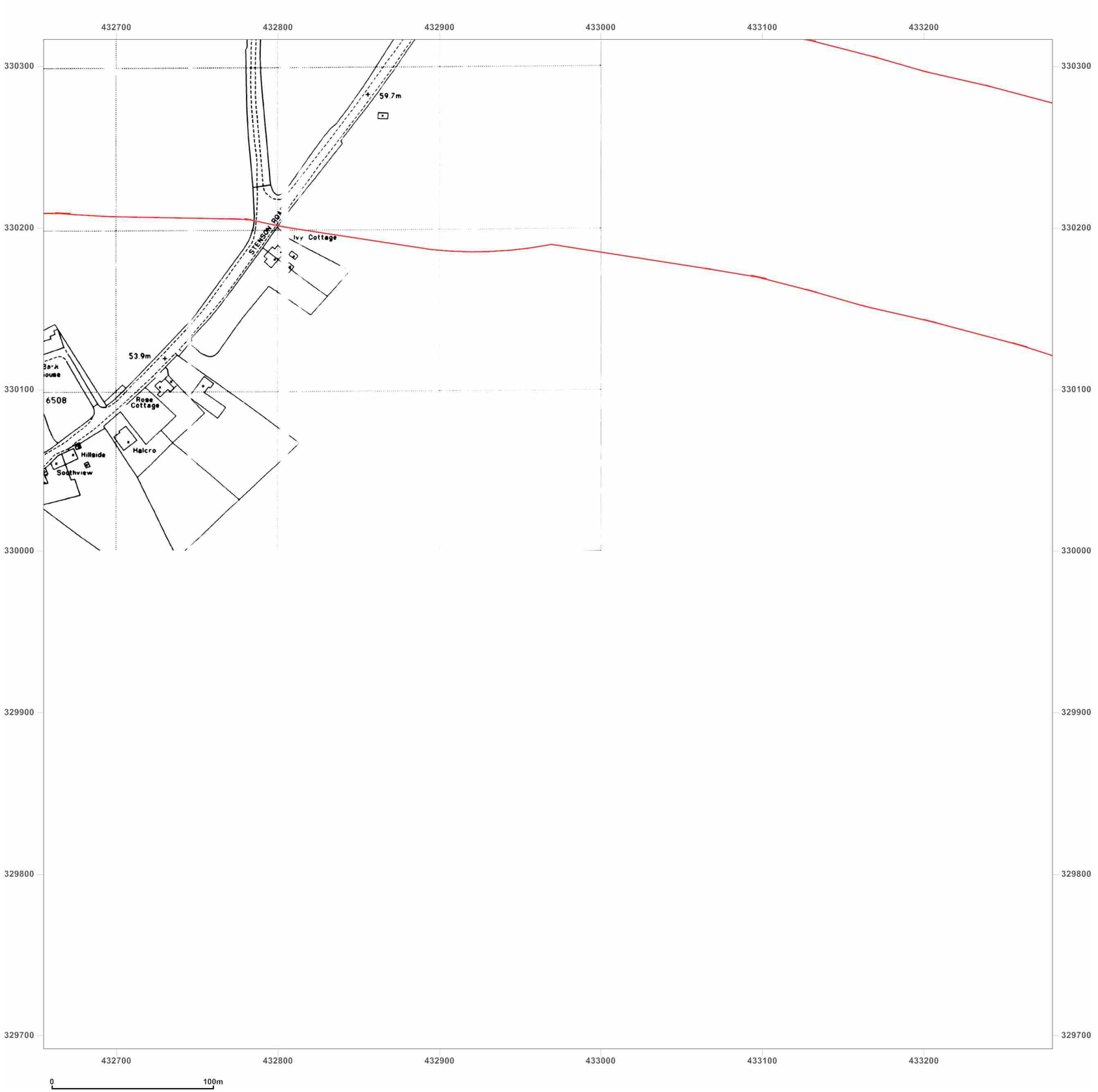
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: National Grid

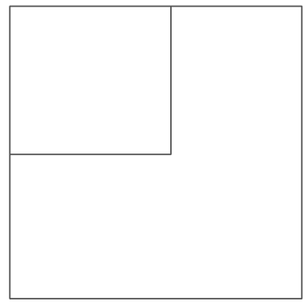
Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



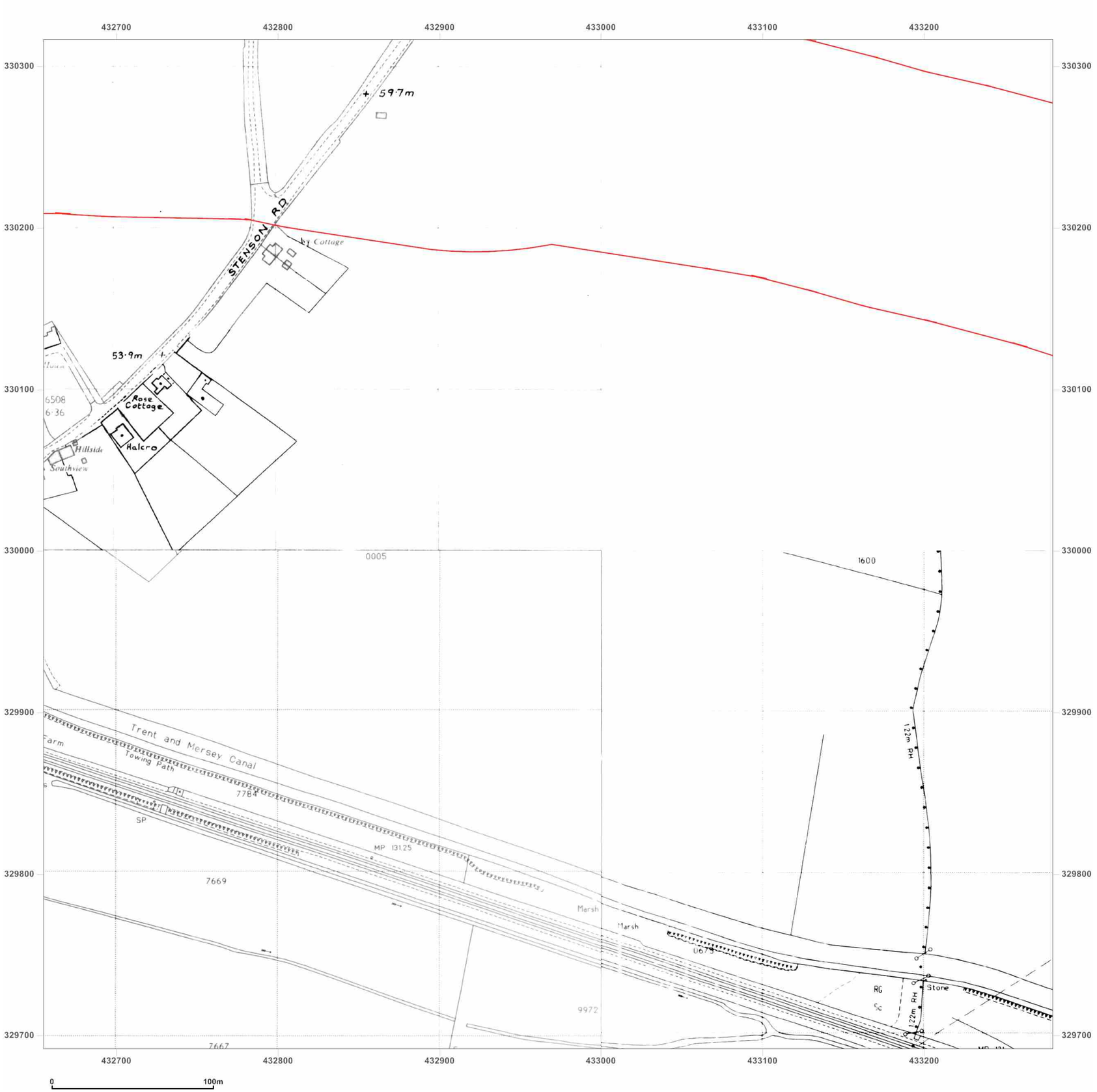
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_2
Grid Ref: 432967, 330004

Map Name: National Grid

Map date: **1990-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1990
Edition N/A
Copyright 1990
Levelled 1967

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

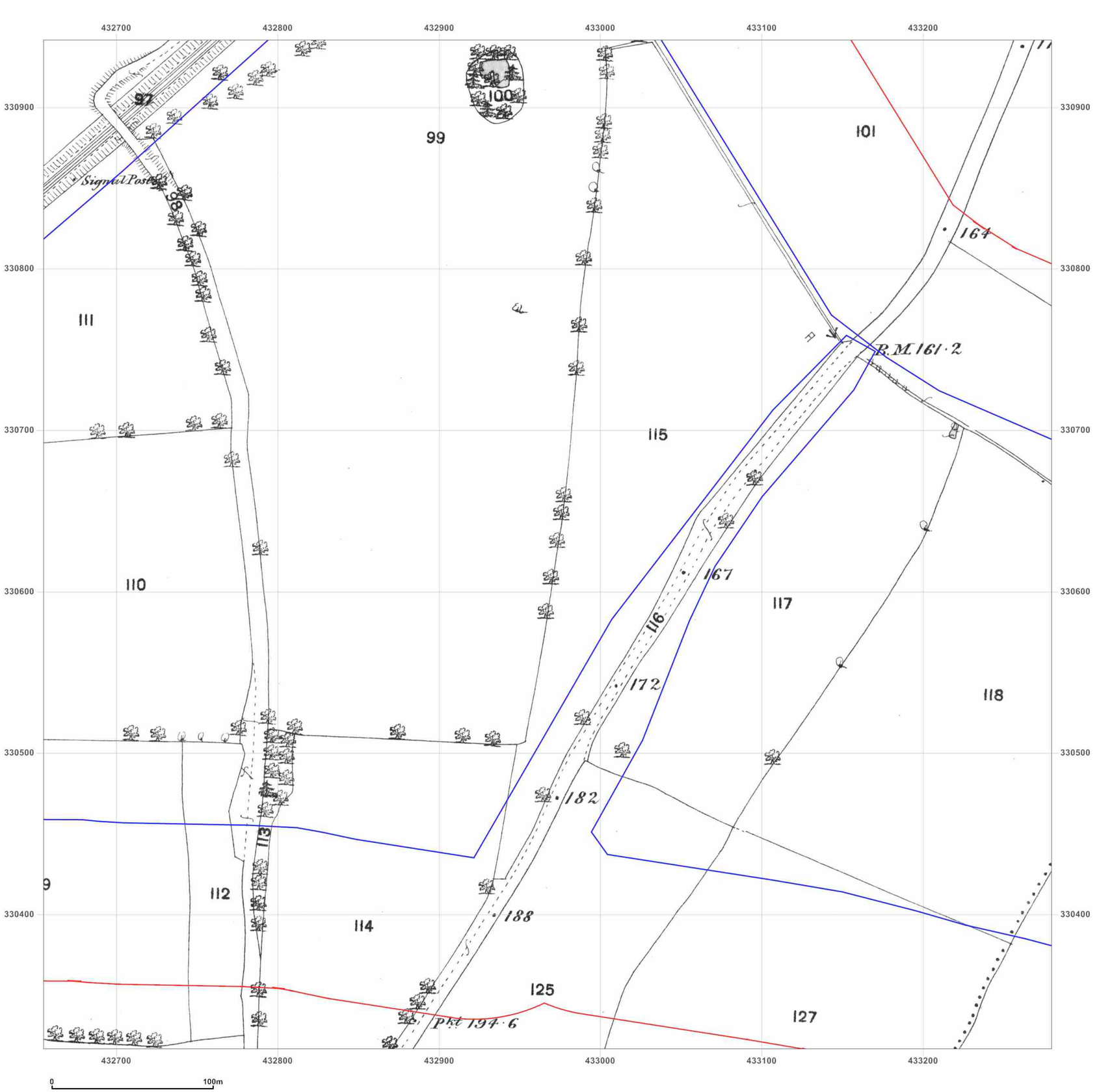
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

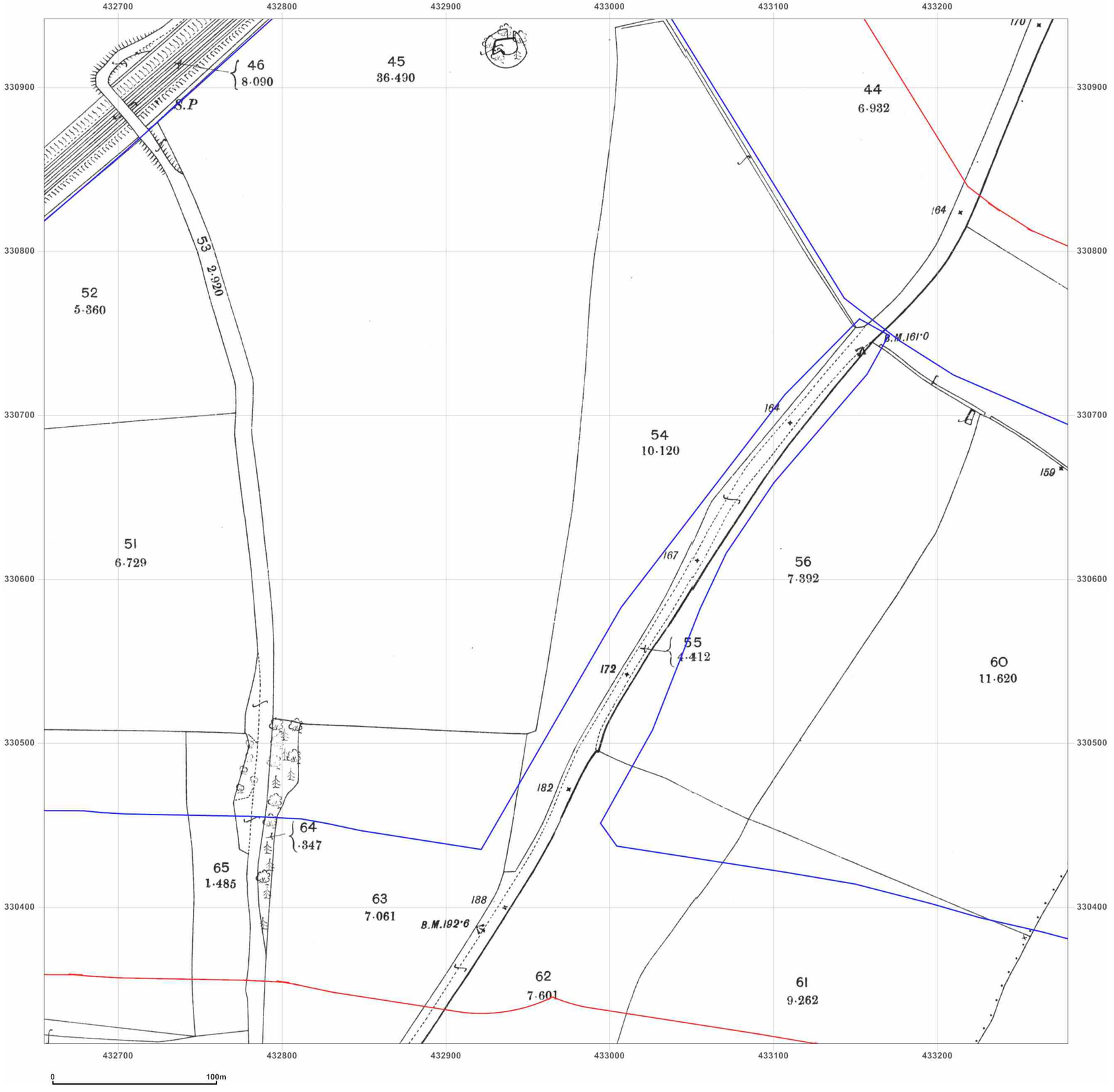
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: County Series
Map date: **1901**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

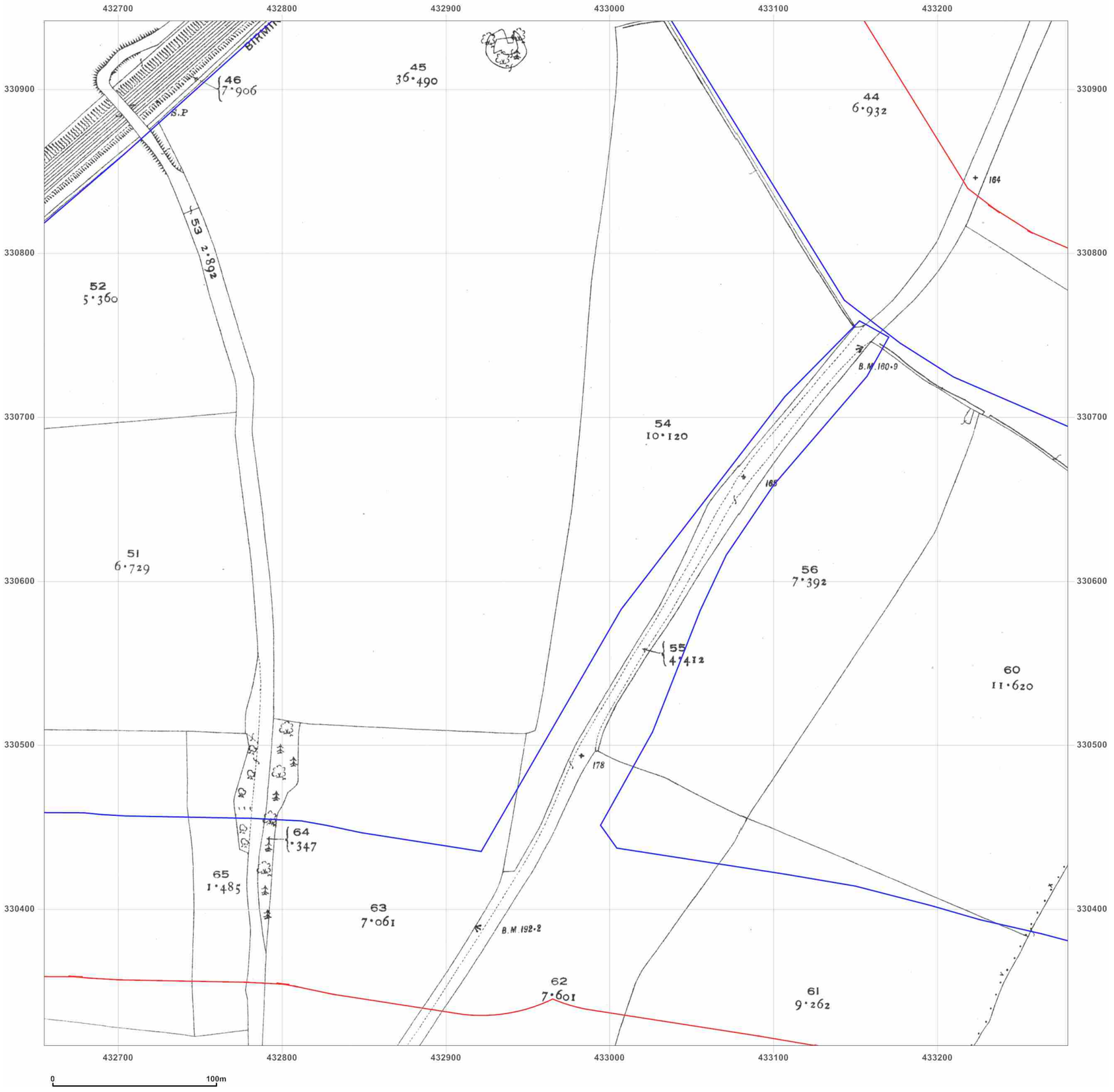
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: County Series
Map date: **1923**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

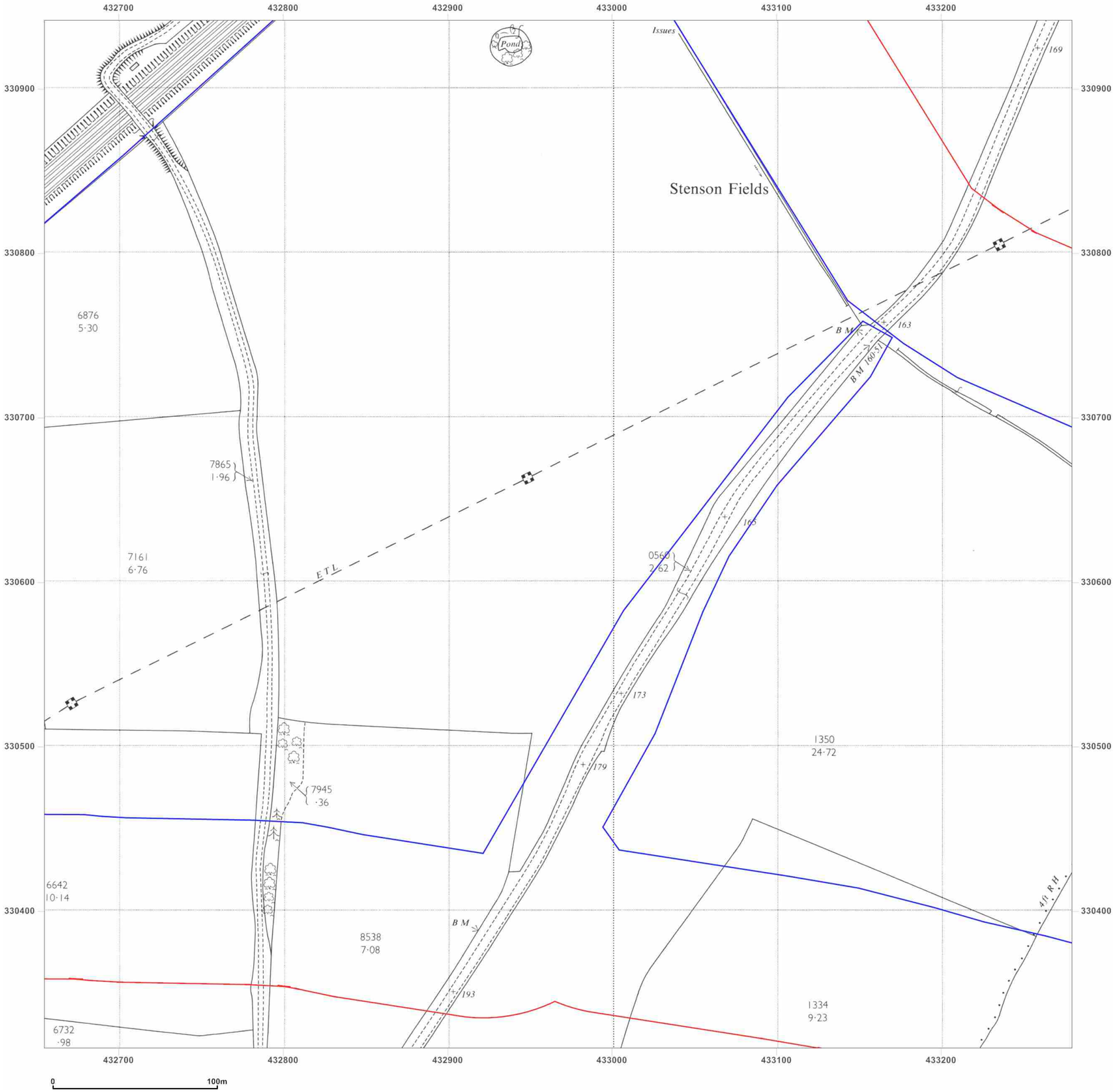
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

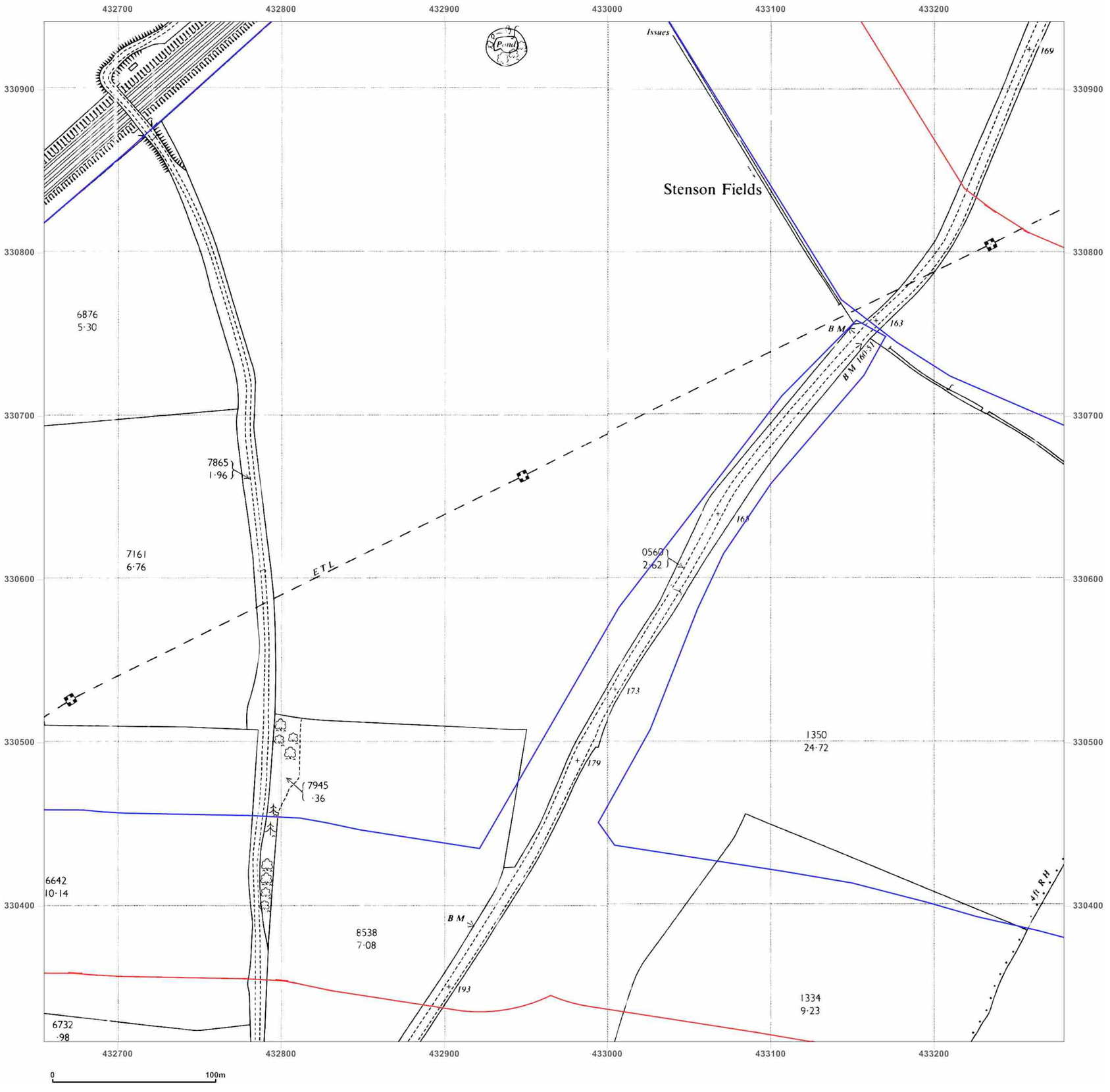
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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

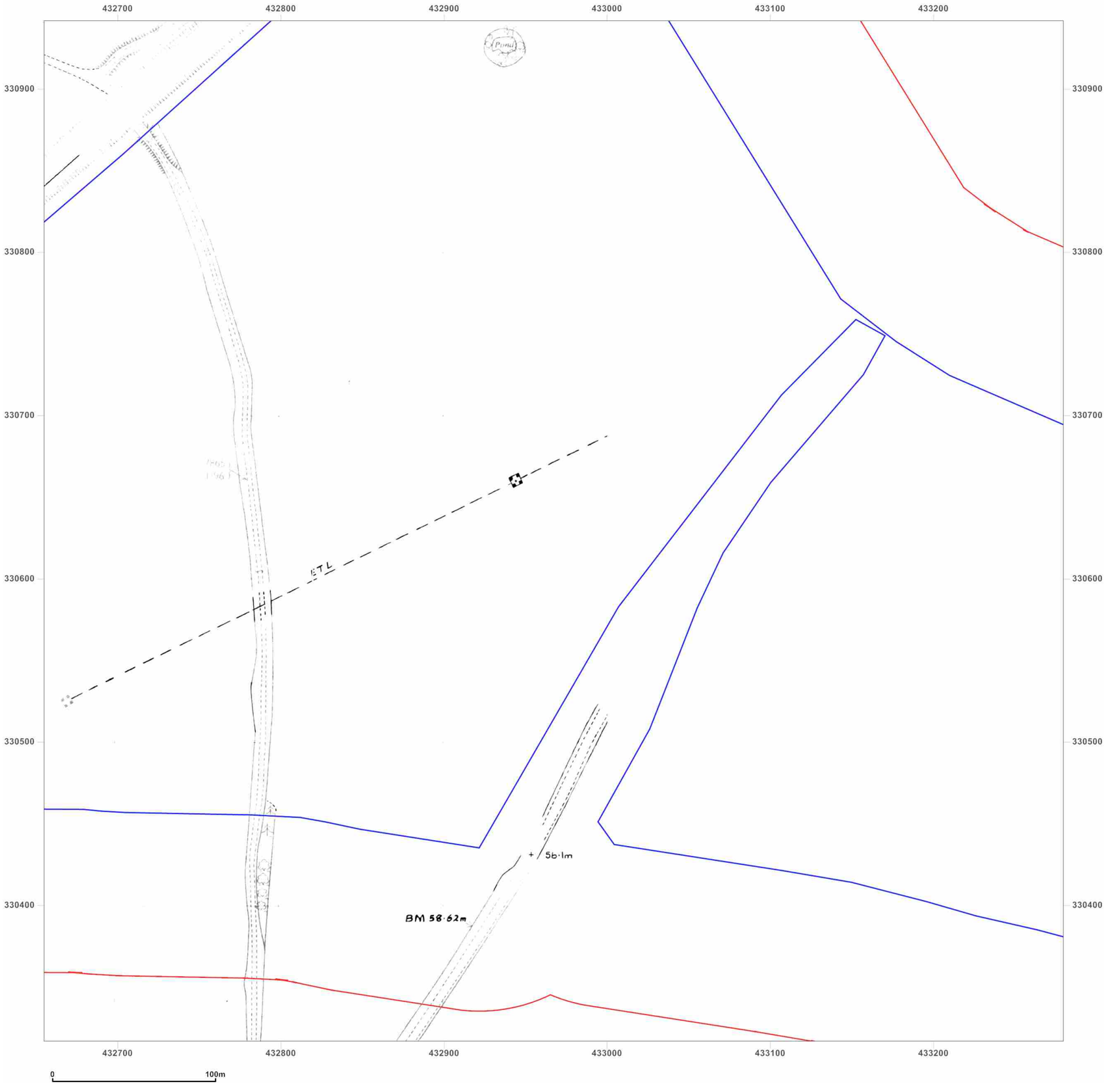
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: National Grid

Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1990
Edition N/A
Copyright 1990
Levelled 1967

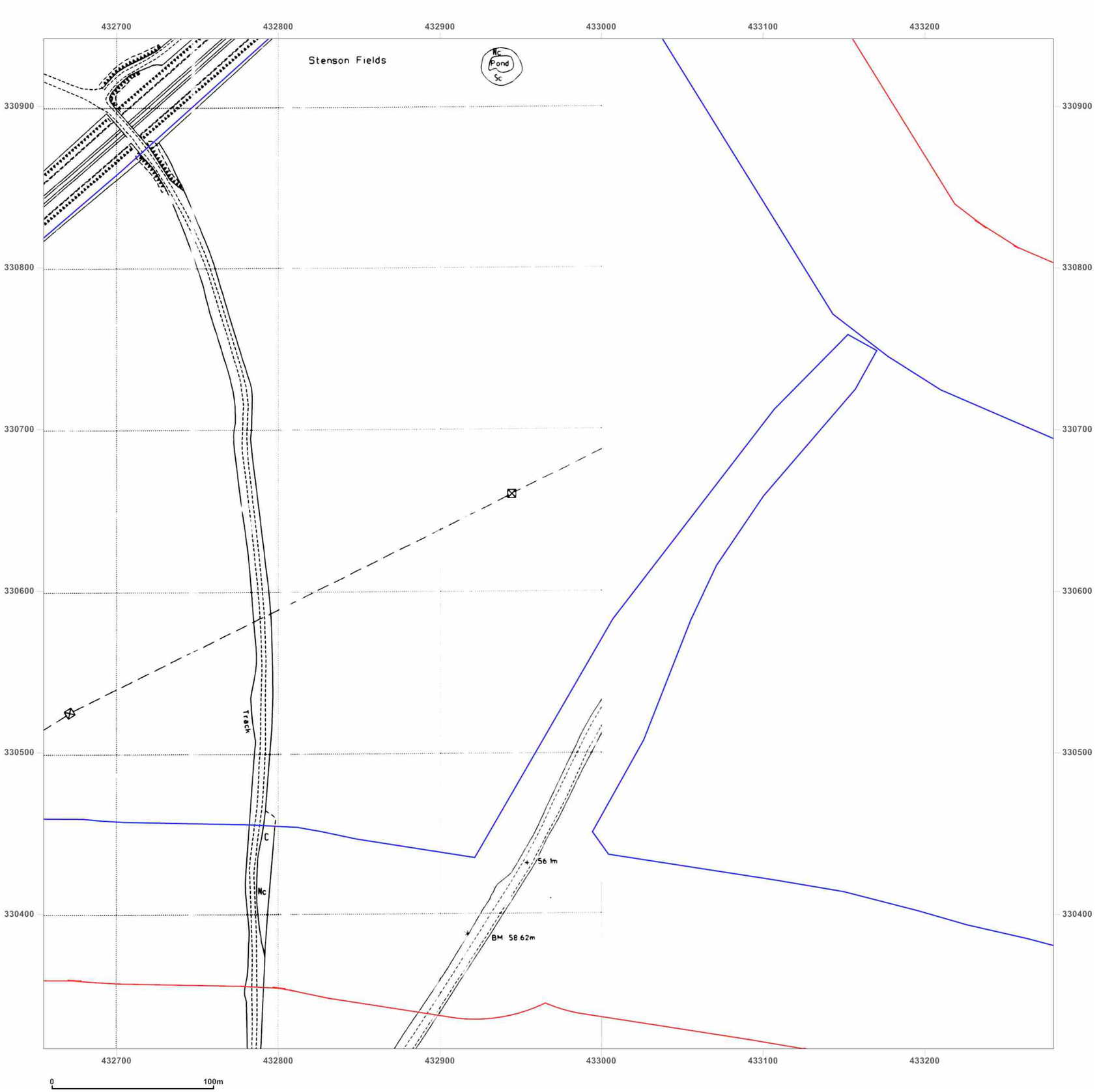
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_3
Grid Ref: 432967, 330629

Map Name: National Grid

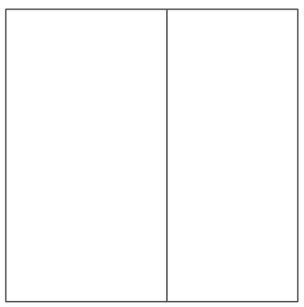
Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



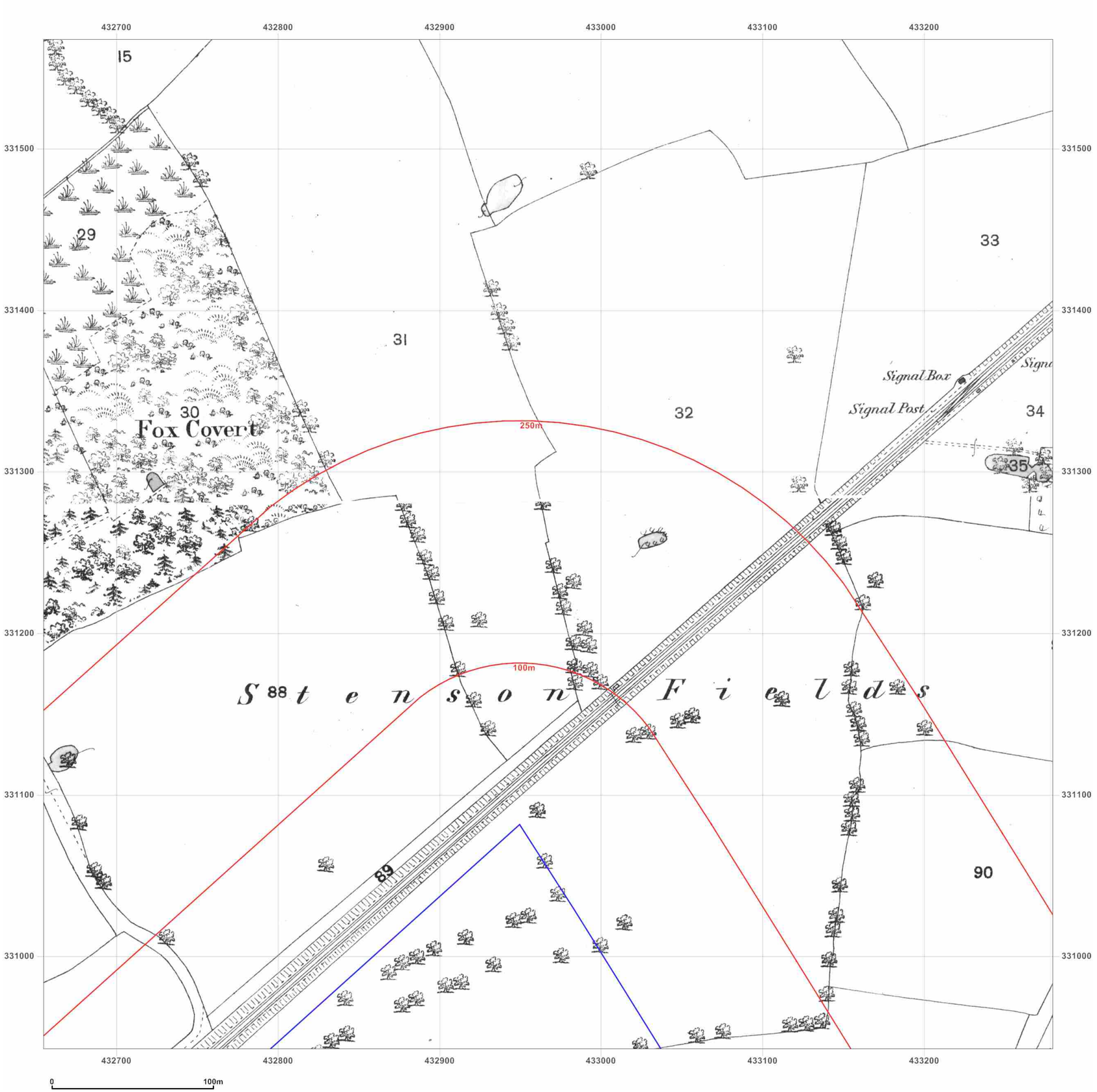
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: County Series

Map date: **1882-1883**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

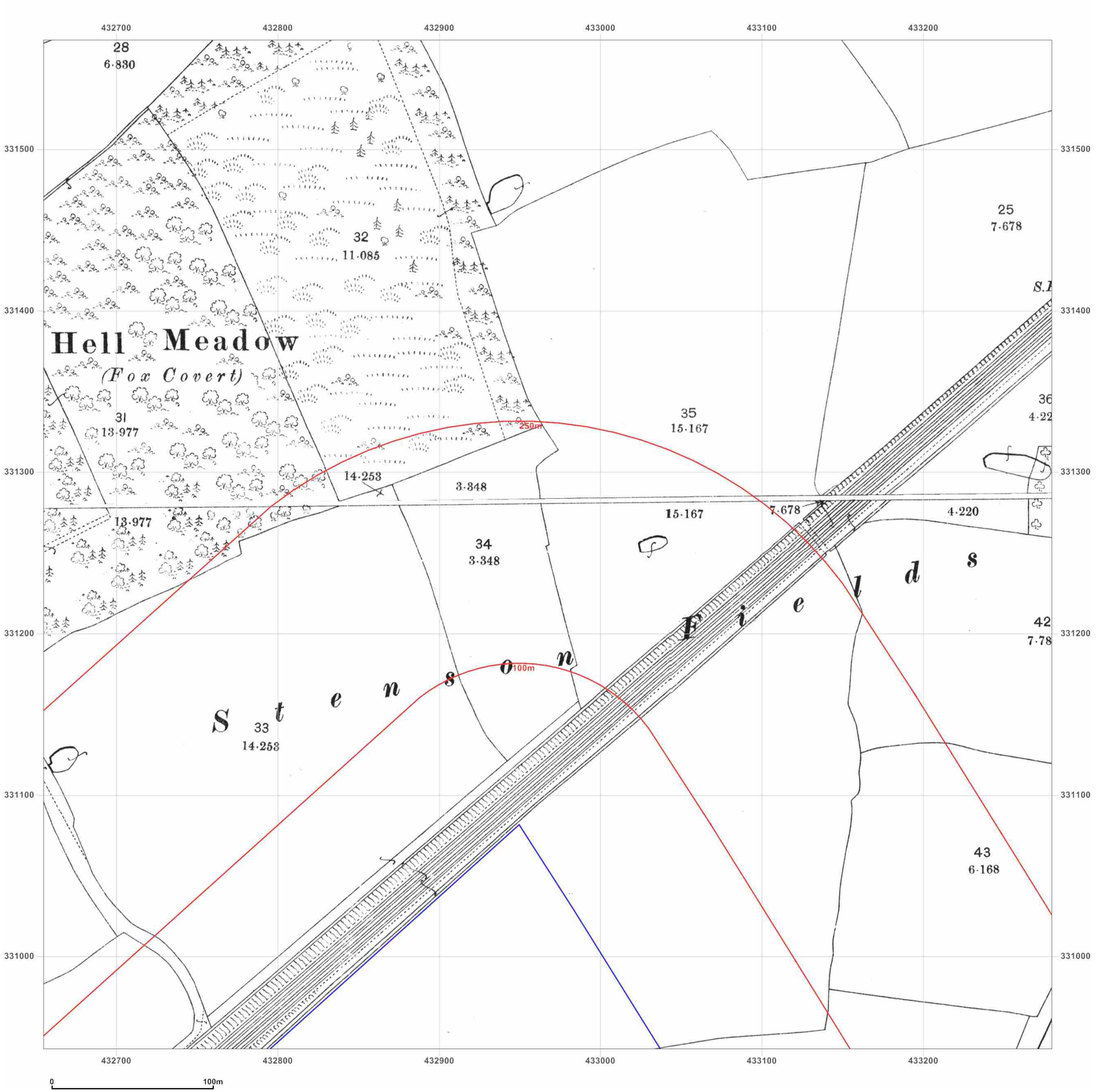
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: County Series

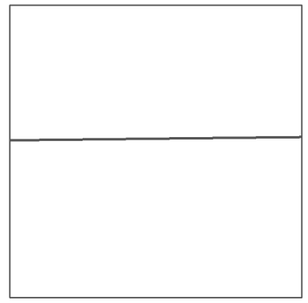
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

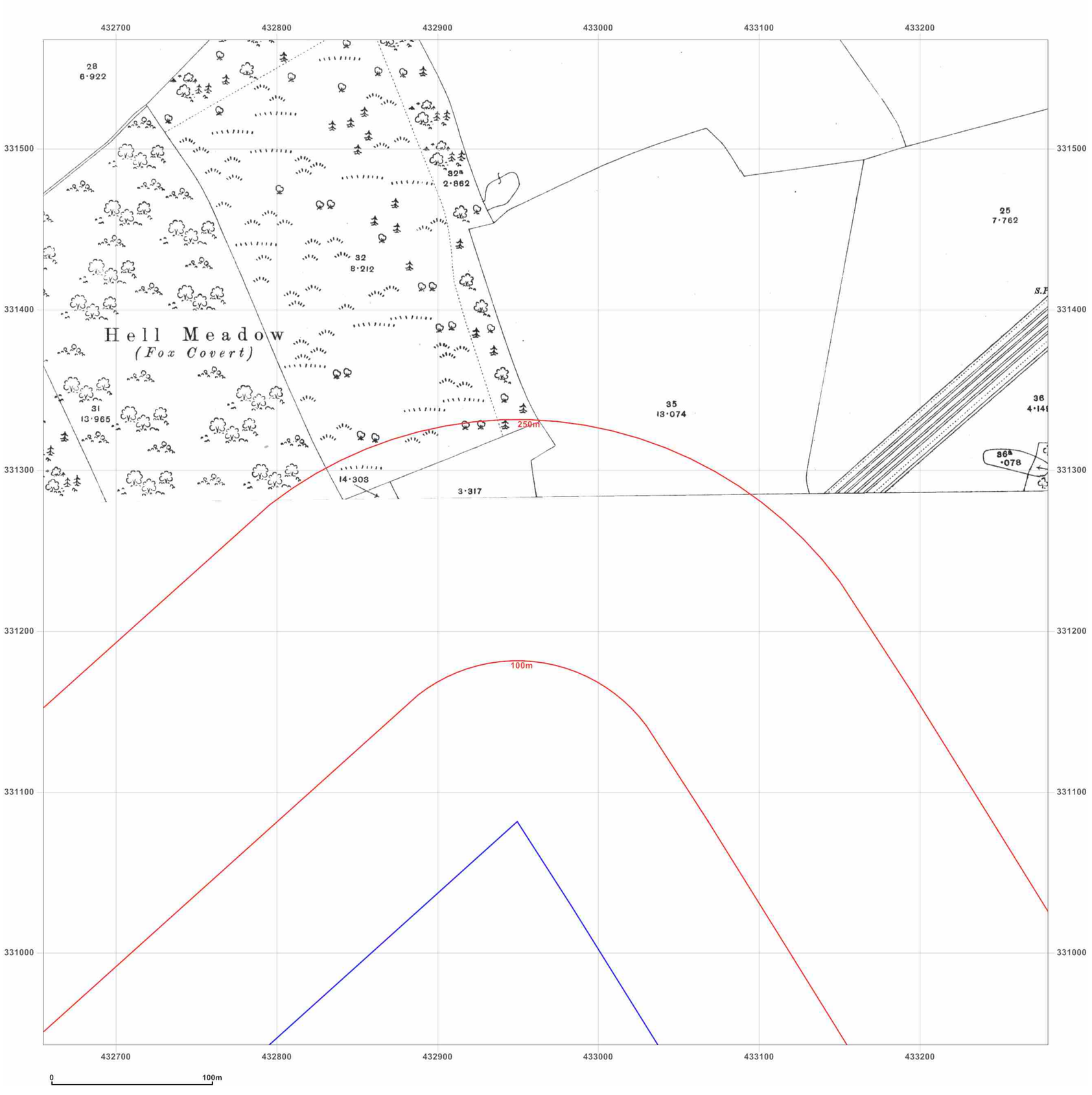
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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: County Series

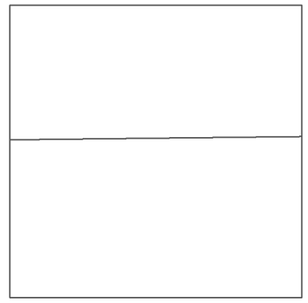
Map date: **1914**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



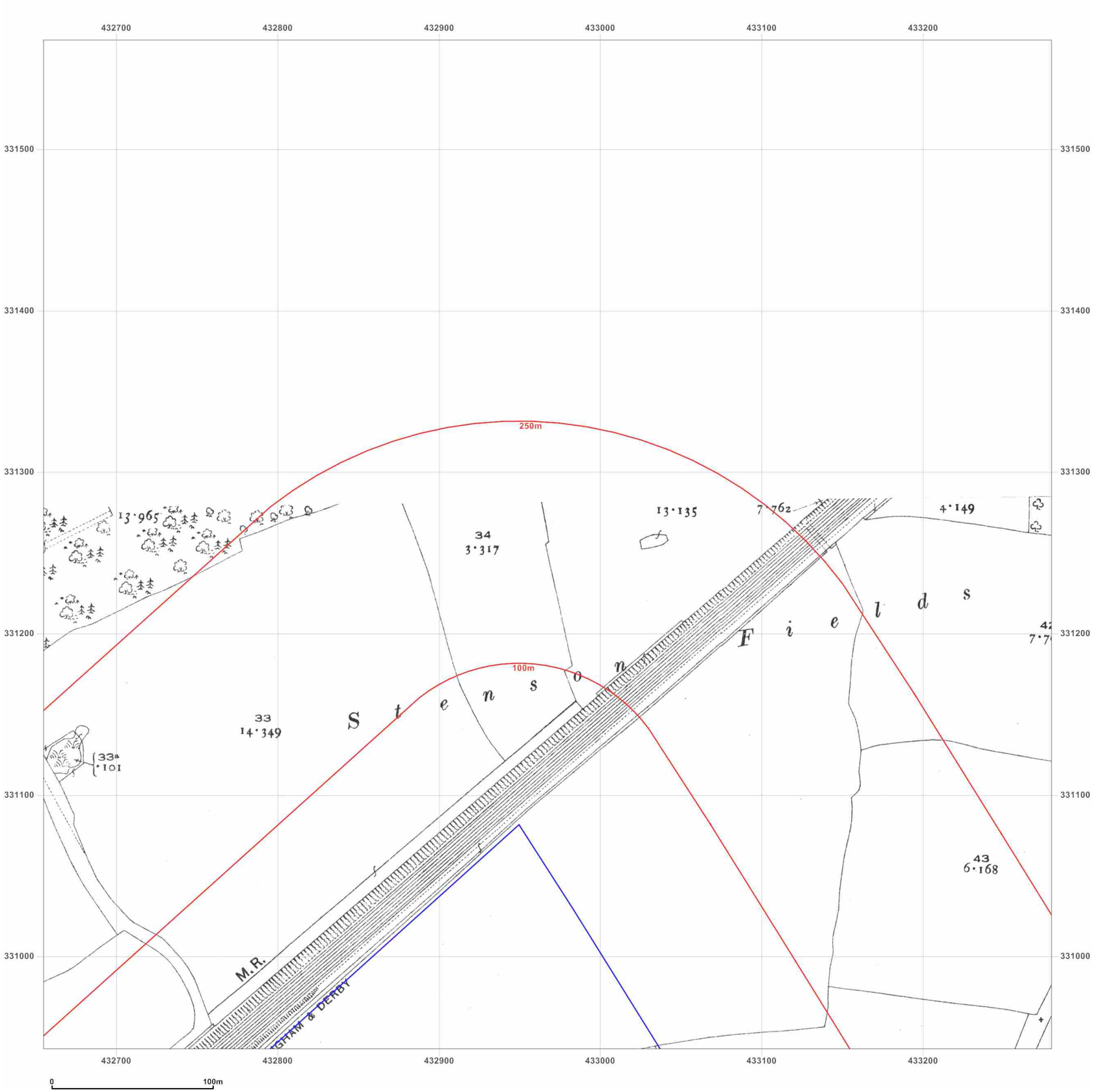
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

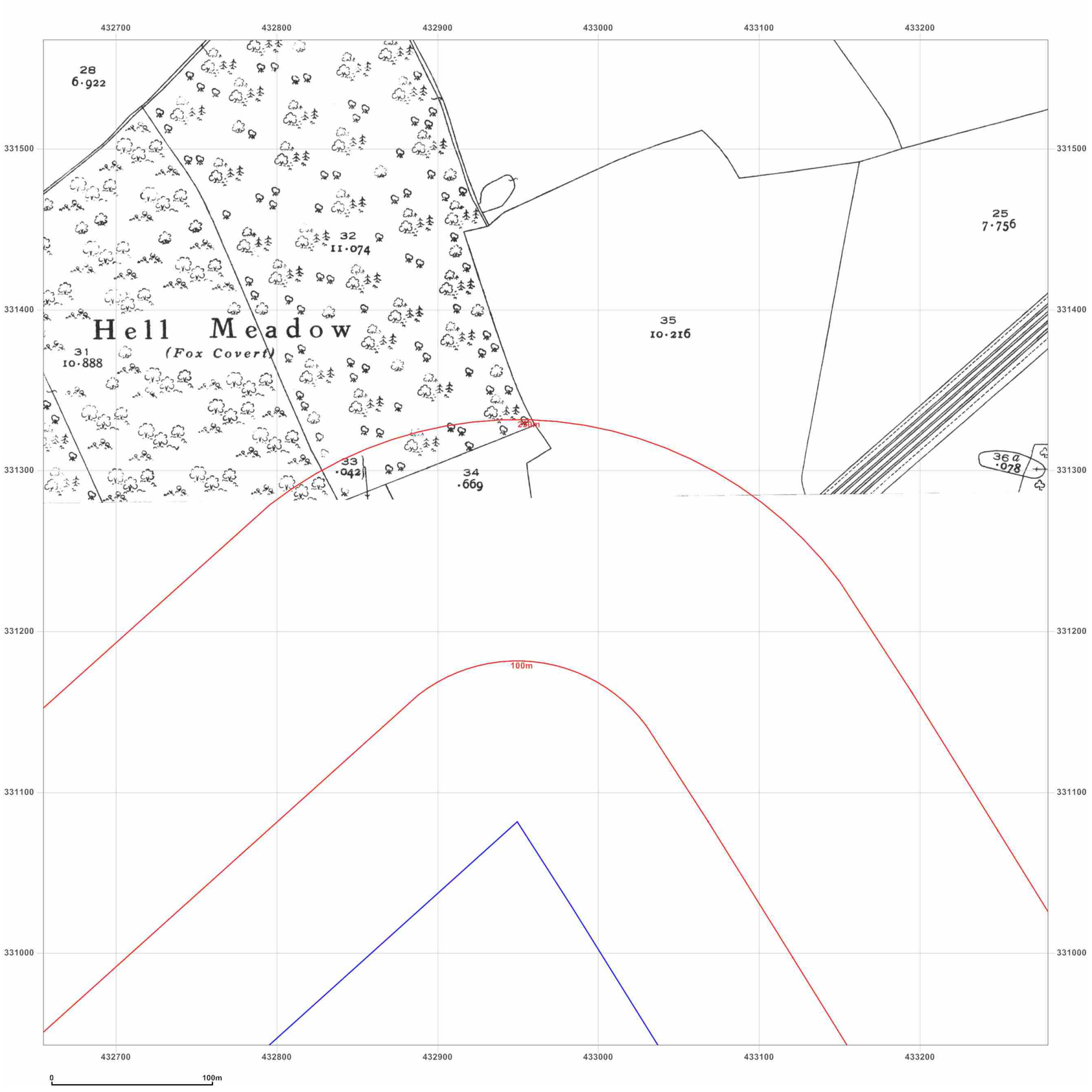
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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: County Series

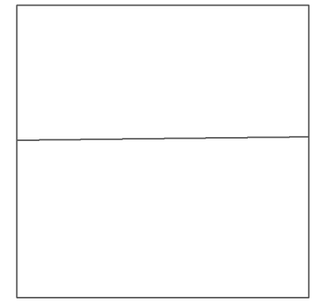
Map date: **1938**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

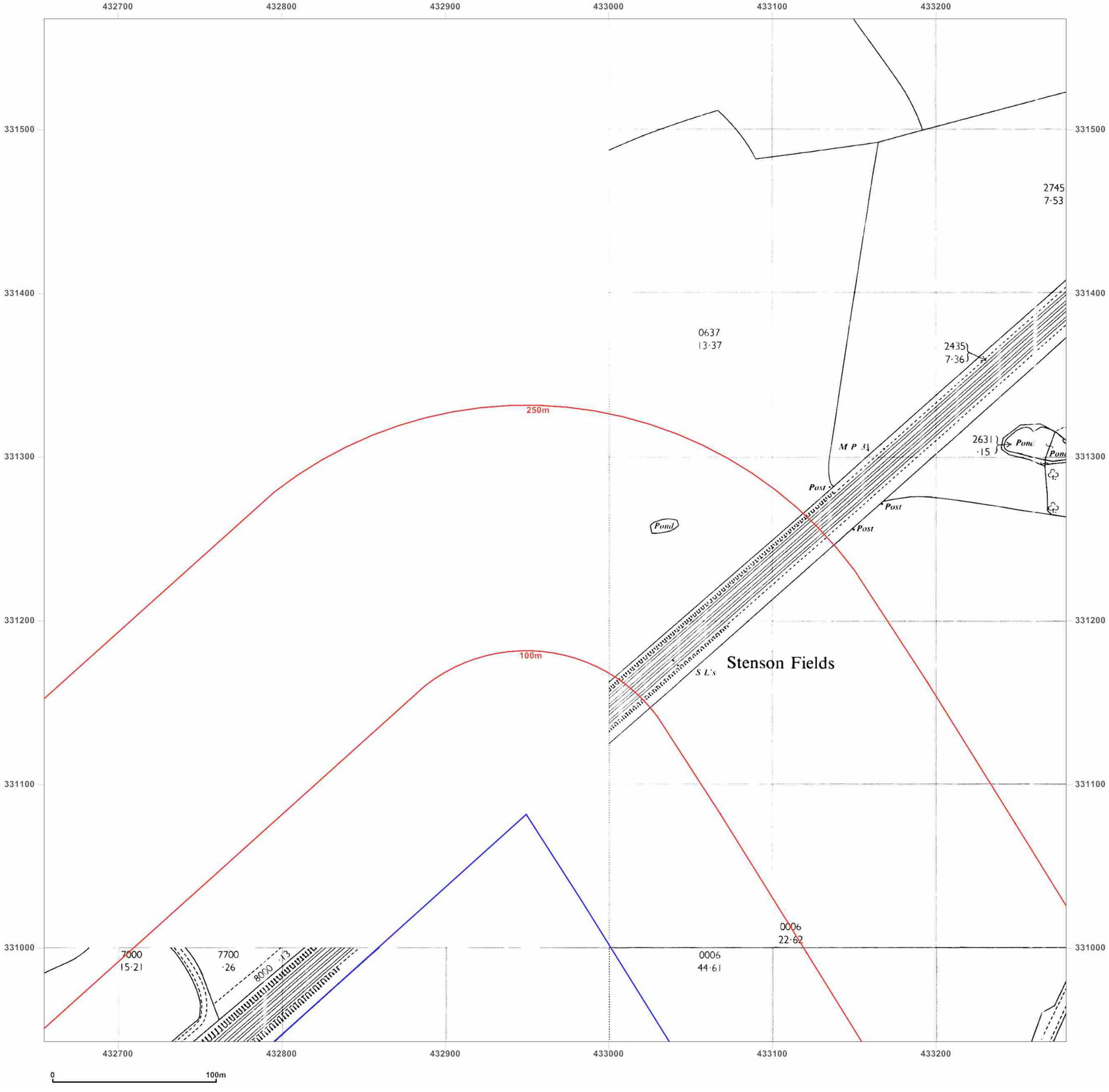
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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

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

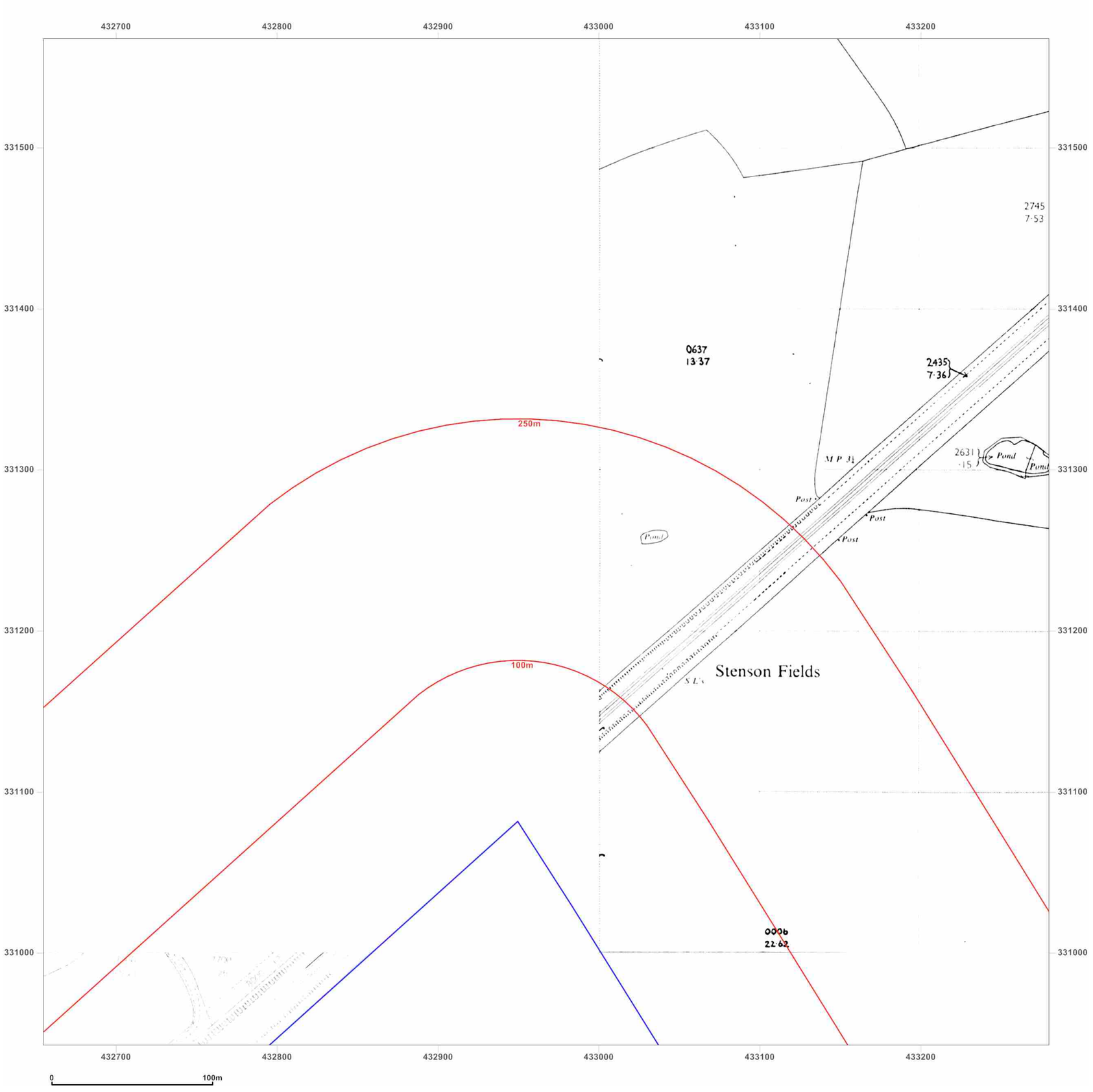
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: National Grid

Map date: **1987-1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1987
Edition N/A
Copyright 1987
Levelled 1967

Surveyed 1967
Revised 1990
Edition N/A
Copyright 1990
Levelled 1967

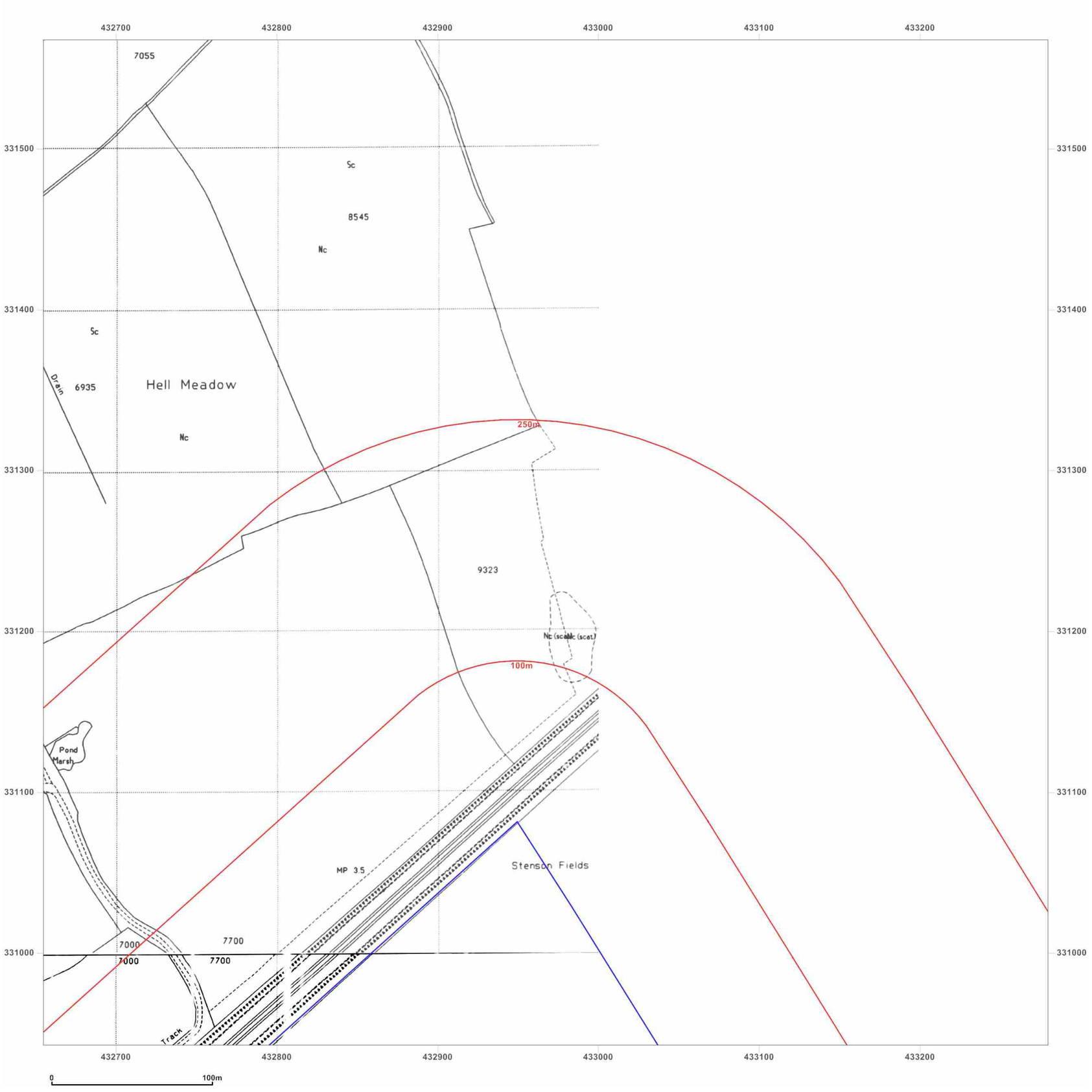
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_2_4
Grid Ref: 432967, 331255

Map Name: National Grid

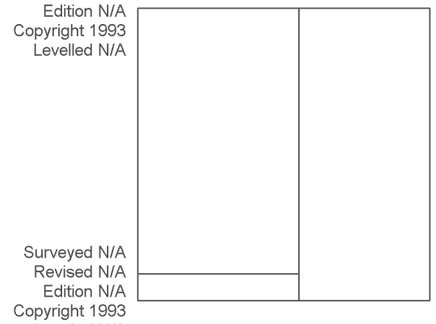
Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

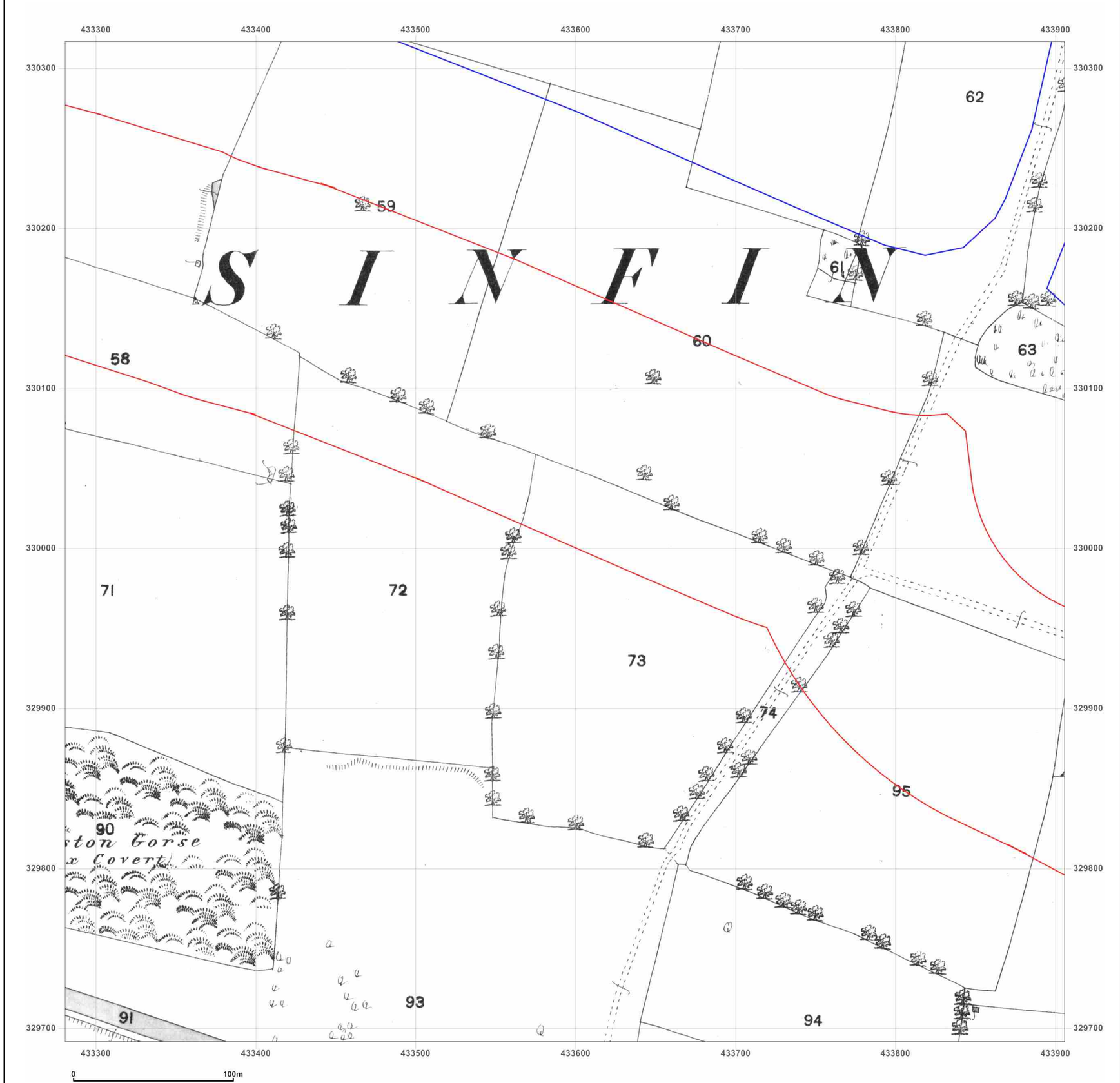
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

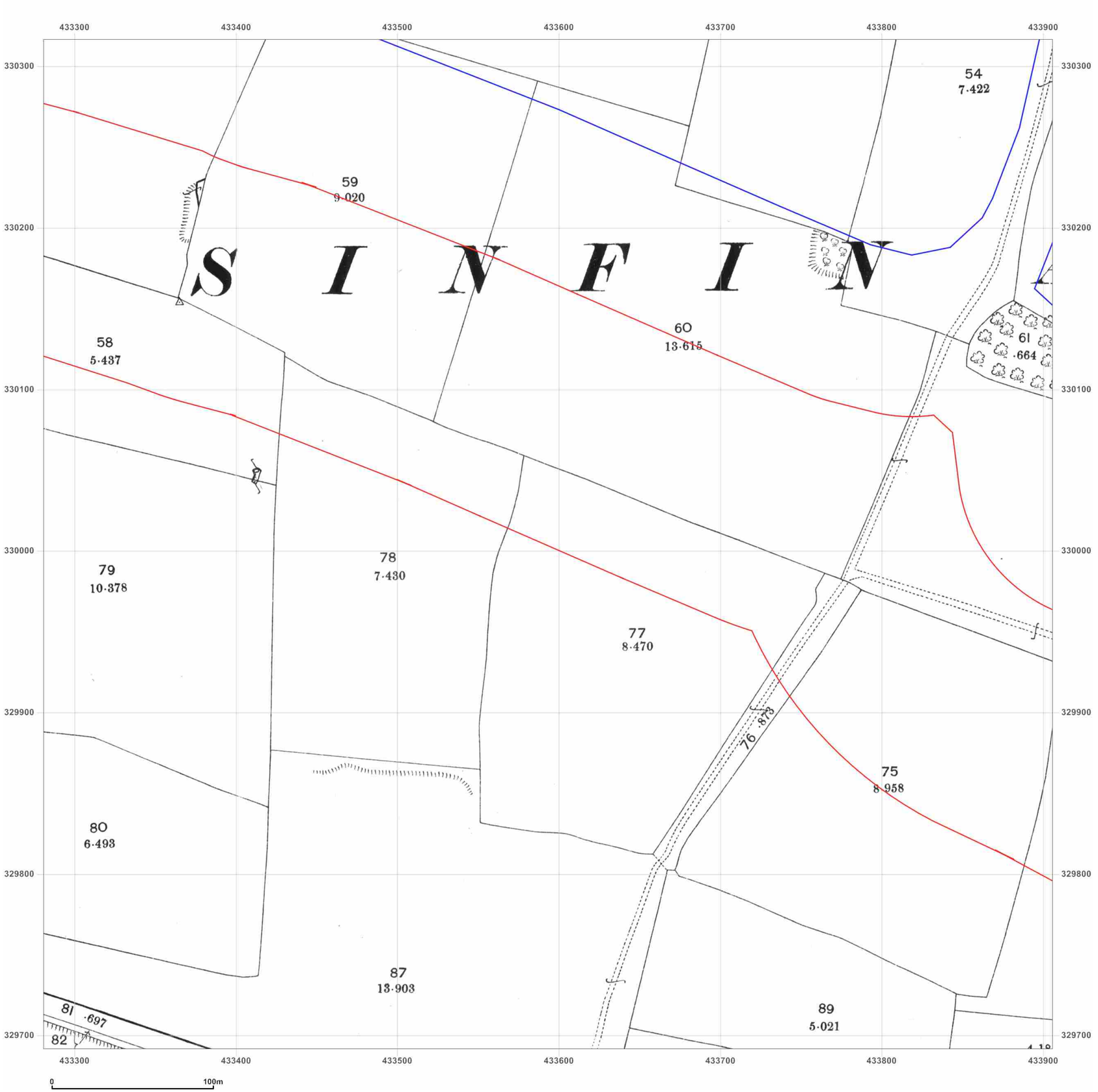
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

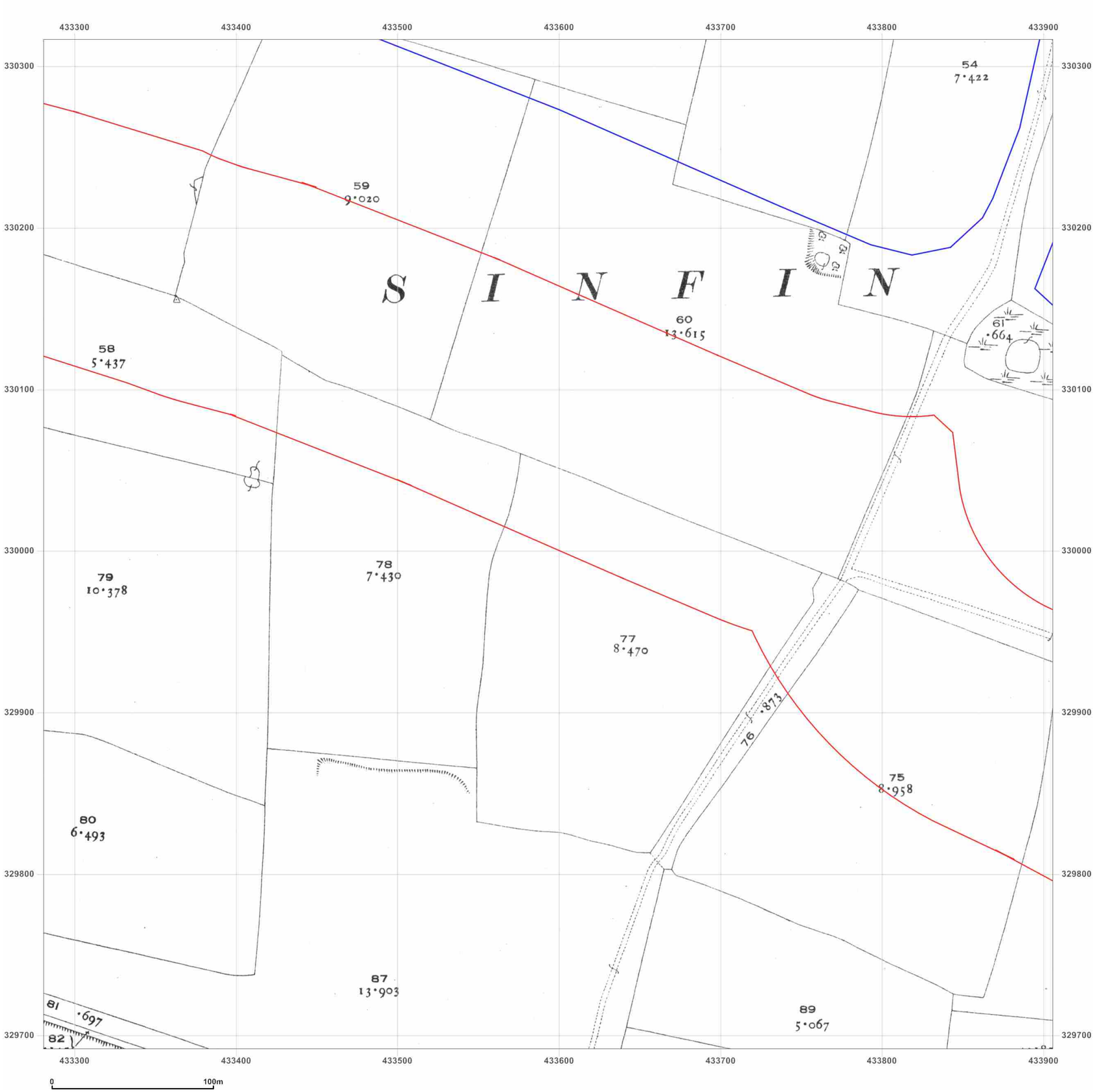
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

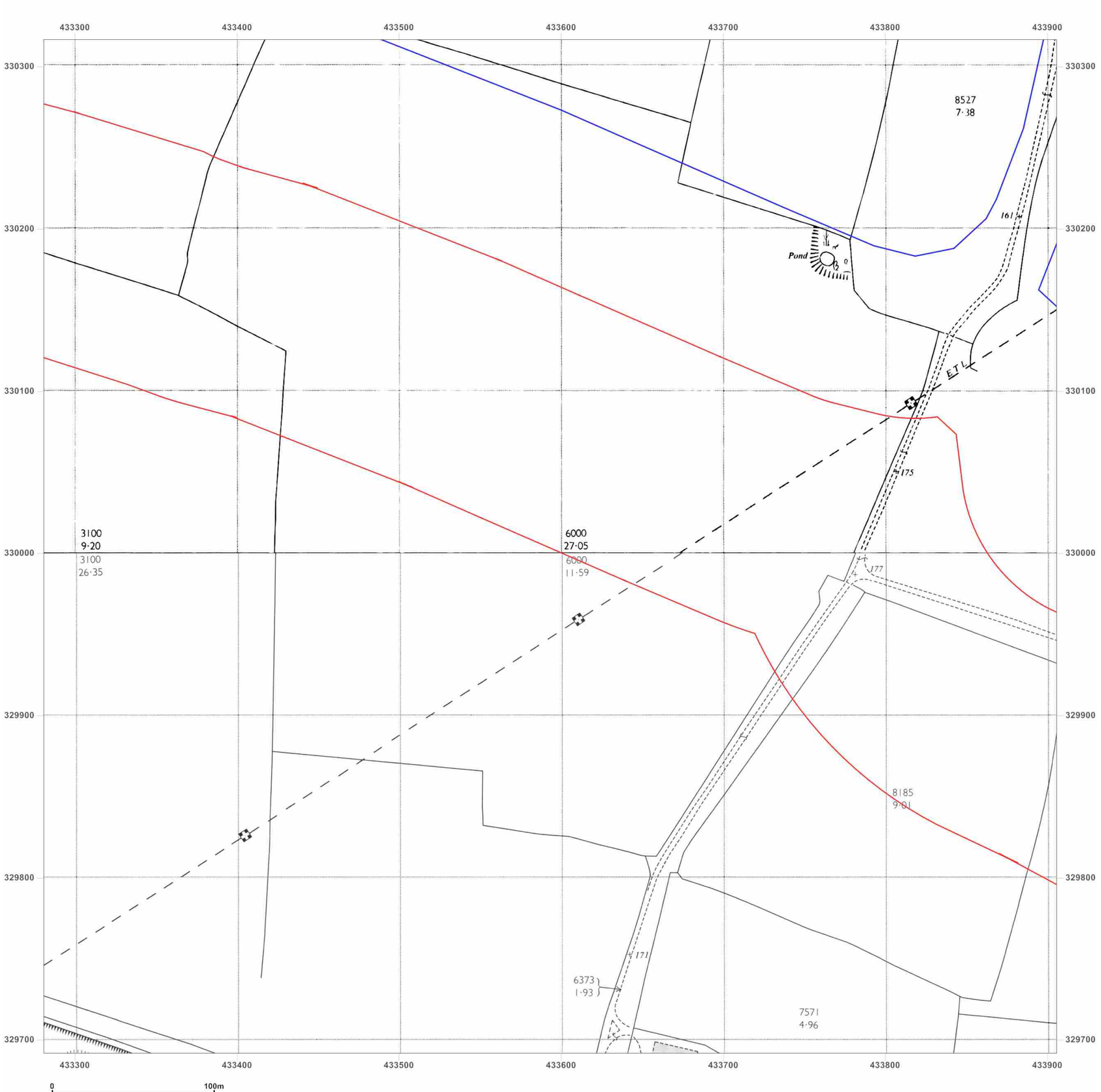
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: National Grid

Map date: **1967-1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1969
Levelled 1967

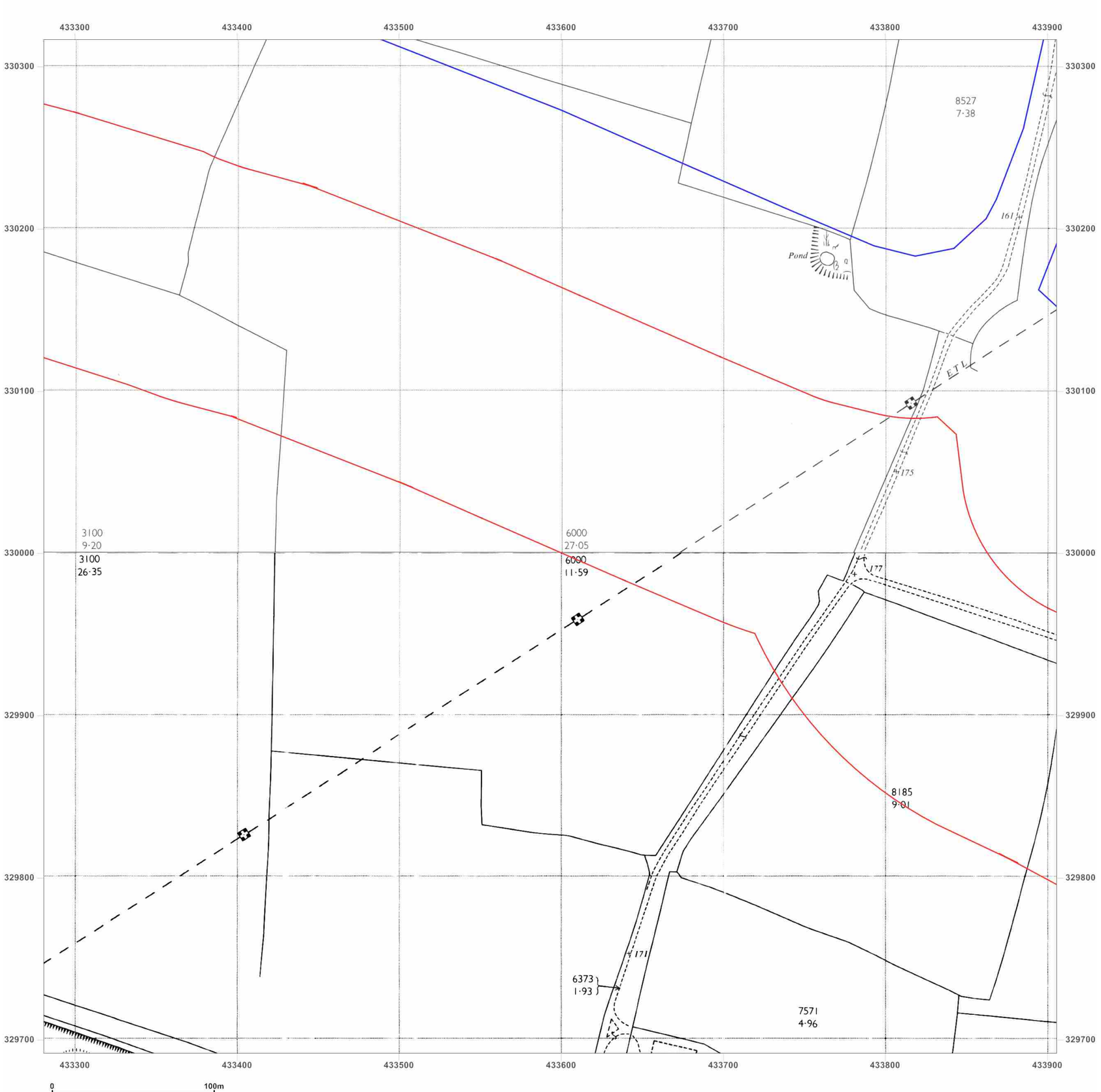
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: National Grid

Map date: **1966-1969**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

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

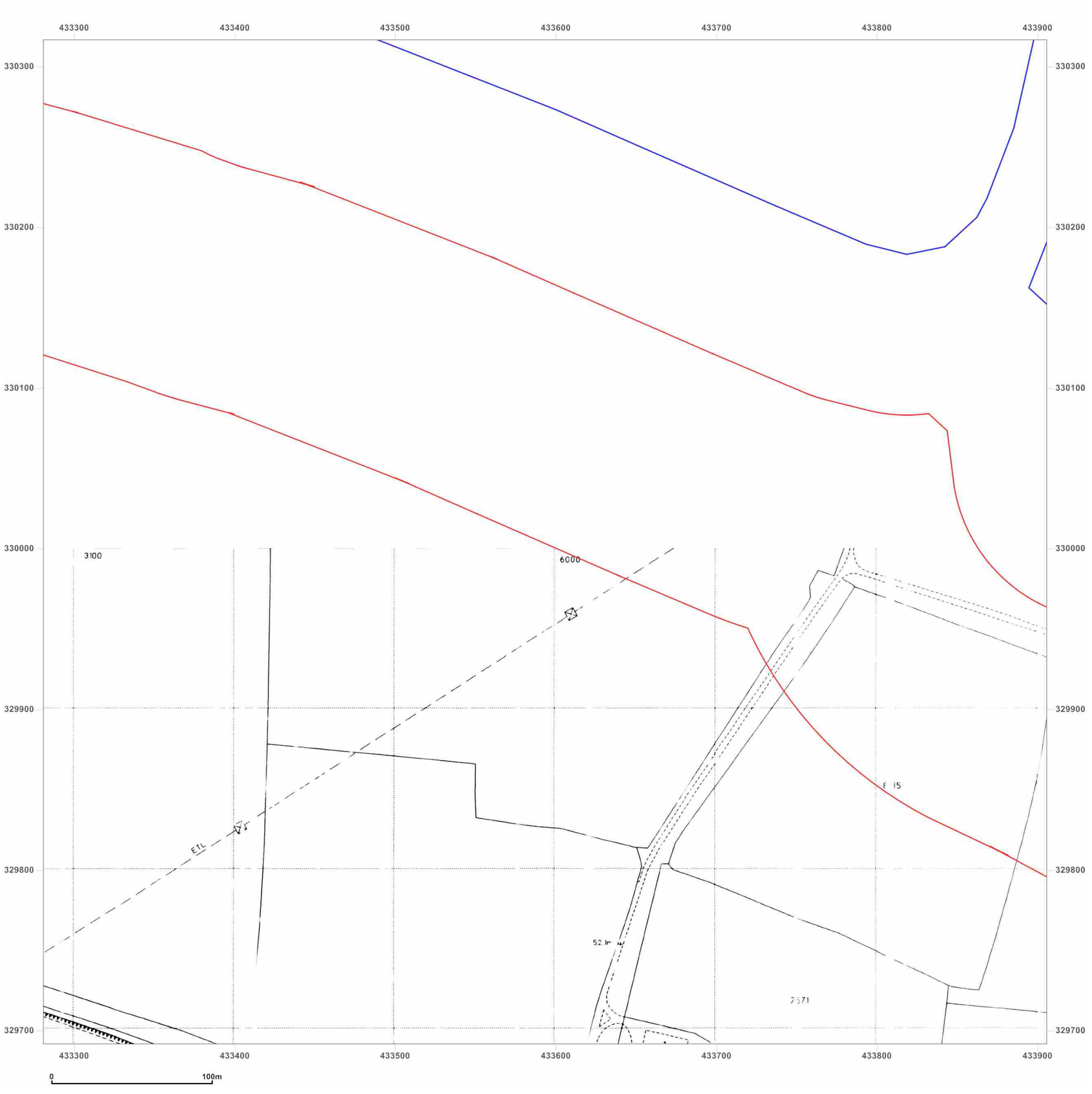
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_2
Grid Ref: 433593, 330004

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

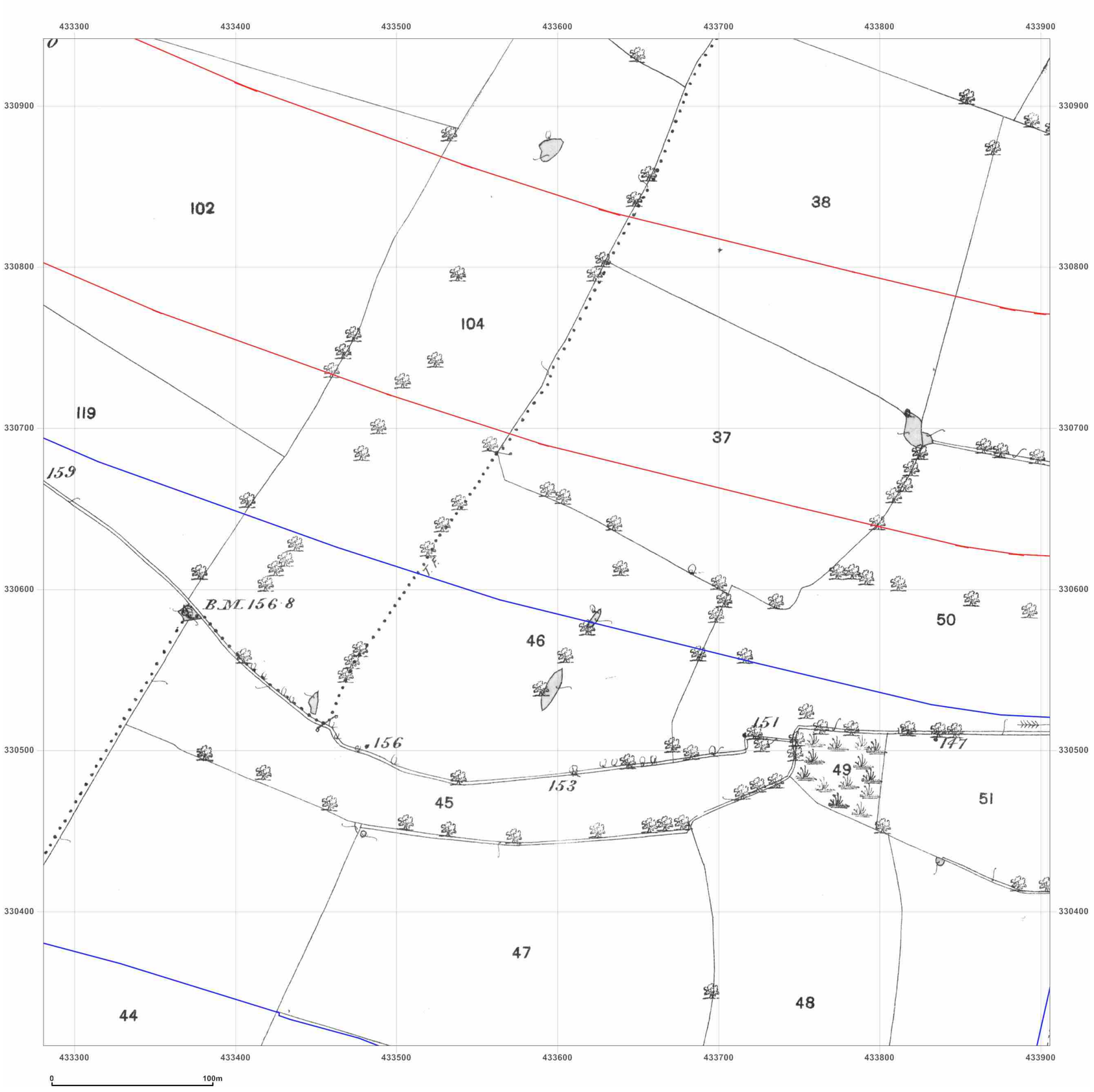
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_3
Grid Ref: 433593, 330629

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

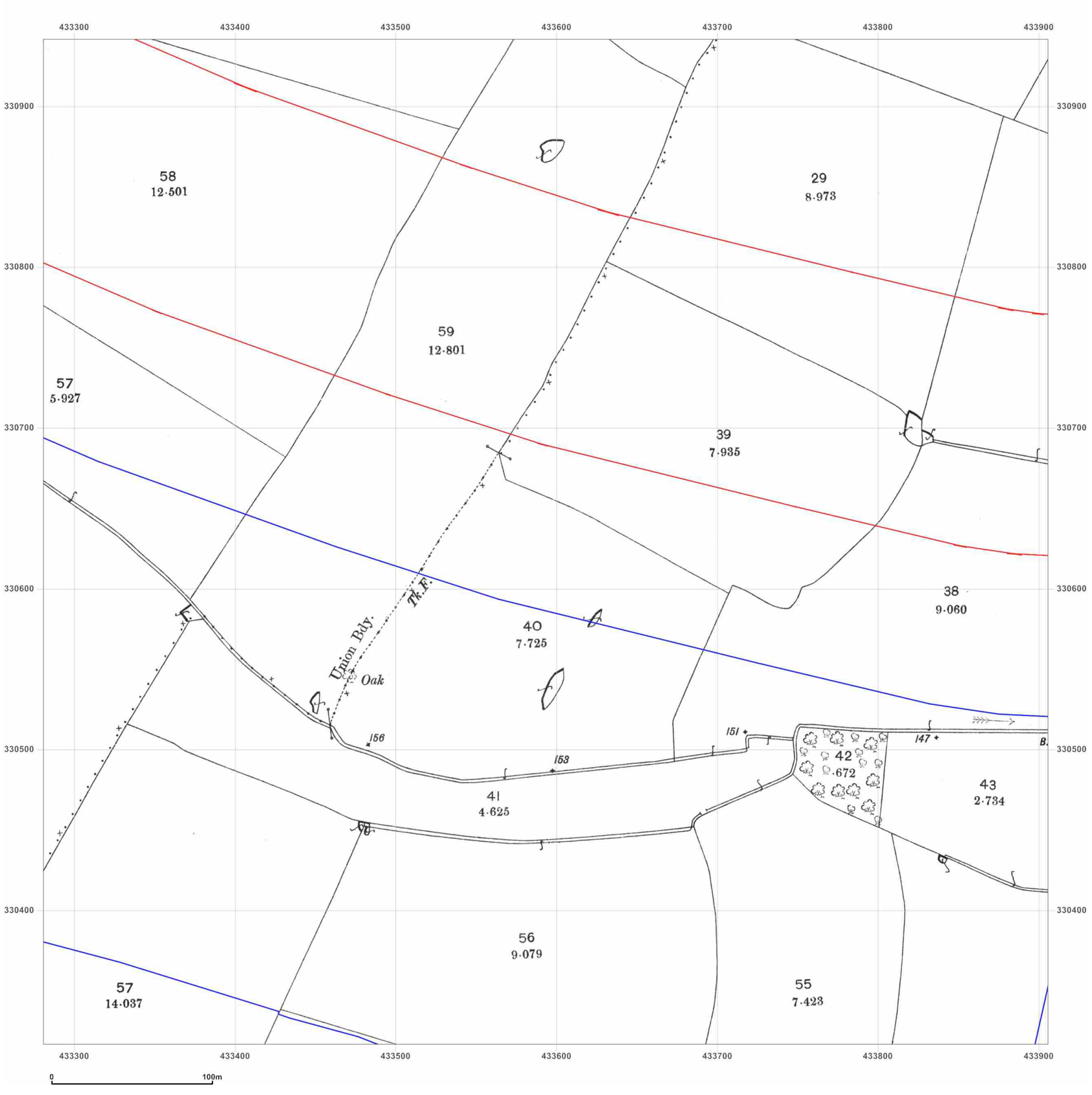
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_3
Grid Ref: 433593, 330629

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

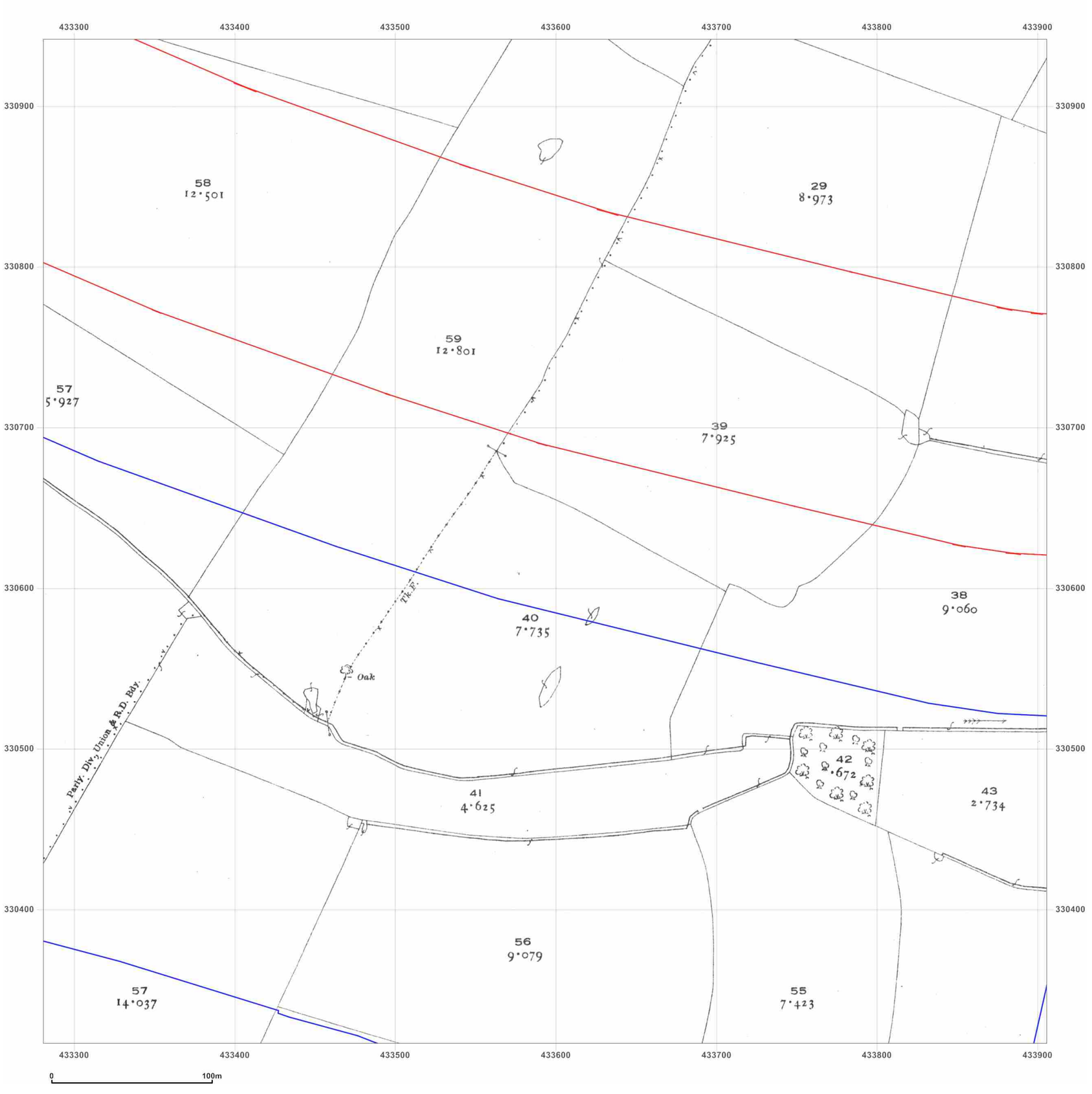
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_3
Grid Ref: 433593, 330629

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

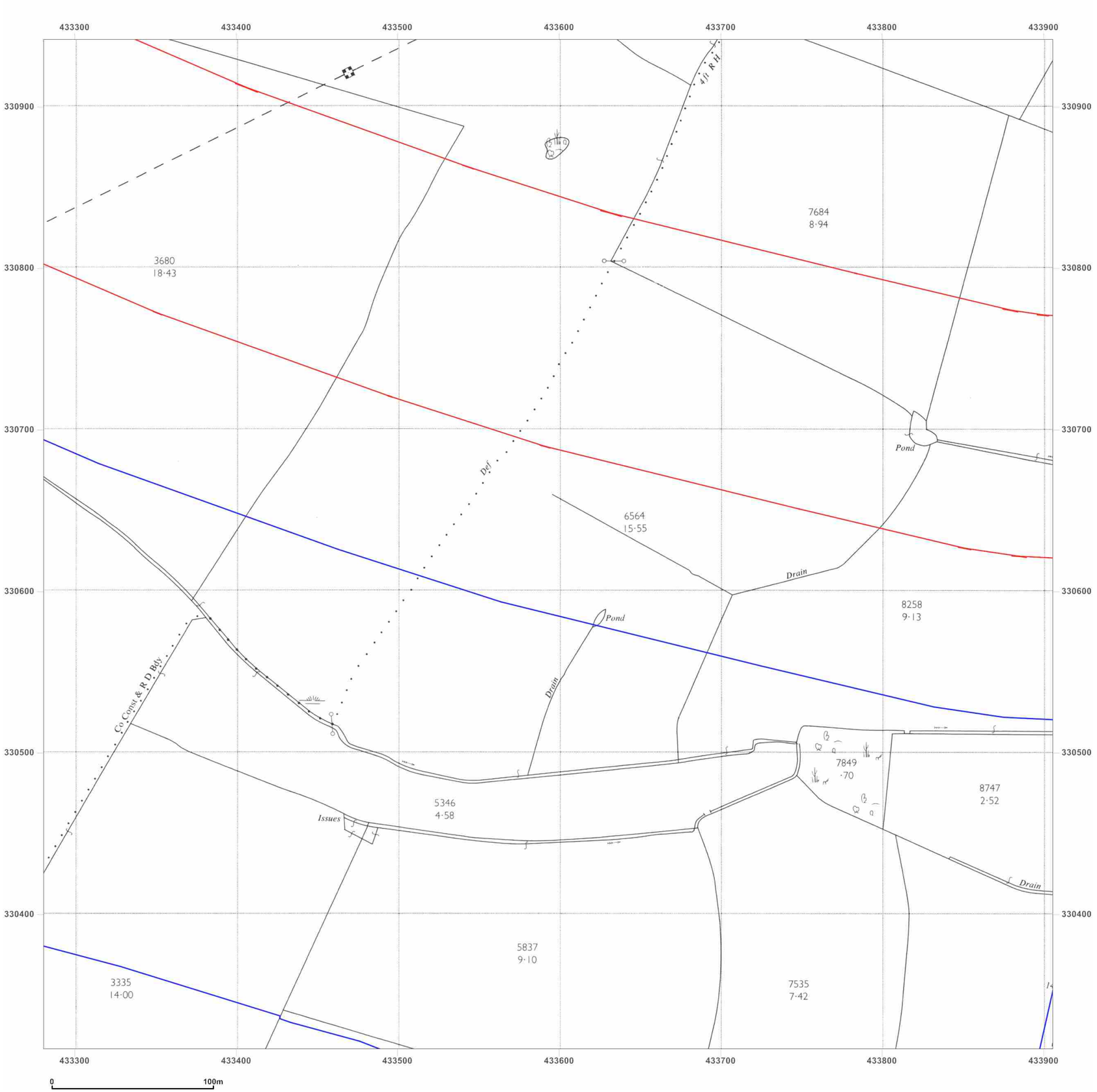
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_3
Grid Ref: 433593, 330629

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

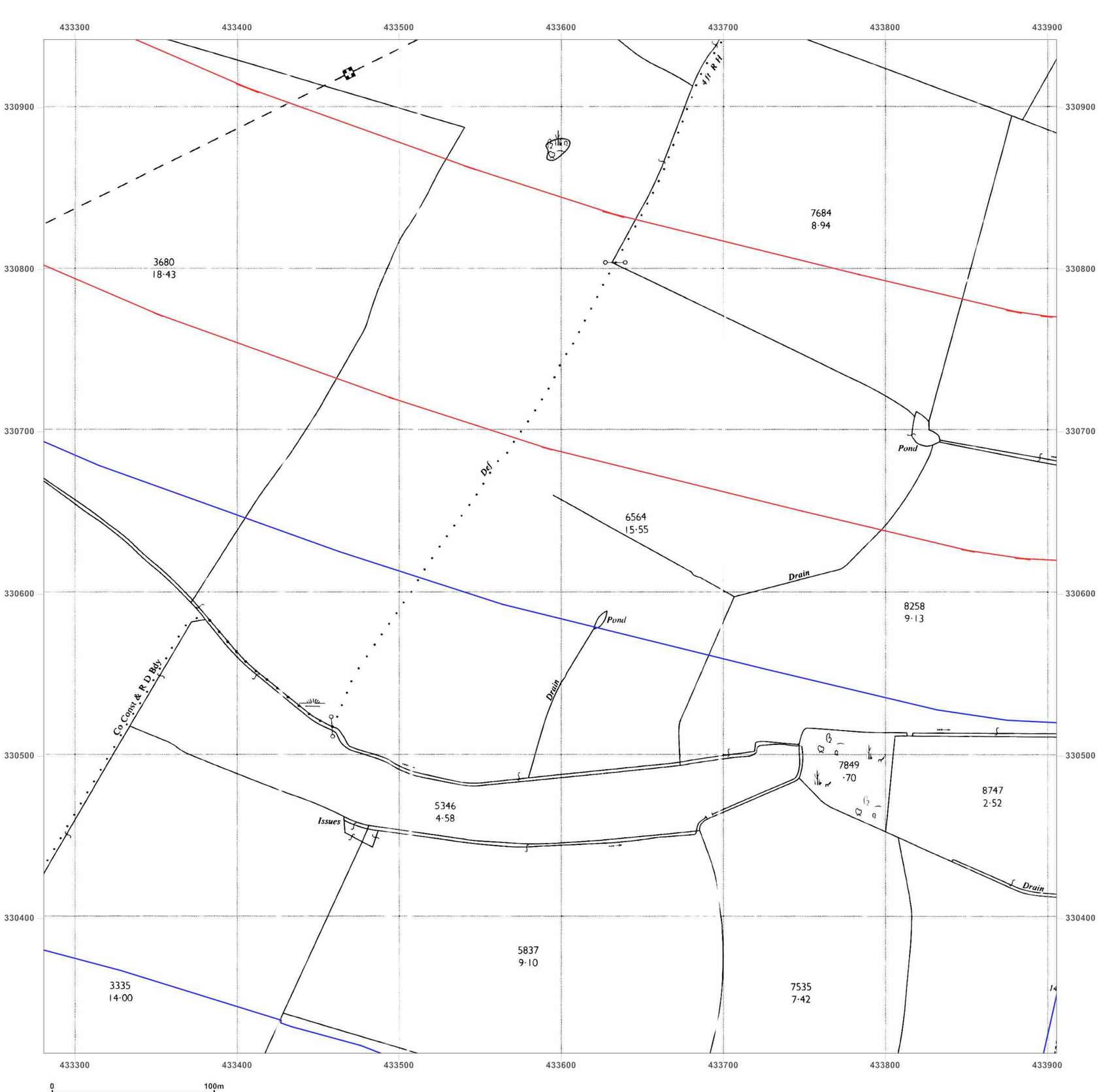
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_3
Grid Ref: 433593, 330629

Map Name: National Grid
Map date: **1968**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

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

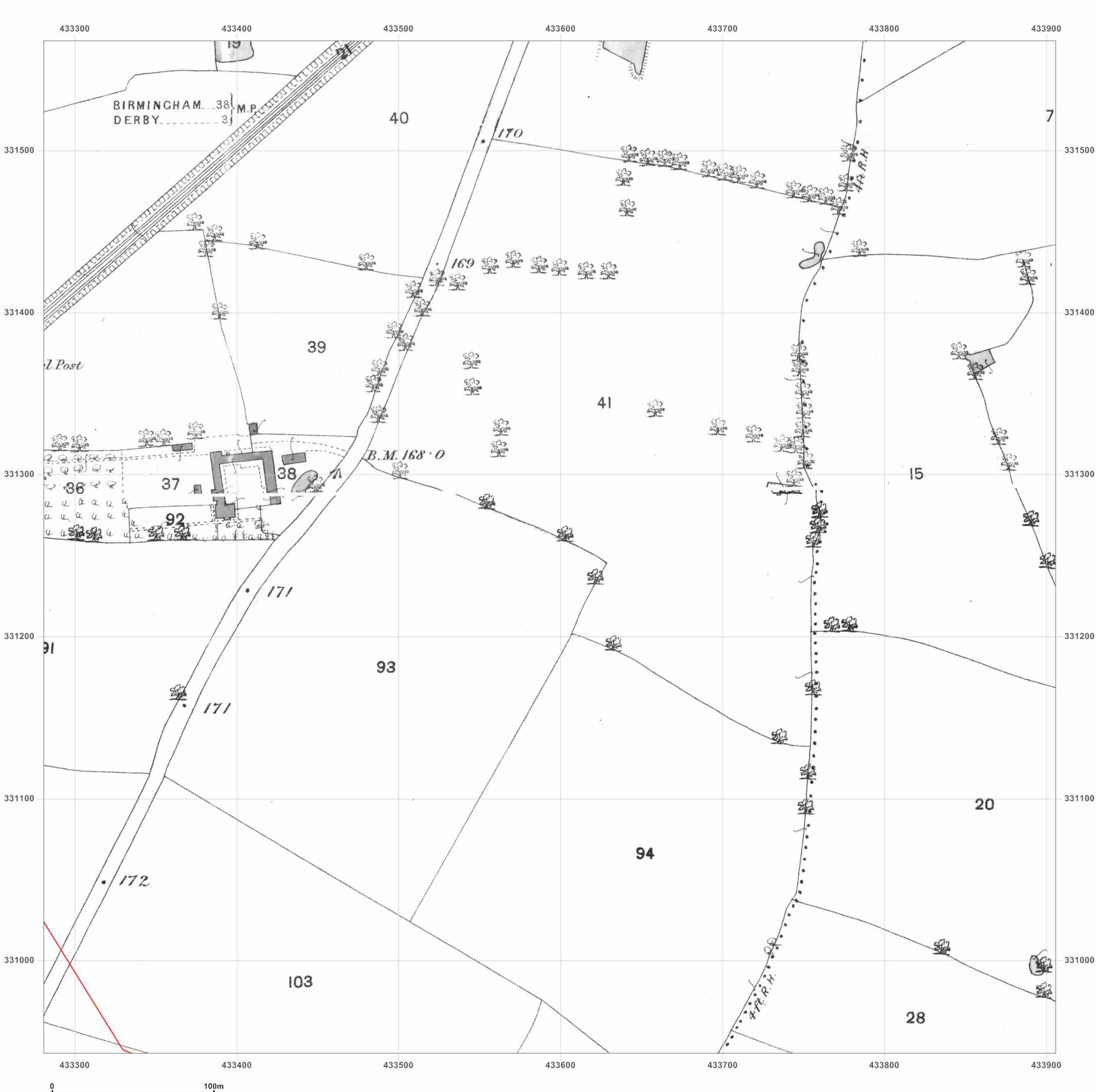
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: County Series

Map date: **1882-1883**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

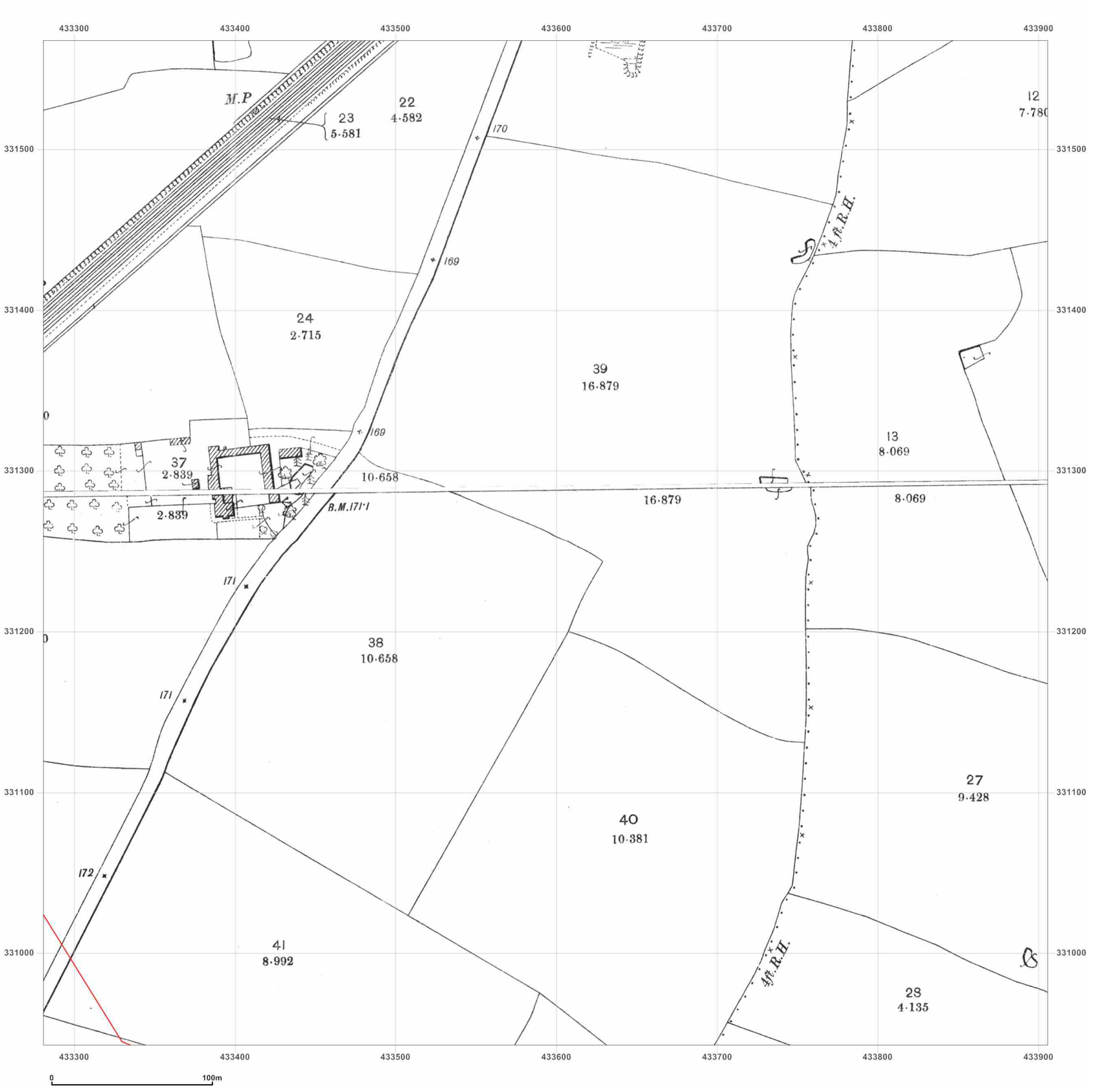
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: County Series

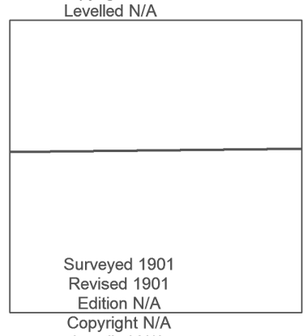
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

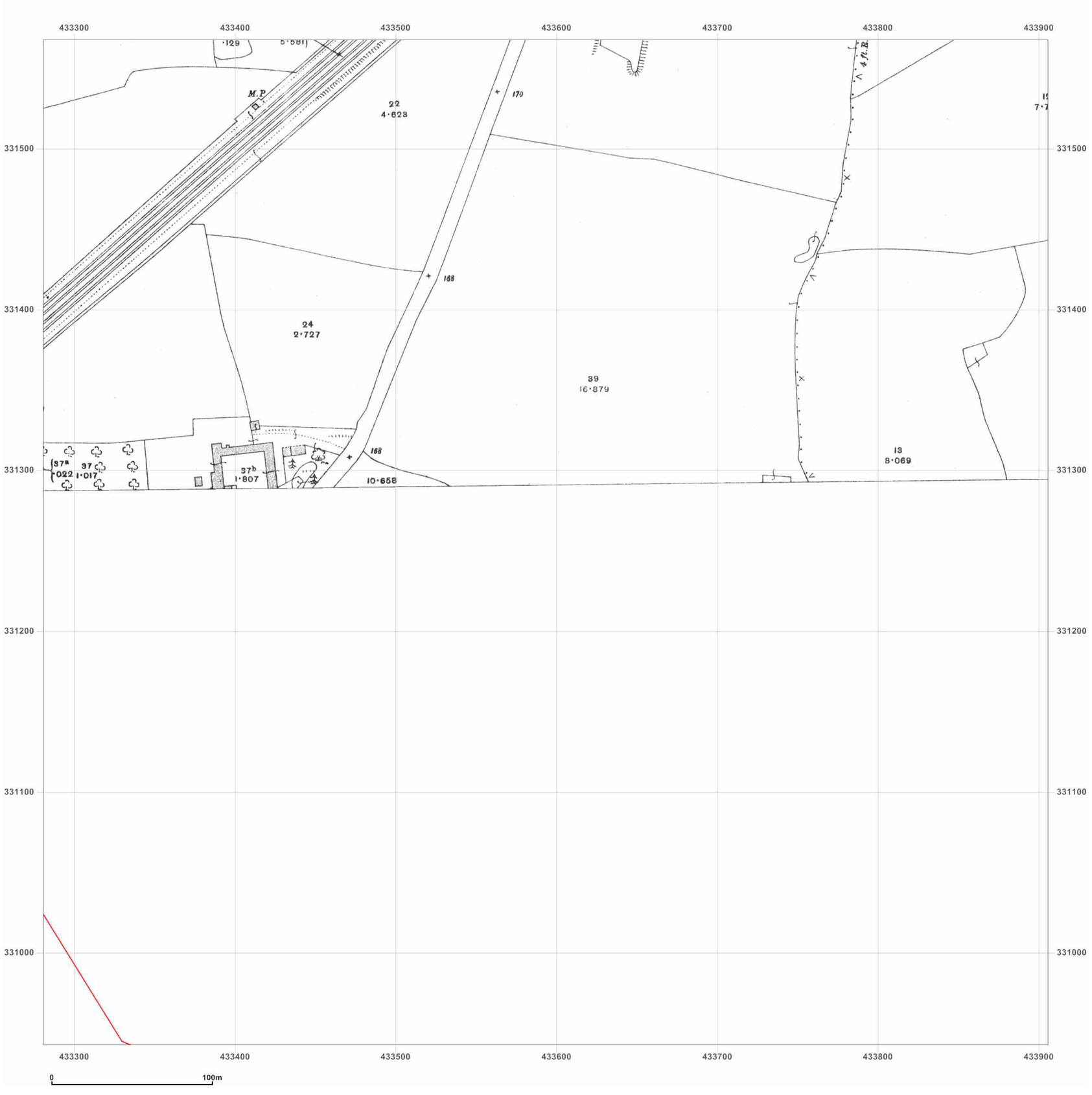
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: County Series

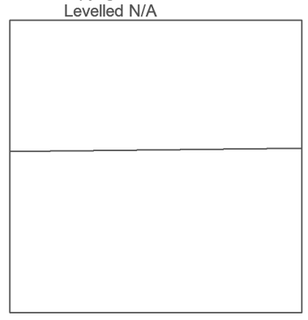
Map date: **1914**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



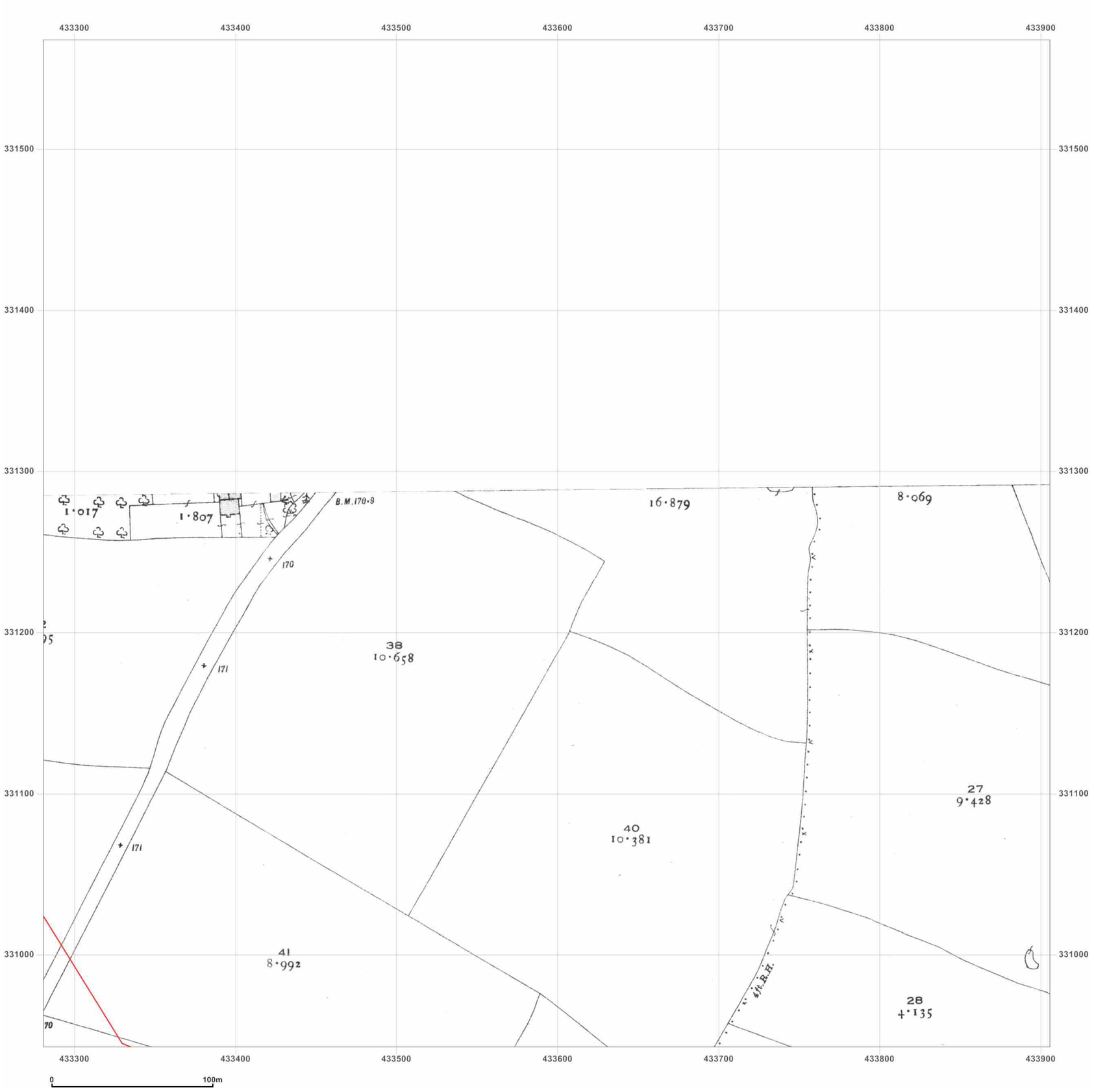
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Production date: 24 April 2019

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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

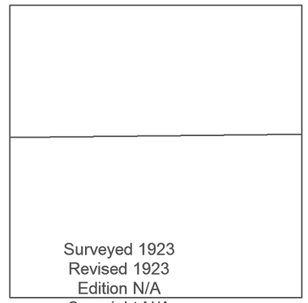
Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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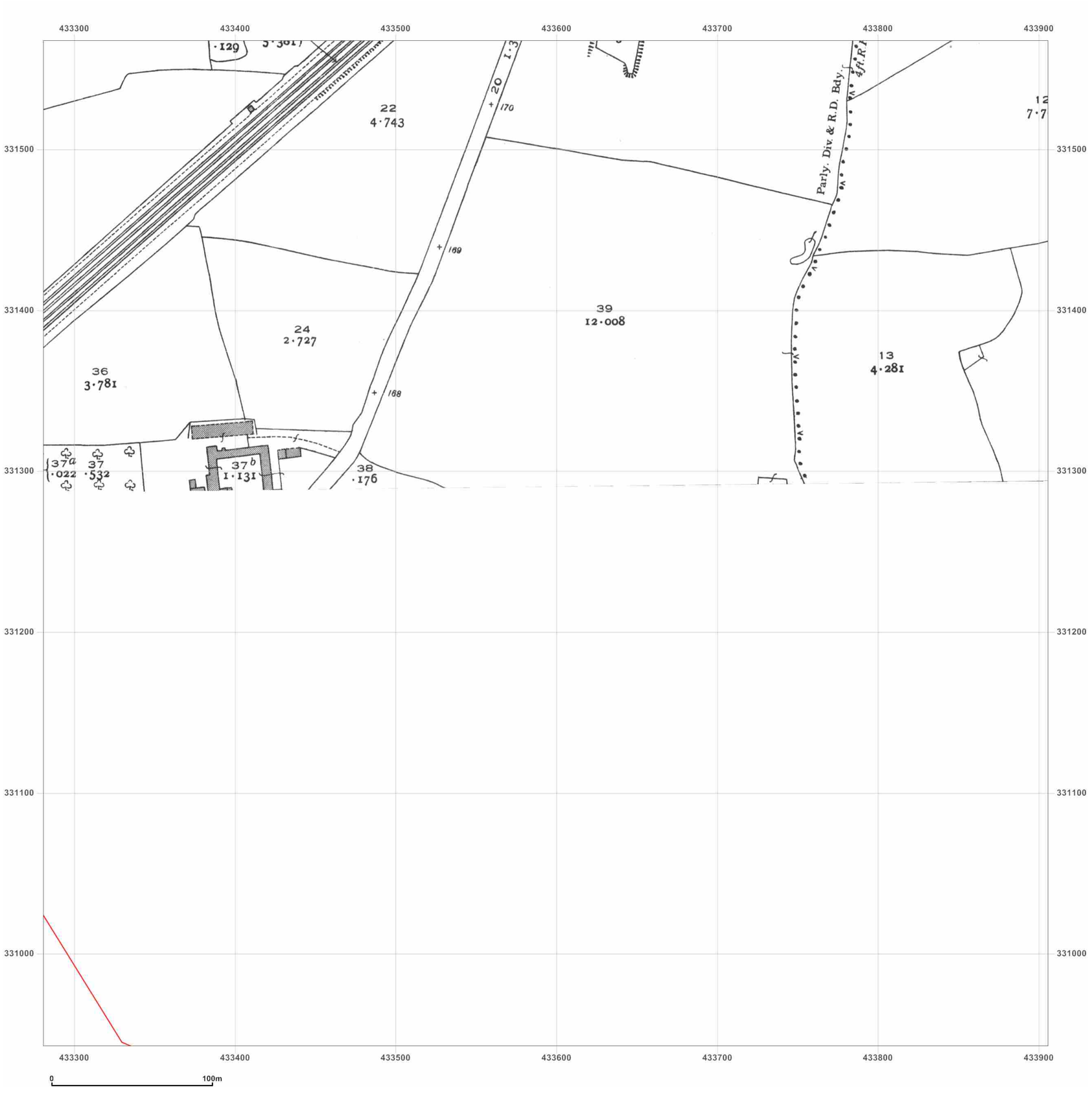
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: County Series

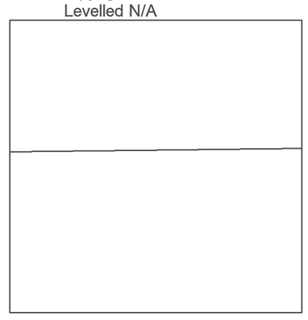
Map date: **1938**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



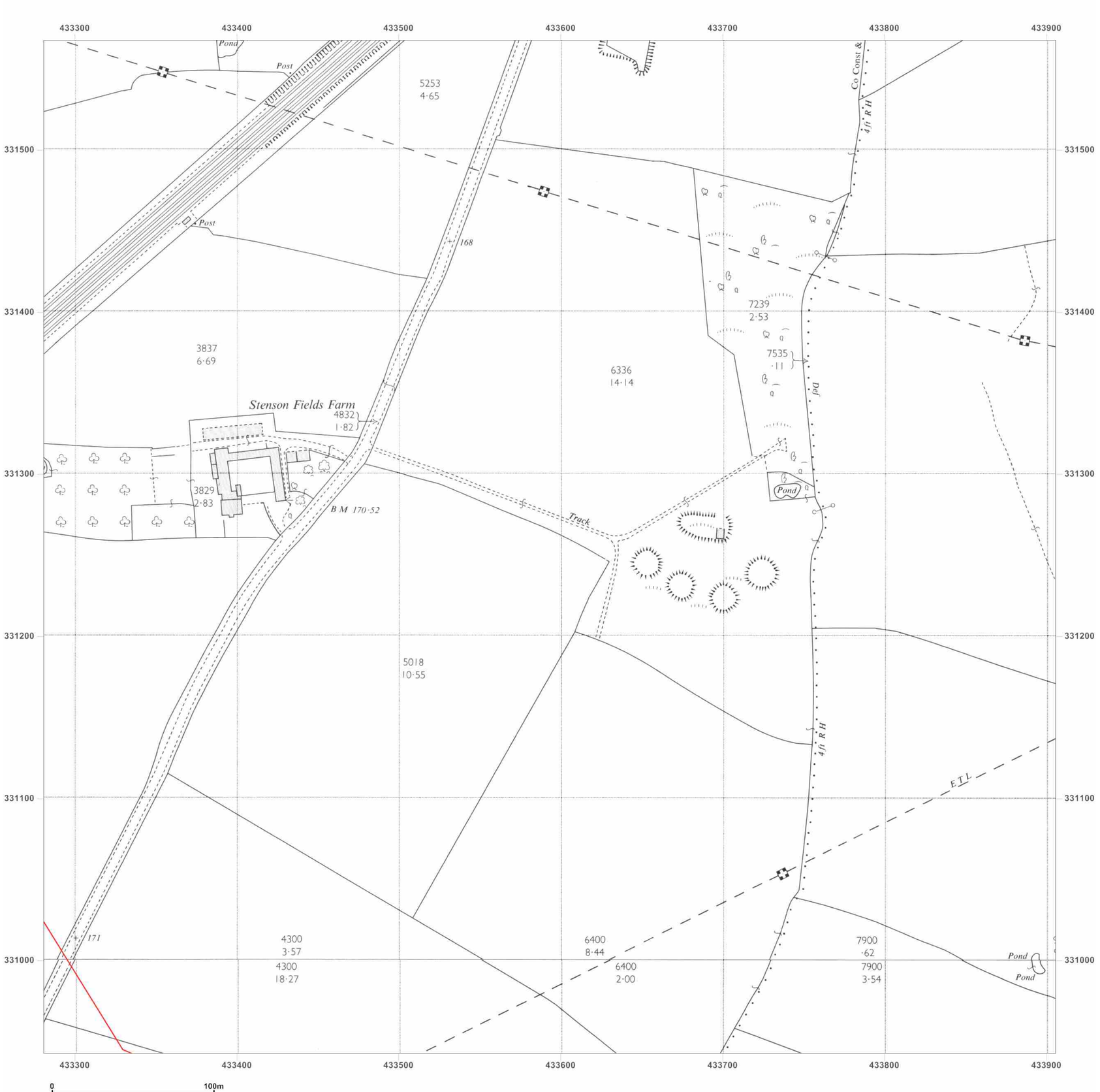
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

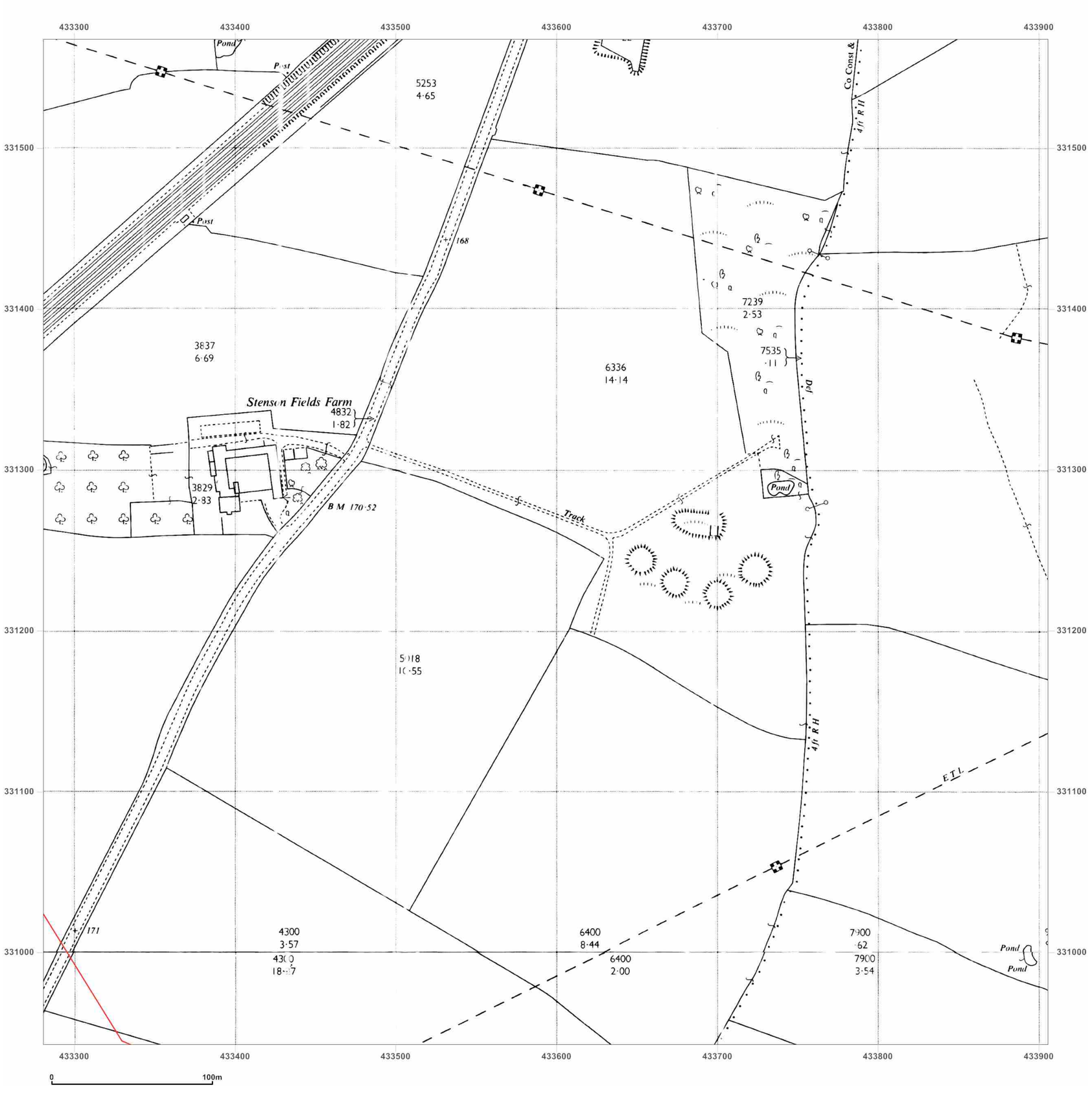
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_3_4
Grid Ref: 433593, 331255

Map Name: National Grid

Map date: **1987**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1987
Edition N/A
Copyright 1987
Levelled 1967

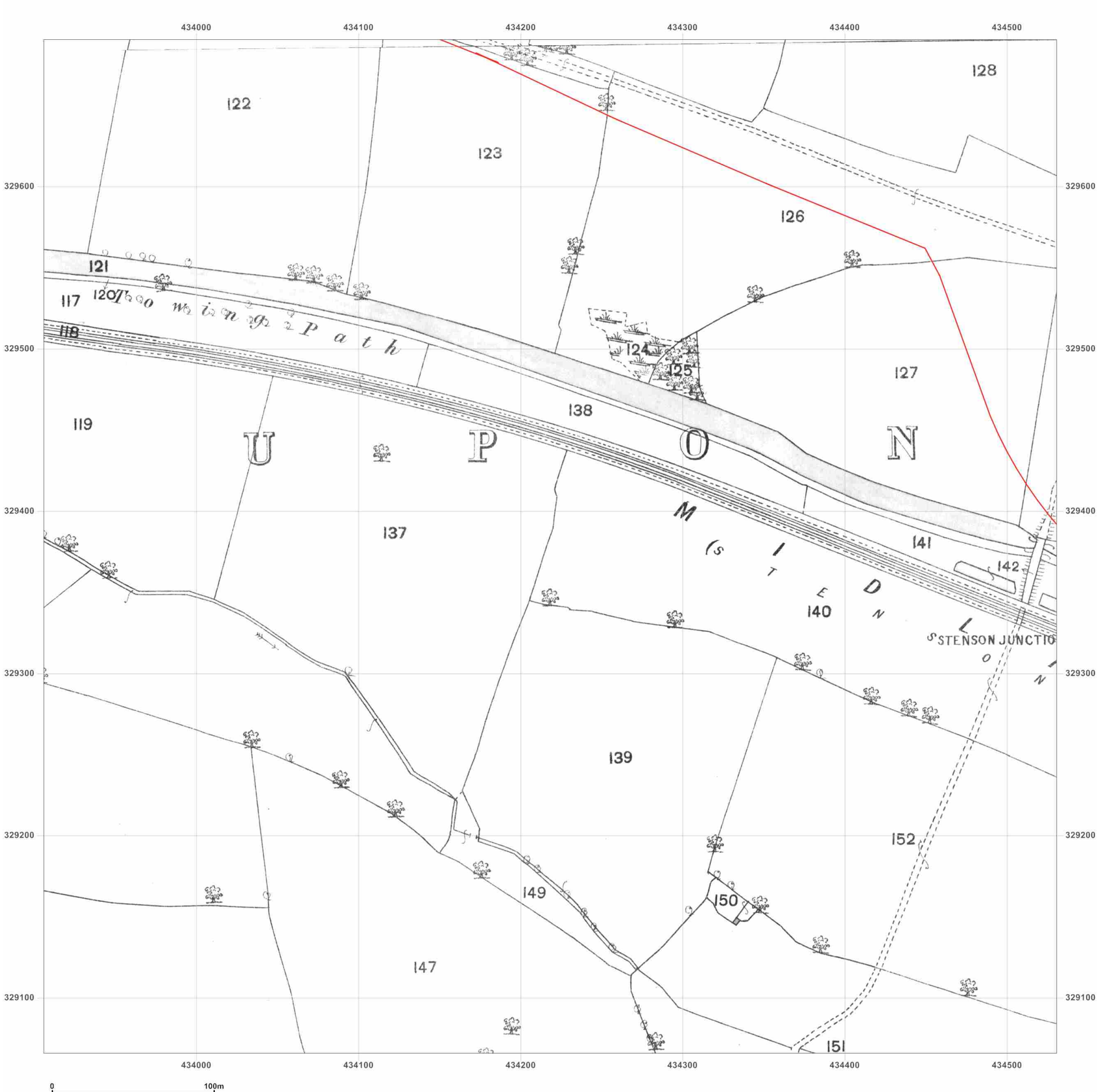
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Site Details:

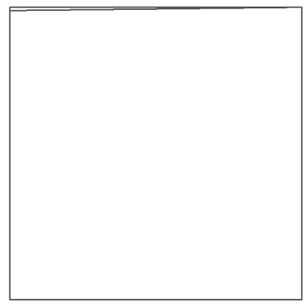
Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_1
Grid Ref: 434218, 329378

Map Name: County Series
Map date: **1882**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

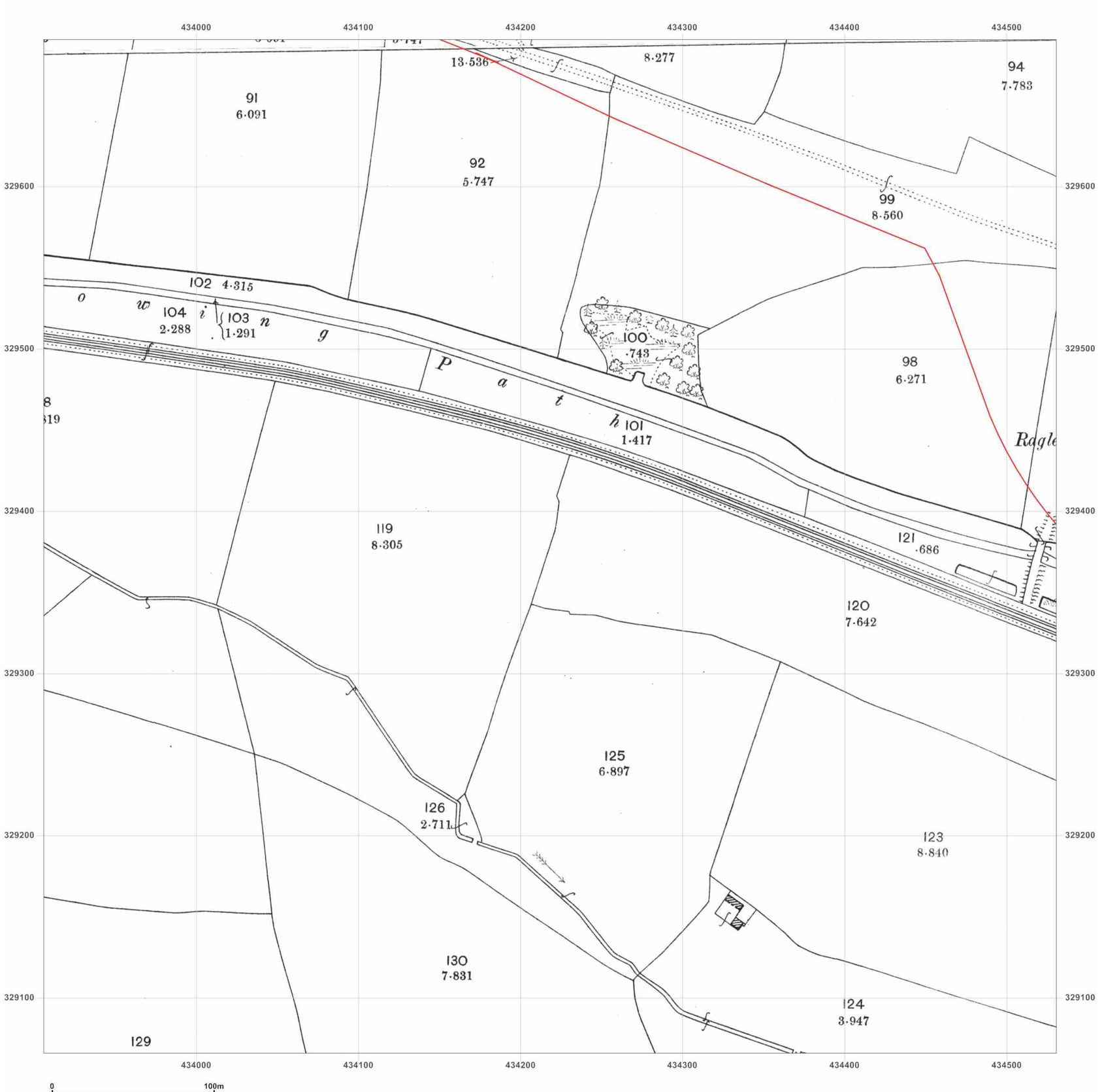
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

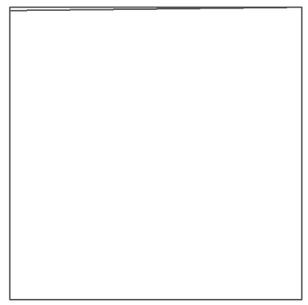
Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_1
Grid Ref: 434218, 329378

Map Name: County Series
Map date: **1901**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

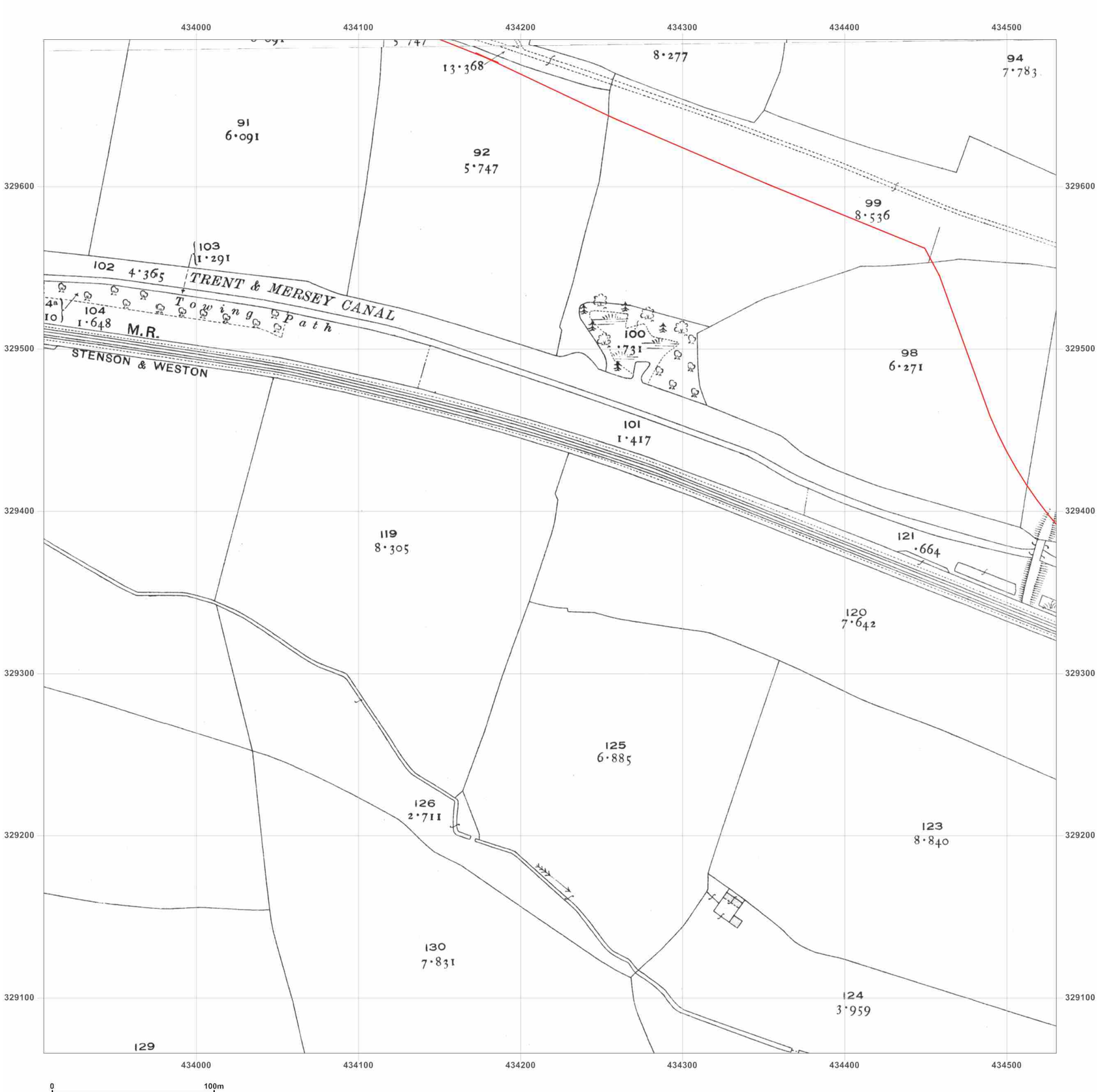
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_1
Grid Ref: 434218, 329378

Map Name: County Series

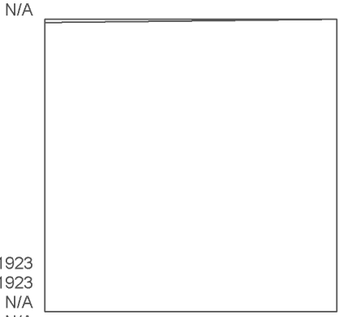
Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

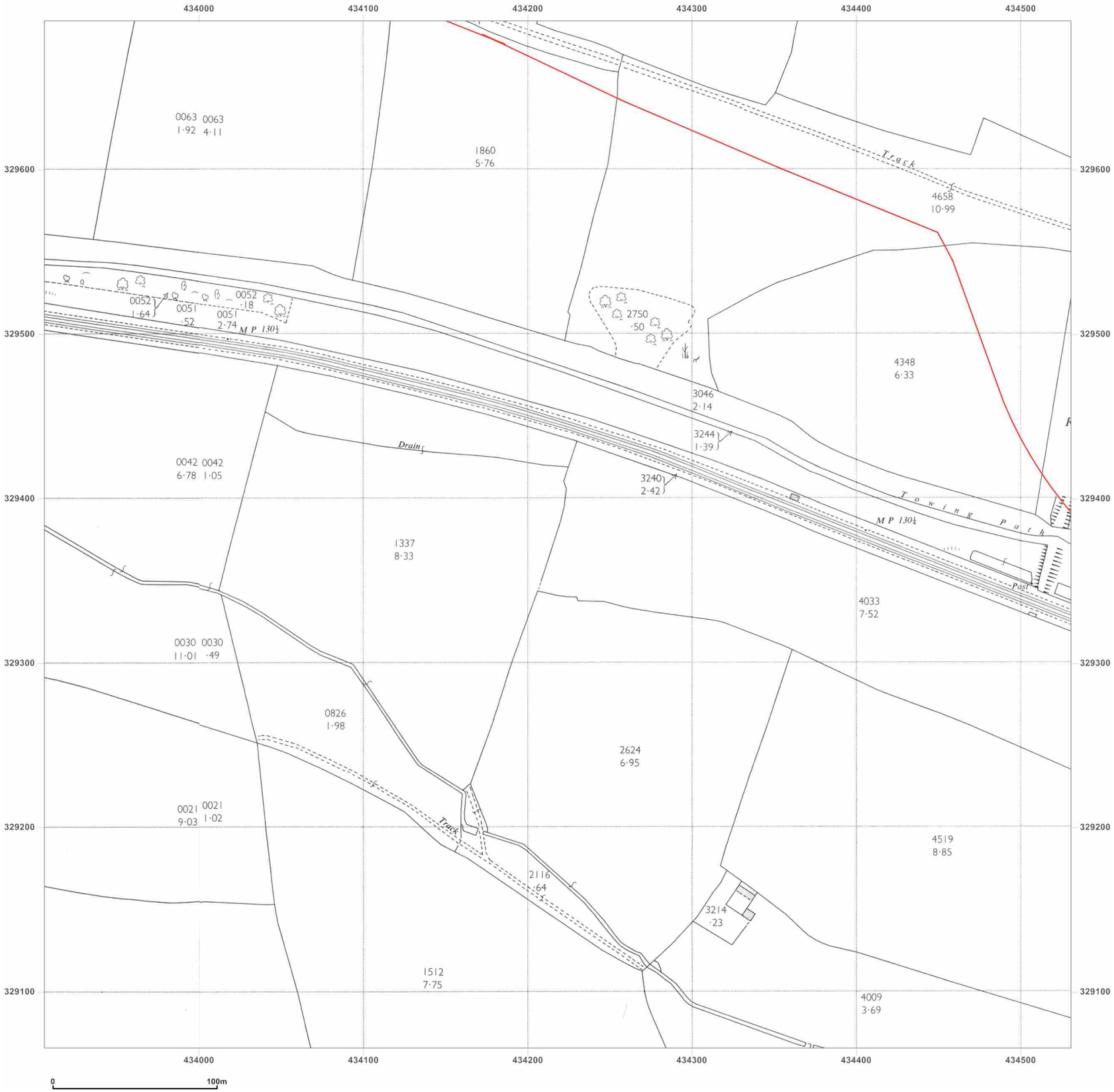
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_1
Grid Ref: 434218, 329378

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1969
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

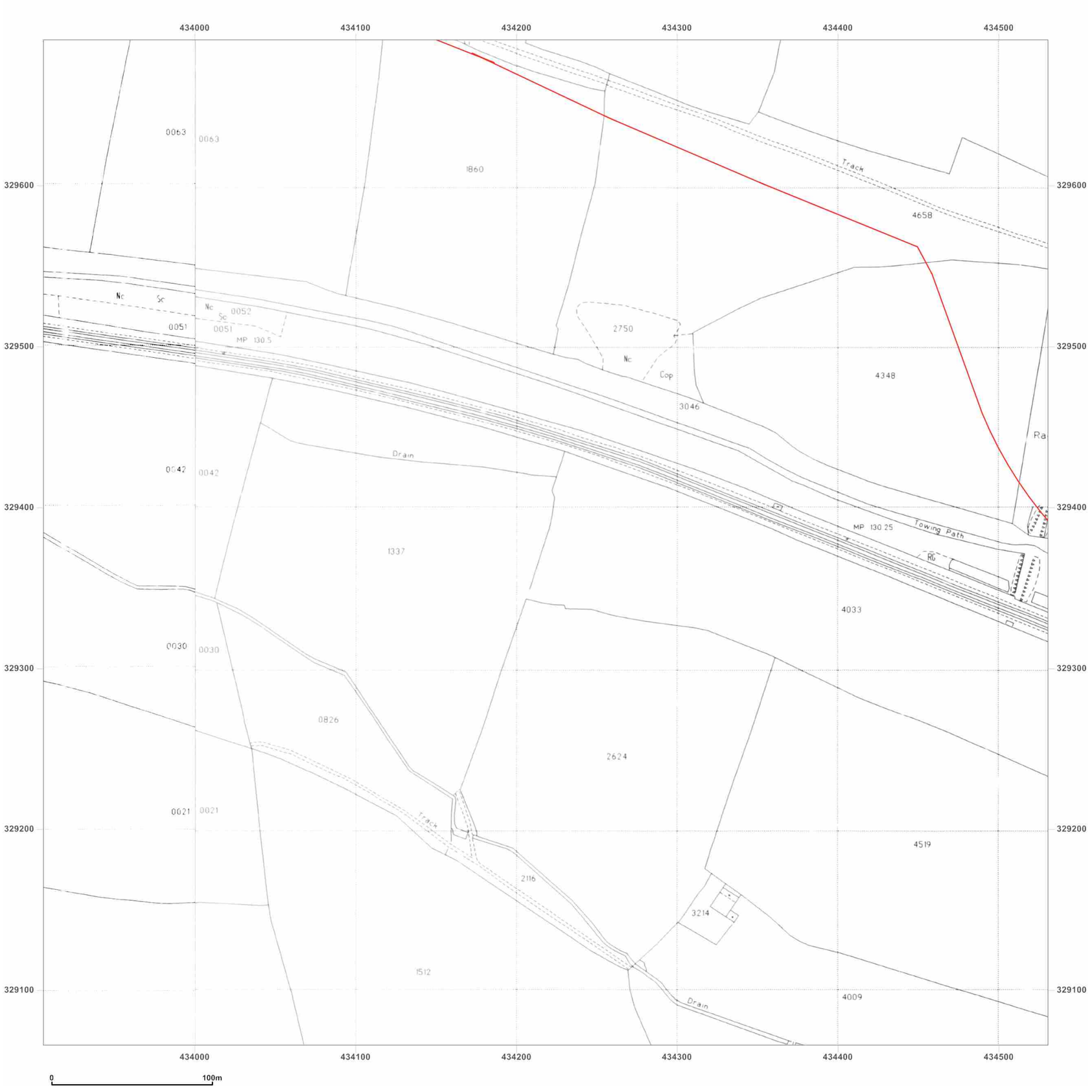
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_1
Grid Ref: 434218, 329378

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

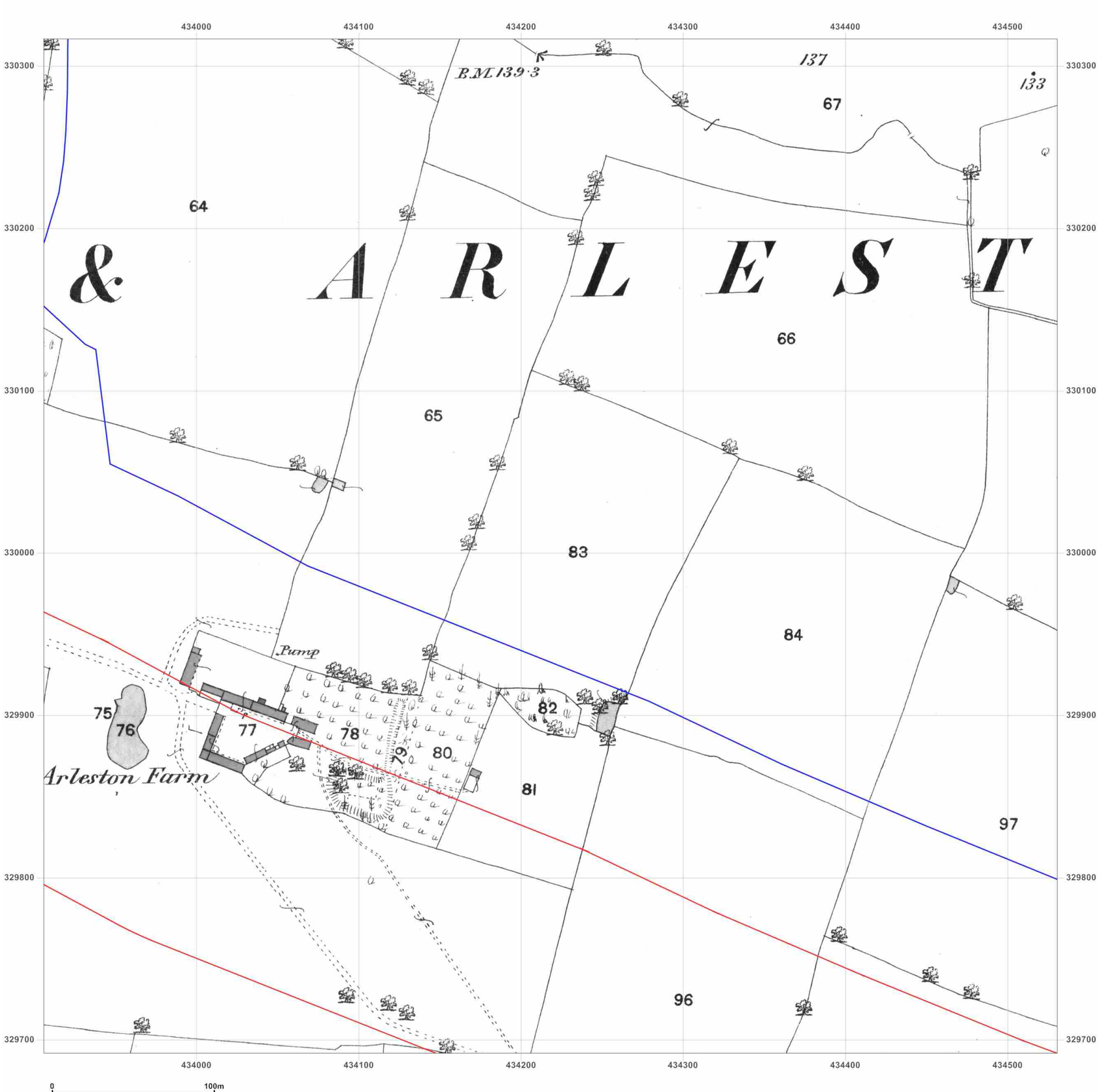
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

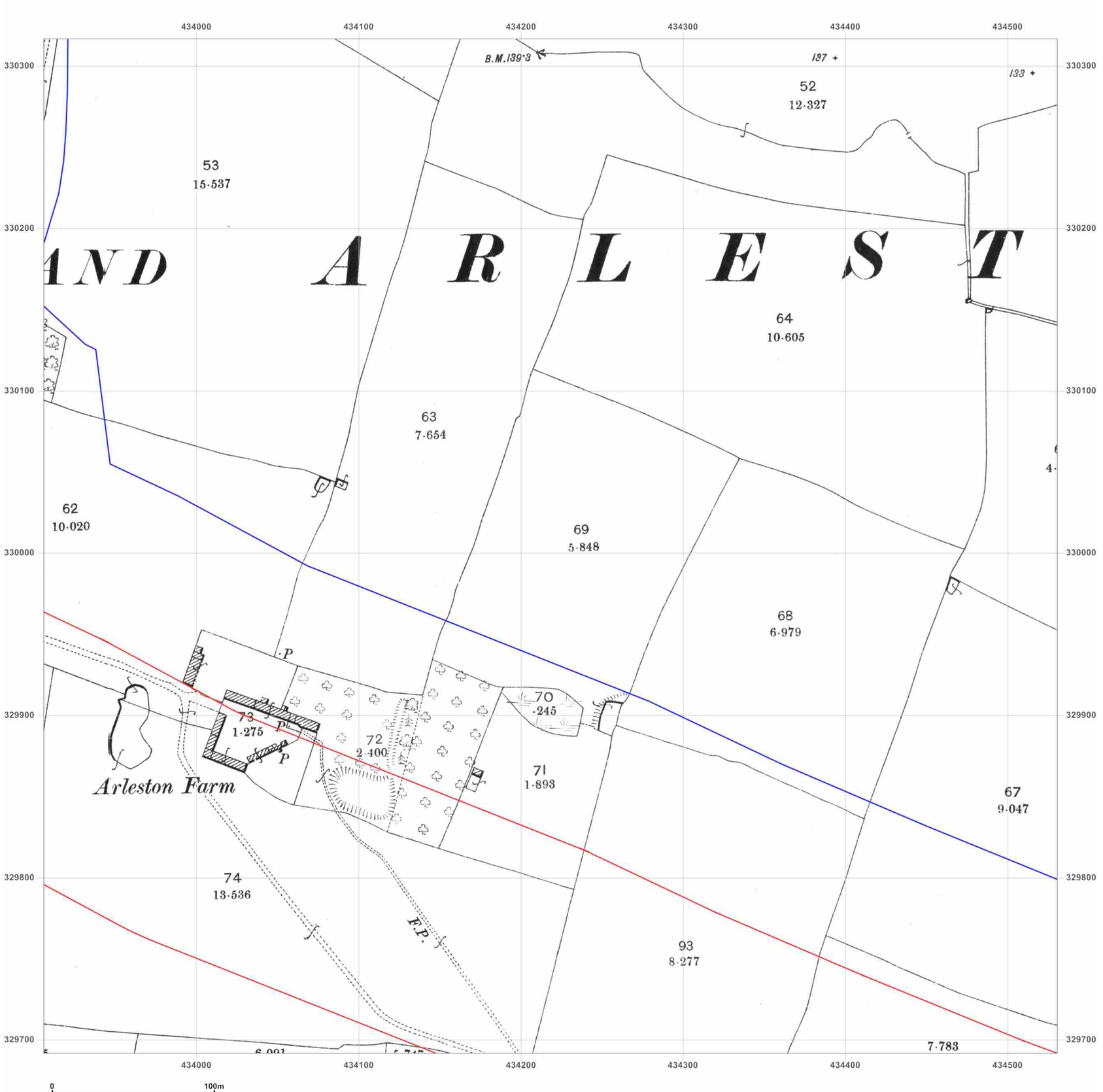
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: County Series
Map date: **1901**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

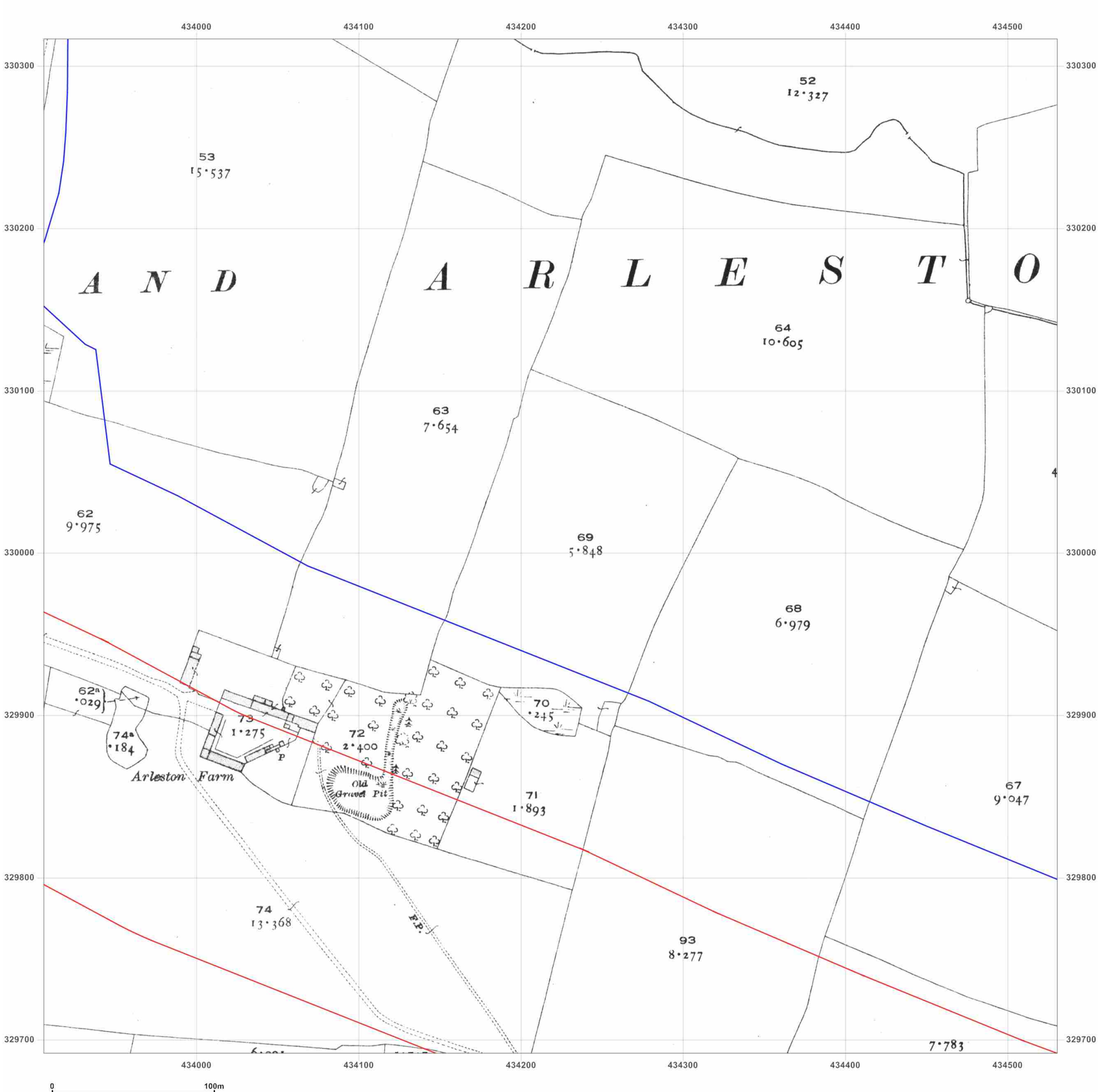
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: County Series
Map date: **1923**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

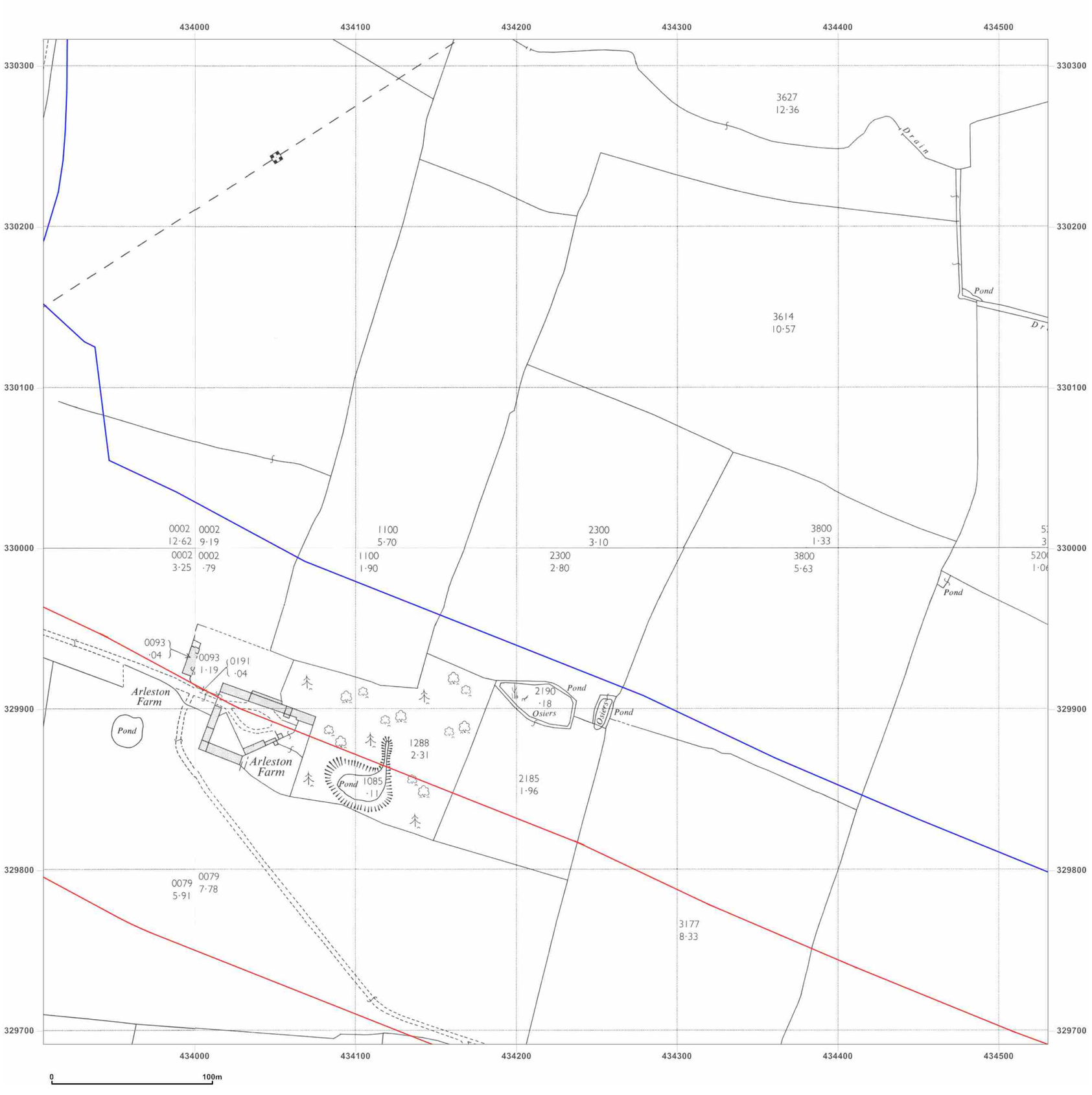
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: National Grid

Map date: **1966-1967**

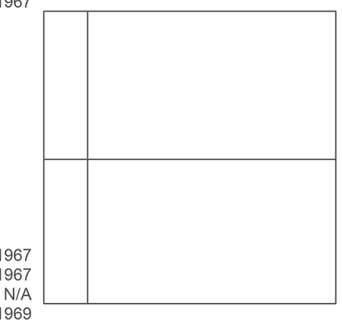
Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967



Surveyed 1967
Revised 1967
Edition N/A
Copyright 1969
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

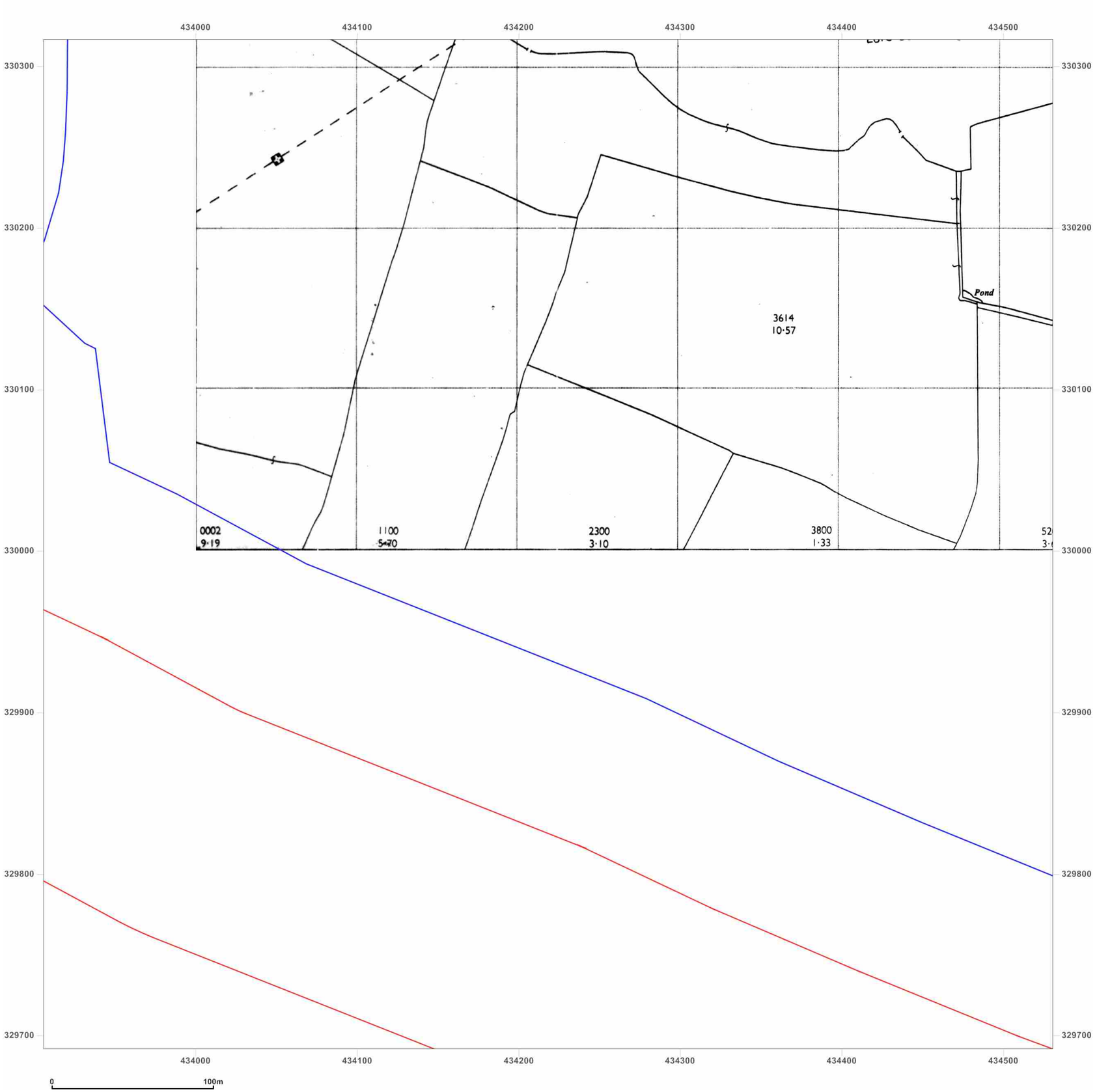
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: National Grid

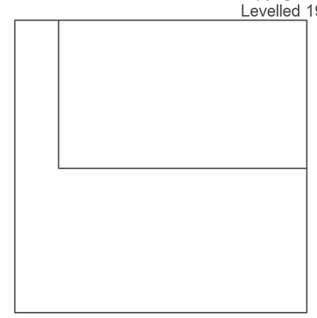
Map date: **1988**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1988
Edition N/A
Copyright 1988
Levelled 1967



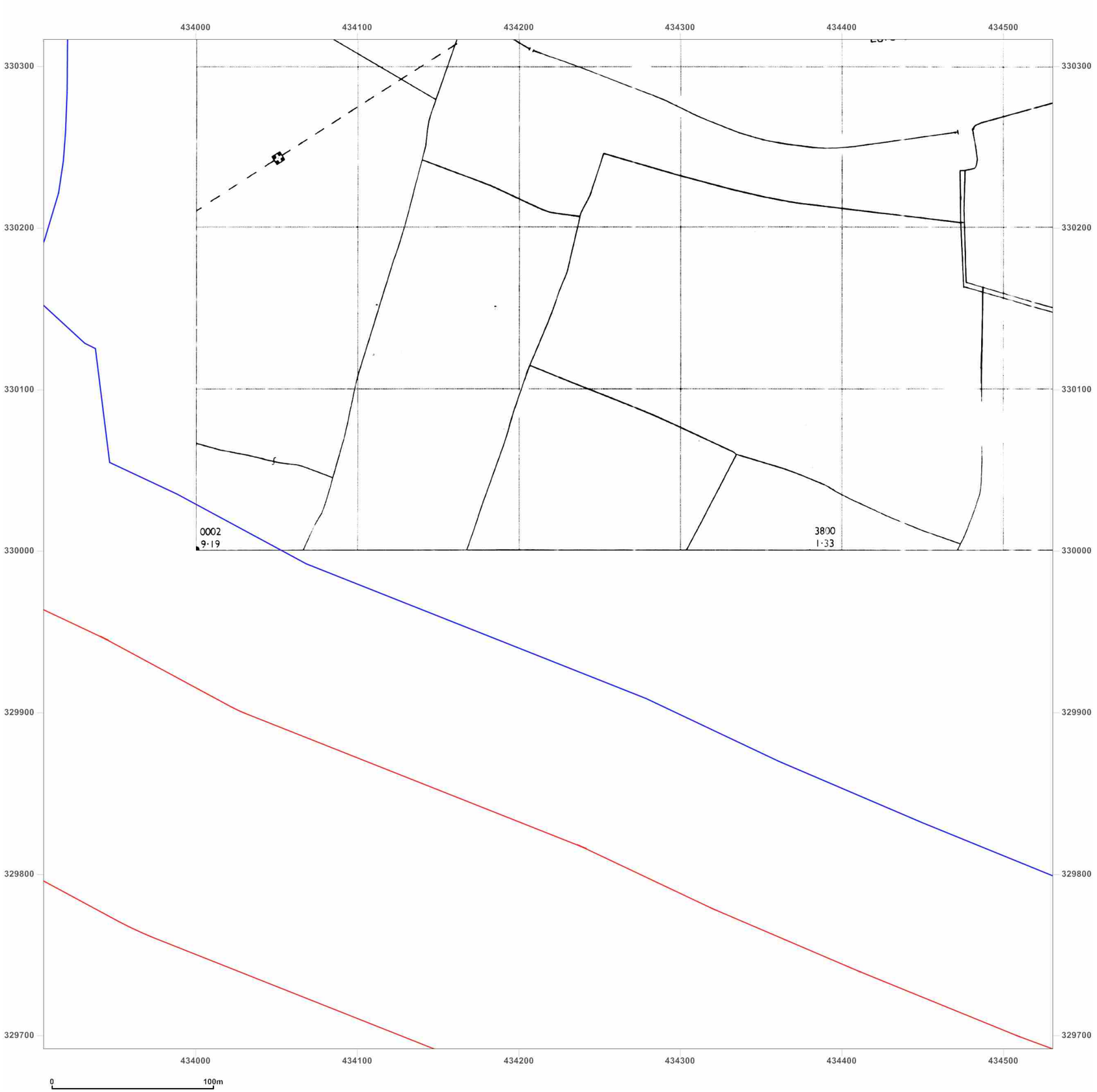
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: National Grid

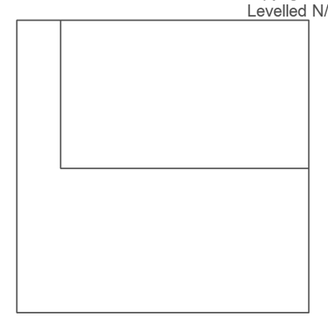
Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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



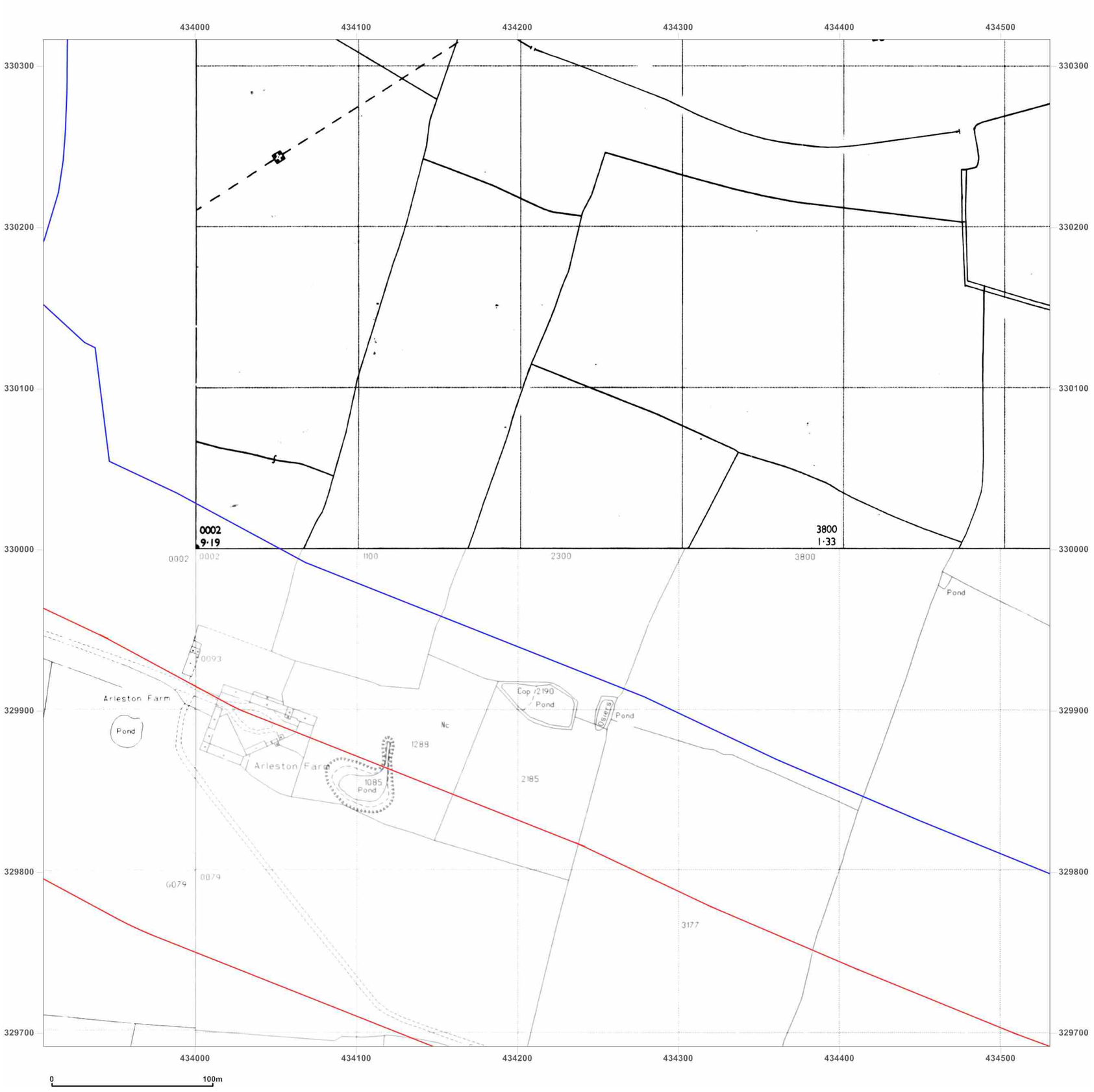
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_2
Grid Ref: 434218, 330004

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

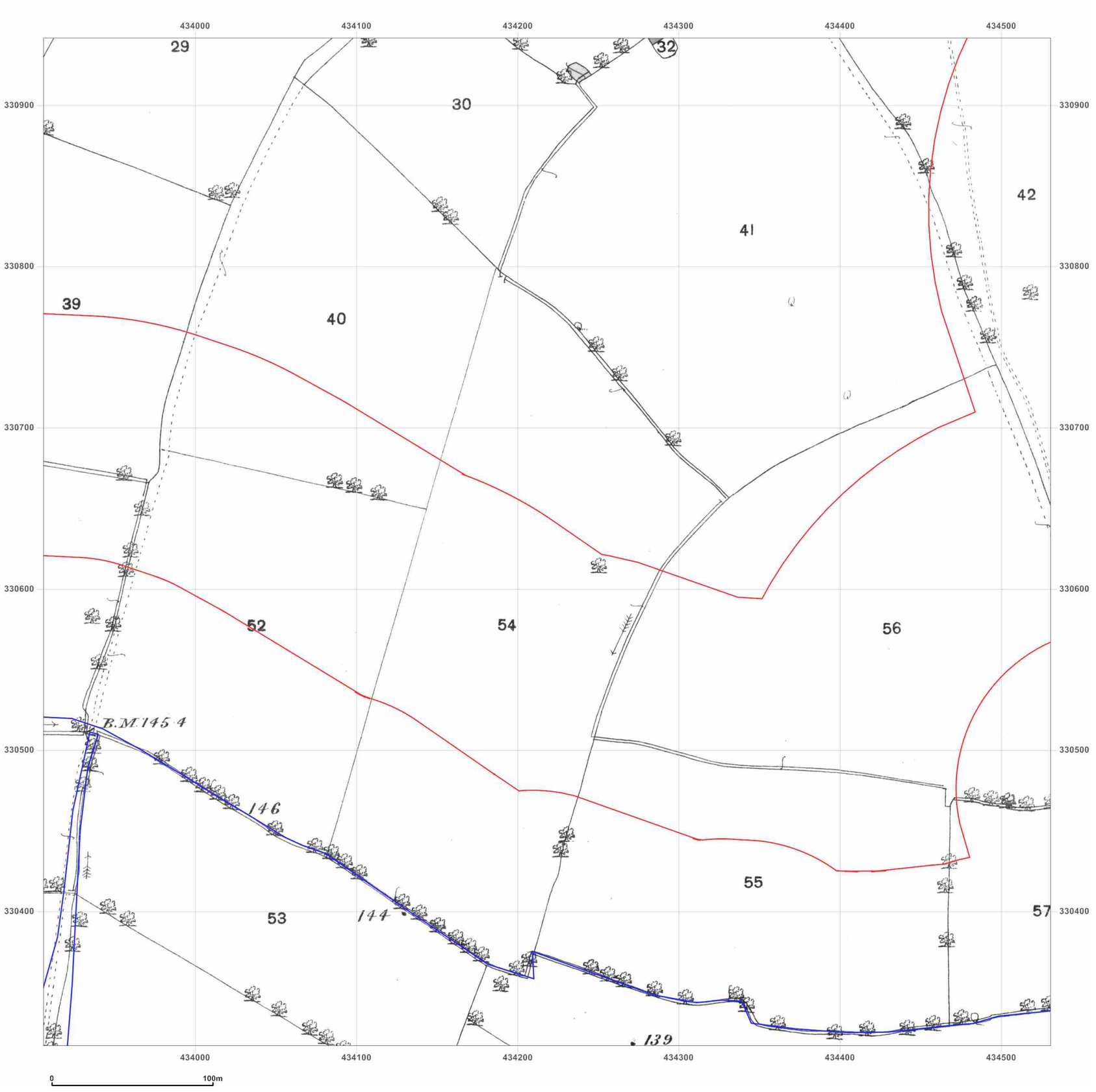
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

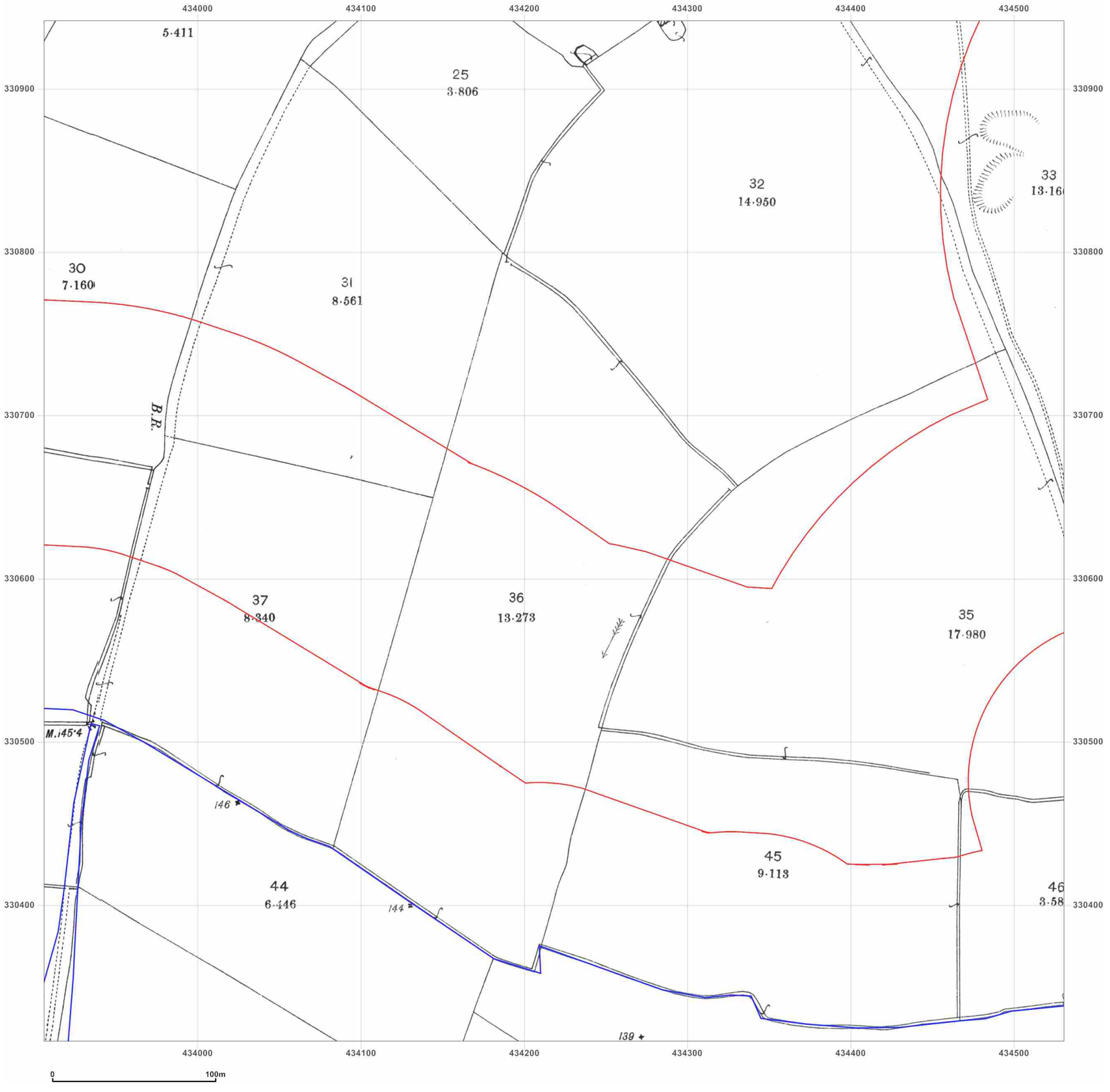
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

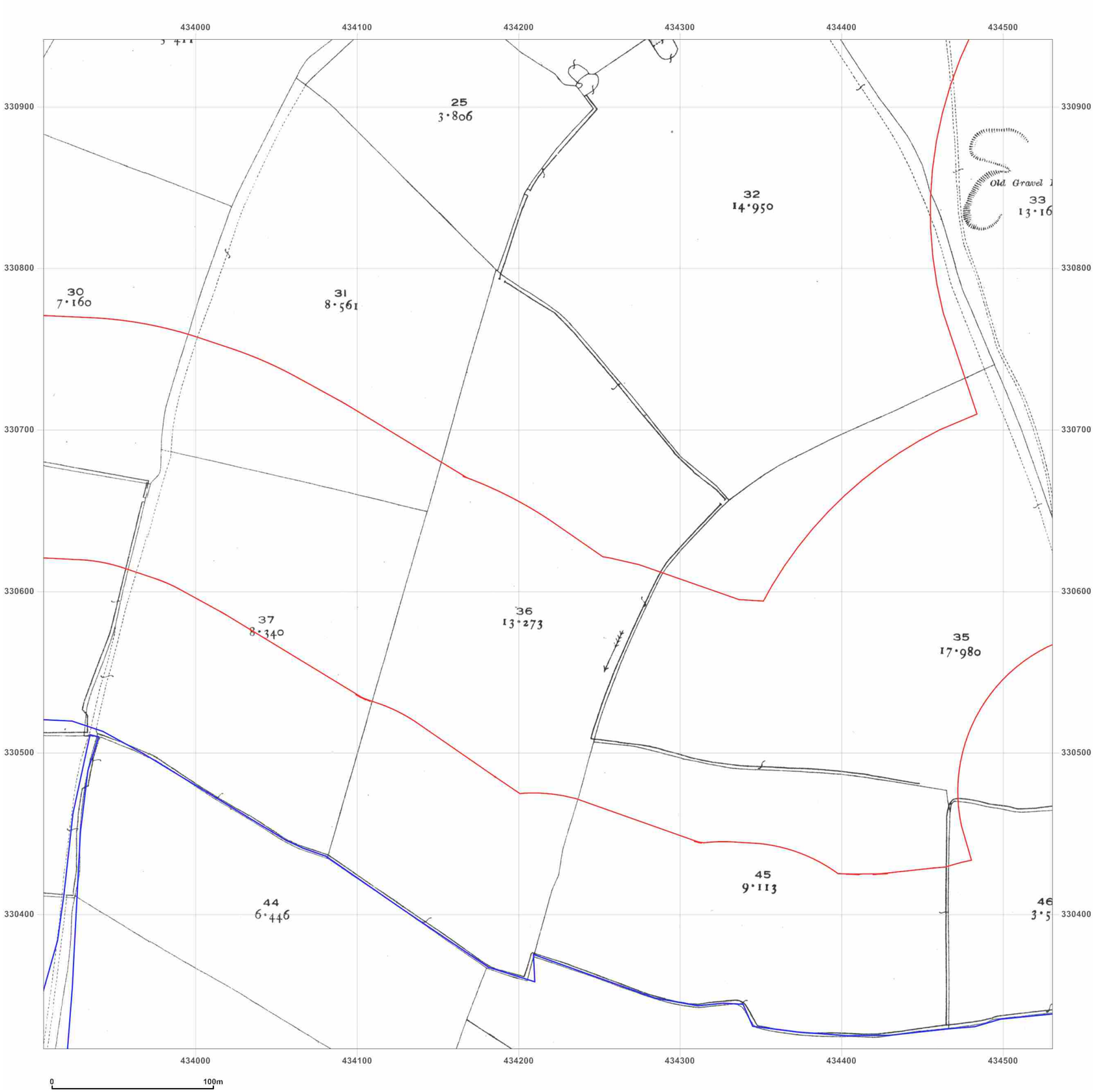
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

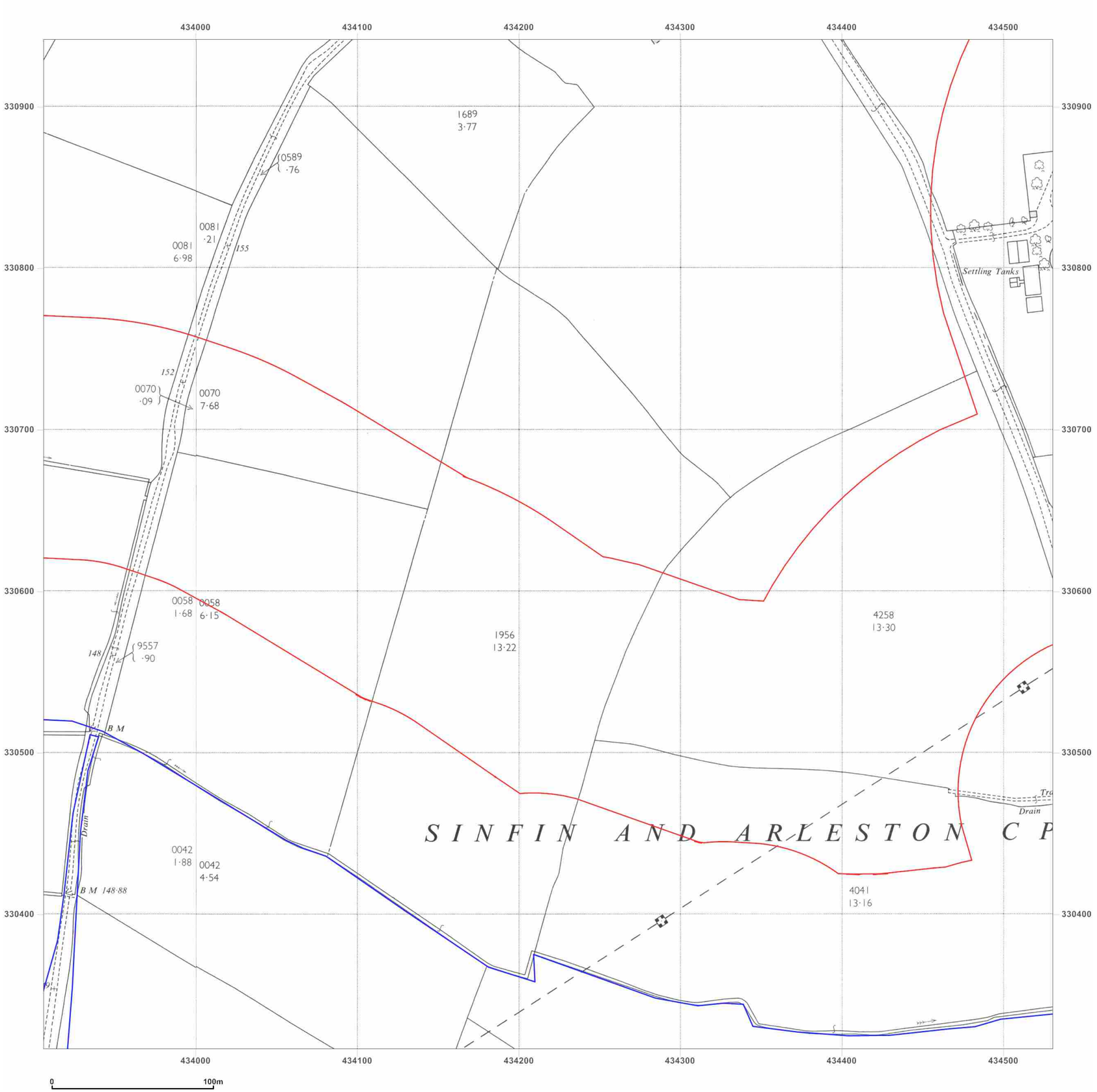
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

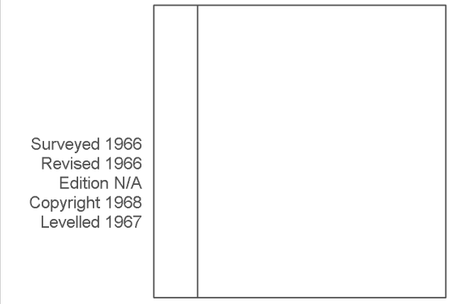
Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



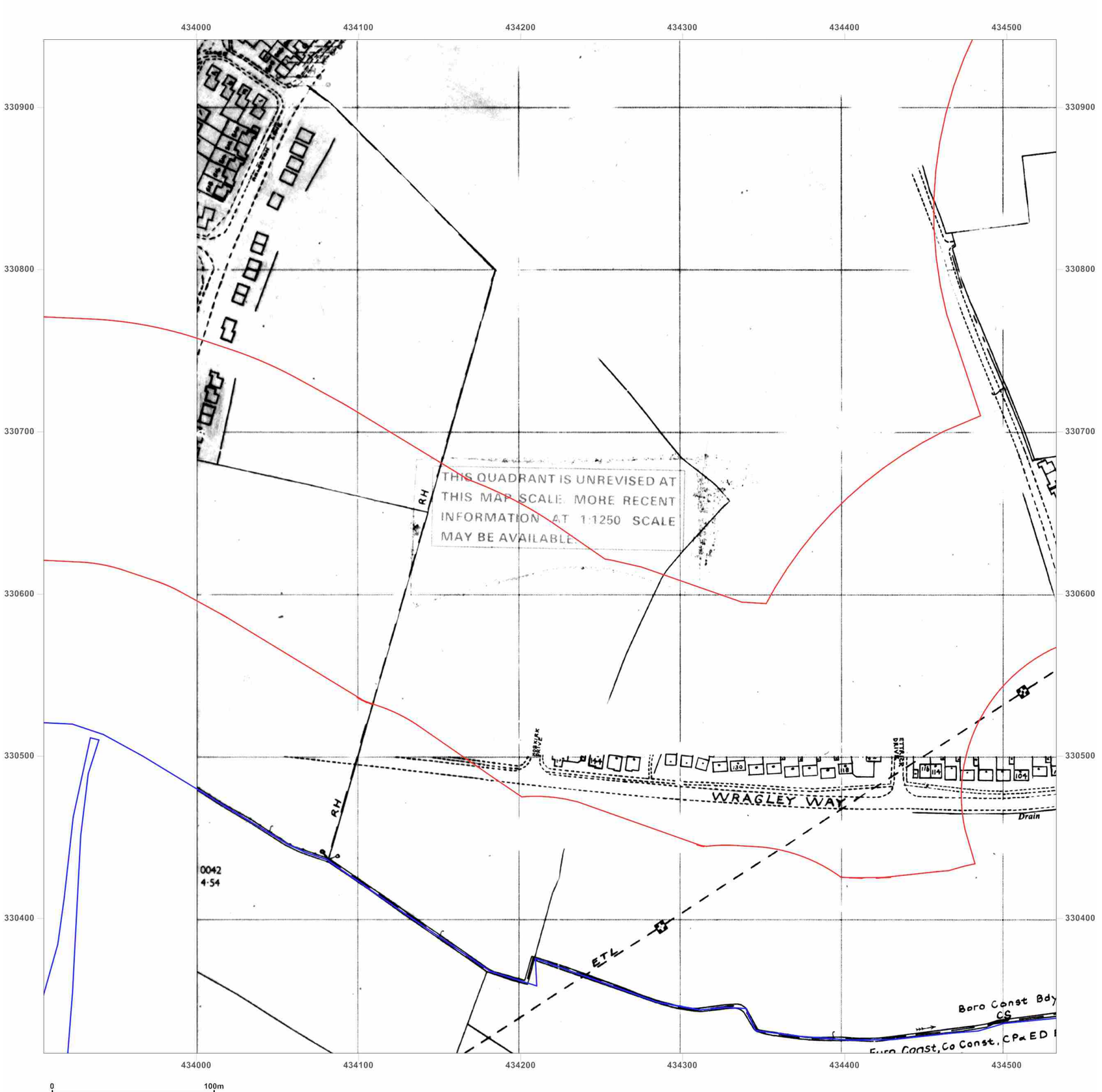
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: National Grid

Map date: **1988**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1988
Edition N/A
Copyright 1988
Levelled 1967

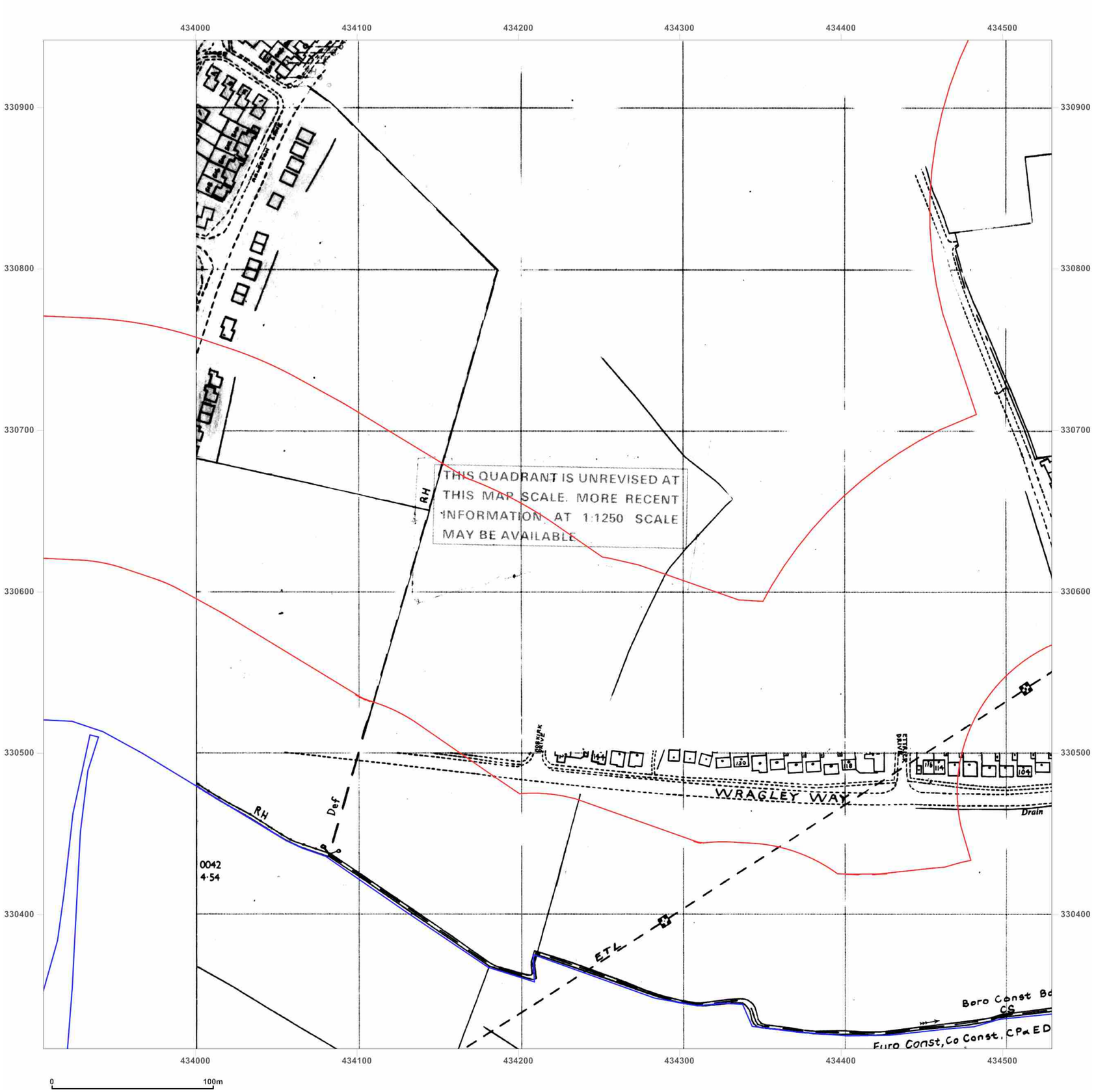
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: National Grid

Map date: **1989**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

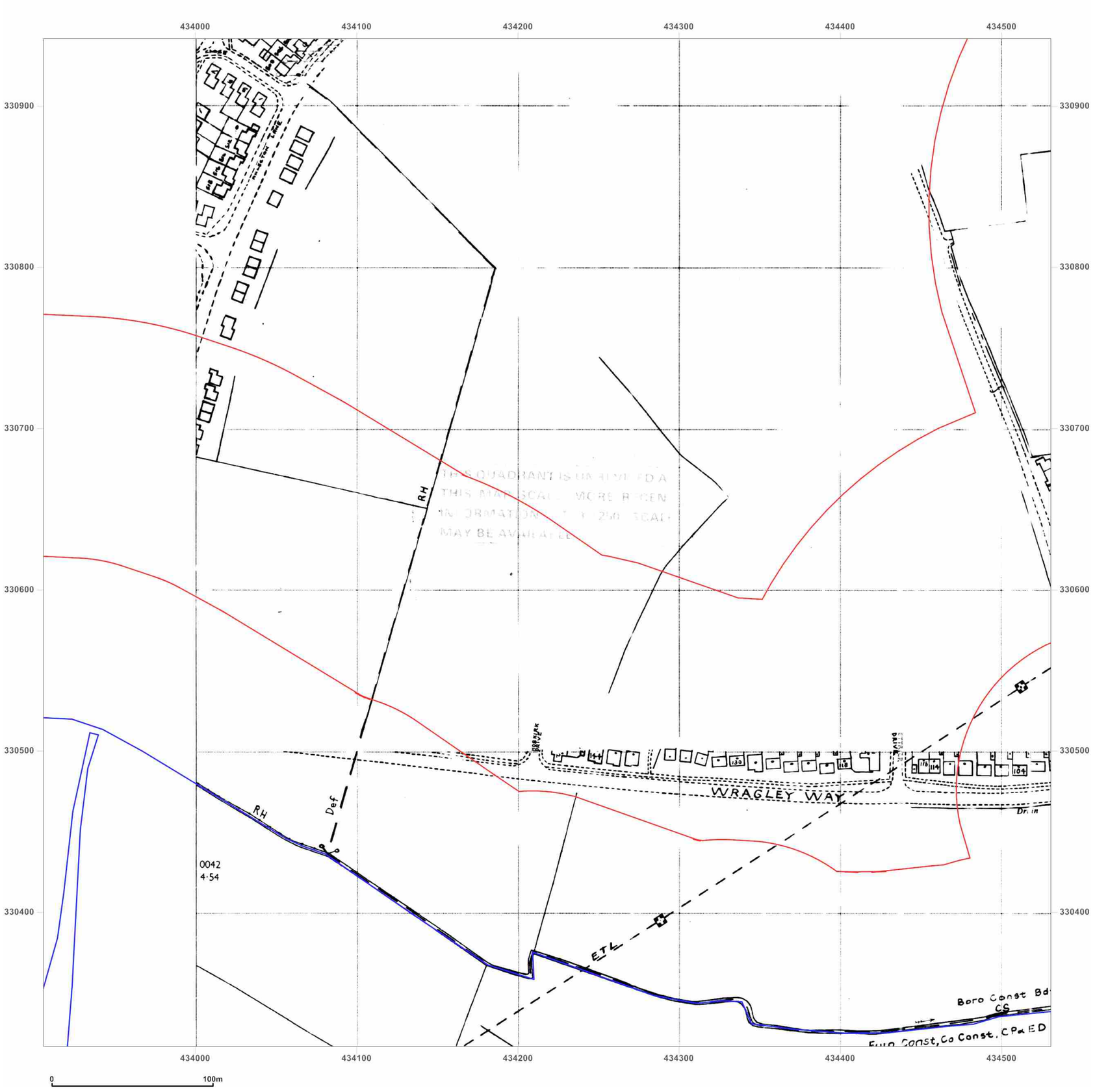
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_3
Grid Ref: 434218, 330629

Map Name: National Grid

Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

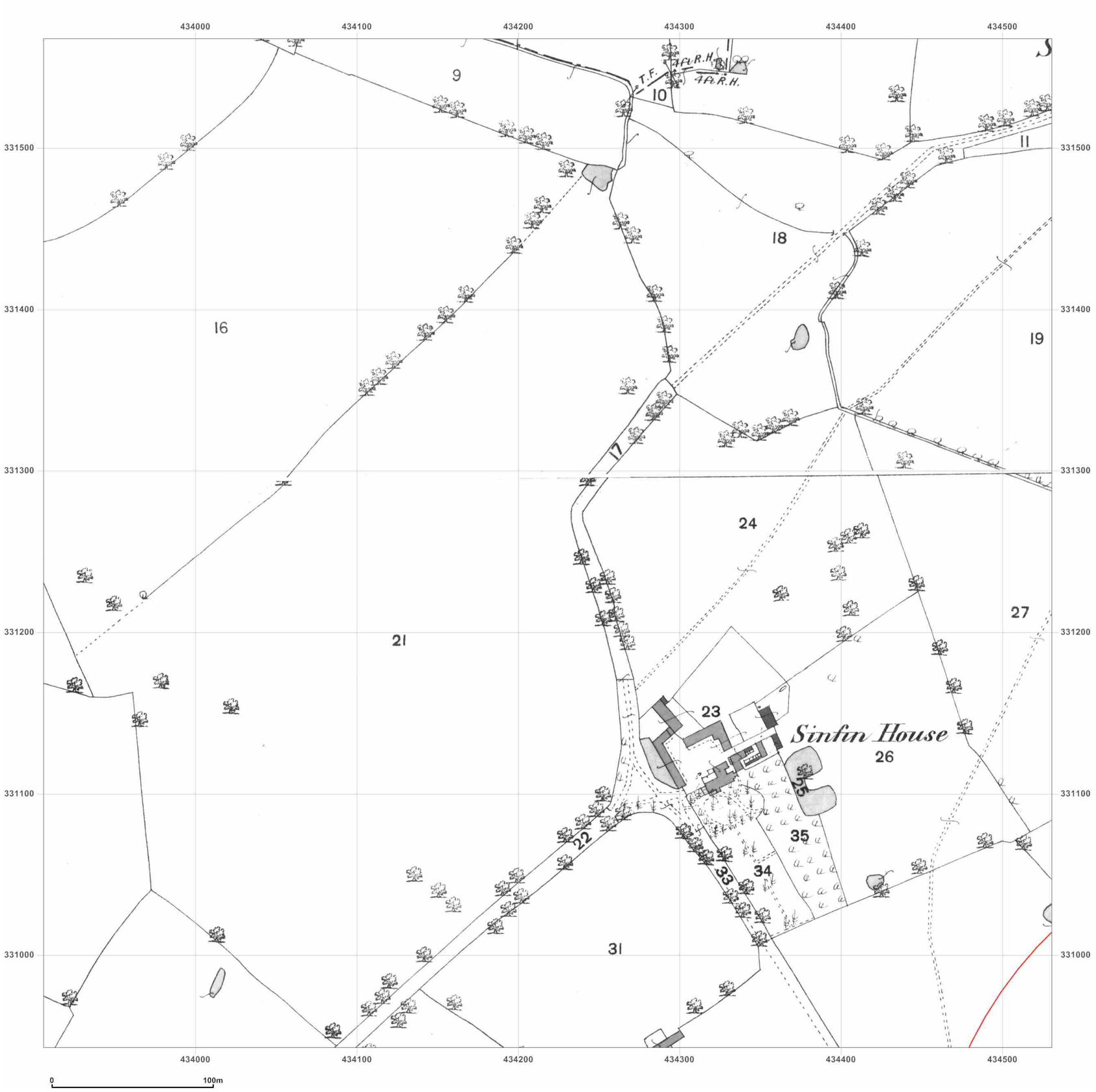
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

Map Name: County Series

Map date: **1882-1883**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

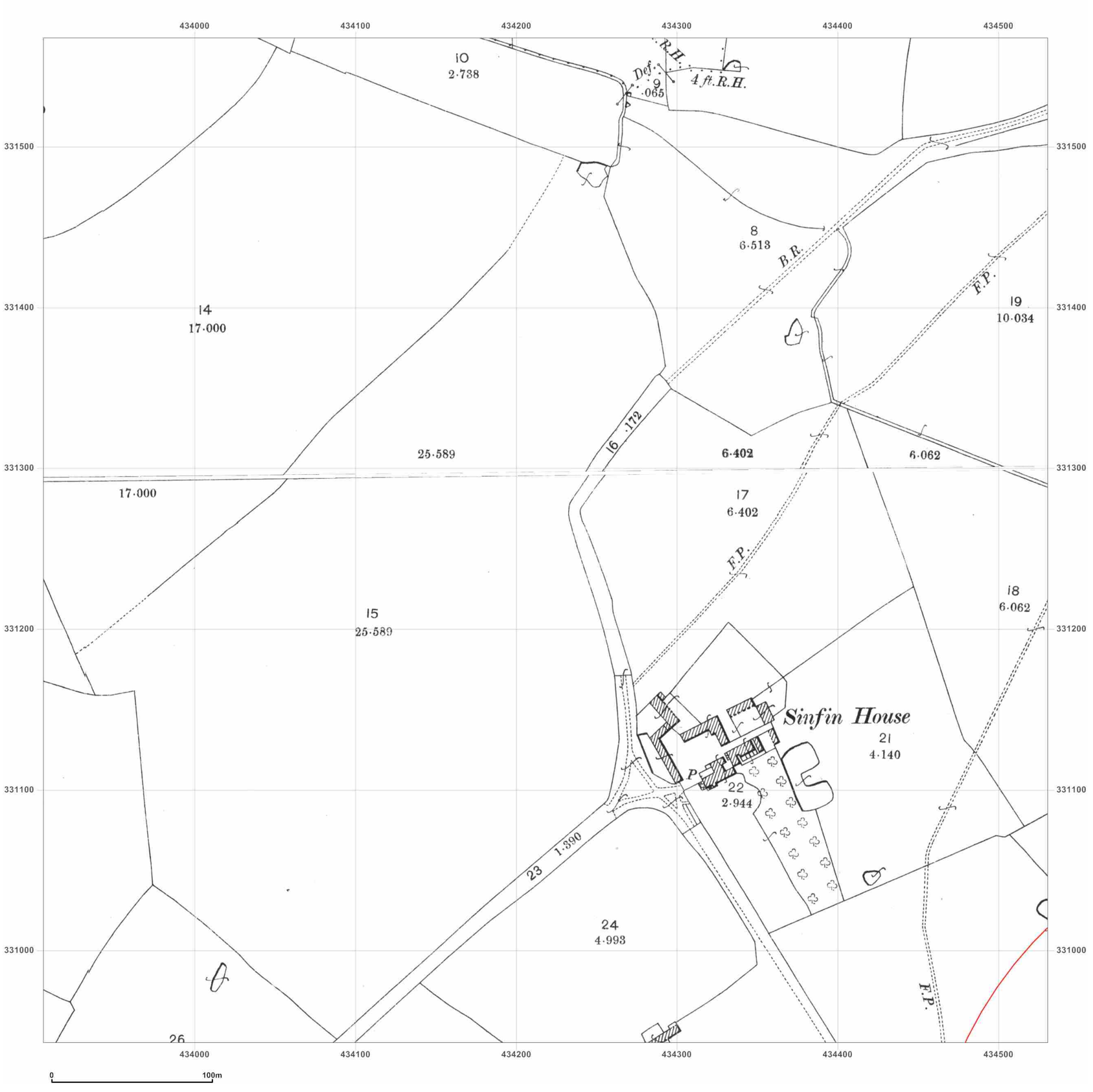
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

Map Name: County Series

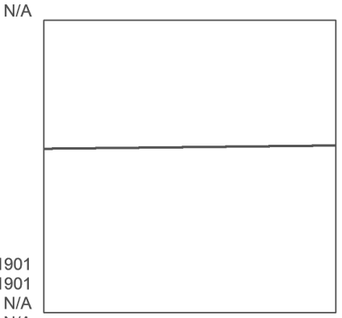
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

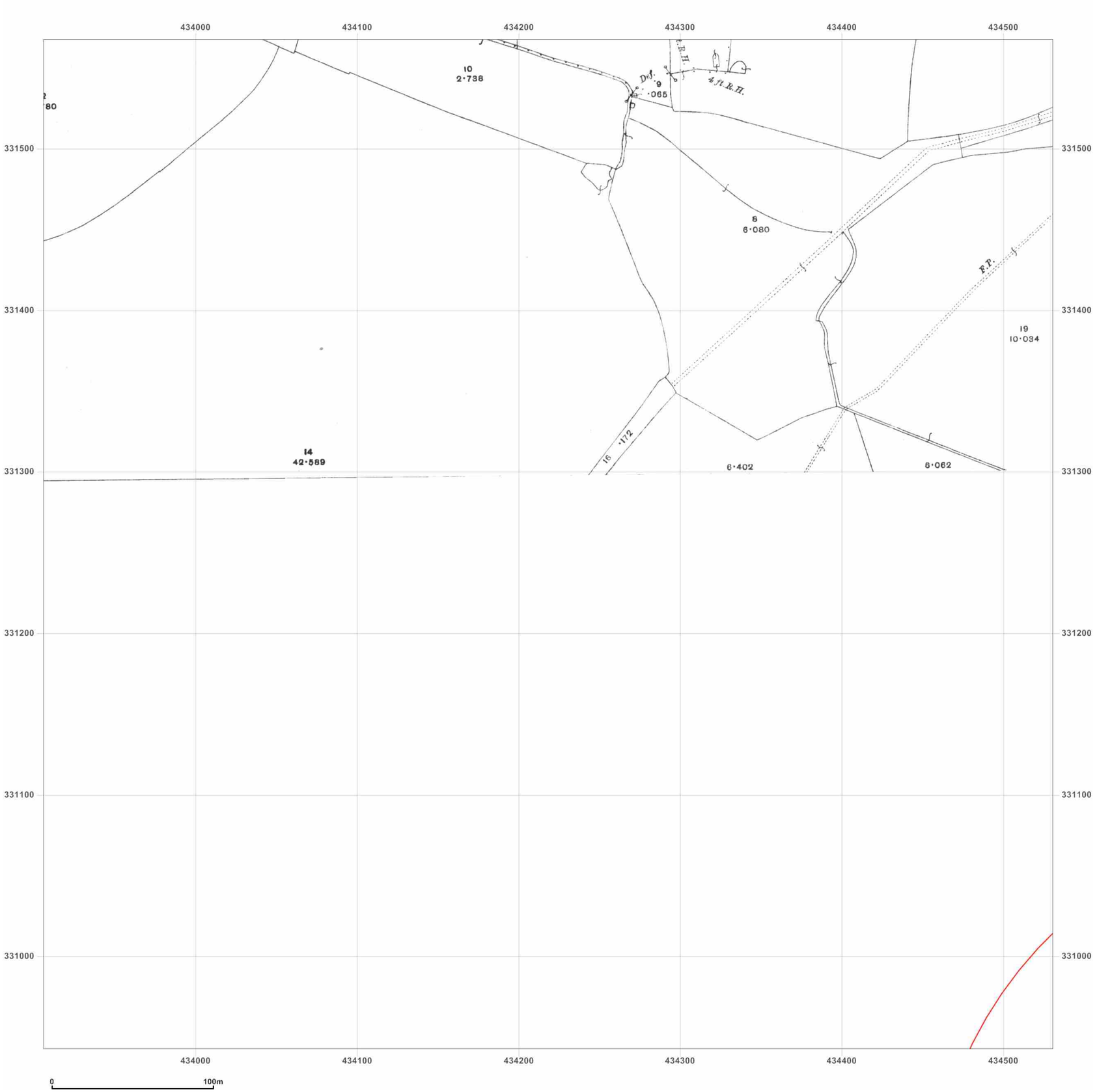
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

Map Name: County Series

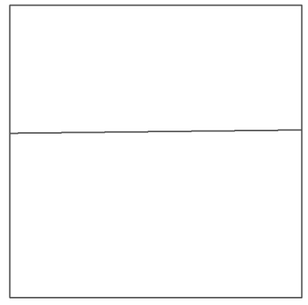
Map date: **1914**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



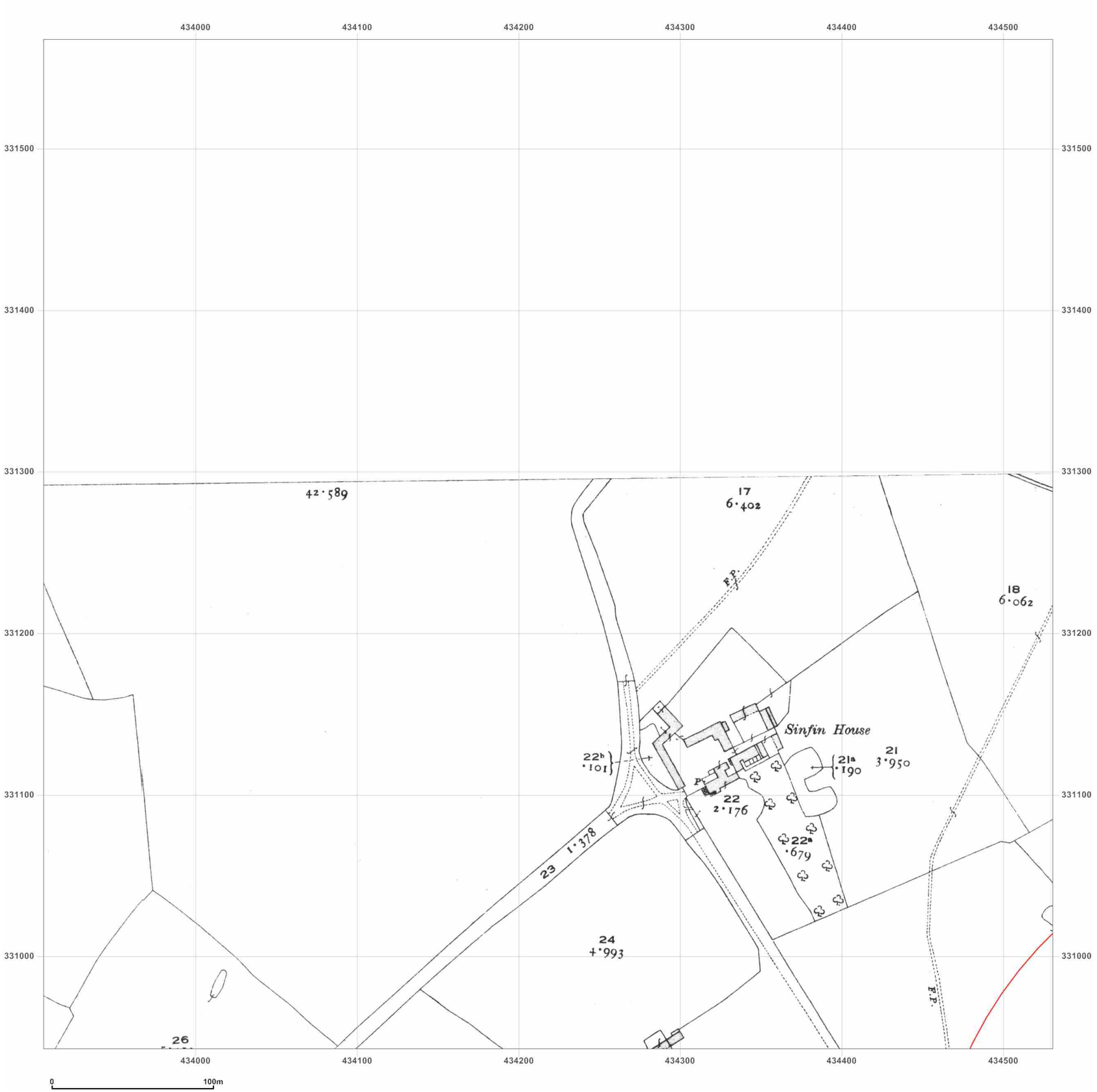
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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

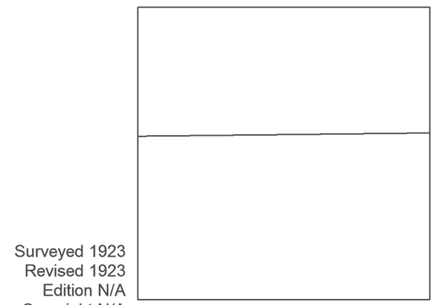
Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

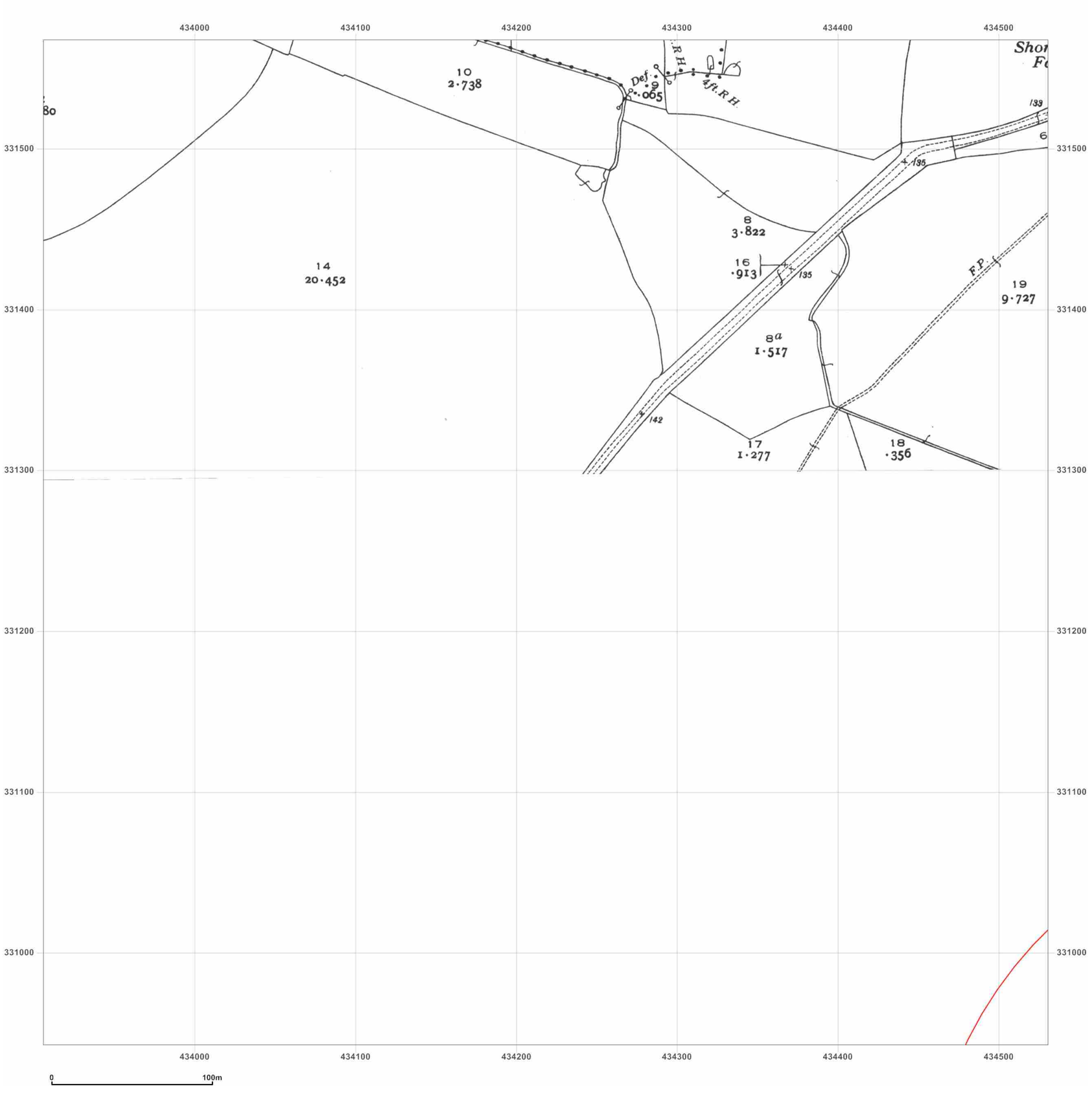
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

Map Name: County Series

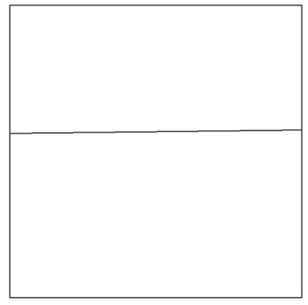
Map date: **1938**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



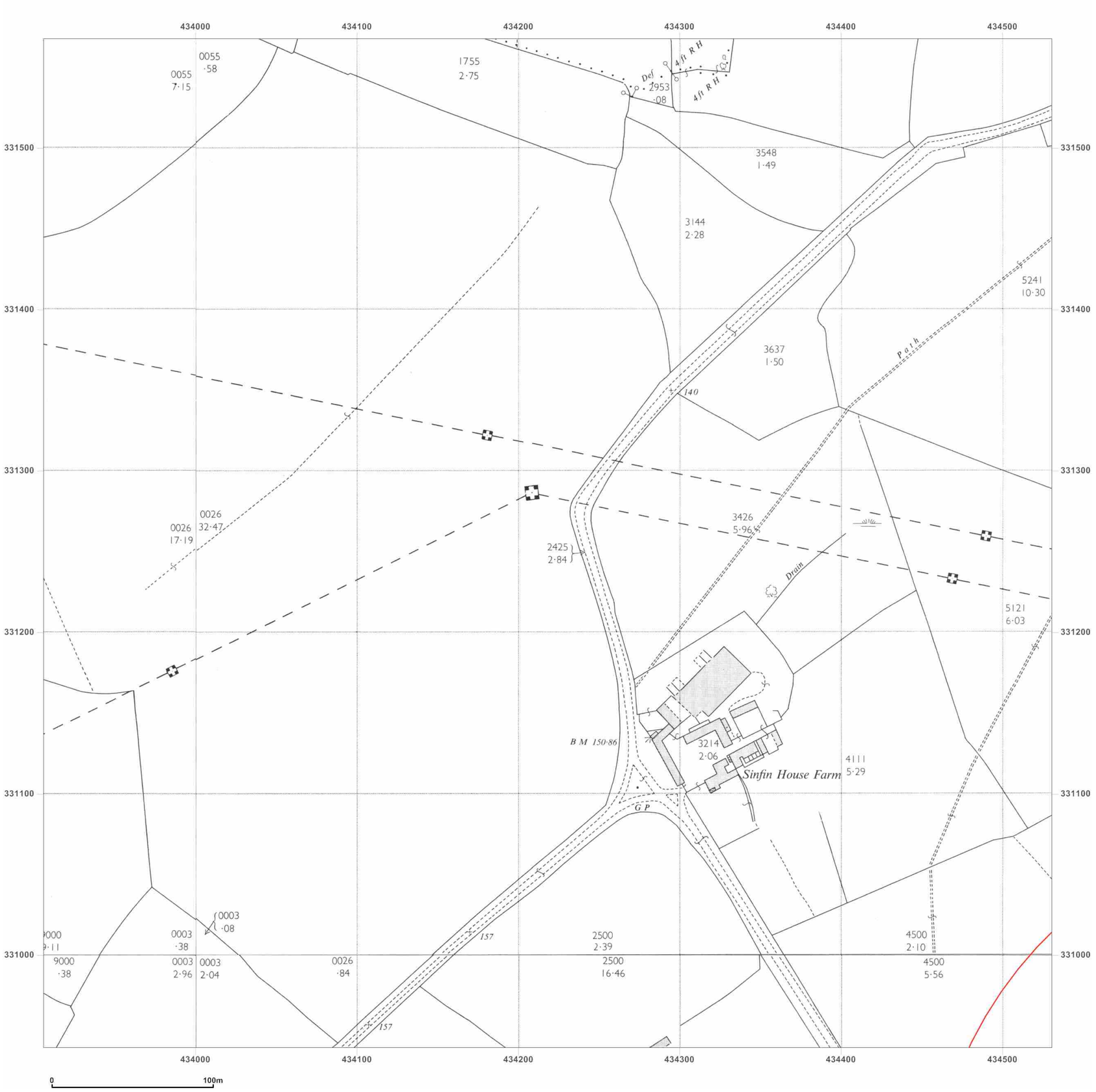
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_4_4
Grid Ref: 434218, 331255

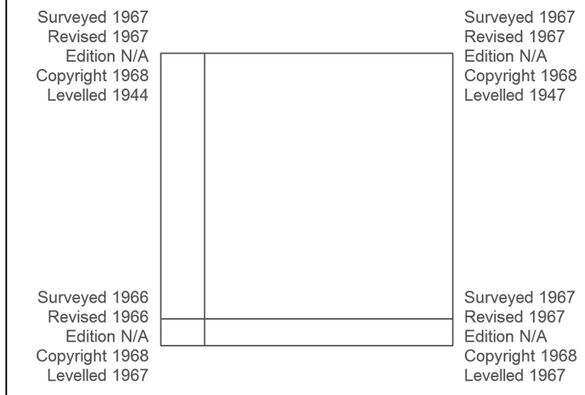
Map Name: National Grid

Map date: **1966-1967**

Scale: 1:2,500

Printed at: 1:2,500

N
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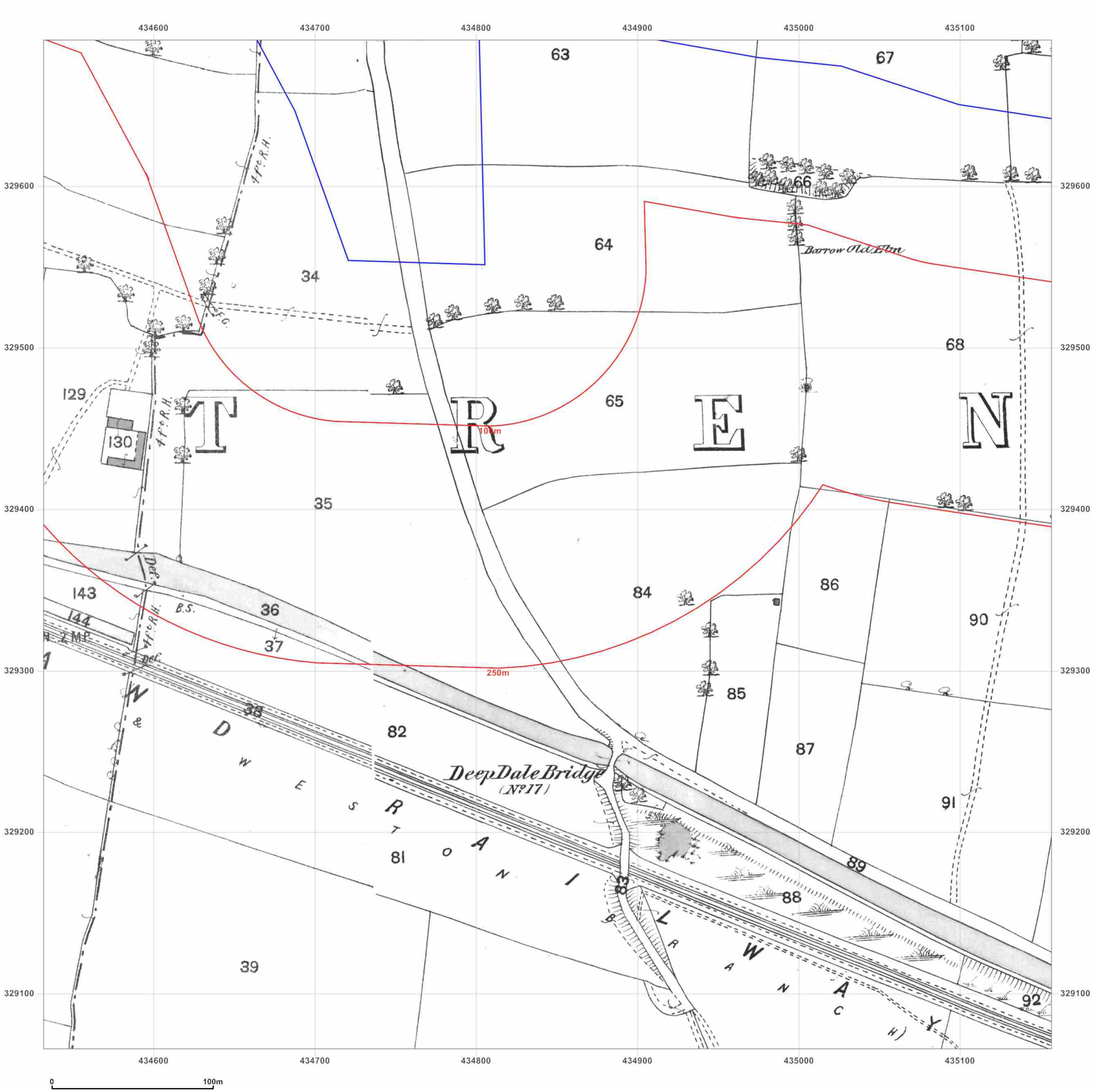
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

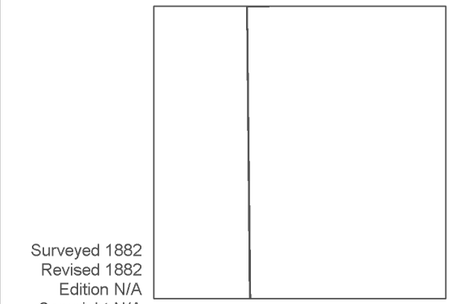
Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

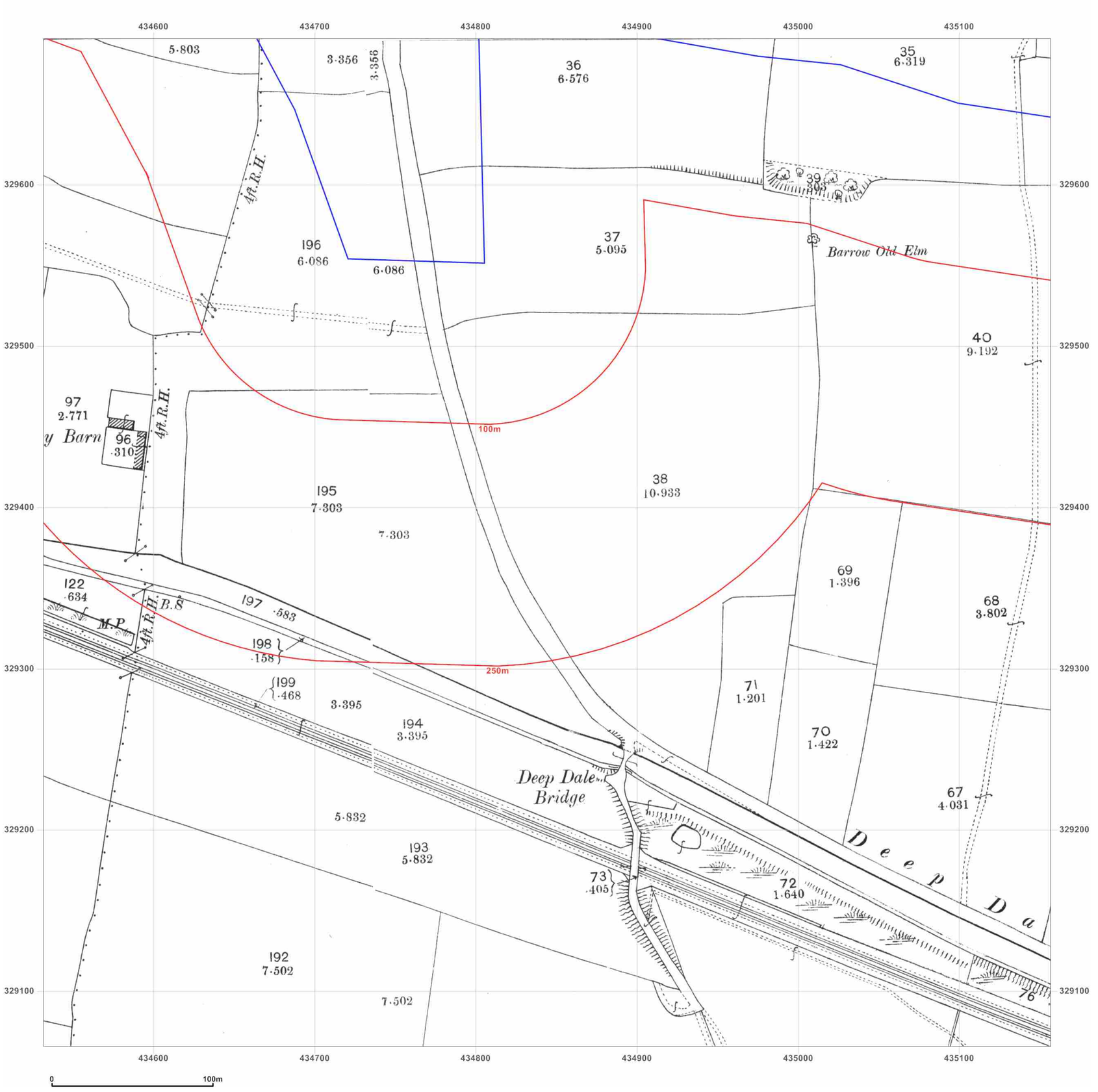
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

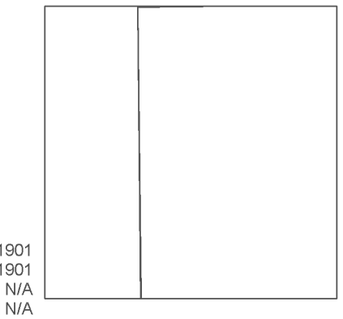
Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

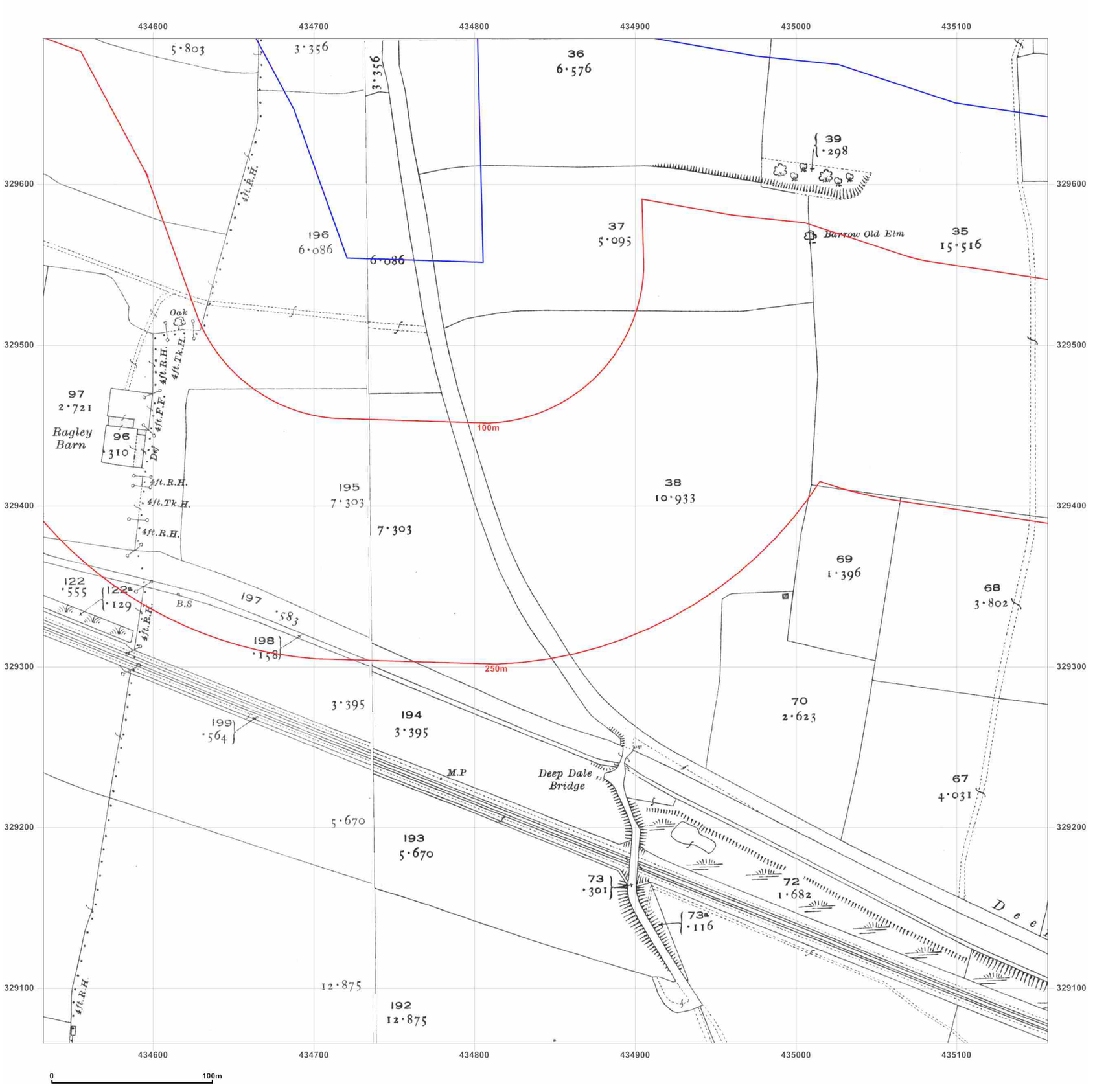
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

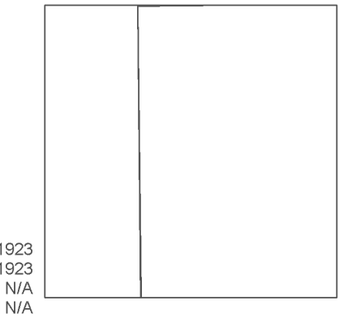
Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

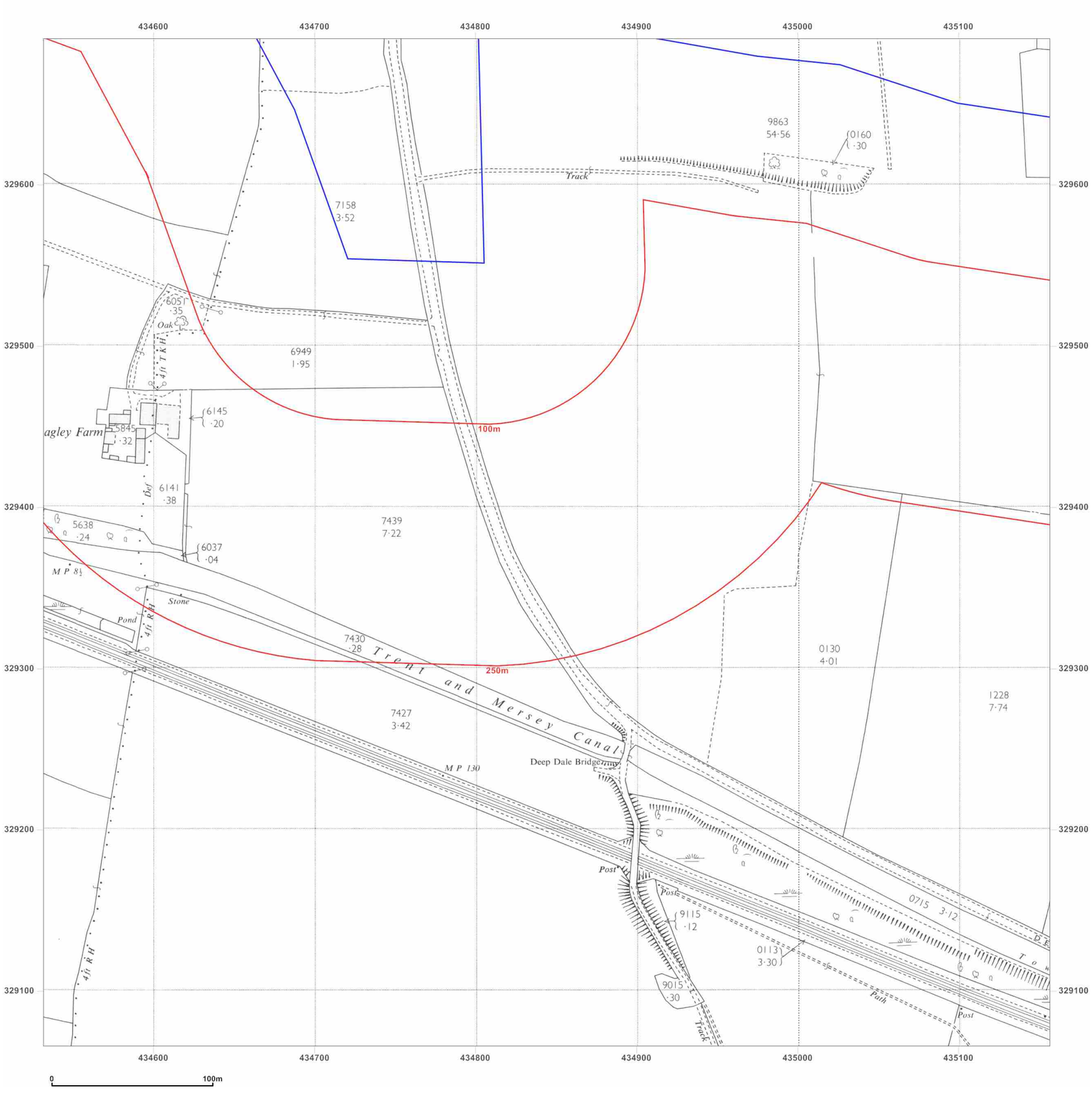
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

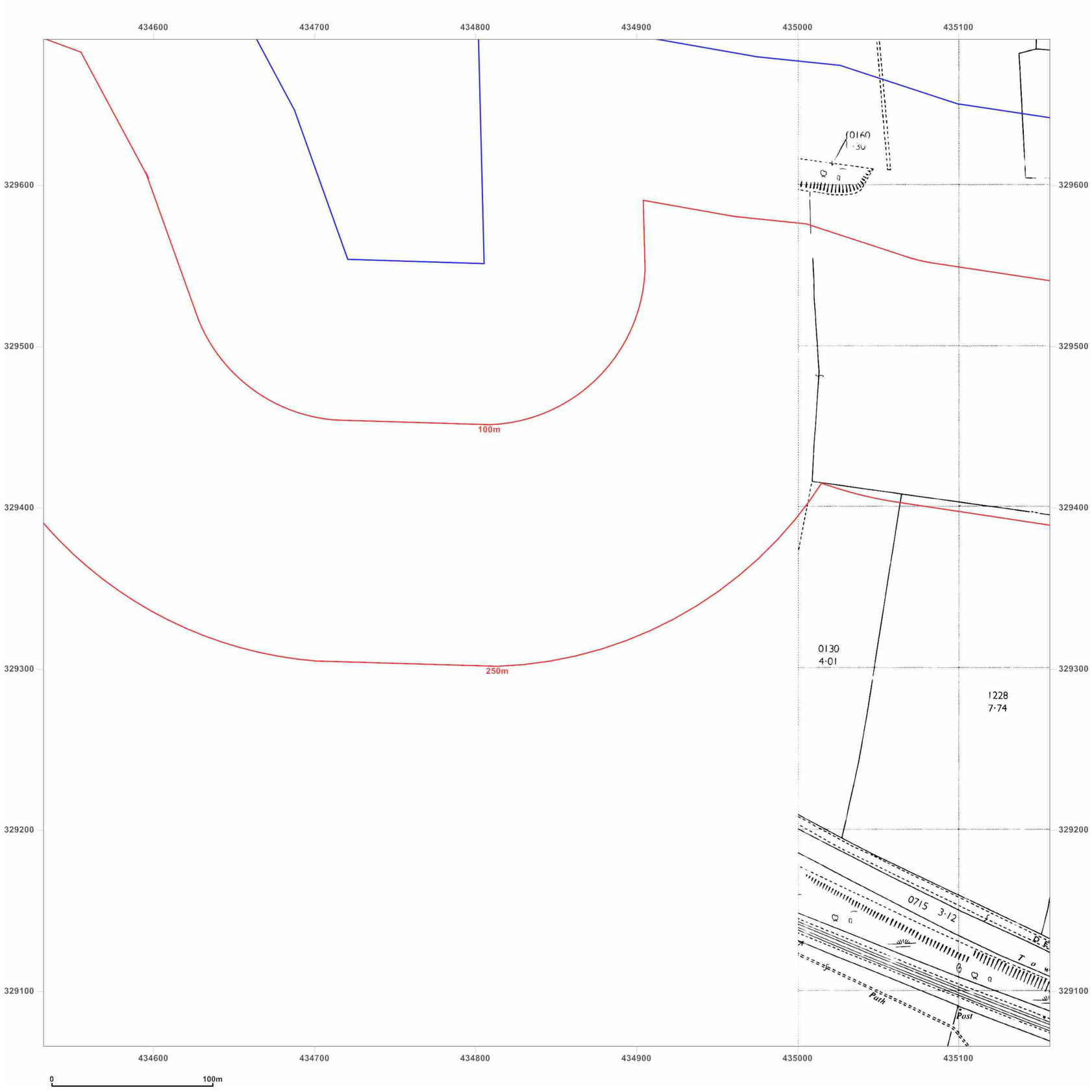
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

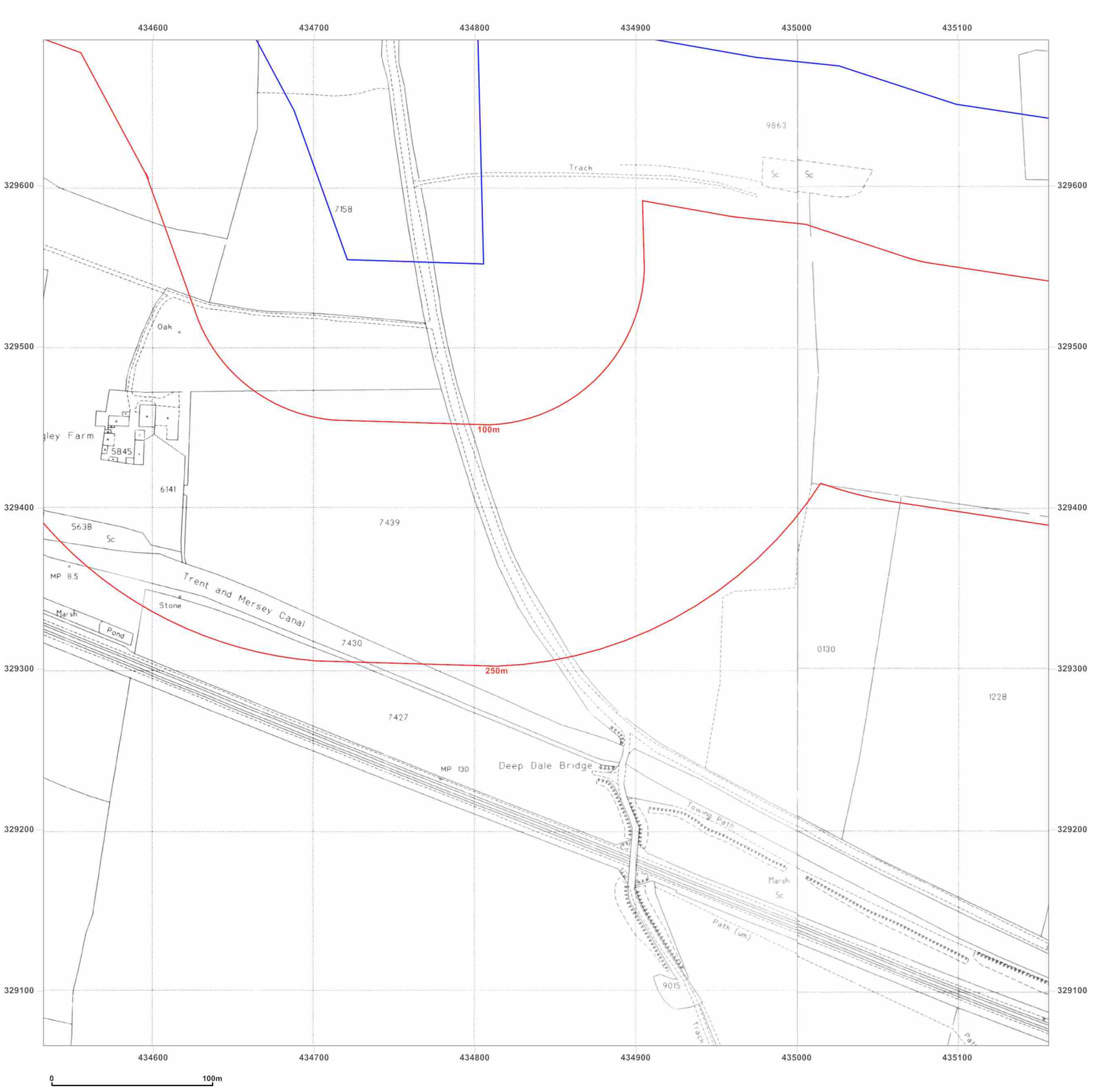
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_1
Grid Ref: 434844, 329378

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

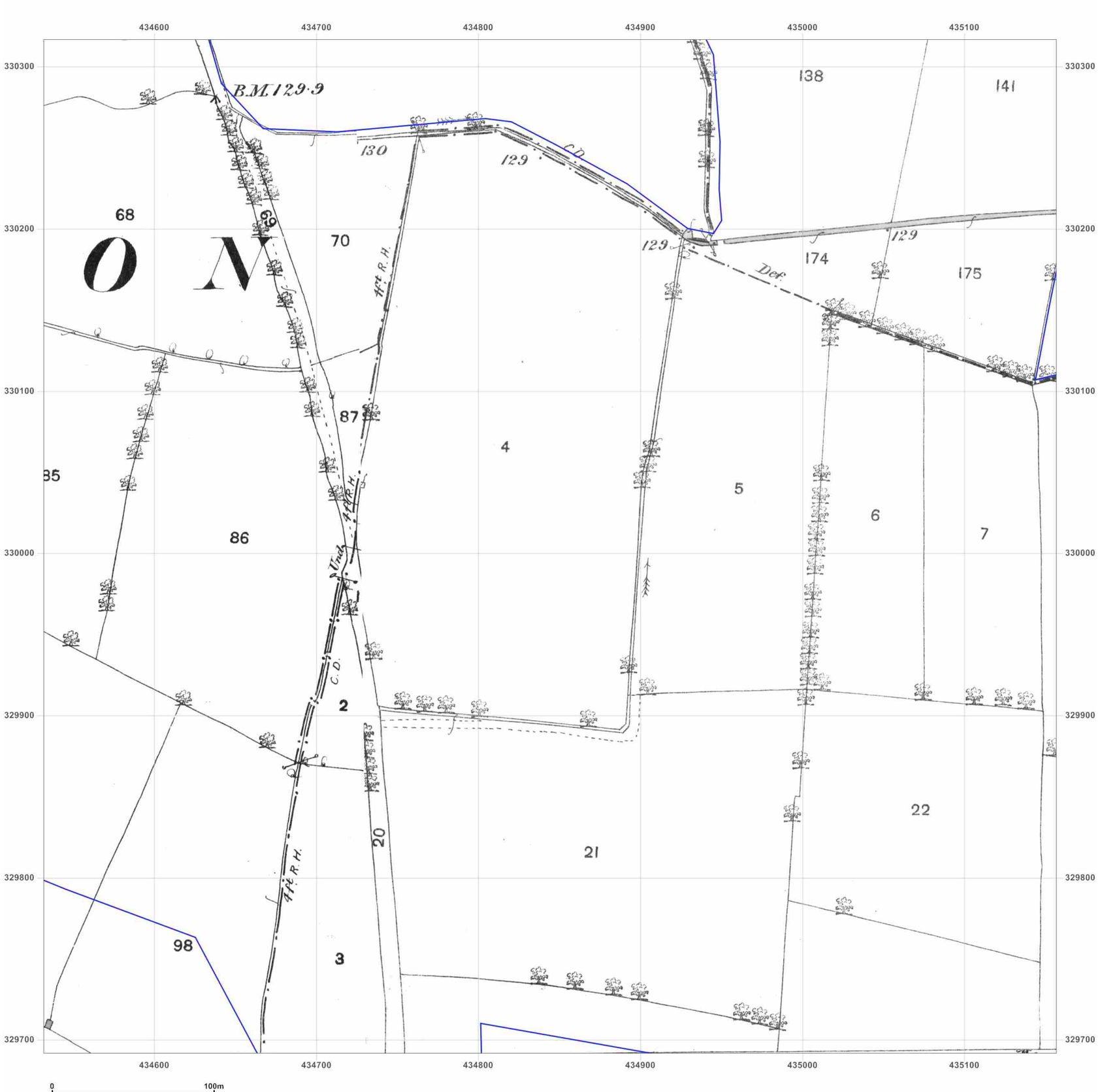
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Production date: 24 April 2019

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Site Details:

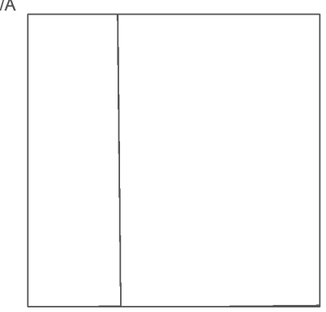
Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: County Series
Map date: **1882**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

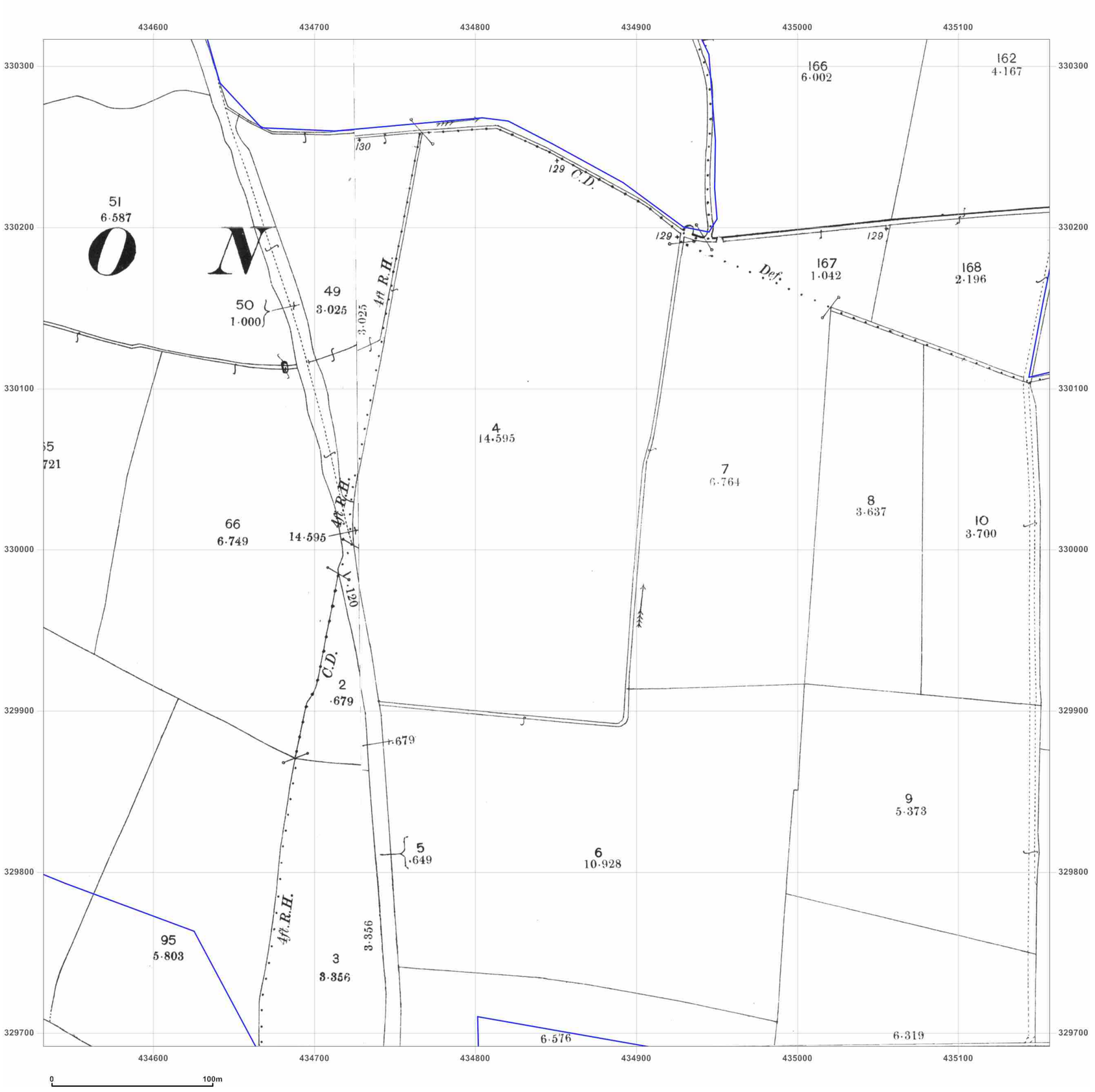
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Production date: 24 April 2019

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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: County Series

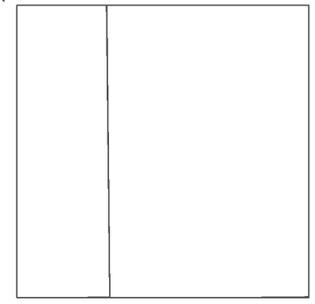
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

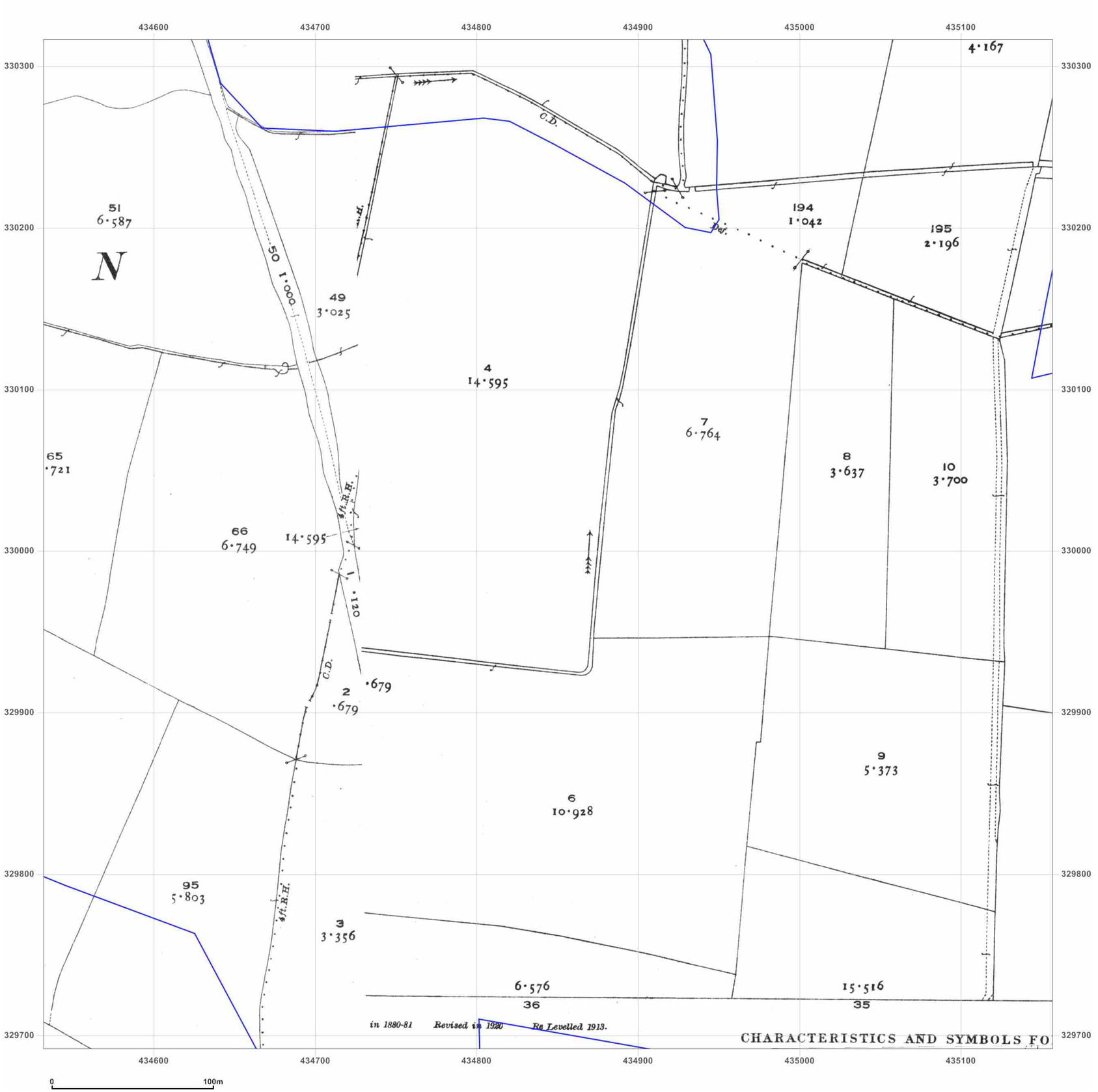
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: County Series

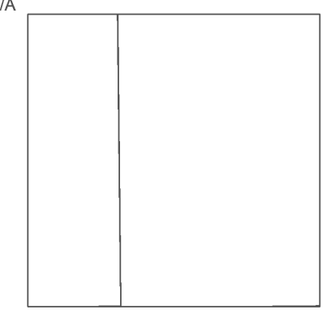
Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

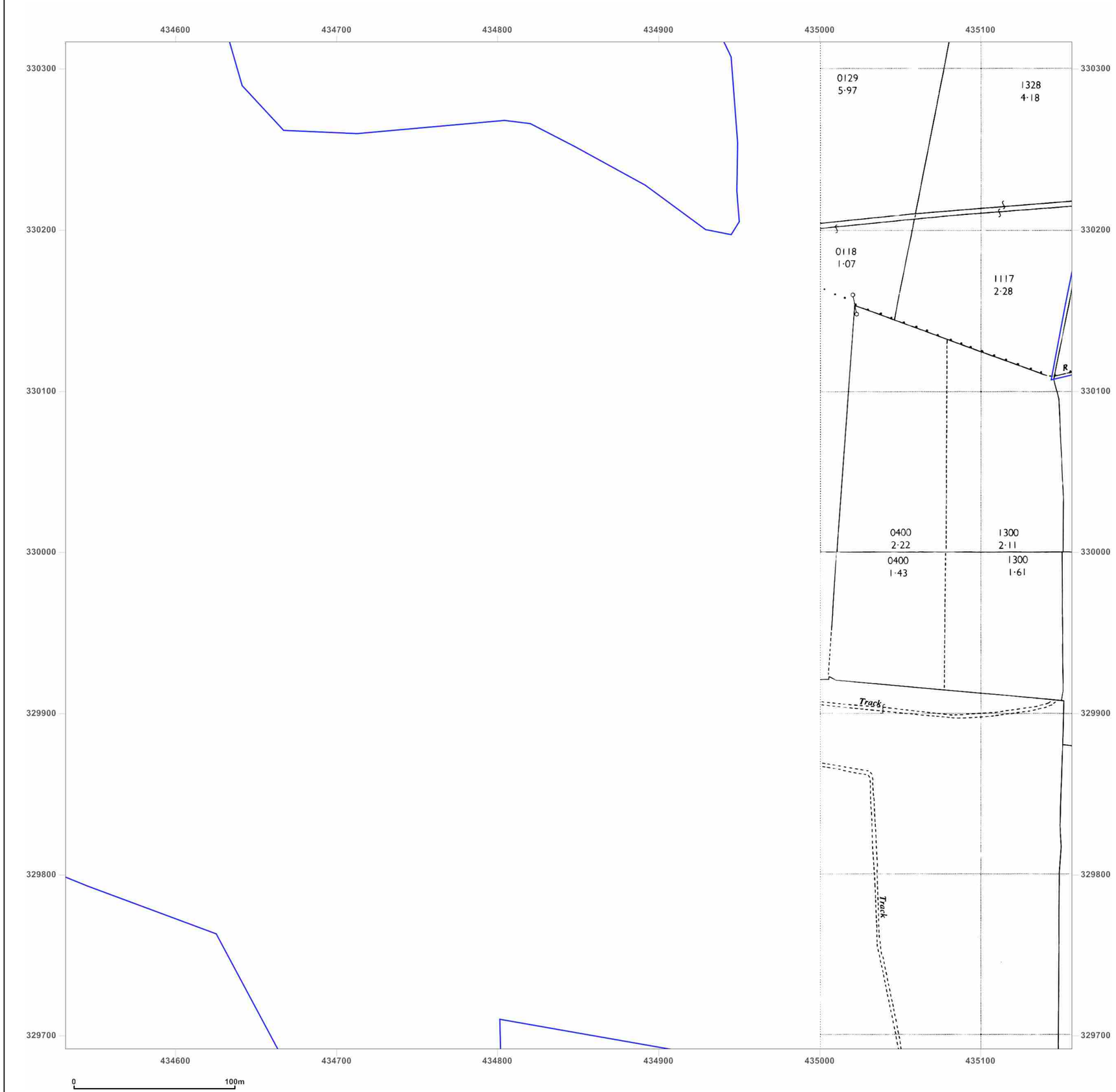
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

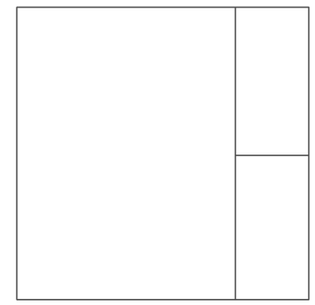
Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

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

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

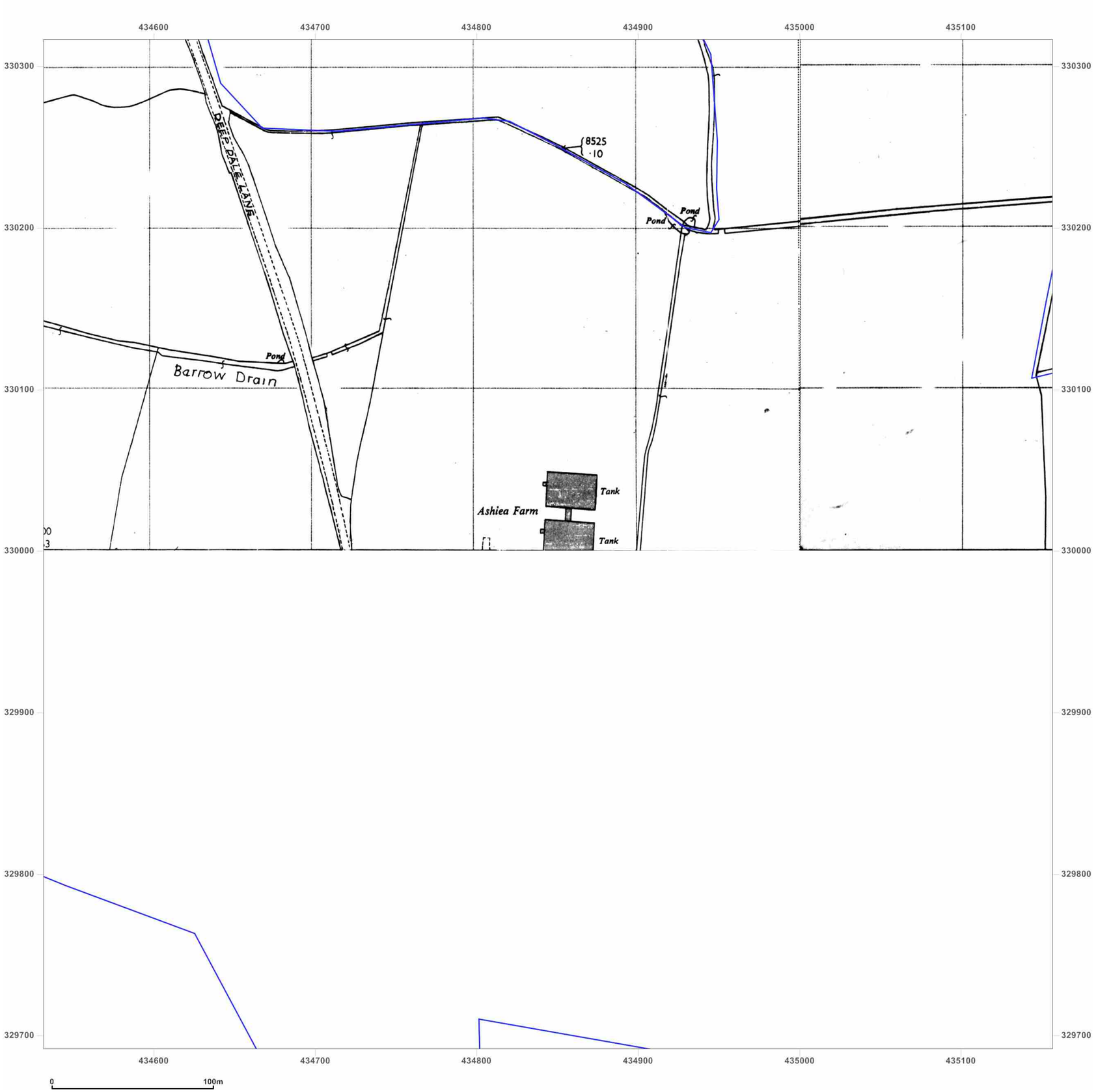
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: National Grid

Map date: **1988-1989**

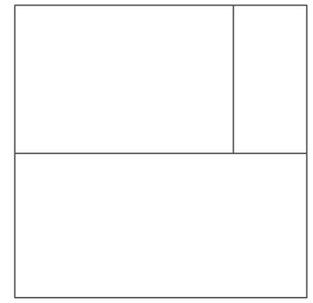
Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1967
Revised 1988
Edition N/A
Copyright 1988
Levelled 1967

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967



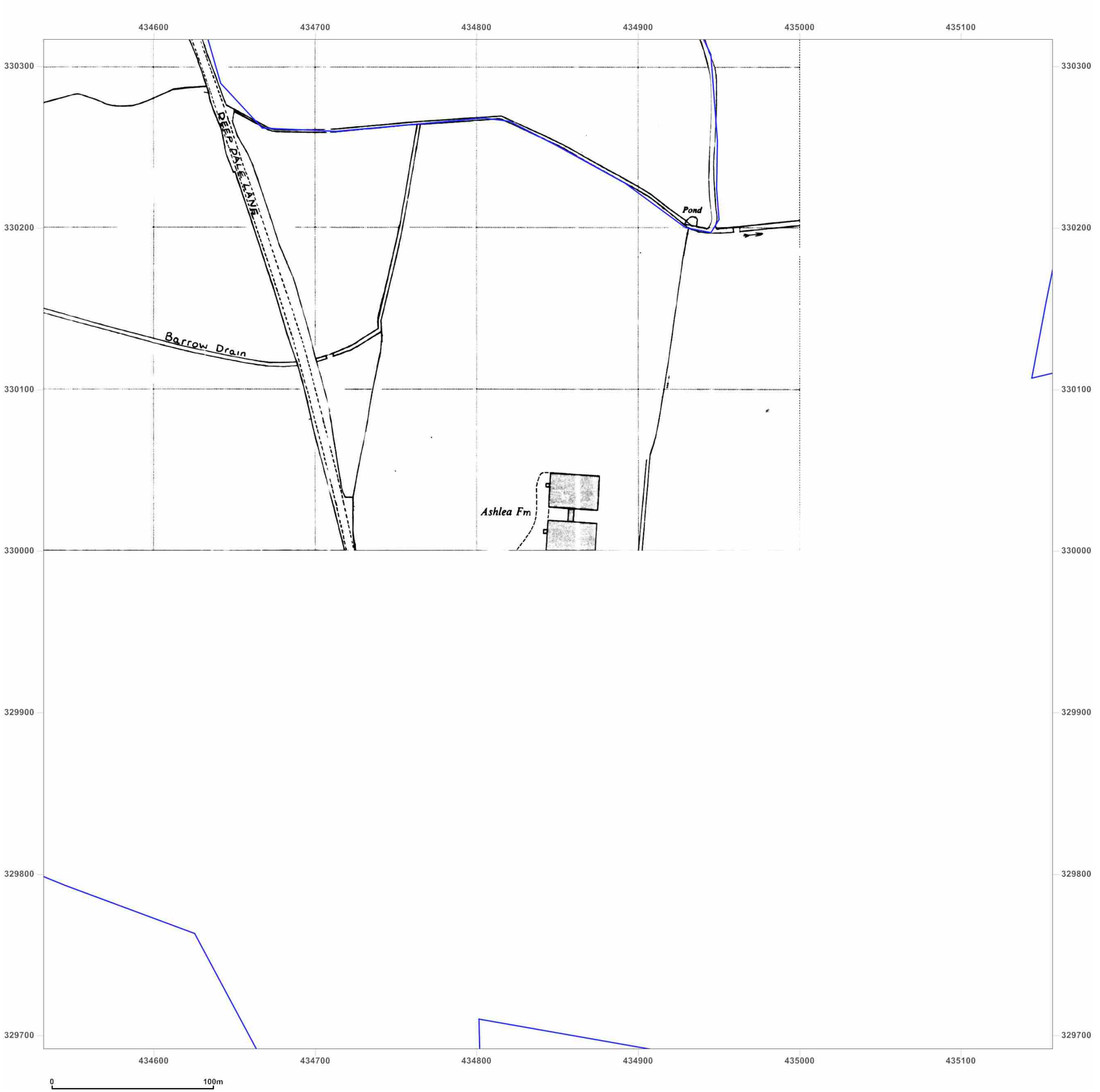
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: National Grid

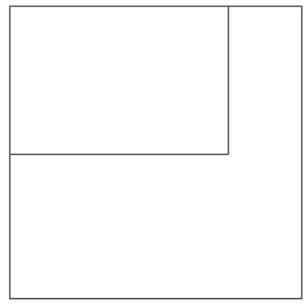
Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

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



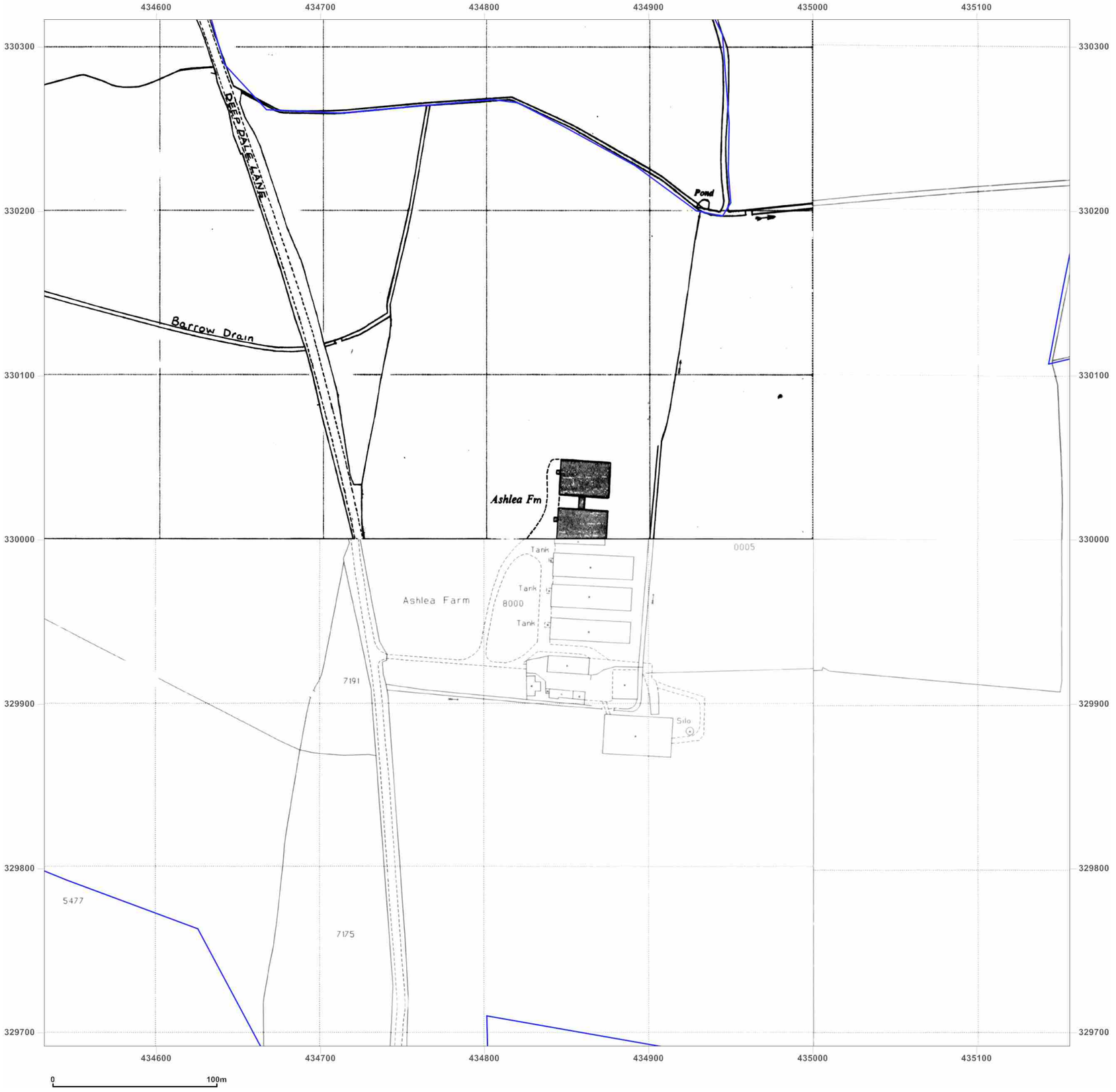
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_2
Grid Ref: 434844, 330004

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

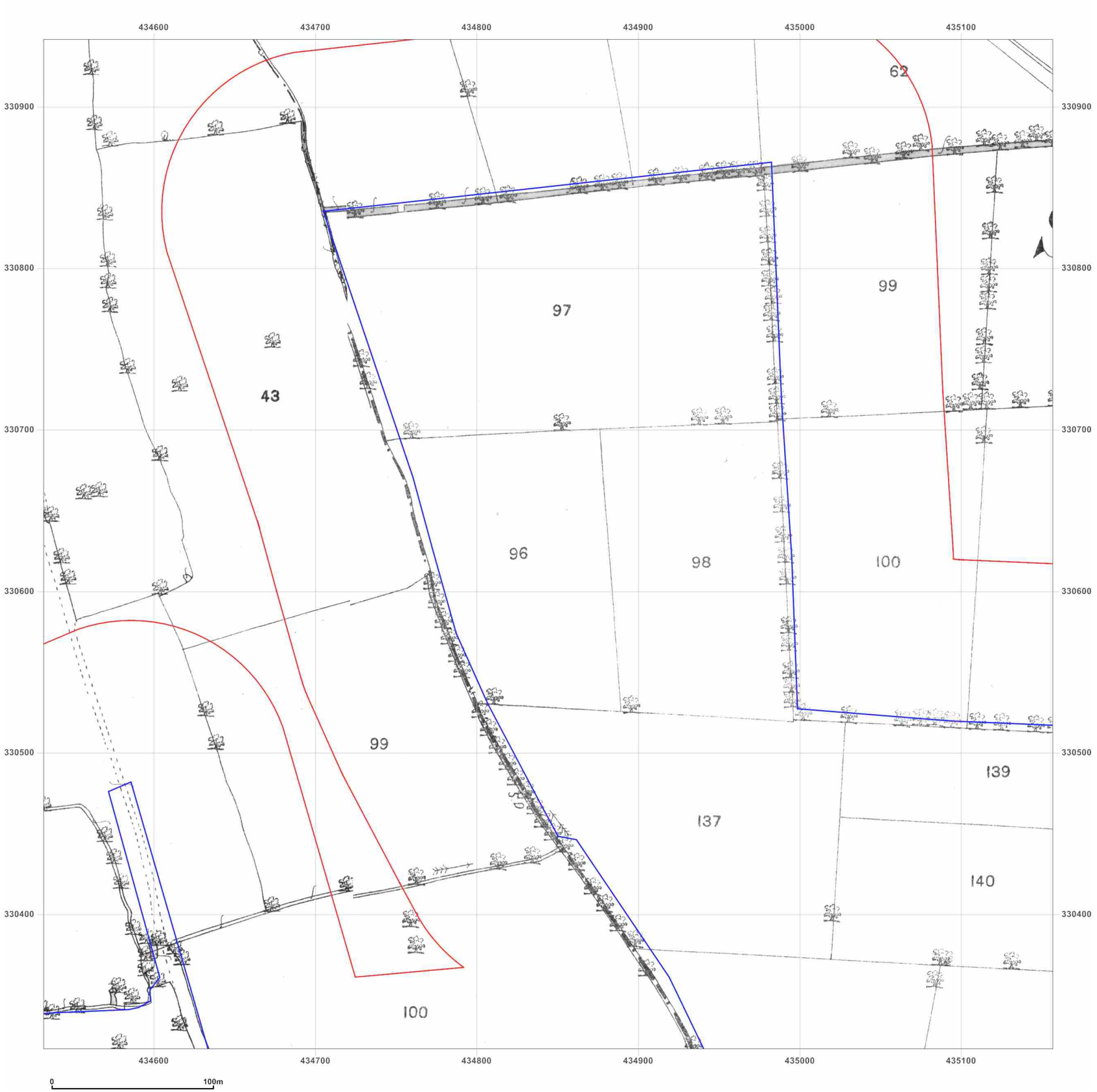
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Production date: 24 April 2019

Map legend available at:
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

Map Name: County Series

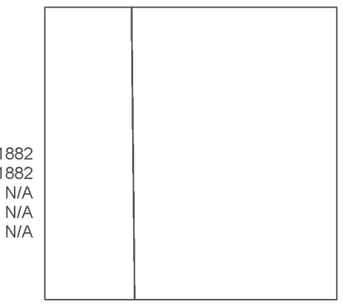
Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

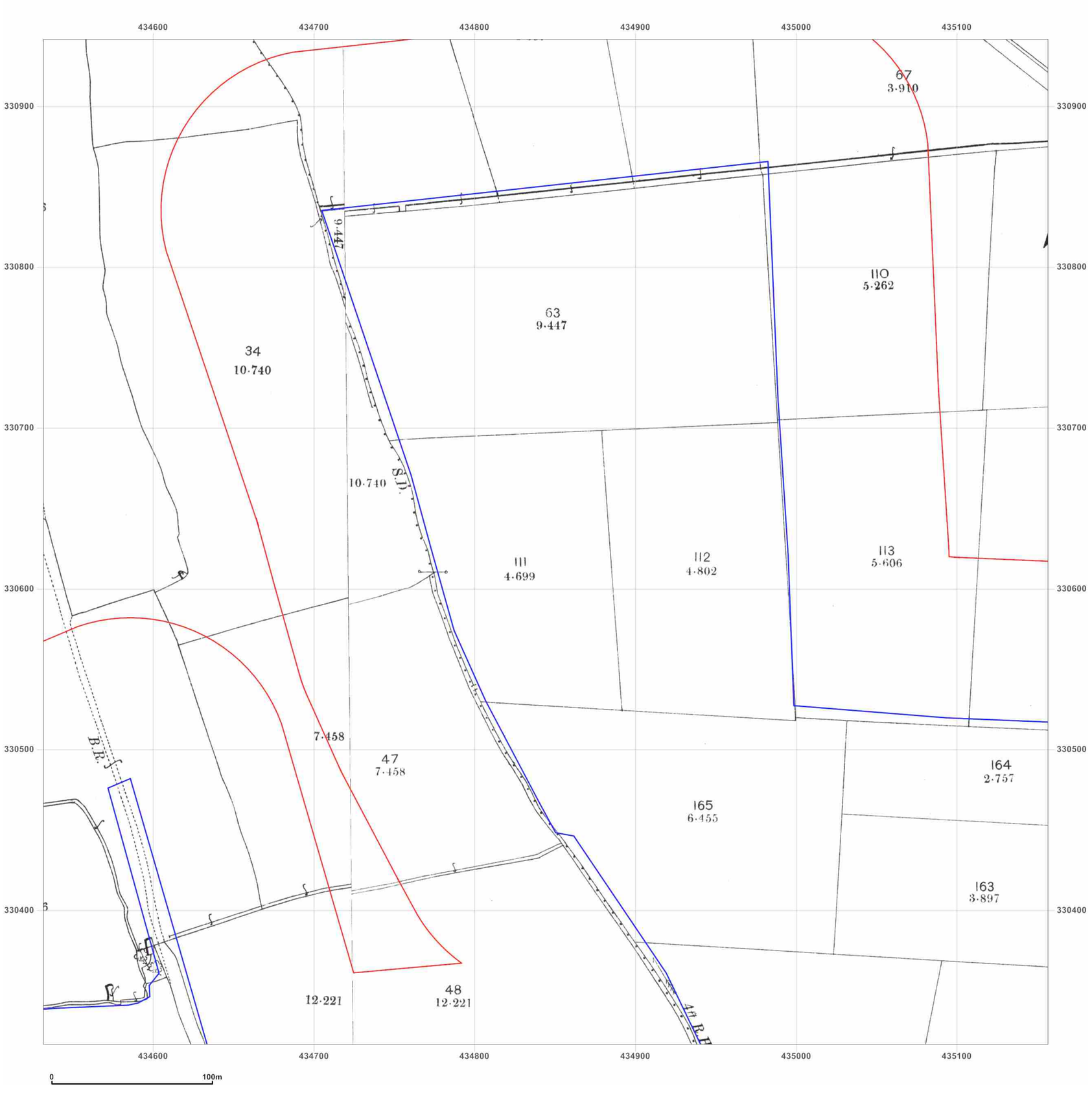
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

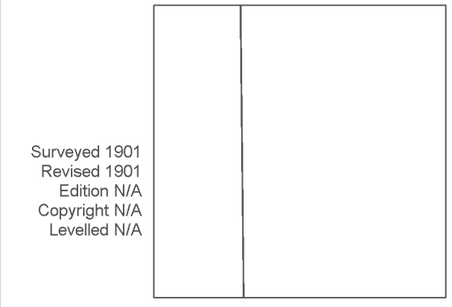
Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

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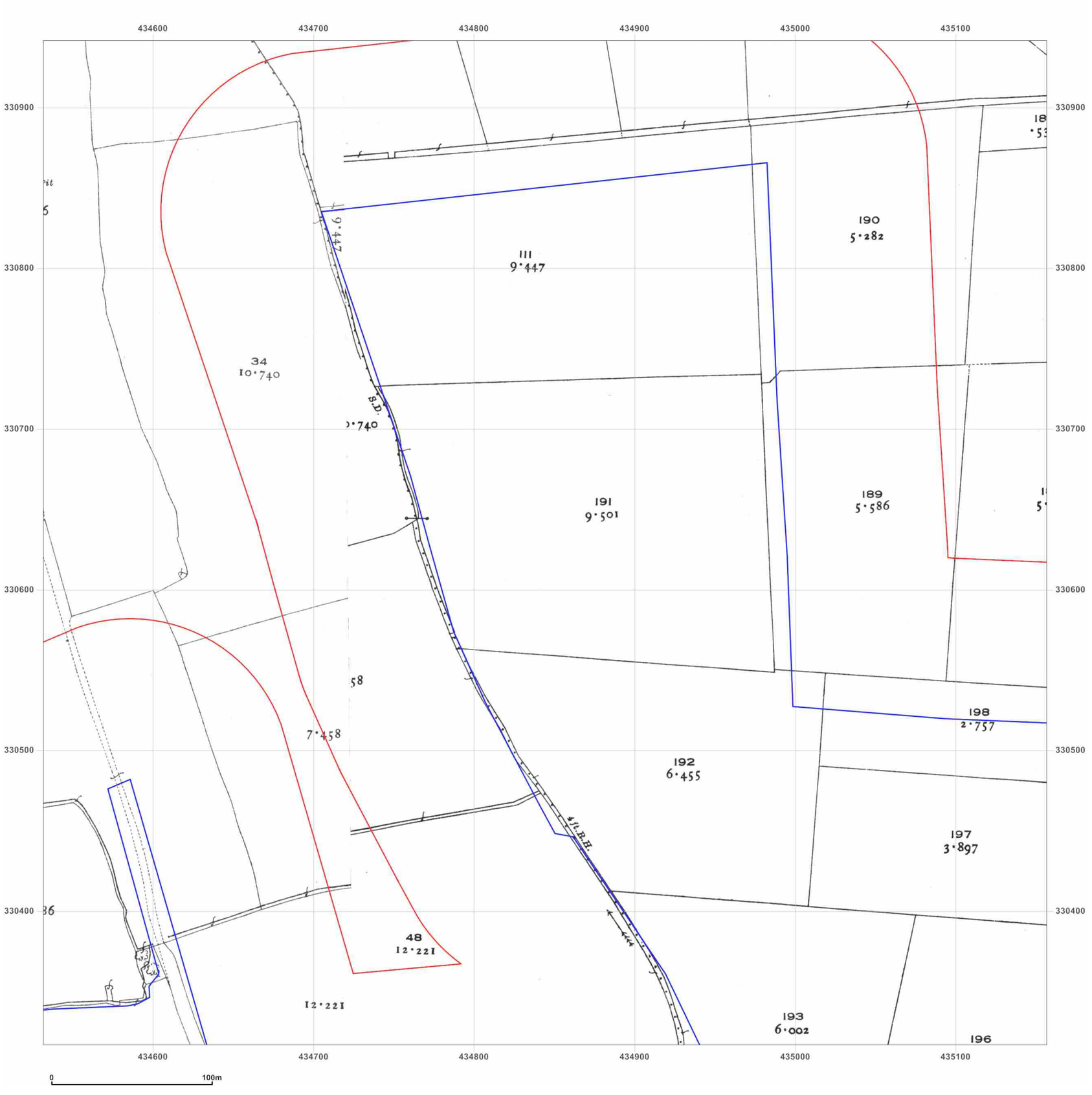
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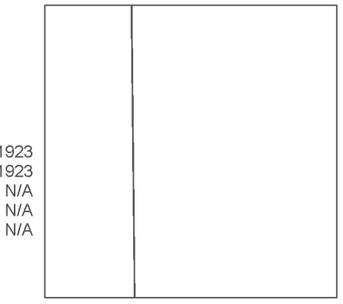
Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

Map Name: County Series
Map date: **1923**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

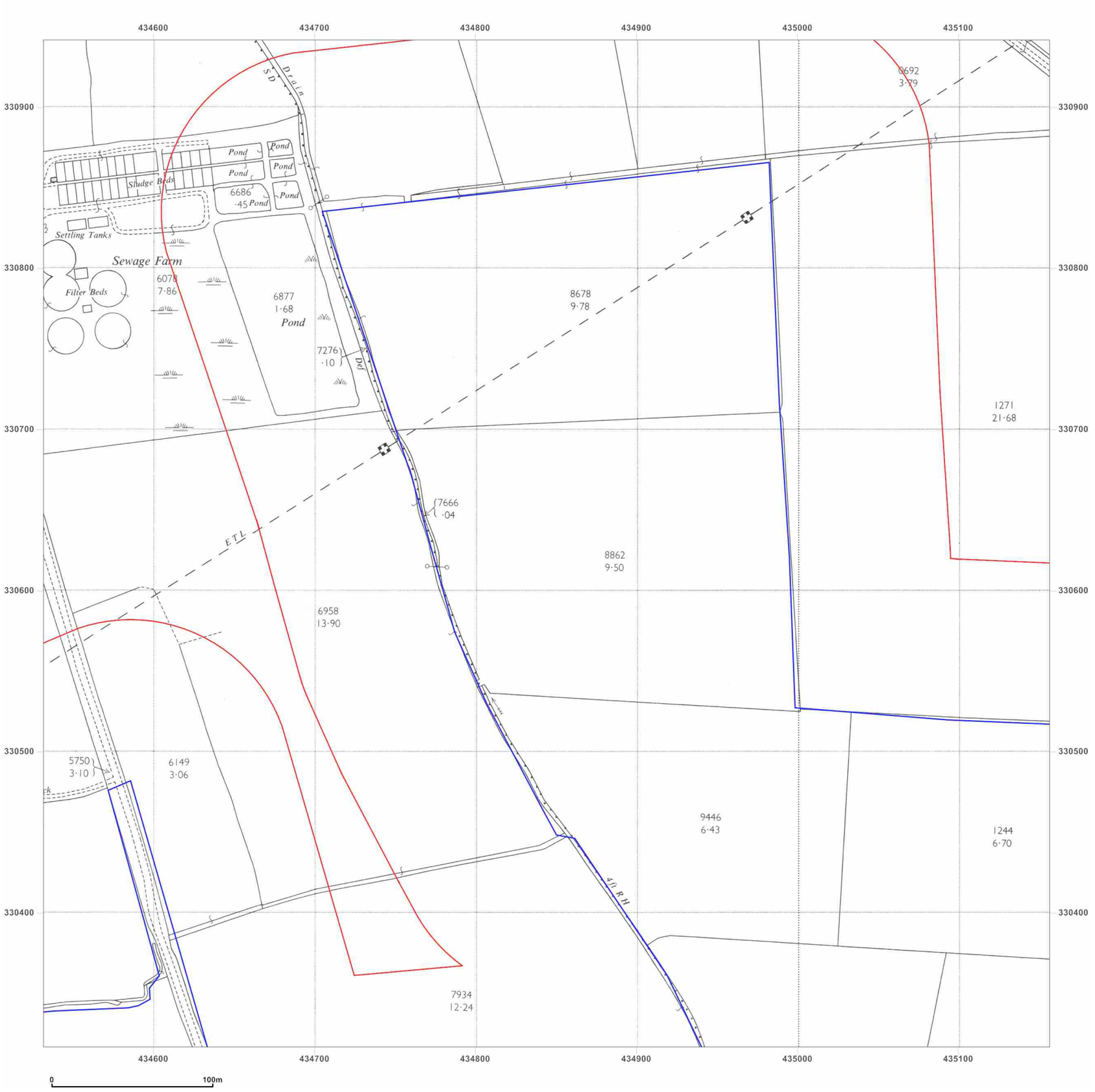
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967

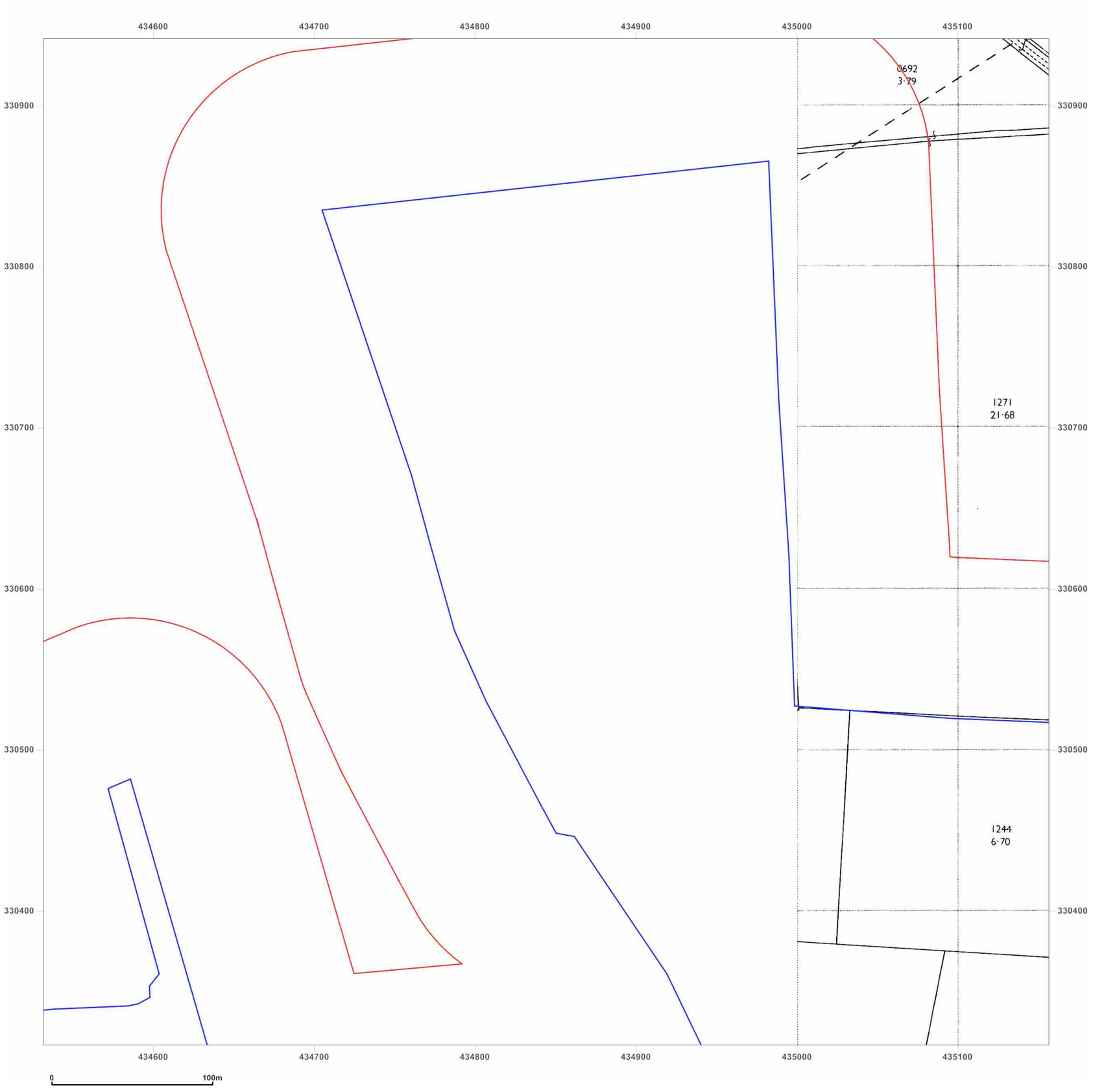
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

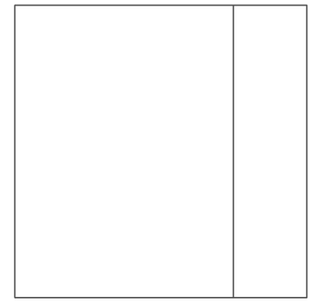
Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

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

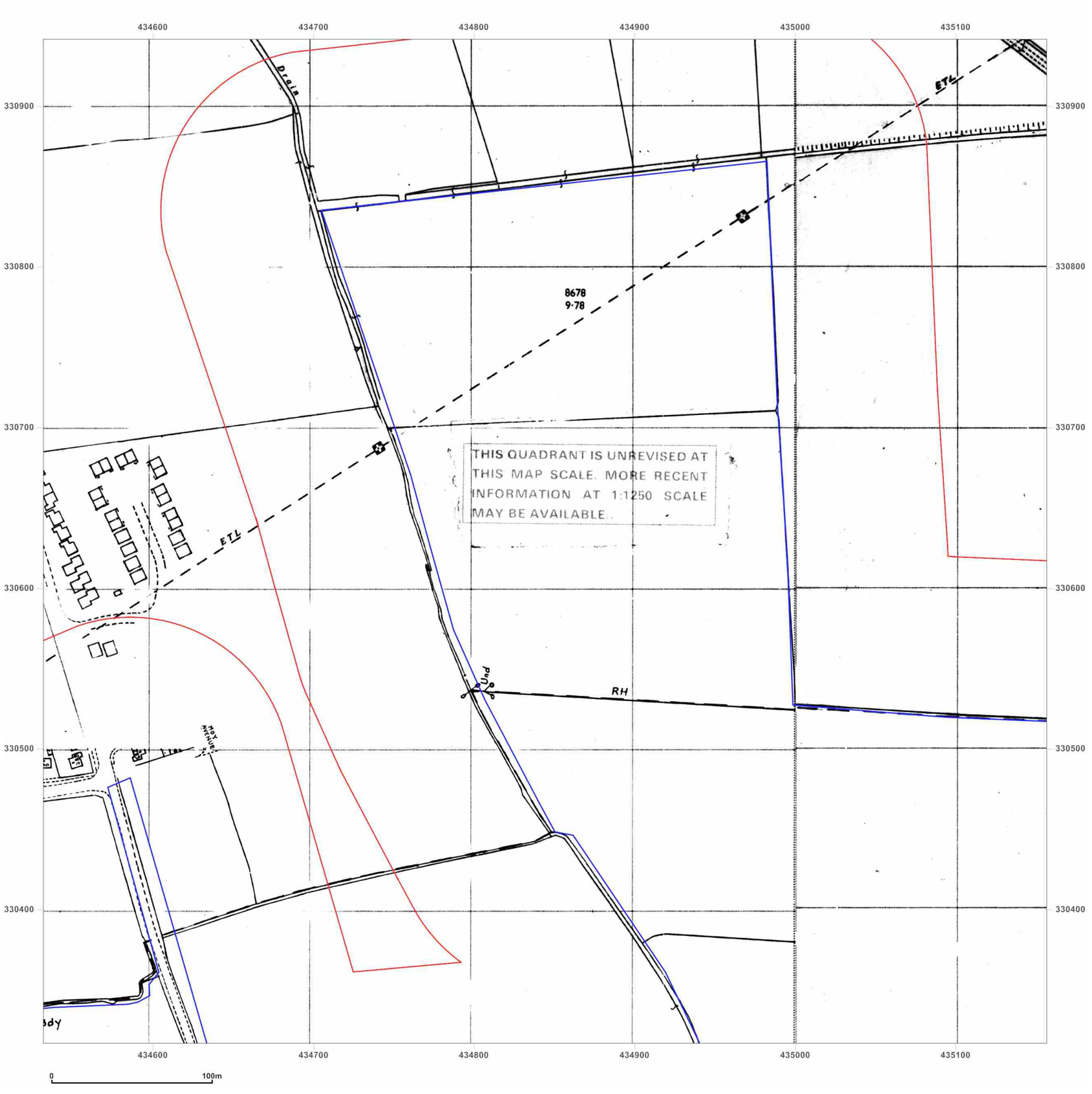
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

Map Name: National Grid

Map date: **1988-1989**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1967 Revised 1988 Edition N/A Copyright 1988 Levelled 1967	Surveyed 1967 Revised 1989 Edition N/A Copyright 1989 Levelled 1967

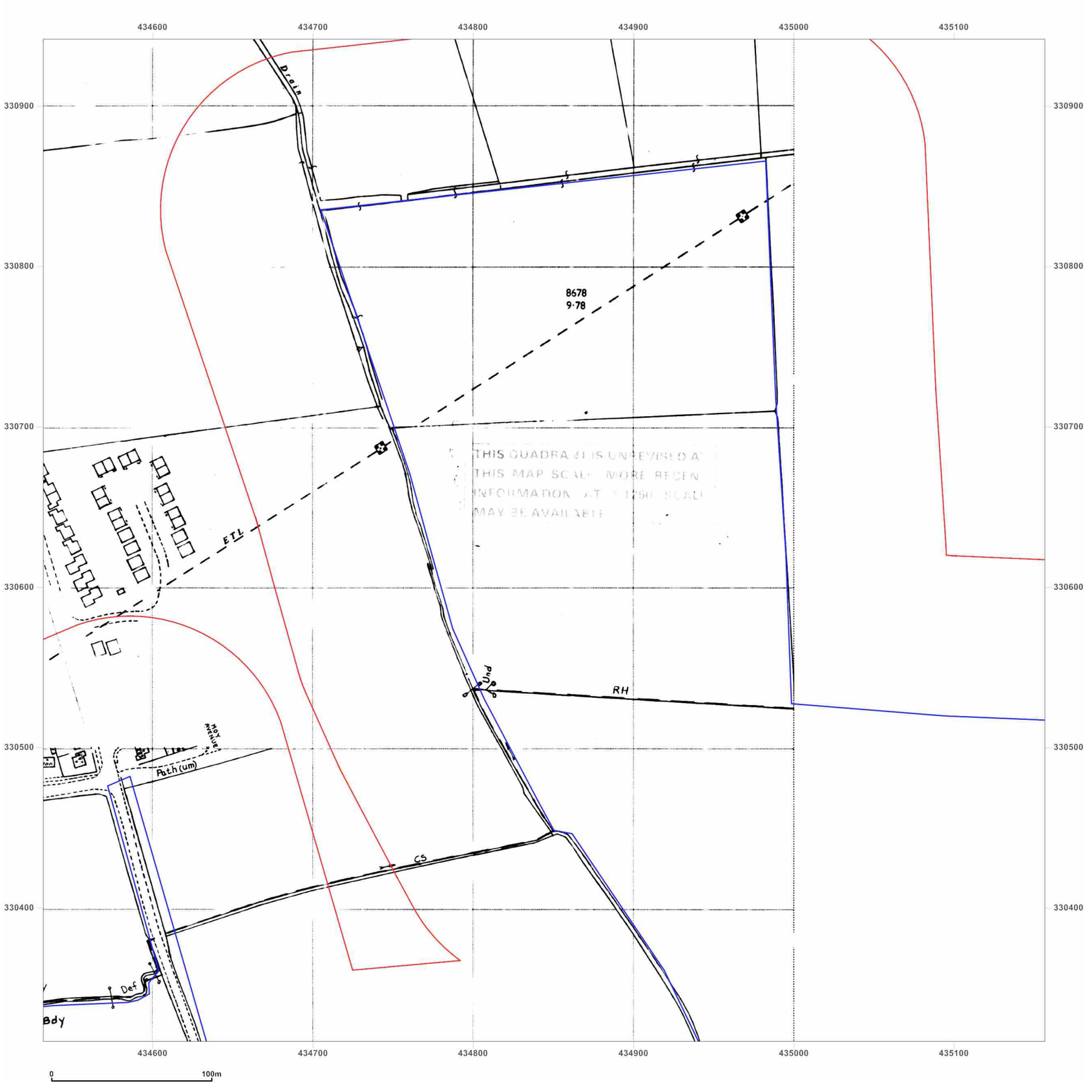
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

Map Name: National Grid

Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

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

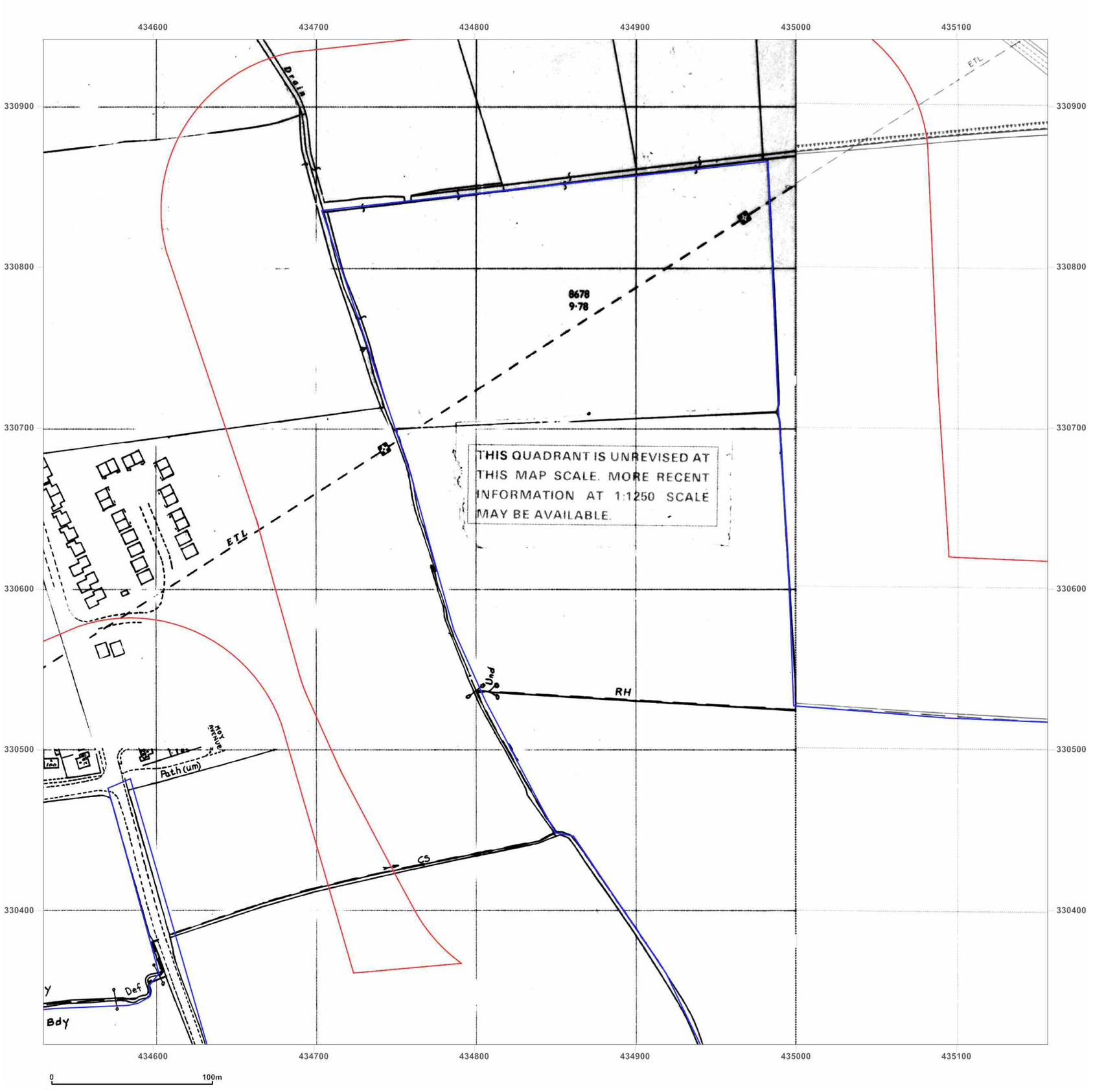
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_3
Grid Ref: 434844, 330629

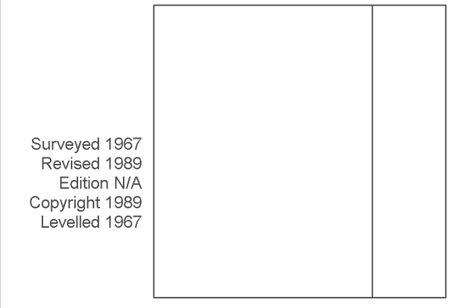
Map Name: National Grid

Map date: **1989-1993**

Scale: 1:2,500

Printed at: 1:2,500

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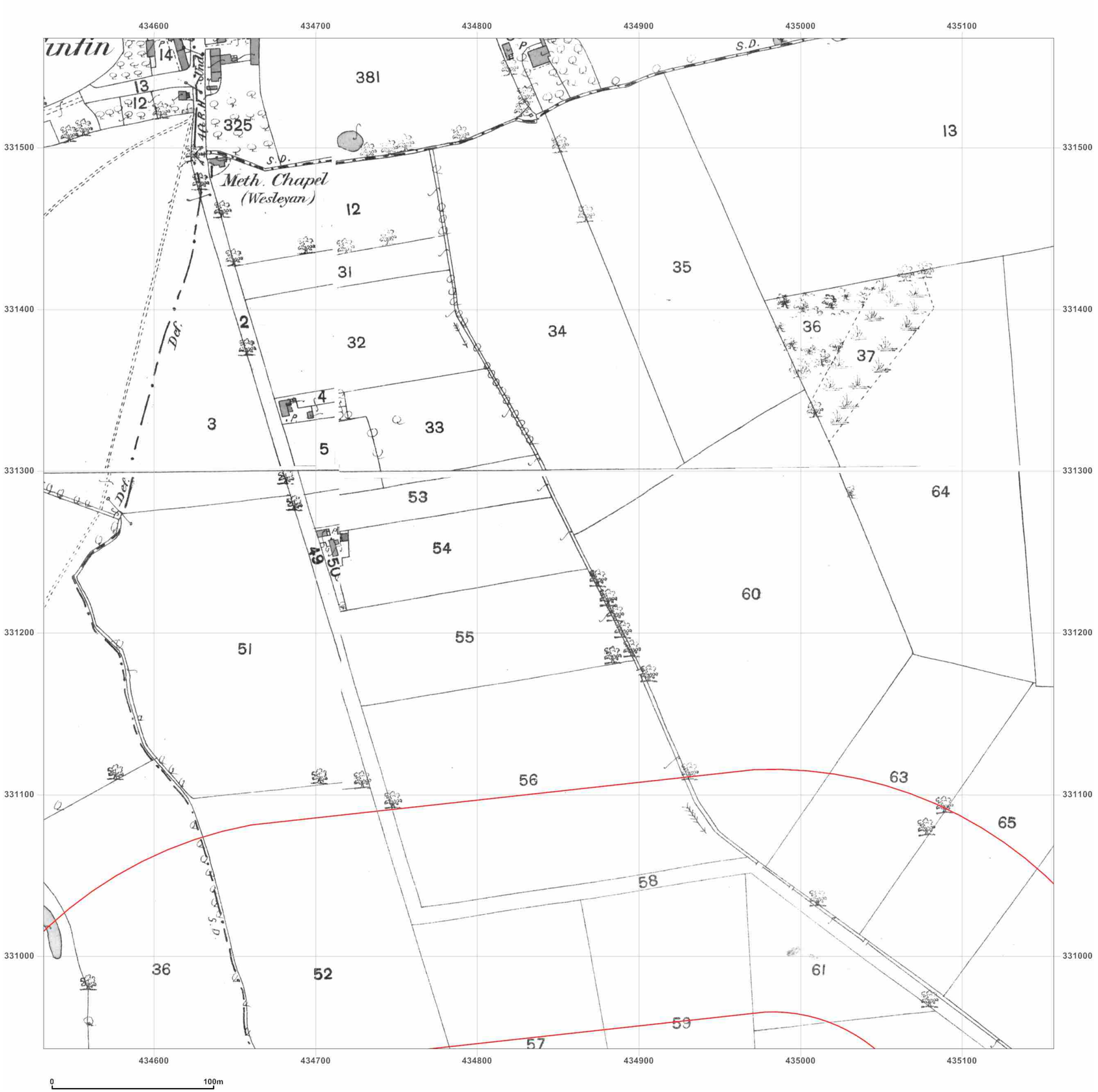
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

Map Name: County Series

Map date: **1882-1883**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

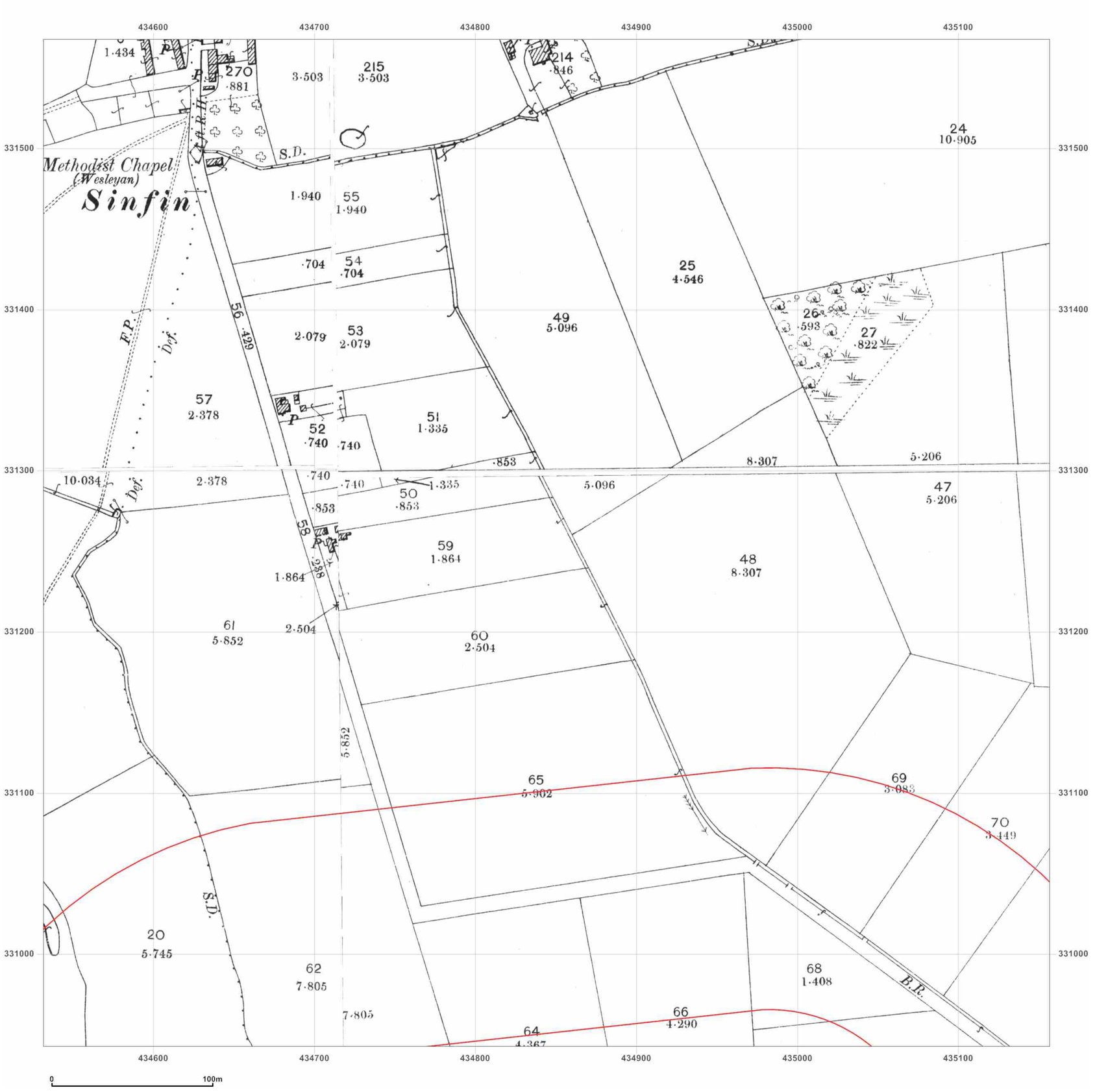
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

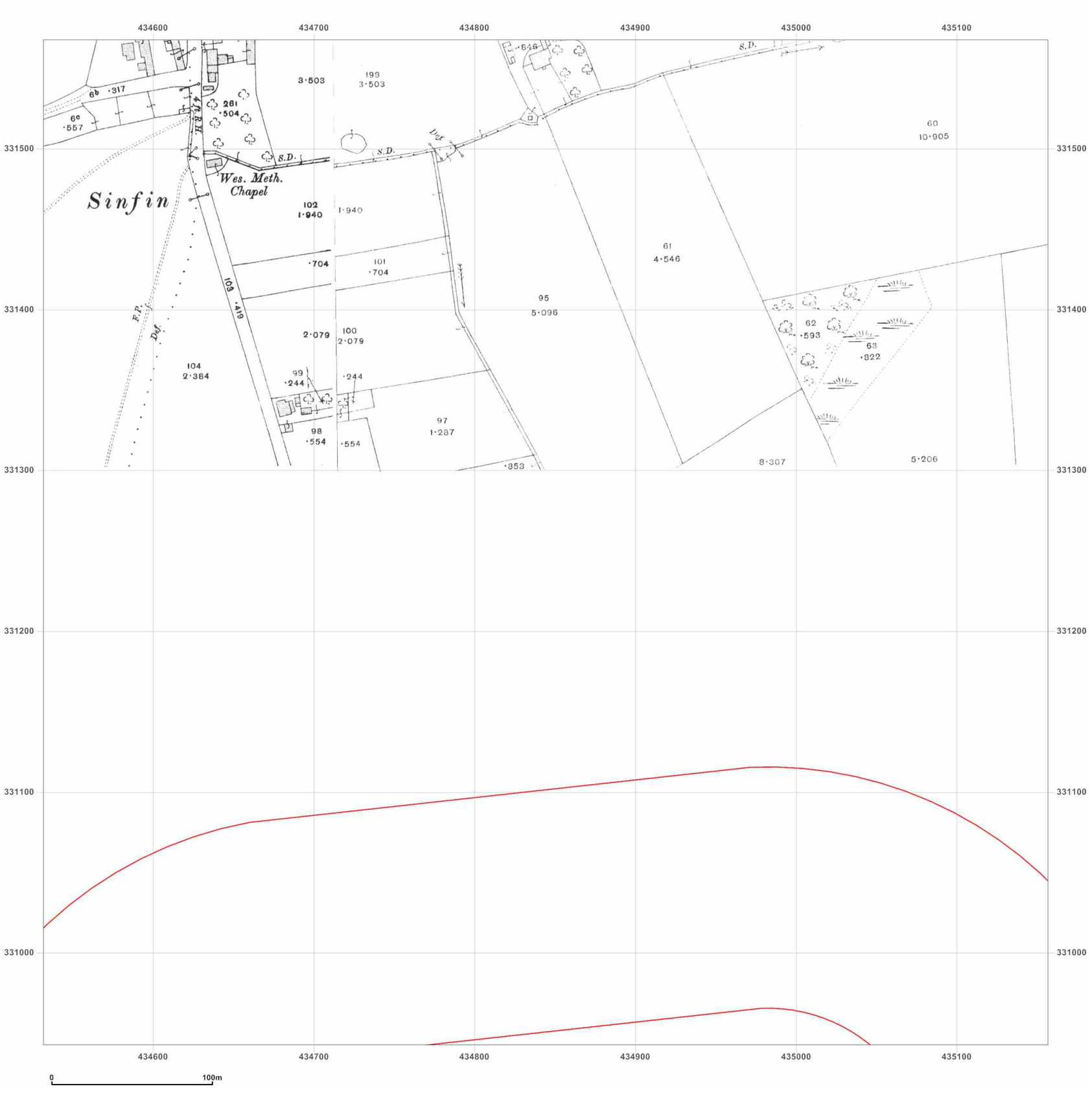
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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

Map Name: County Series

Map date: **1914**

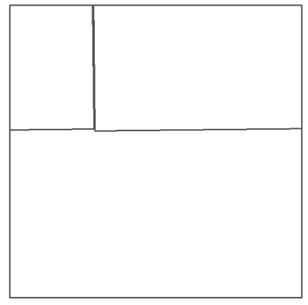
Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



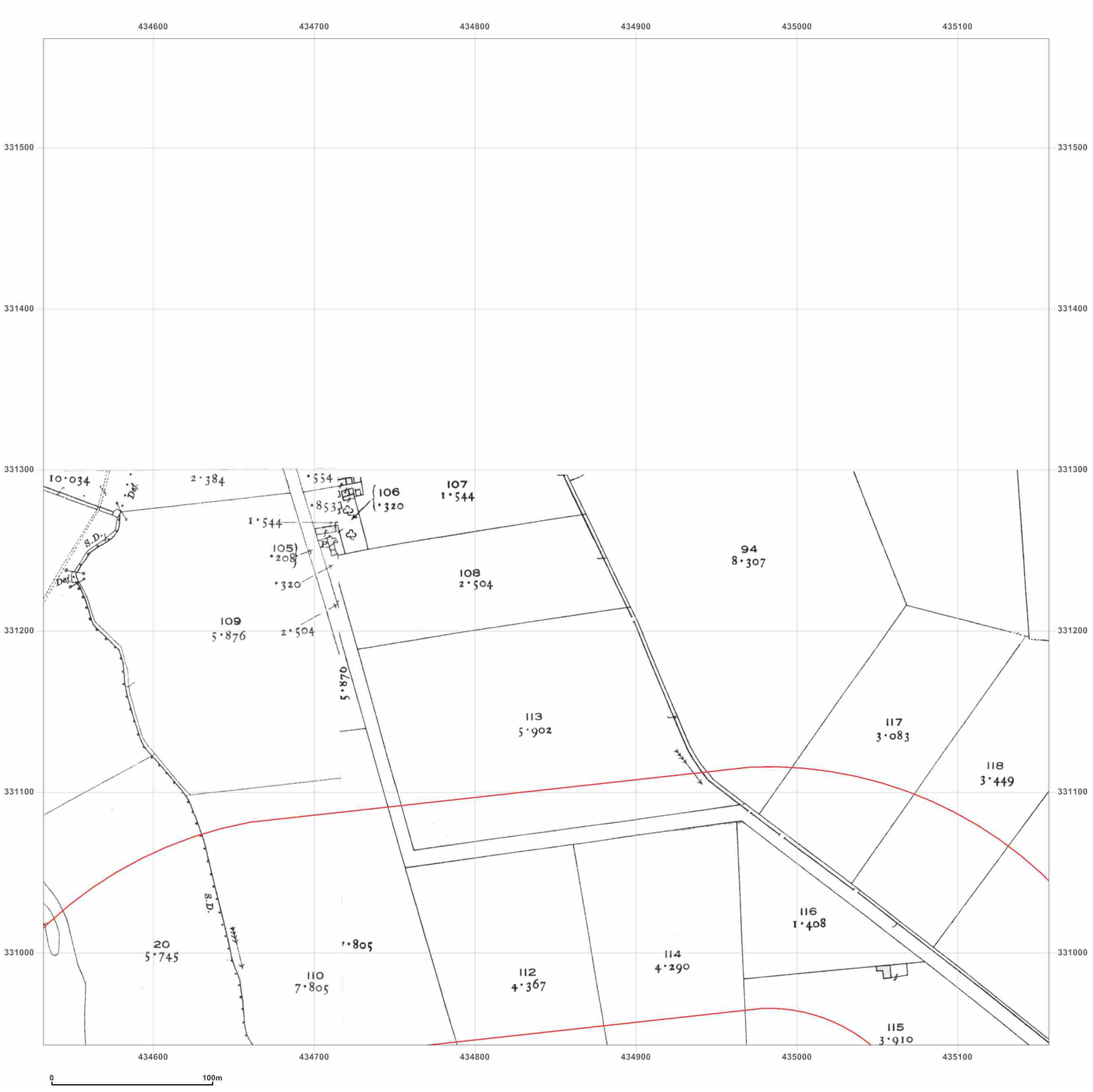
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

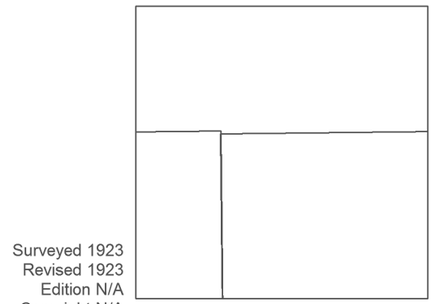
Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

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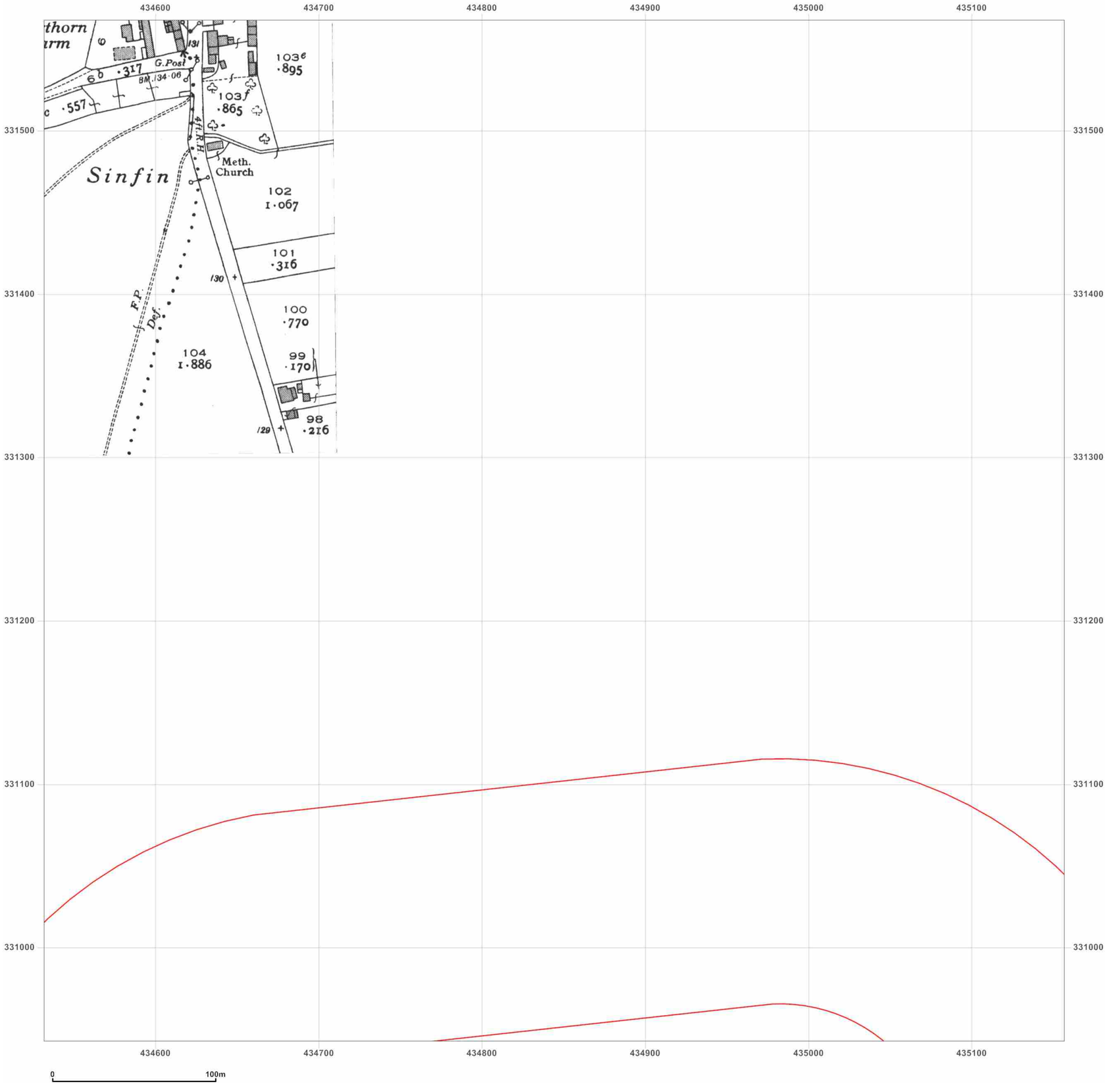
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Site Details:

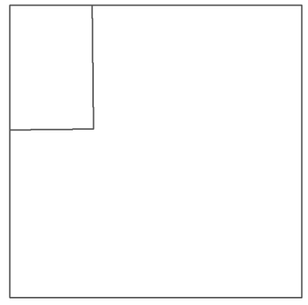
Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



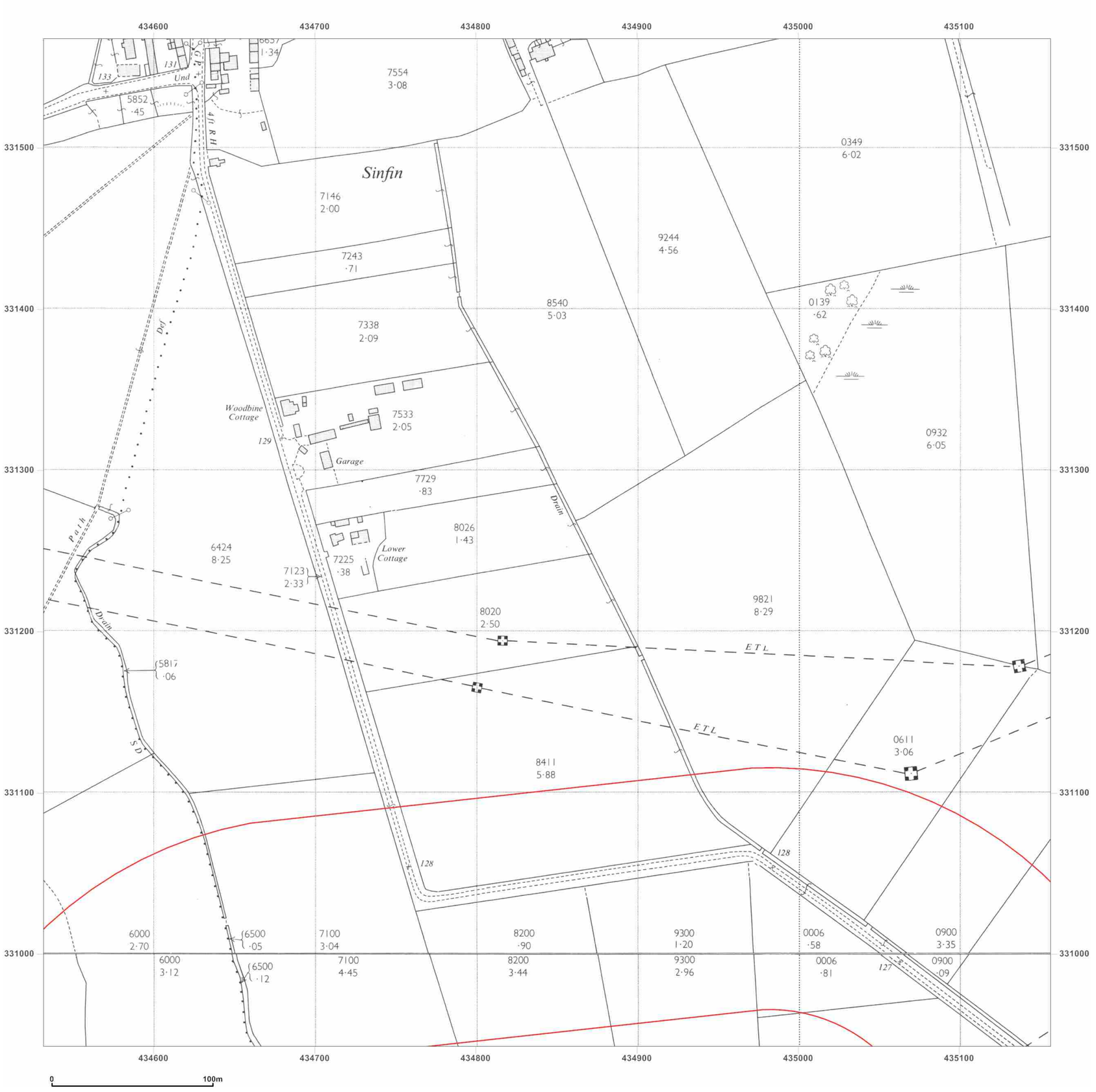
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1947

Surveyed 1967
~~Revised 1967~~
Edition N/A
Copyright 1968
Levelled 1967

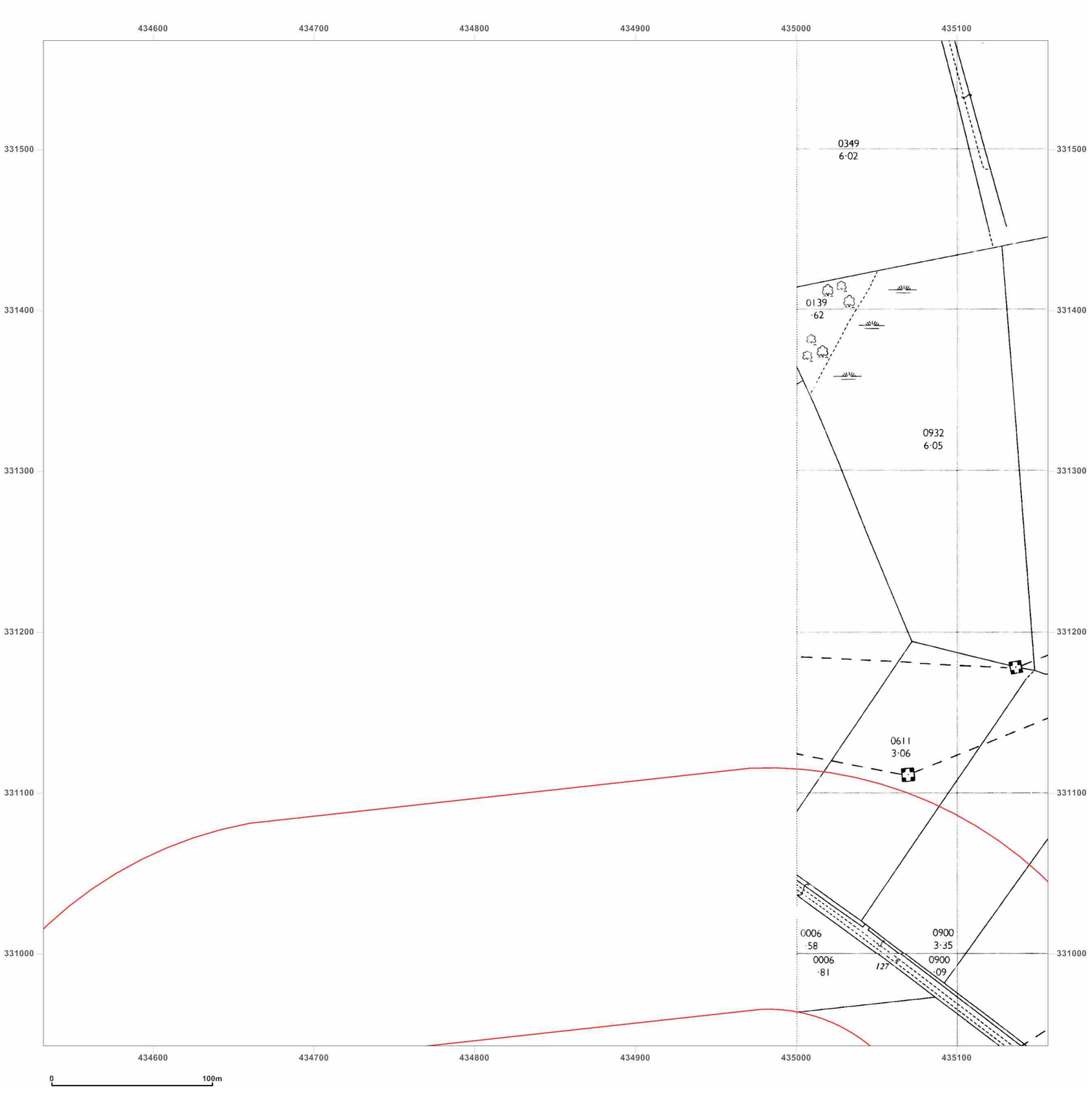
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

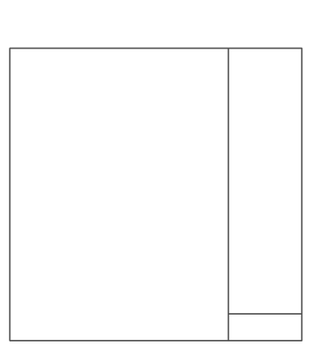
Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

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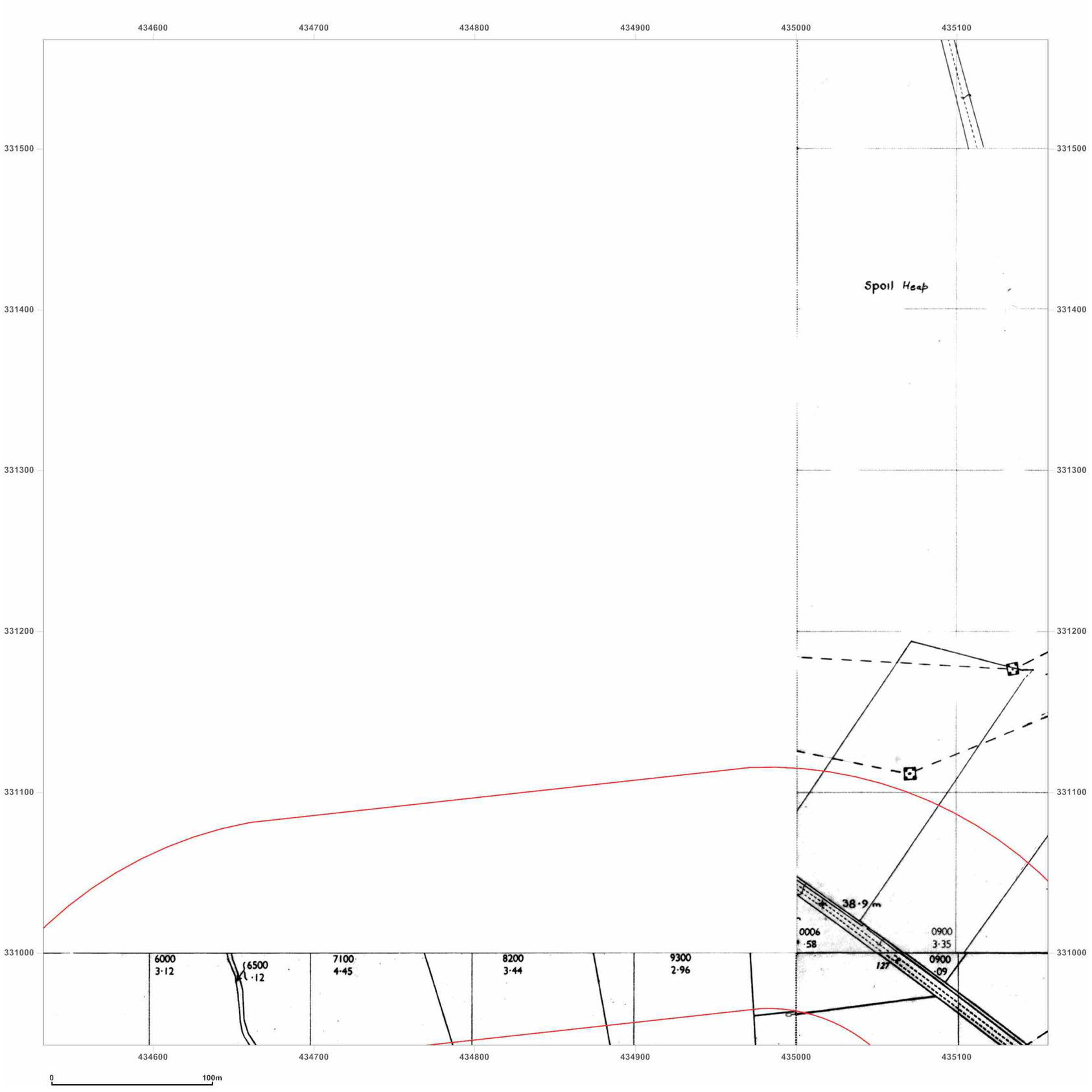
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_5_4
Grid Ref: 434844, 331255

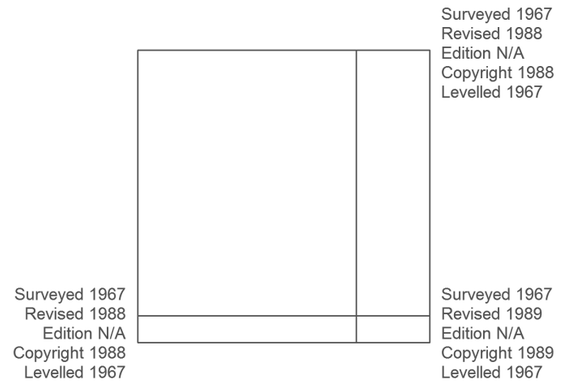
Map Name: National Grid

Map date: **1988-1989**

Scale: 1:2,500

Printed at: 1:2,500

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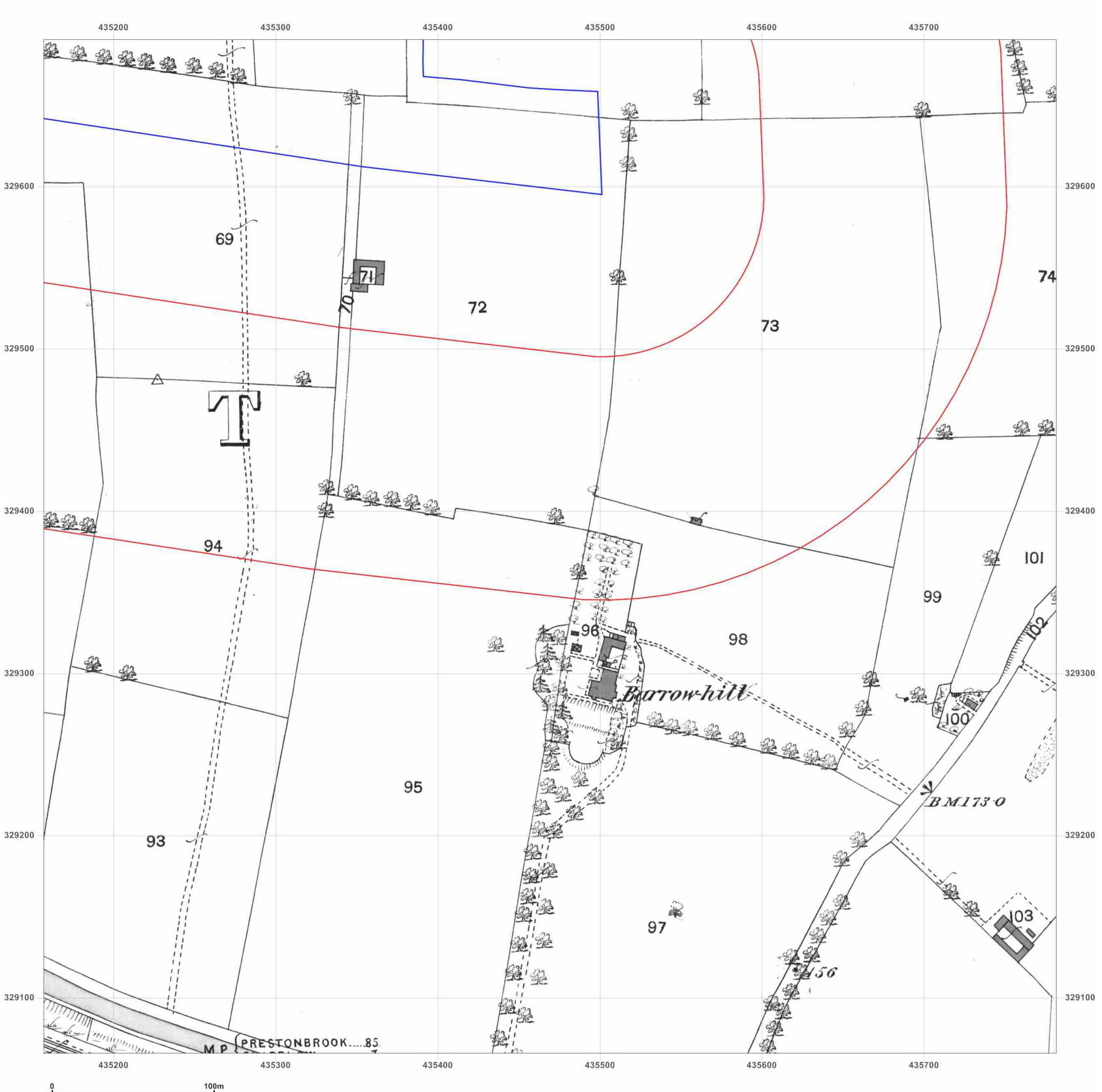
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

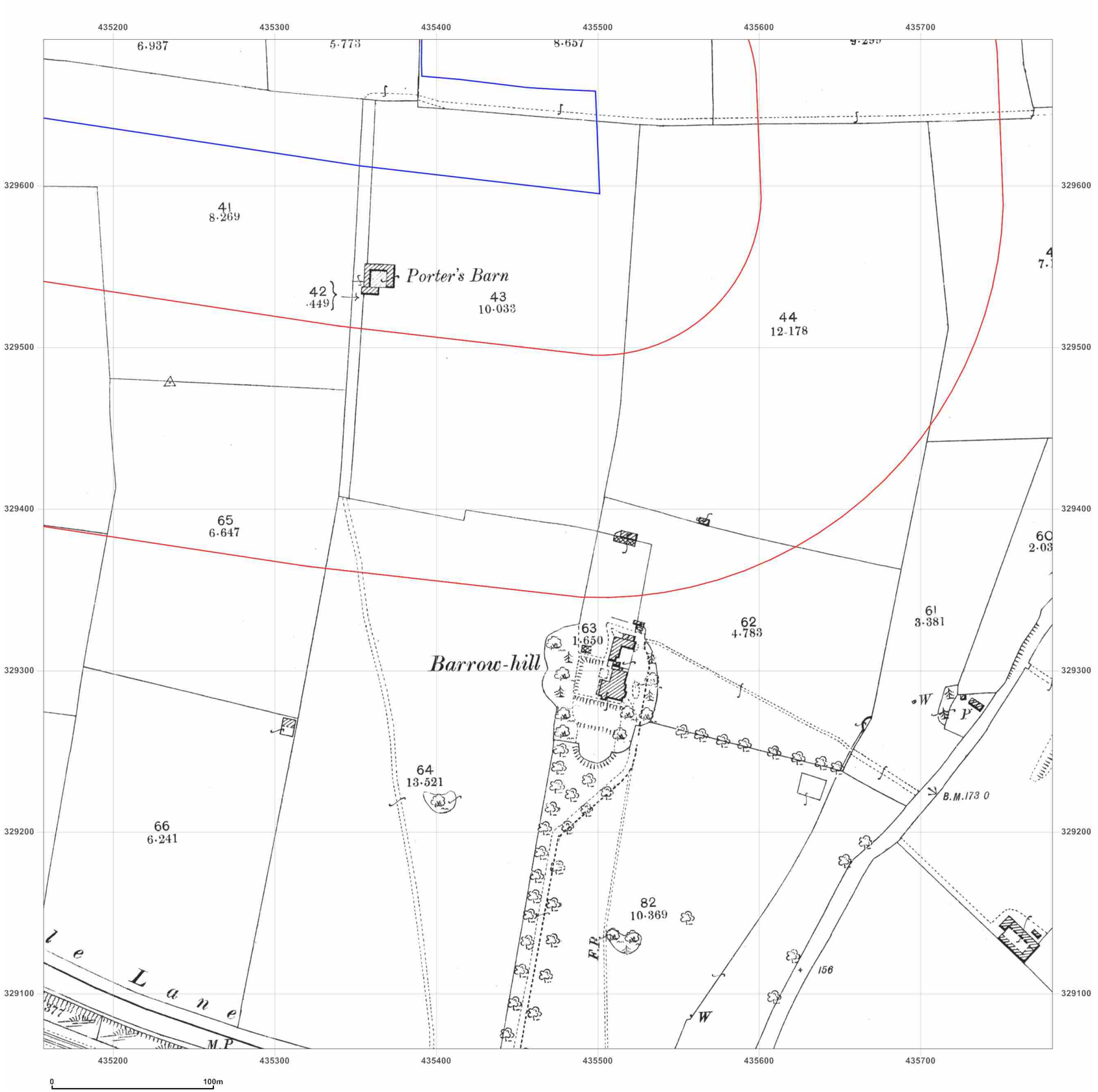
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

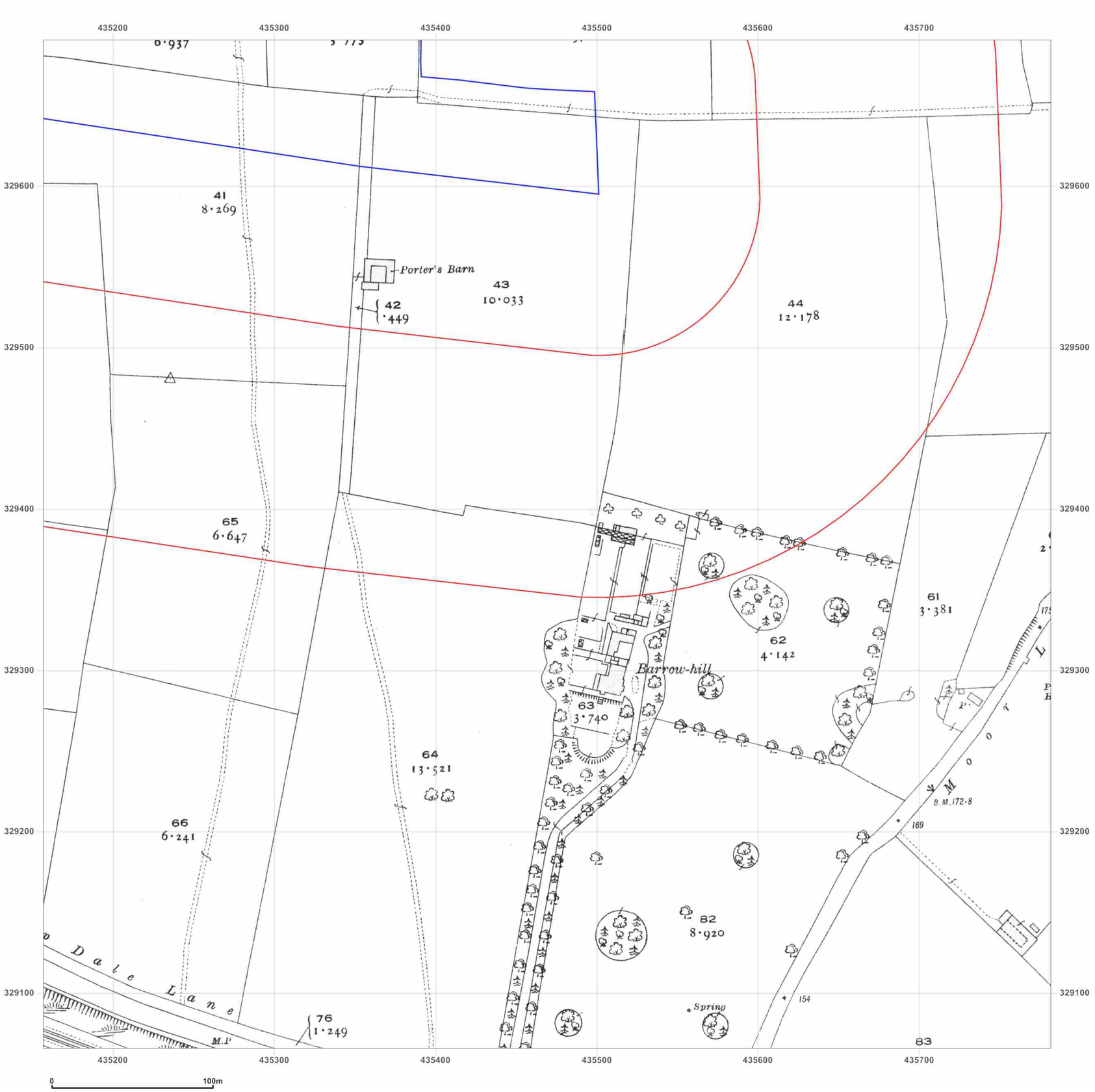
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

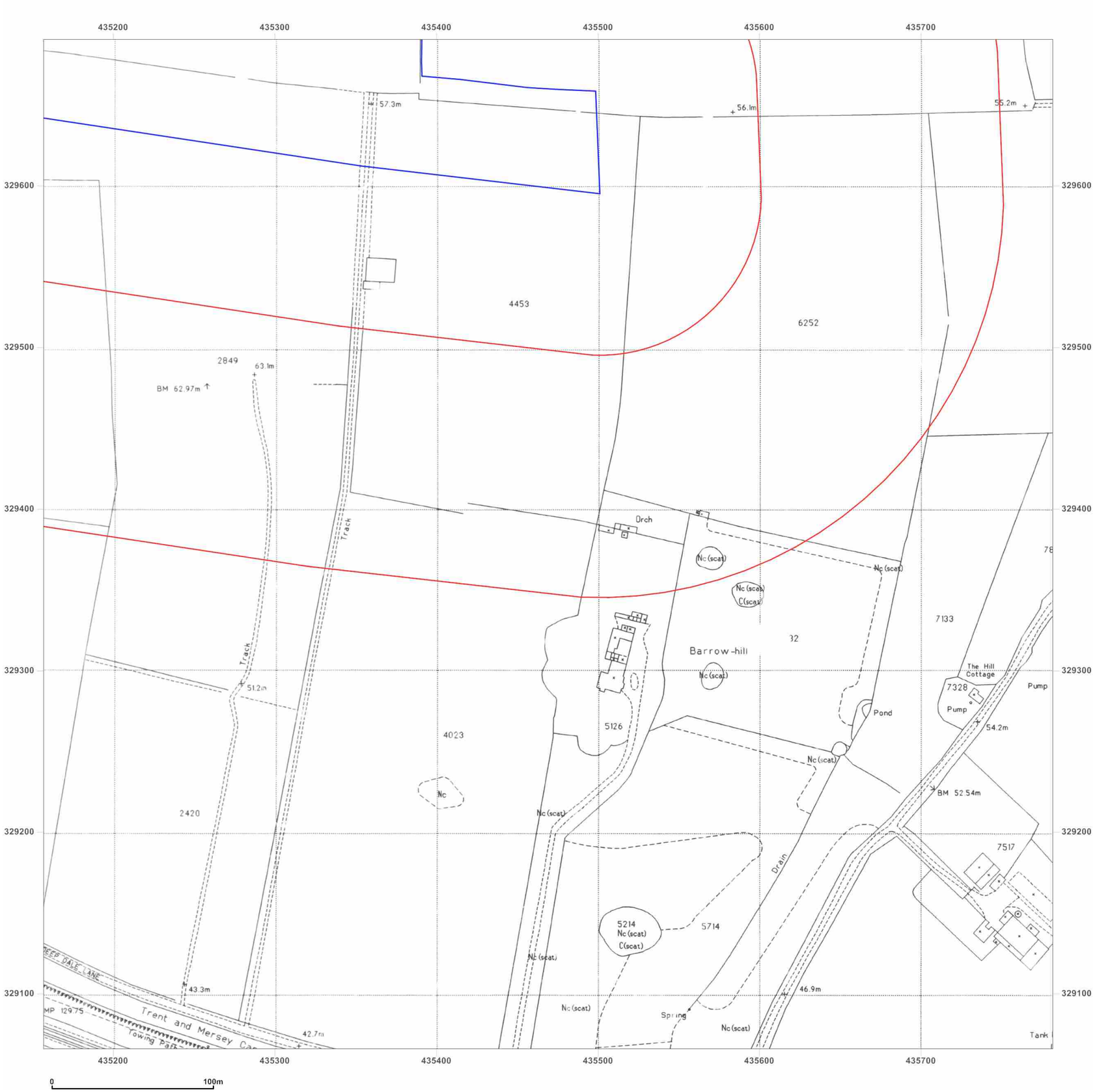
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_1
Grid Ref: 435469, 329378

Map Name: National Grid
Map date: **1994**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

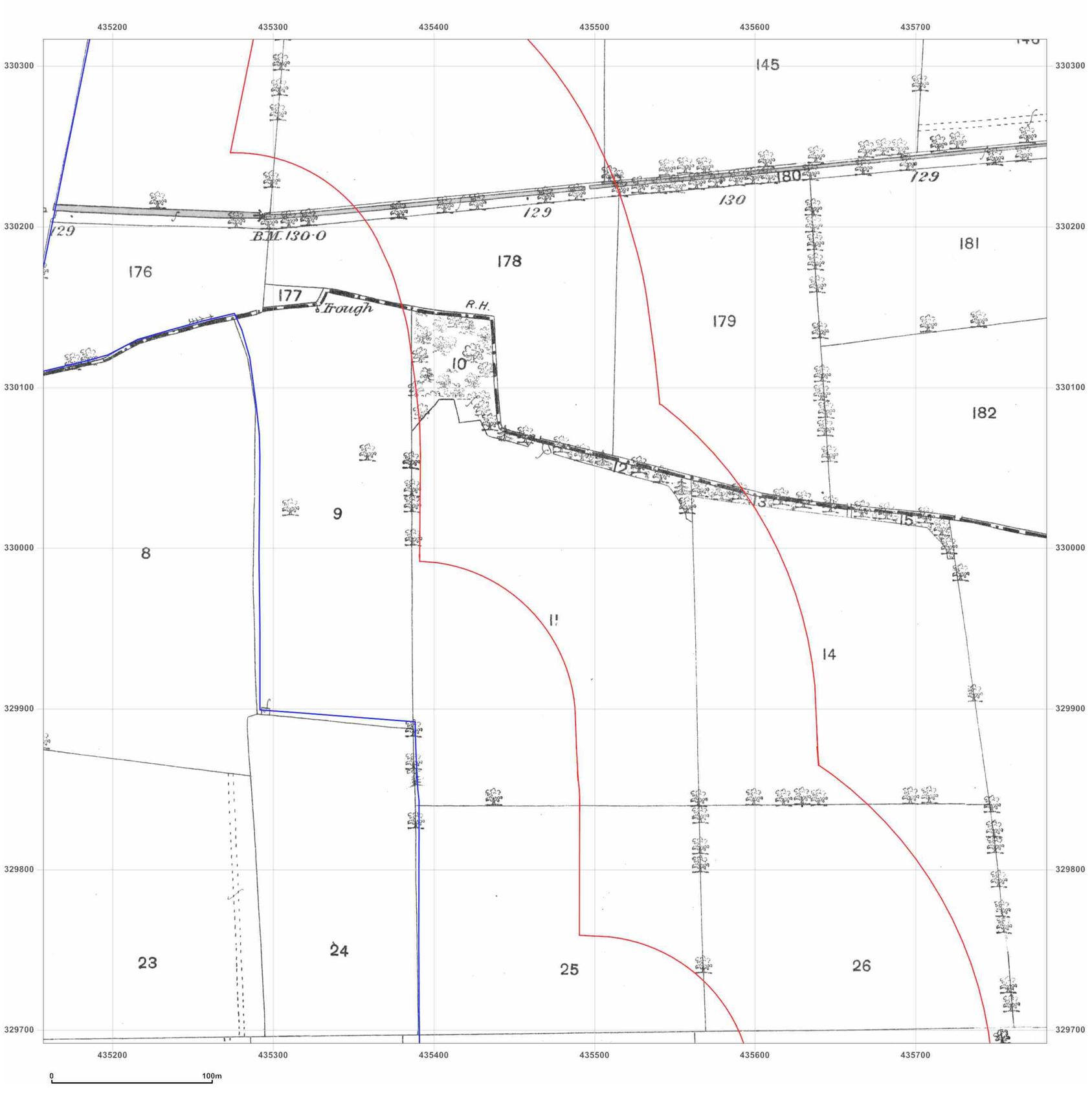
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: County Series

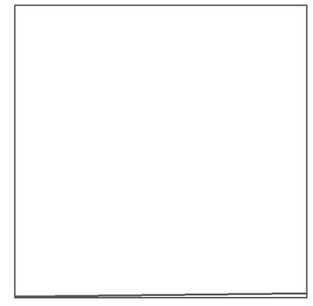
Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

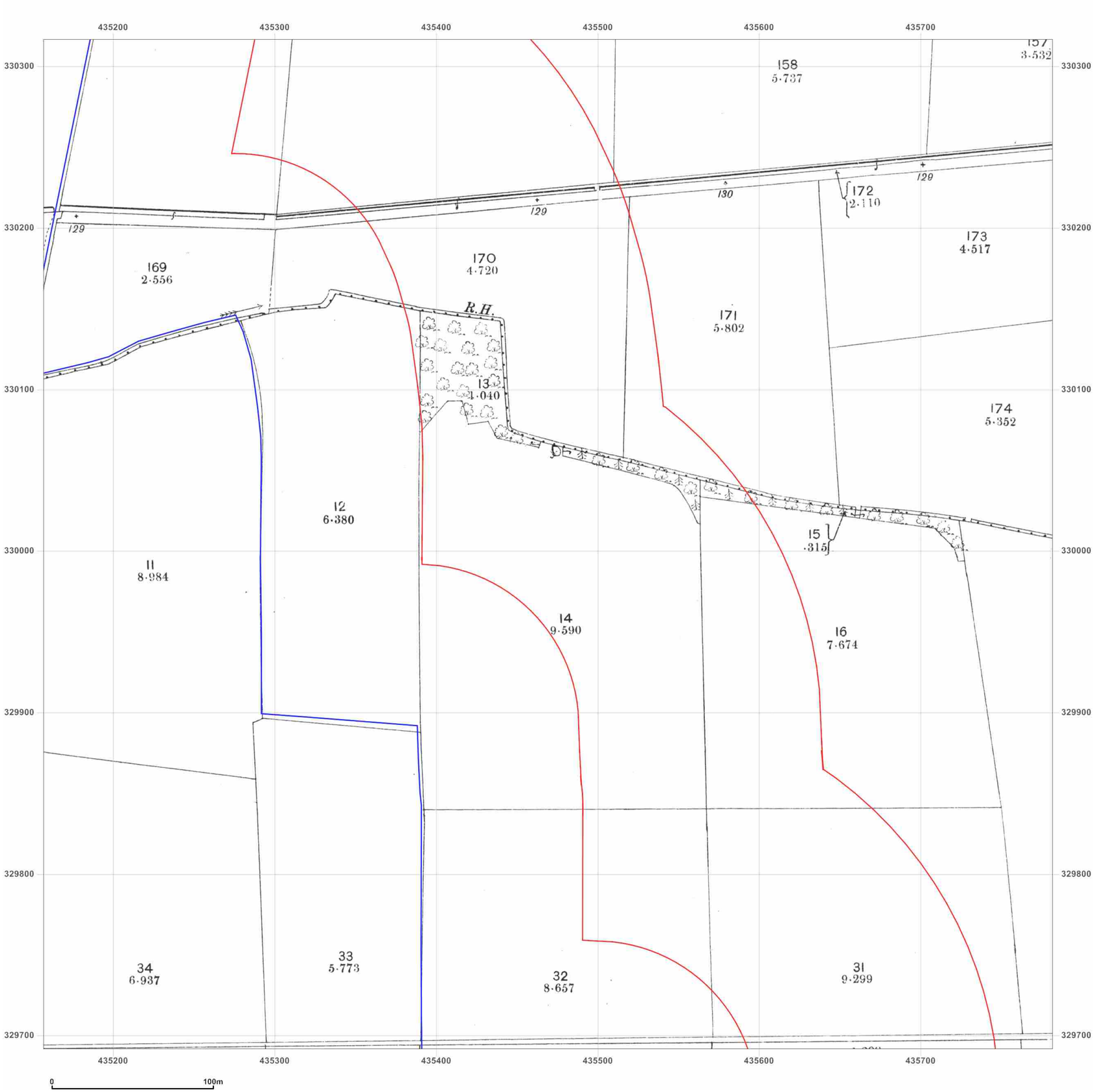
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: County Series

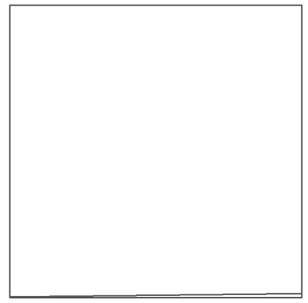
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: County Series

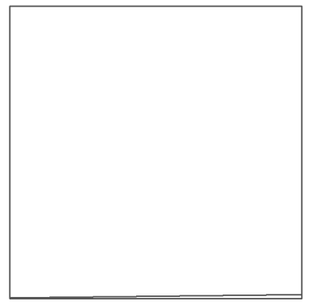
Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

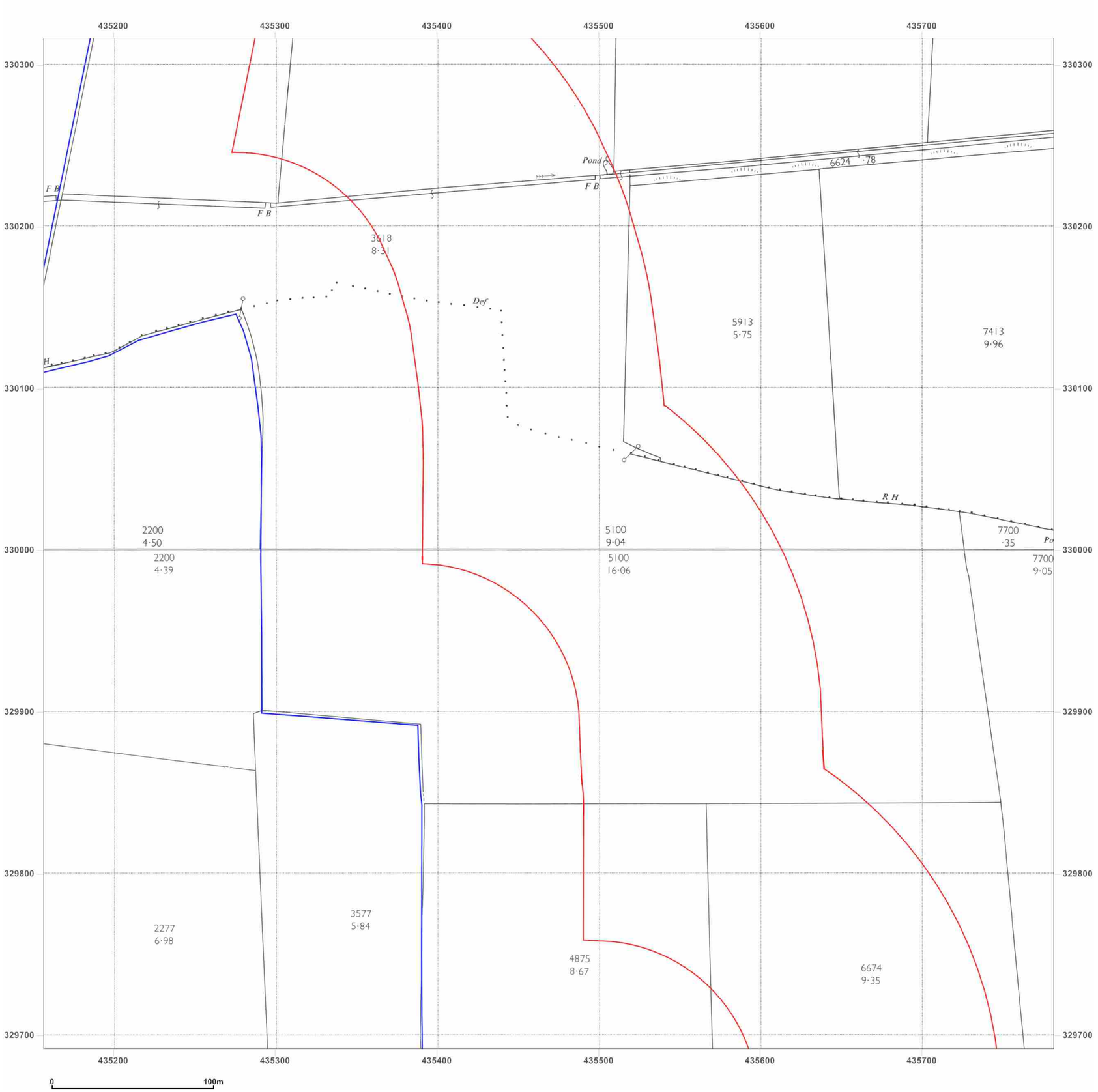
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1944

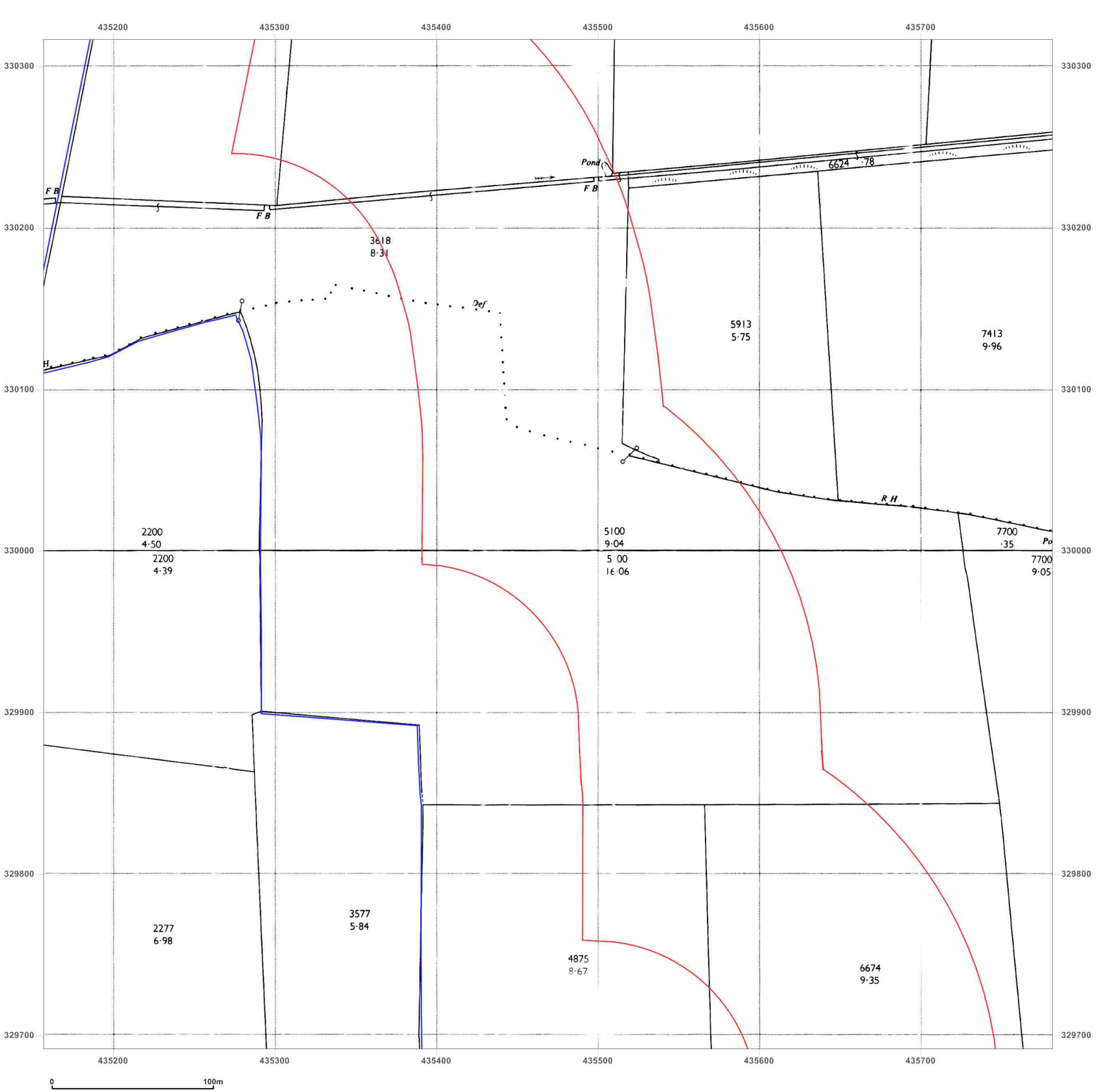
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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

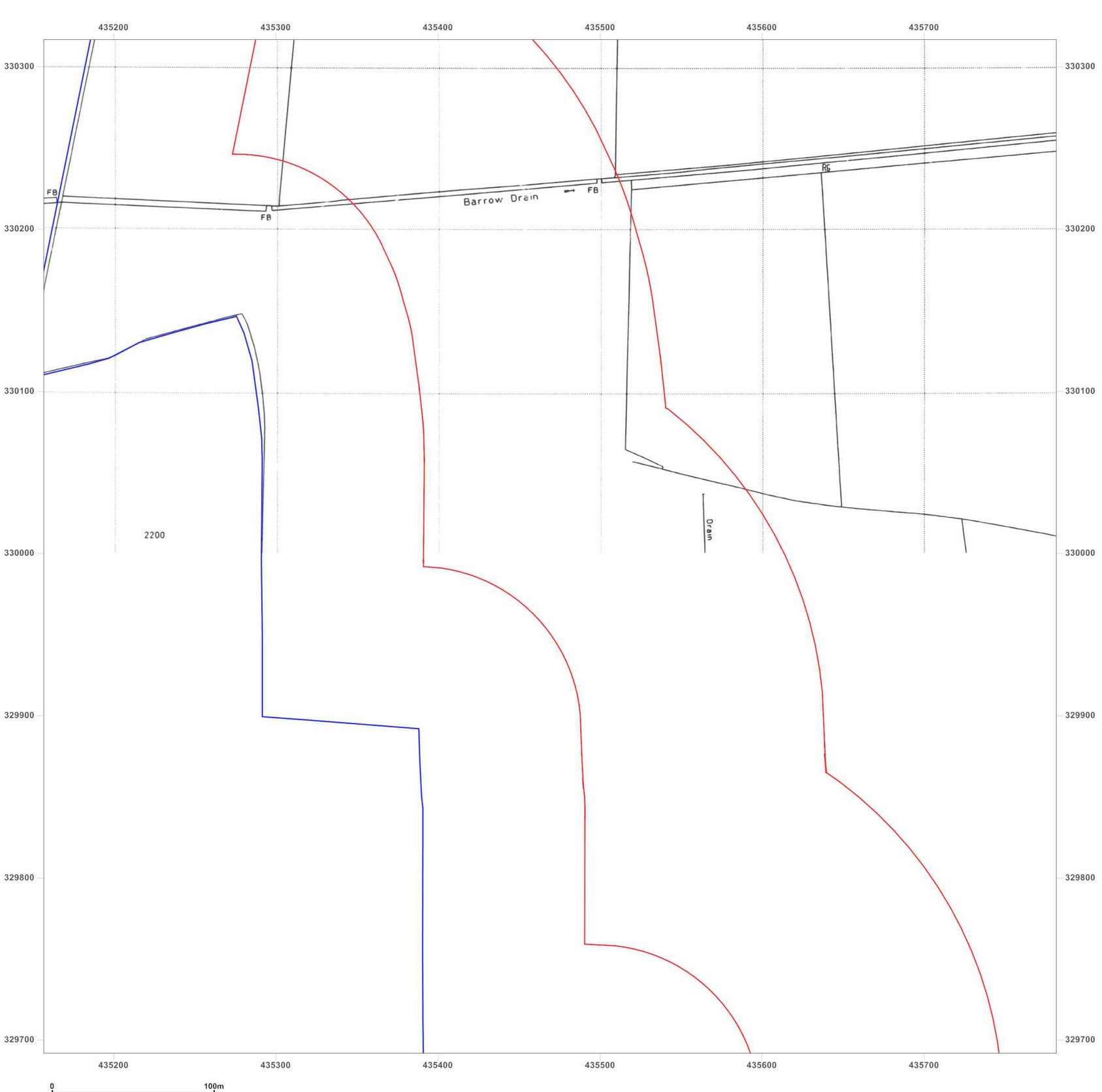
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

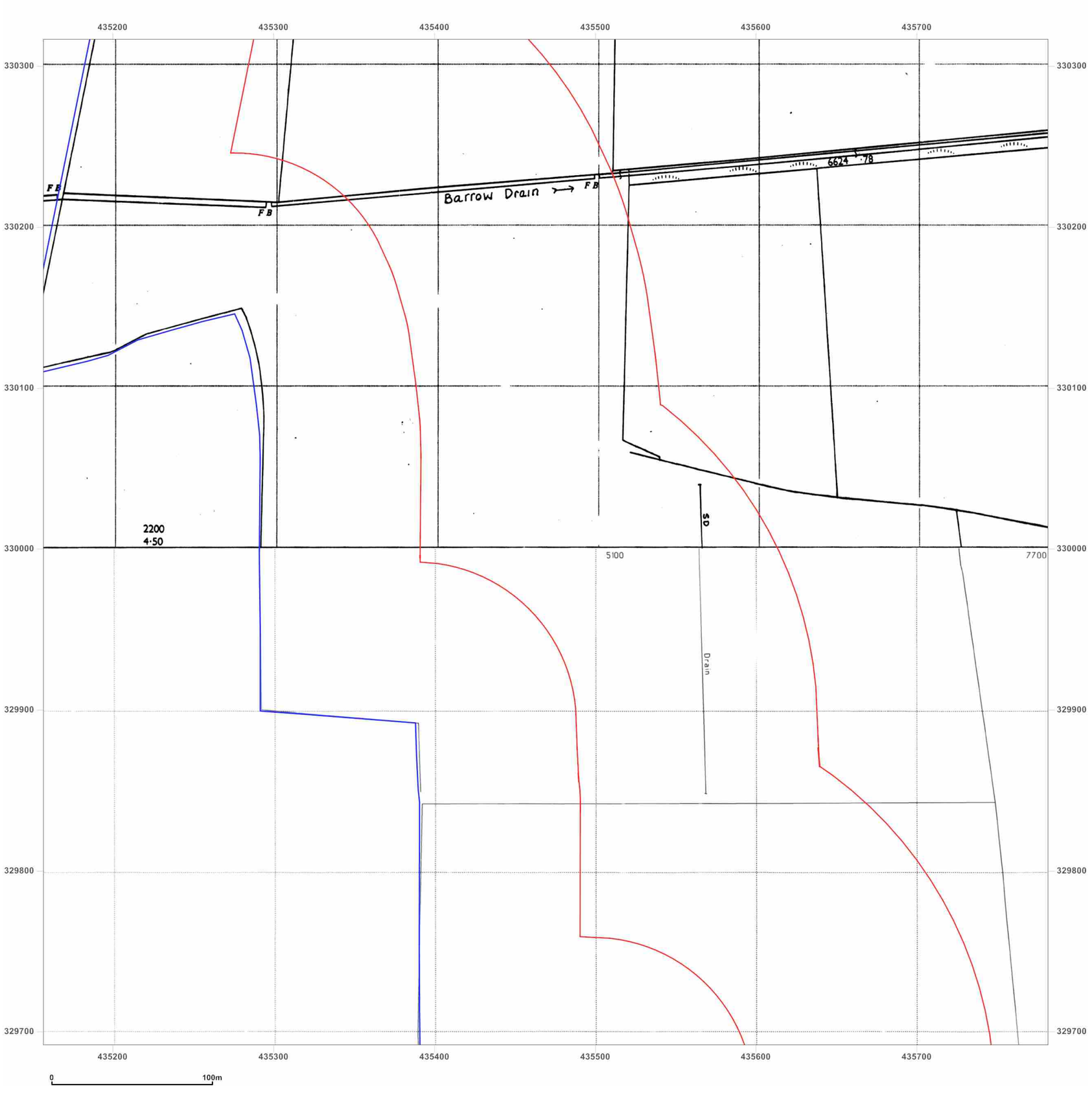
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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_2
Grid Ref: 435469, 330004

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

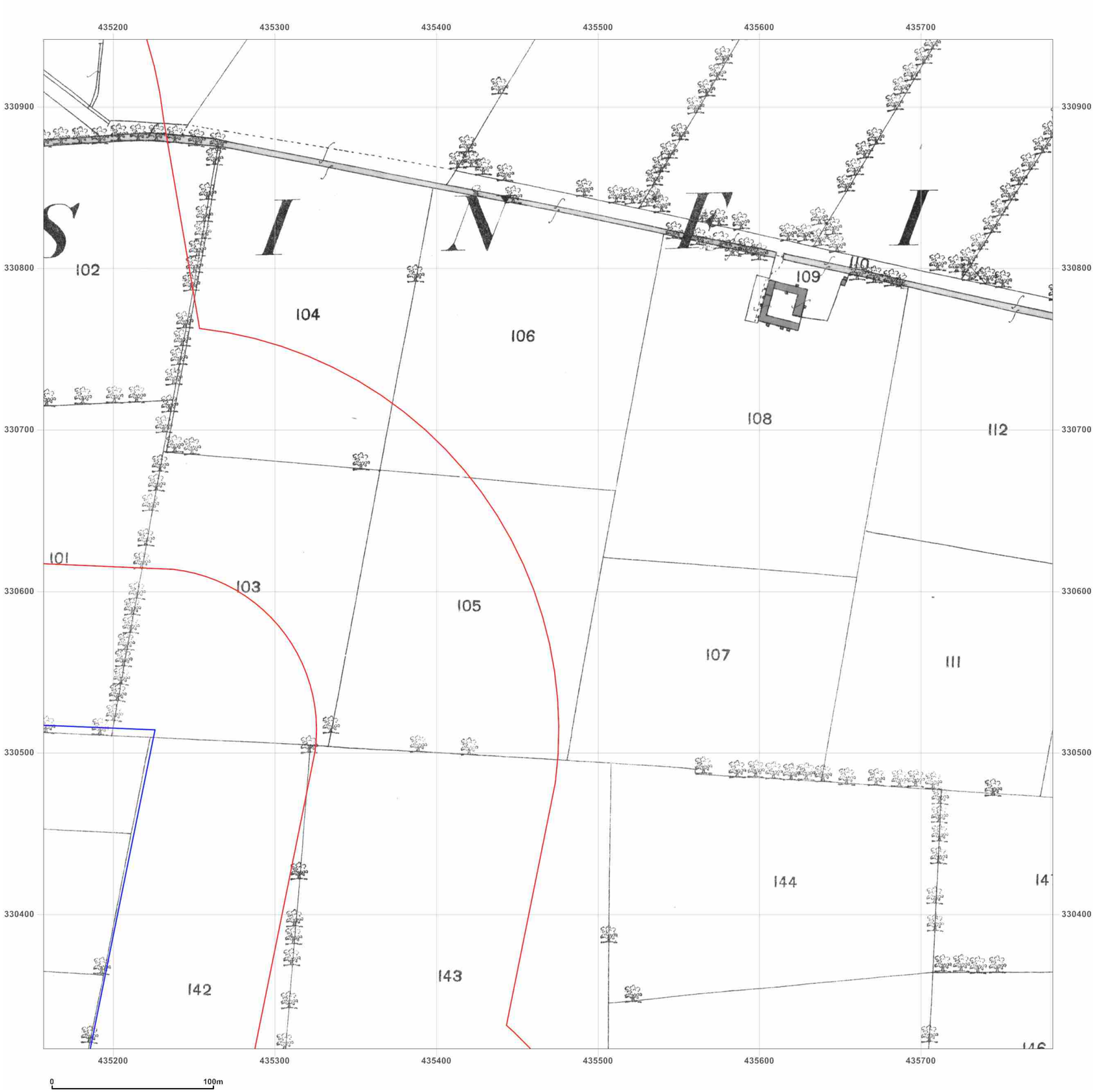
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: County Series

Map date: **1882**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

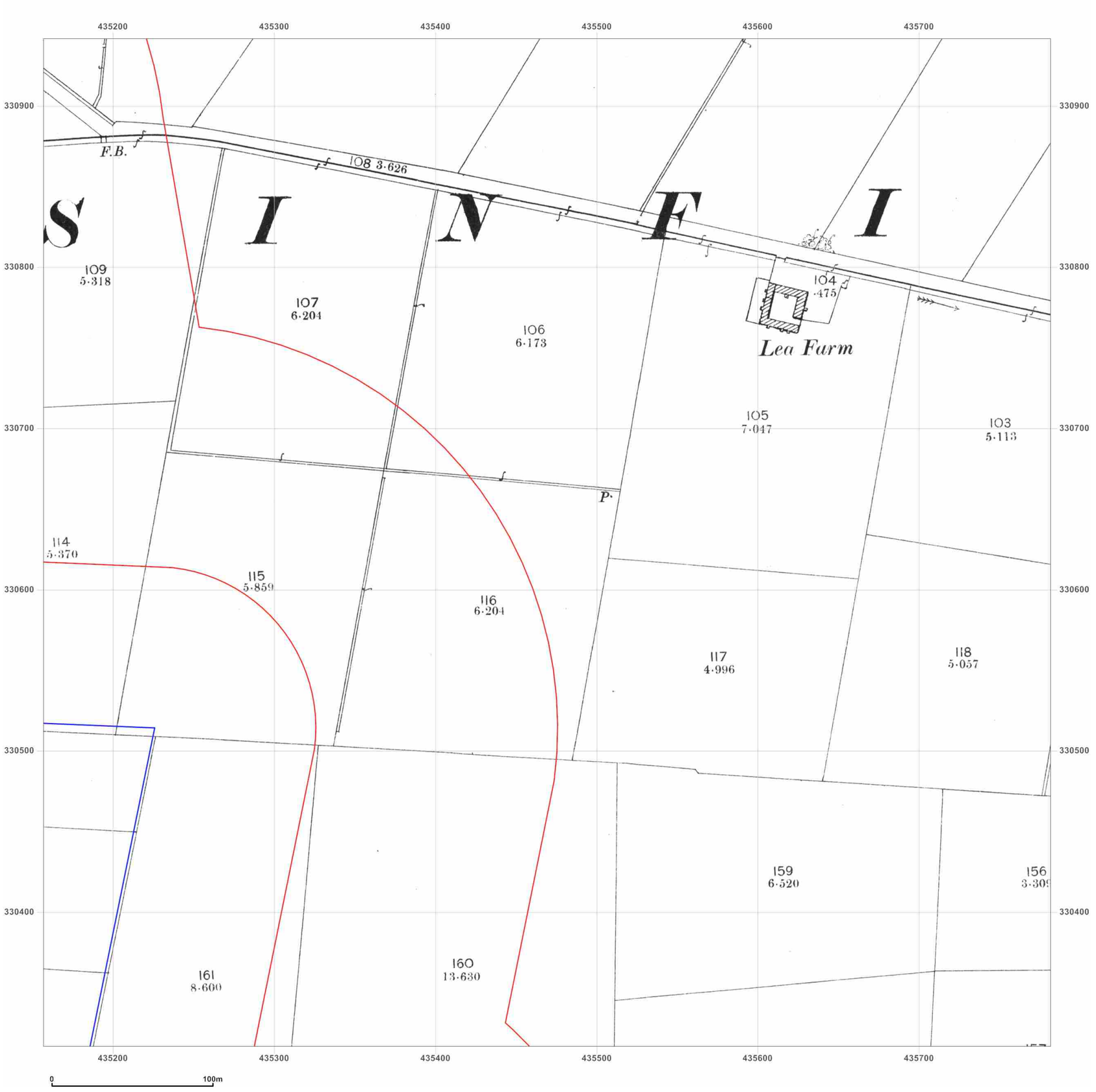
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: County Series
Map date: **1901**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

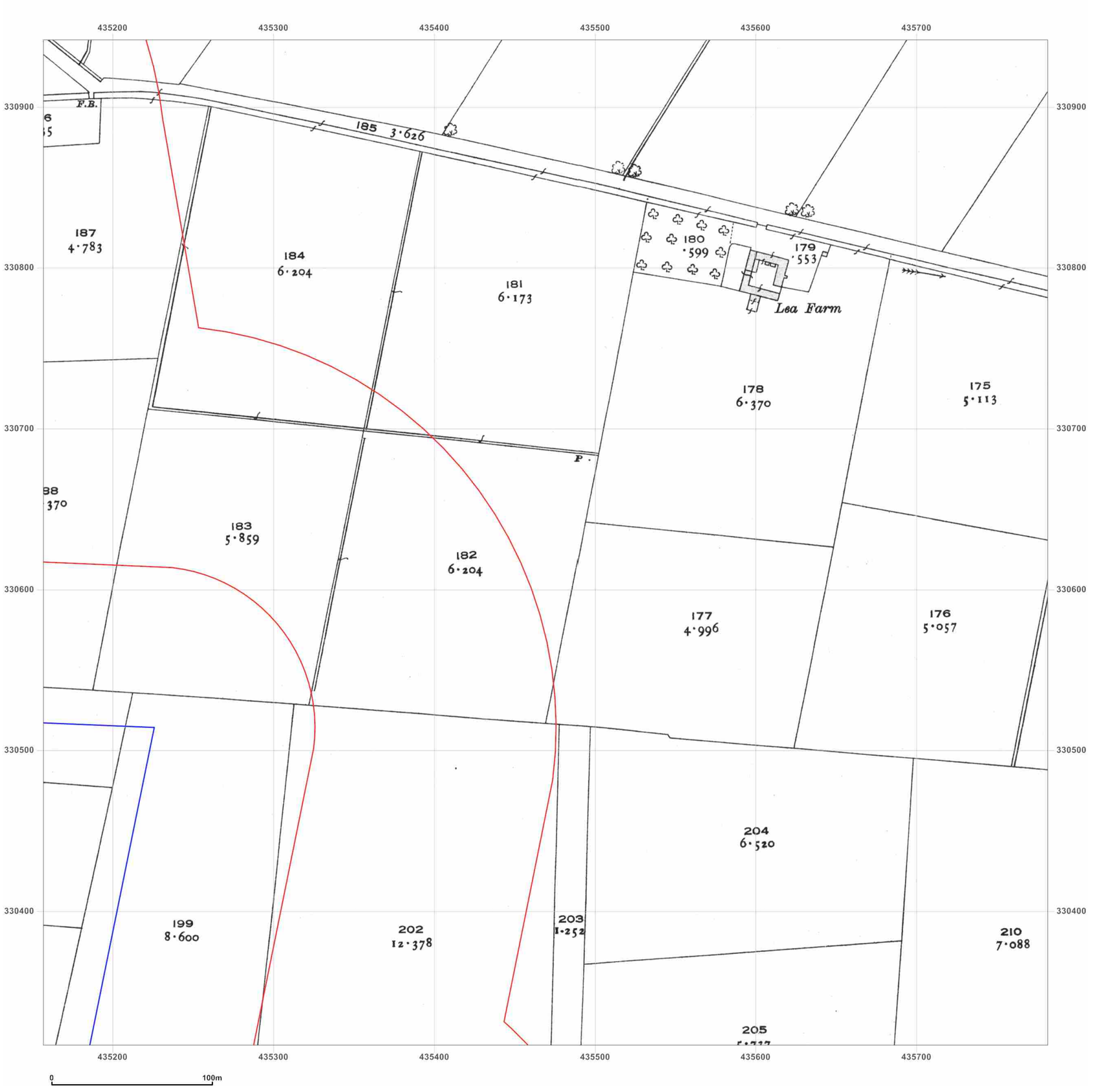
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: County Series
Map date: **1923**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

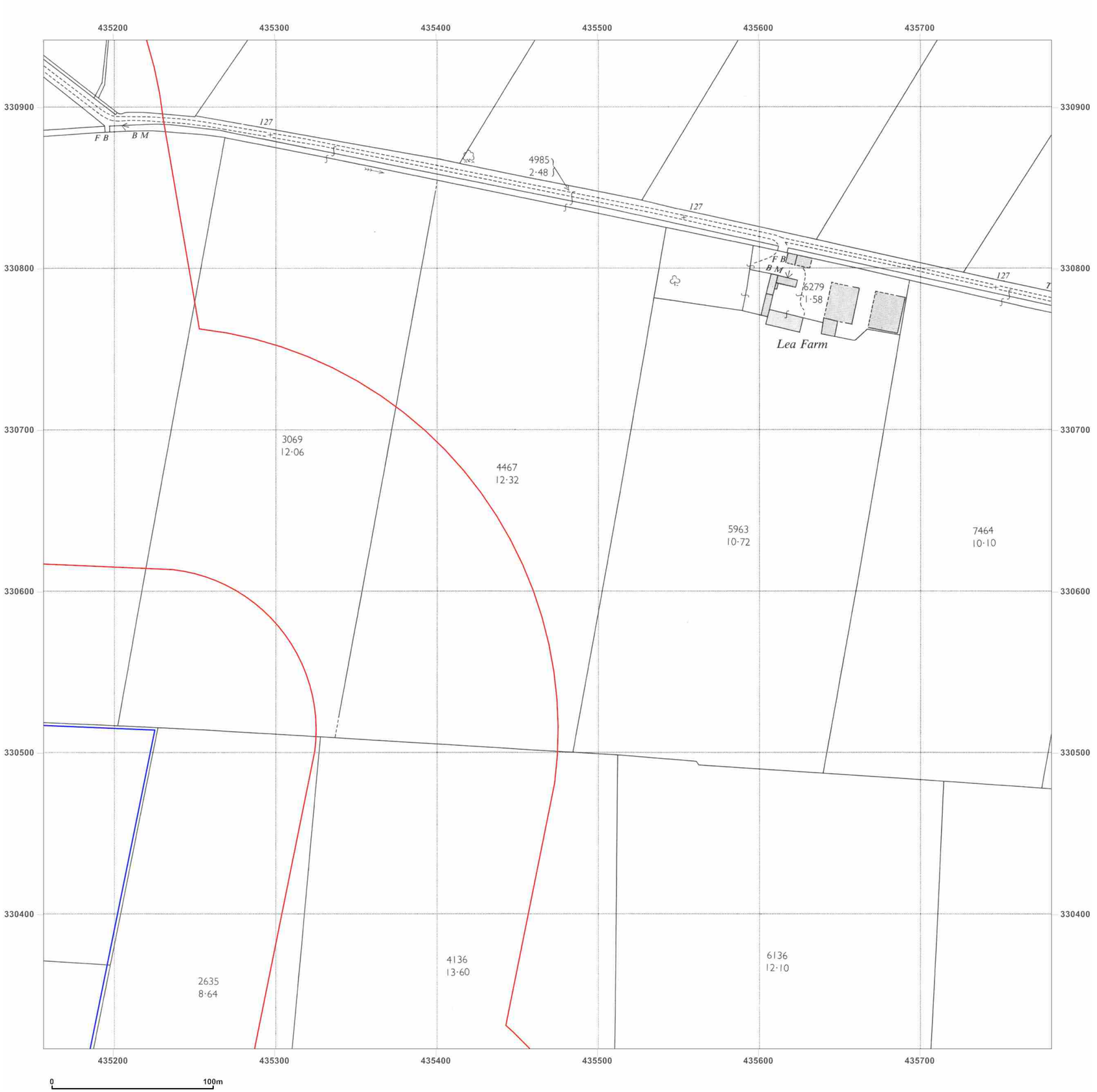
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967

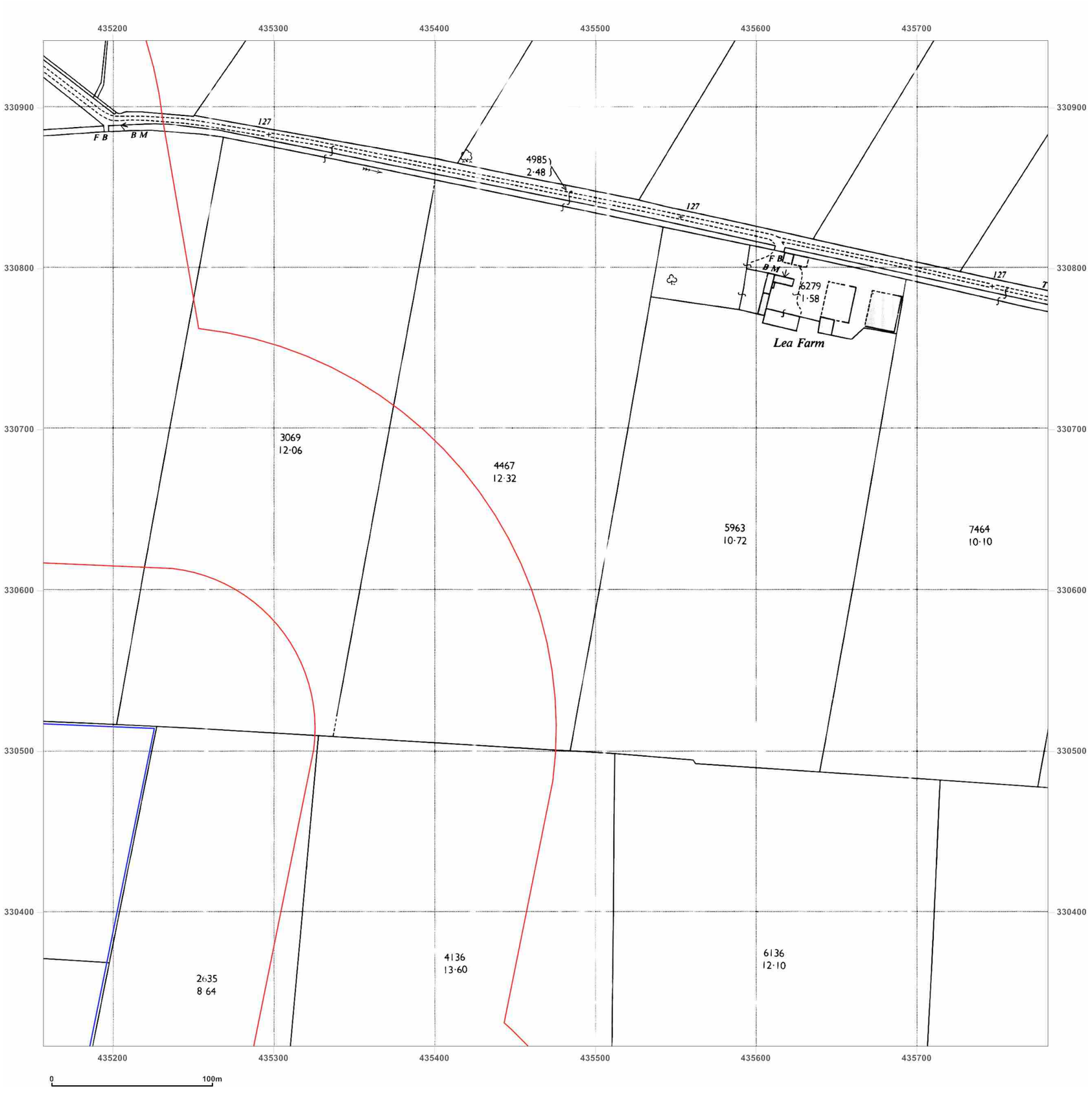
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

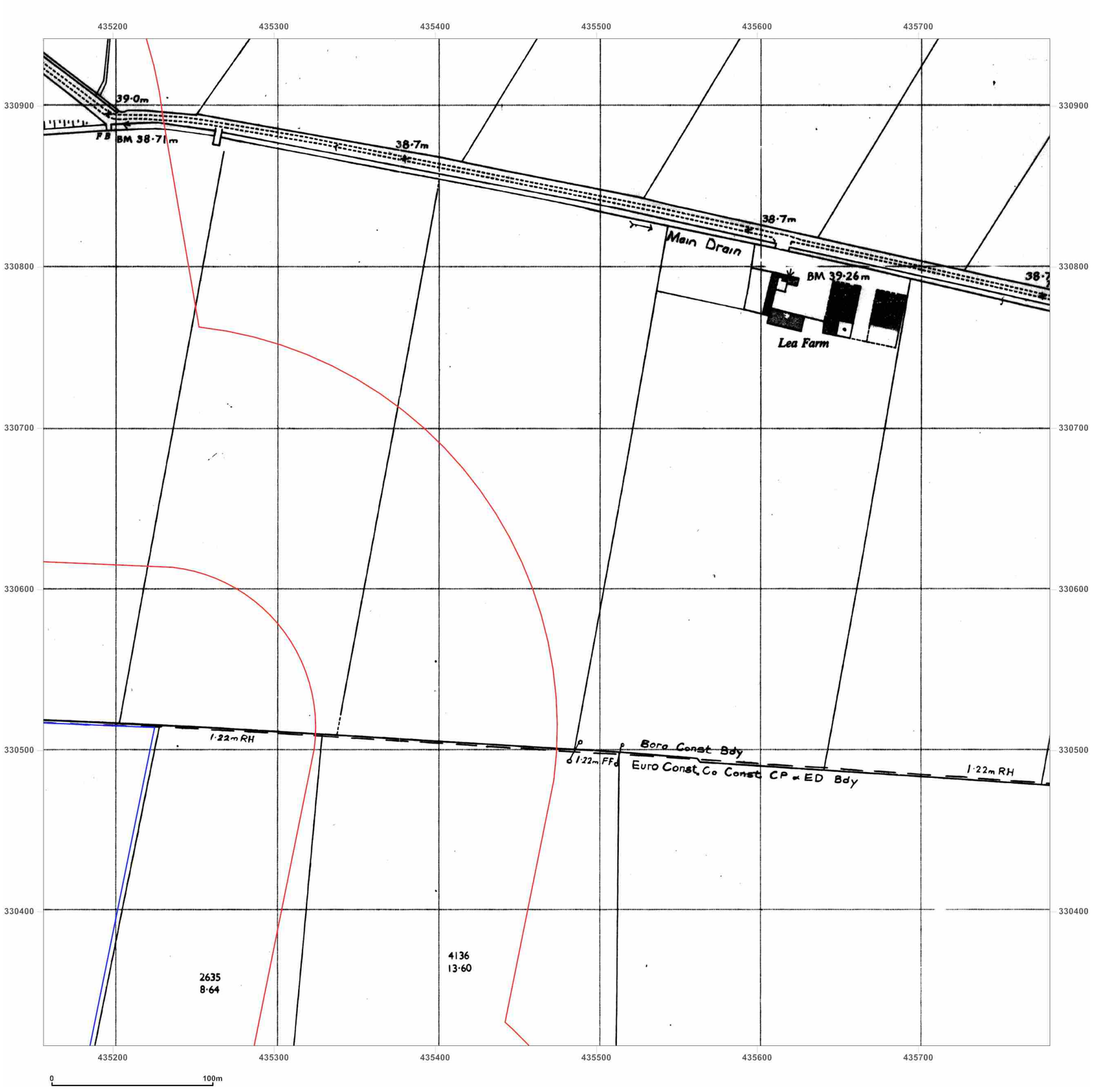
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: National Grid

Map date: **1989**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

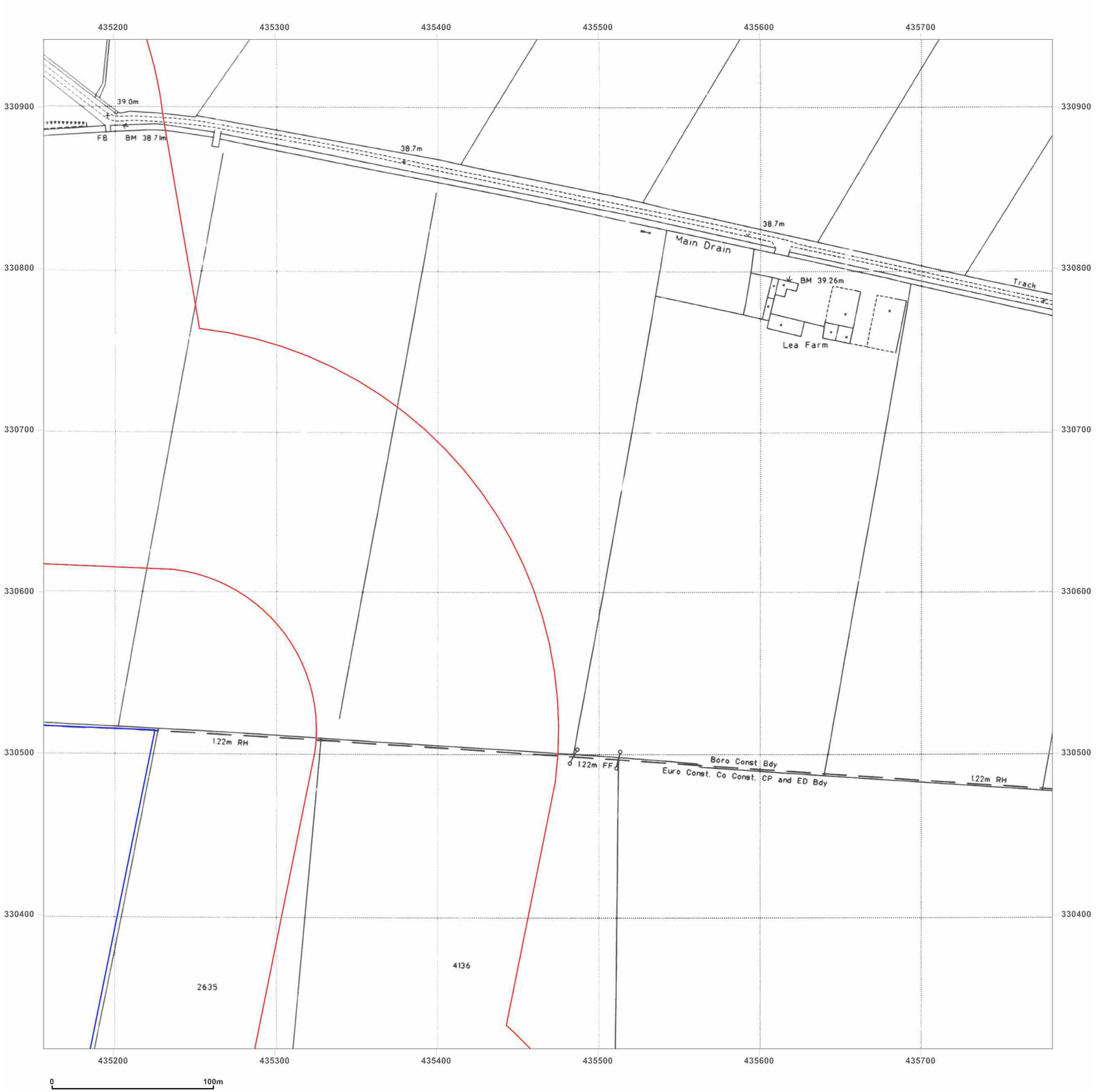
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_3
Grid Ref: 435469, 330629

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

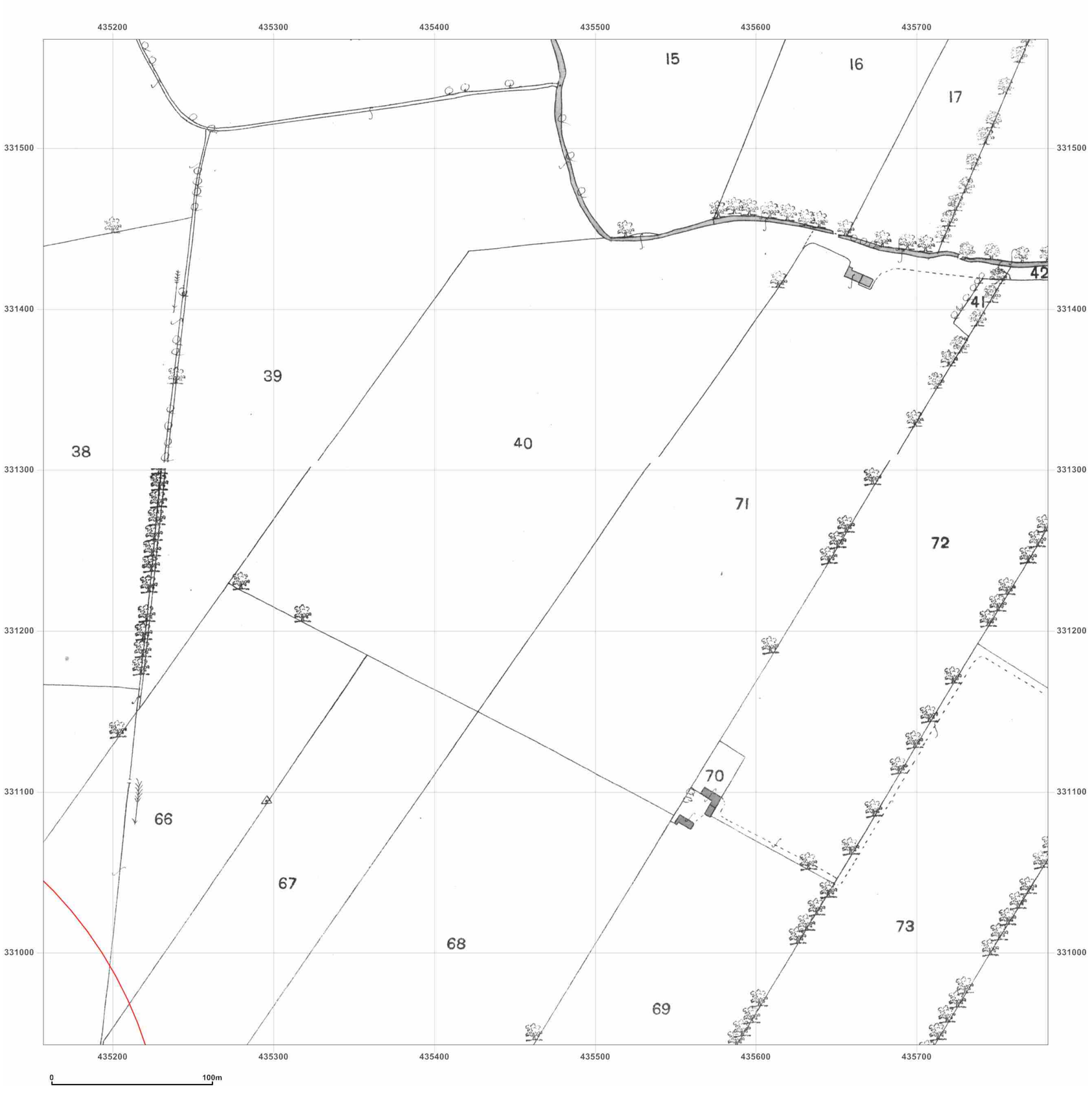
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: County Series

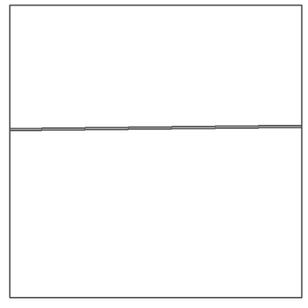
Map date: **1882-1883**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1883
Revised 1883
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

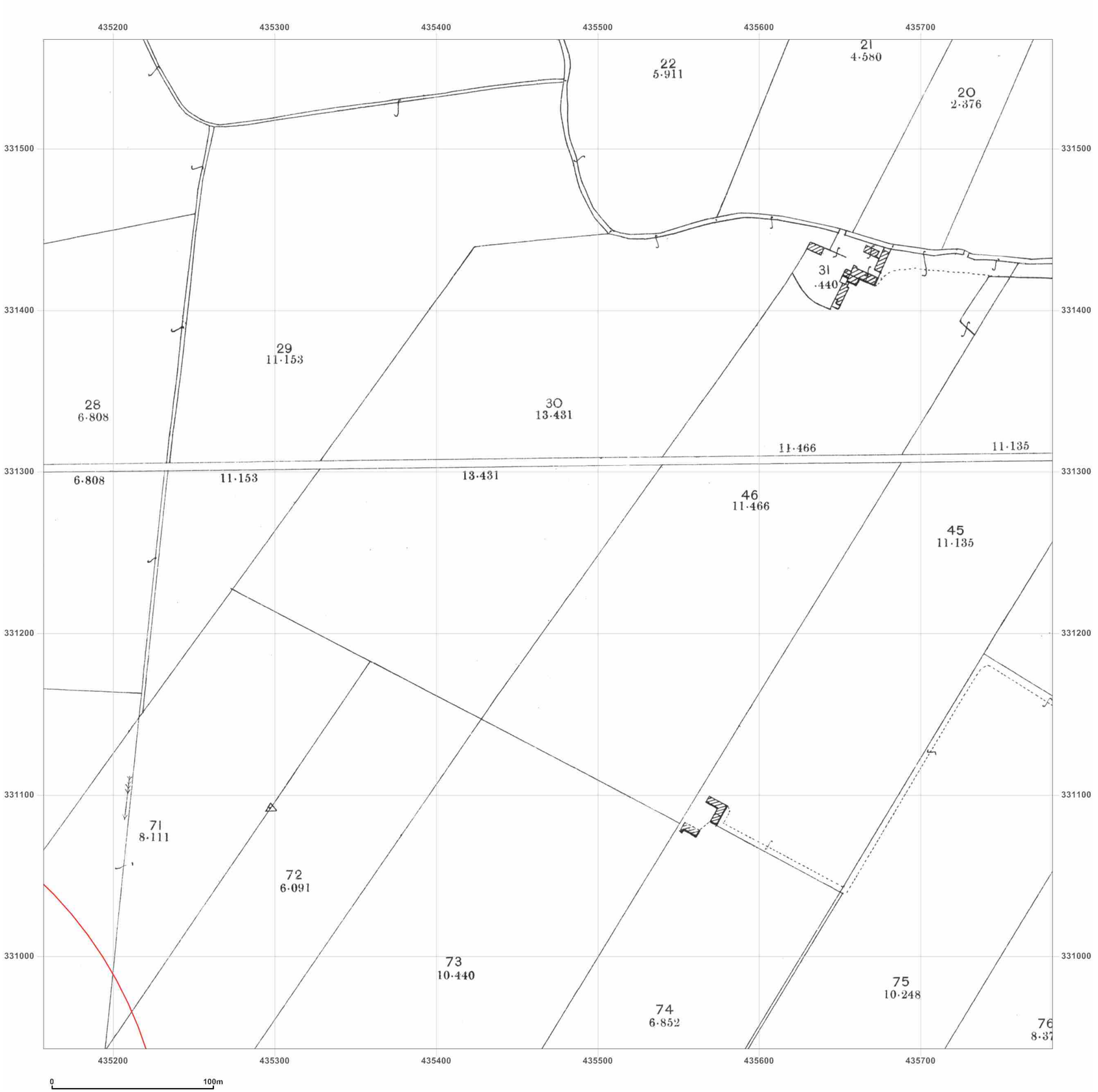
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Production date: 24 April 2019

Map legend available at:
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: County Series

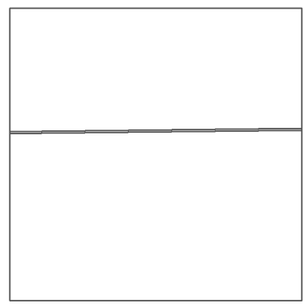
Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

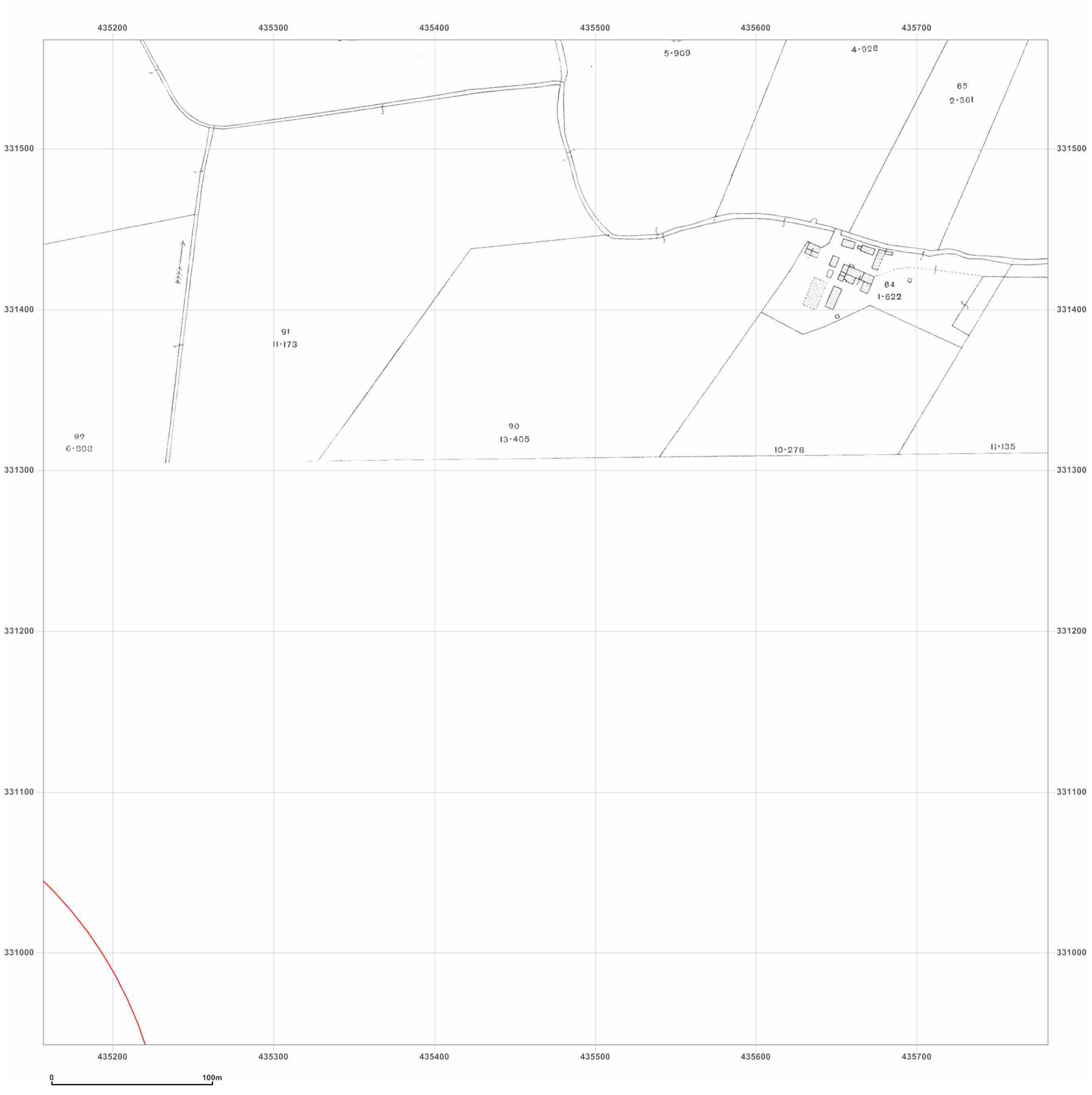
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: County Series

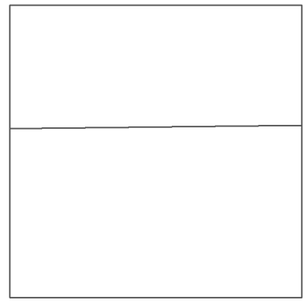
Map date: **1914**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A



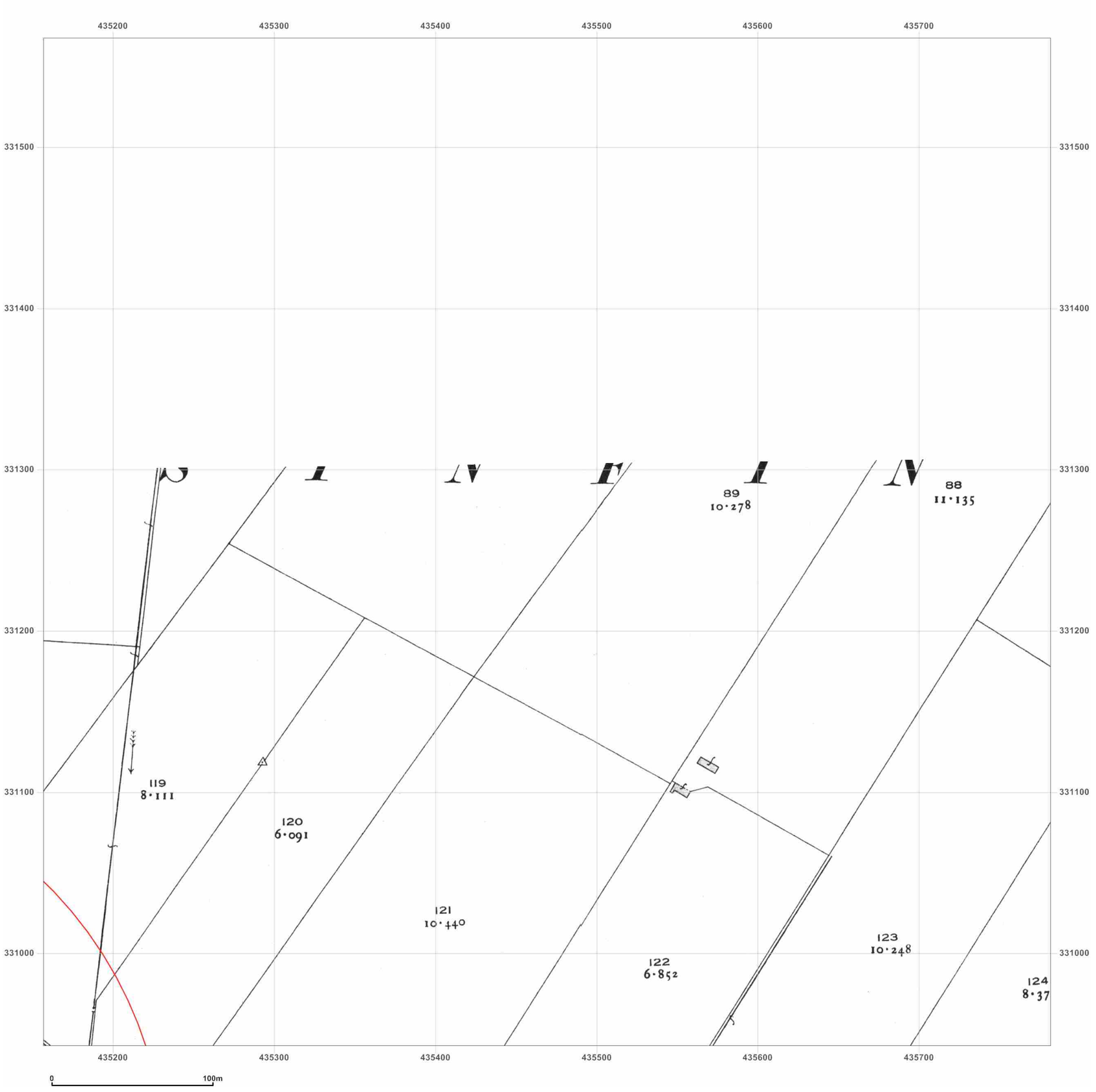
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

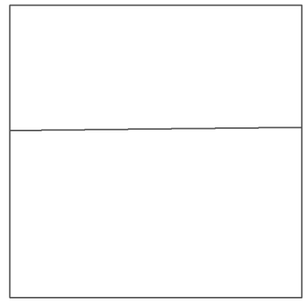
Map Name: County Series

Map date: **1923**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

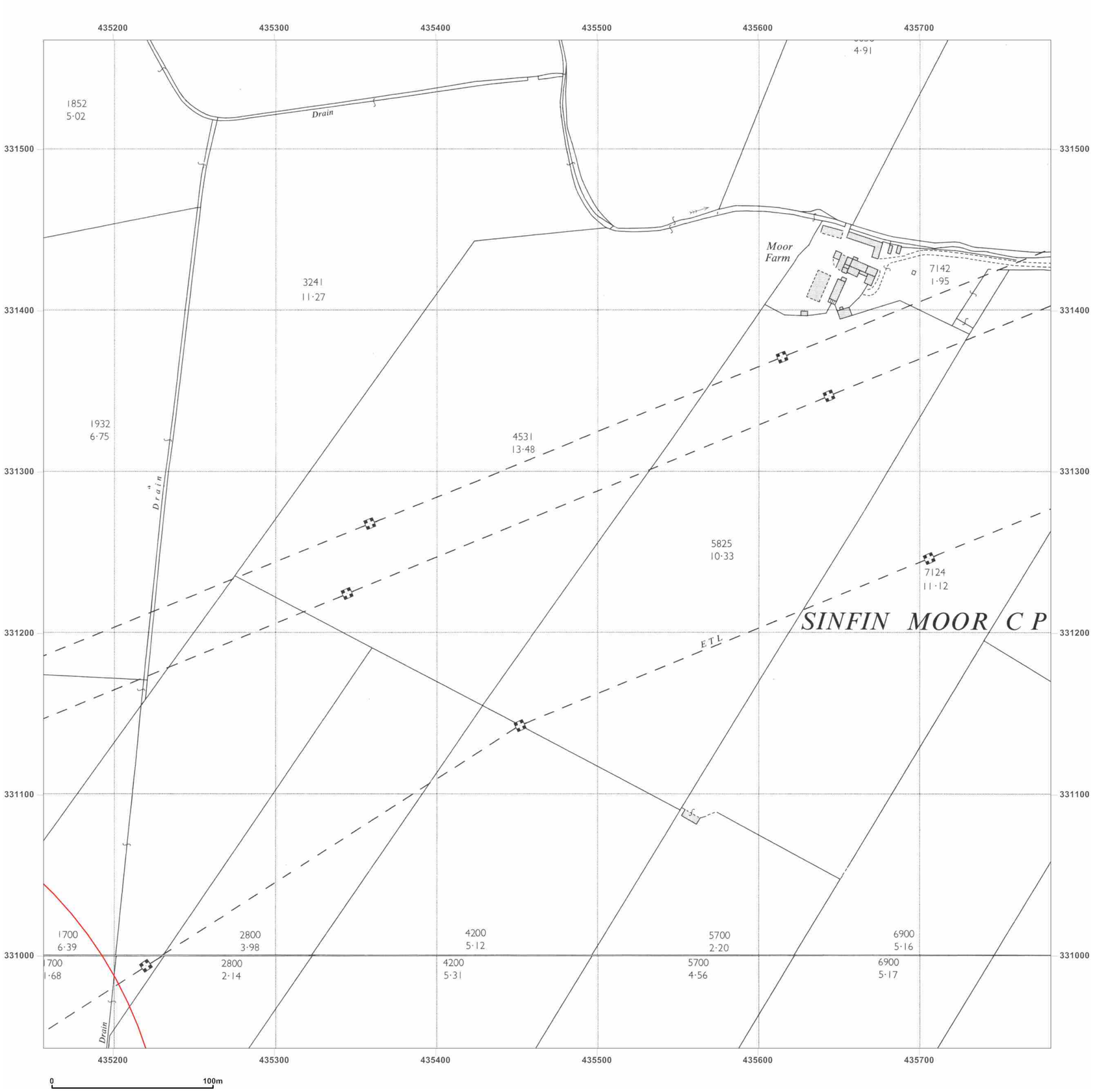
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1947

Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1967

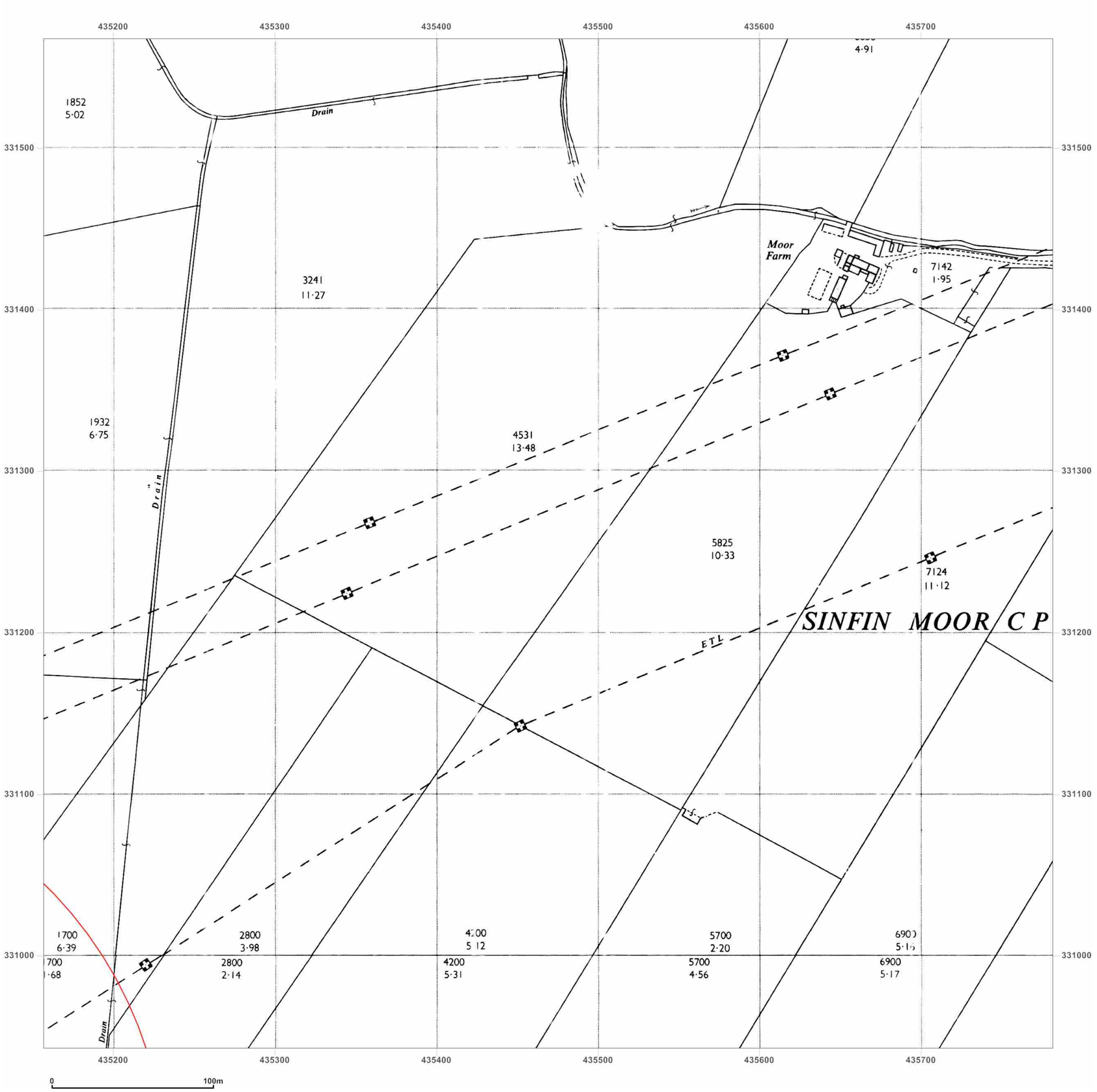
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: National Grid

Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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

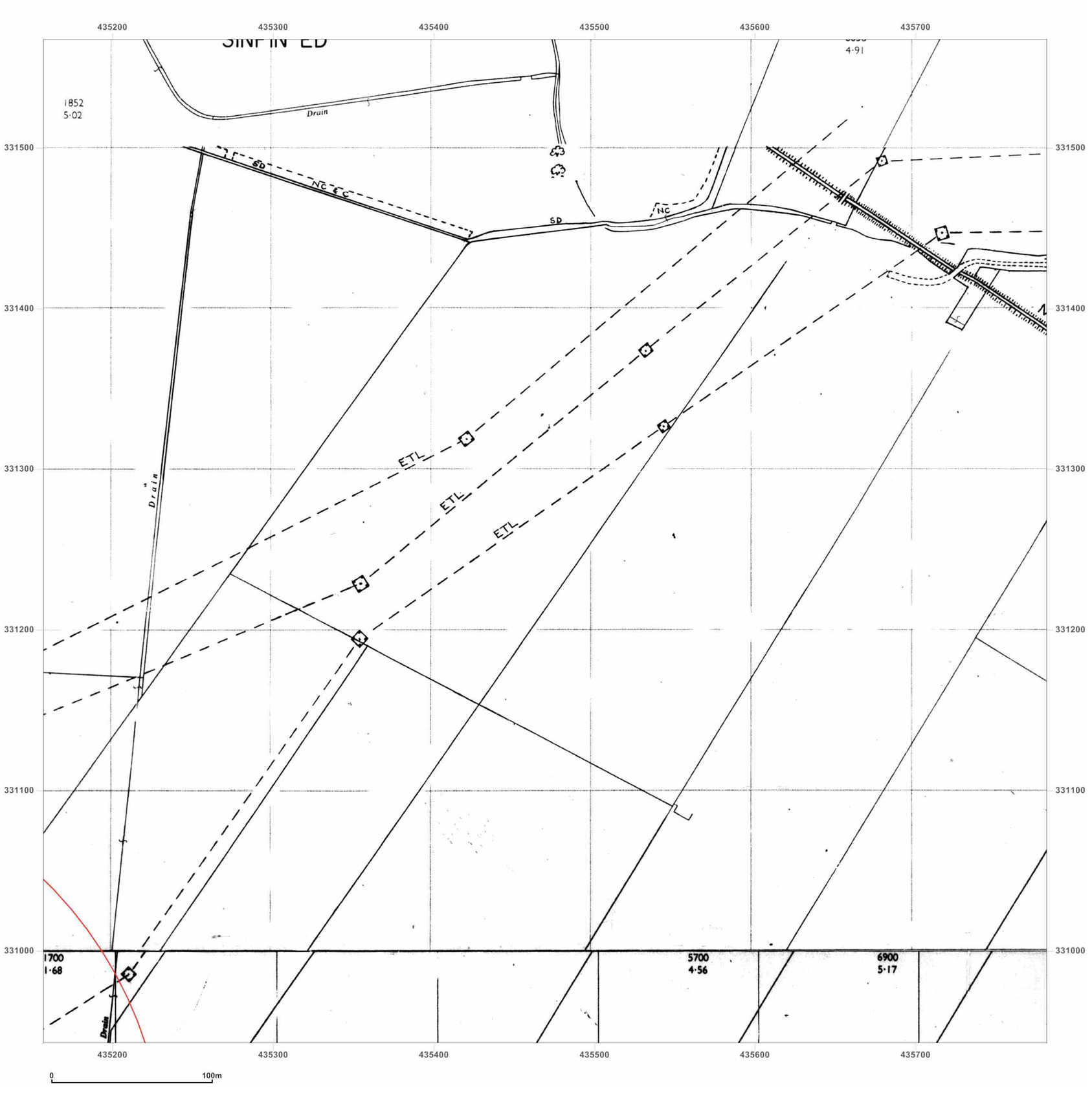
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_LS_6_4
Grid Ref: 435469, 331255

Map Name: National Grid

Map date: **1988-1989**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1967
Revised 1988
Edition N/A
Copyright 1988
Levelled 1967

Surveyed 1967
Revised 1989
Edition N/A
Copyright 1989
Levelled 1967

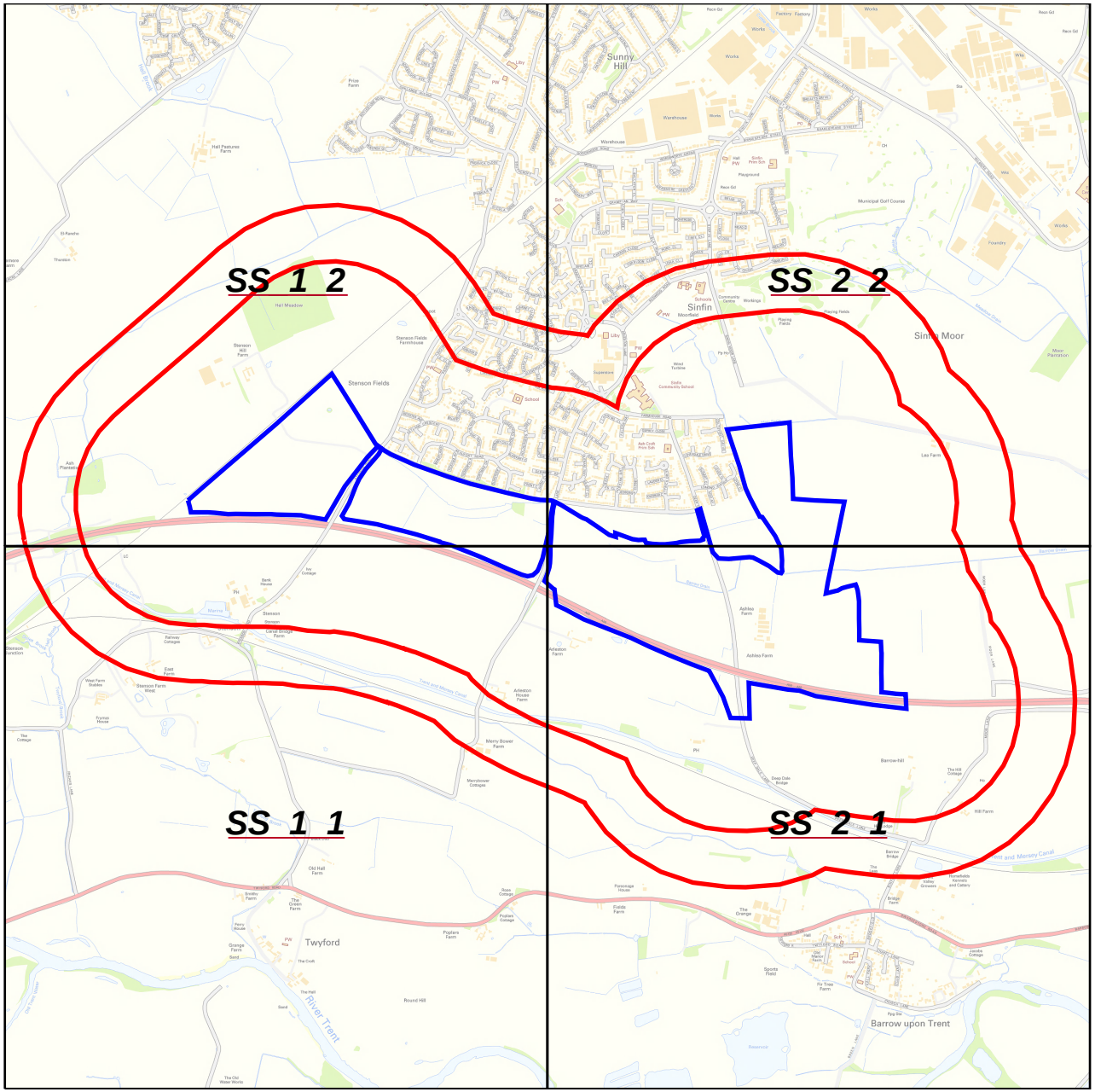
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Small Scale Grid Index



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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: County Series

Map date: **1881**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

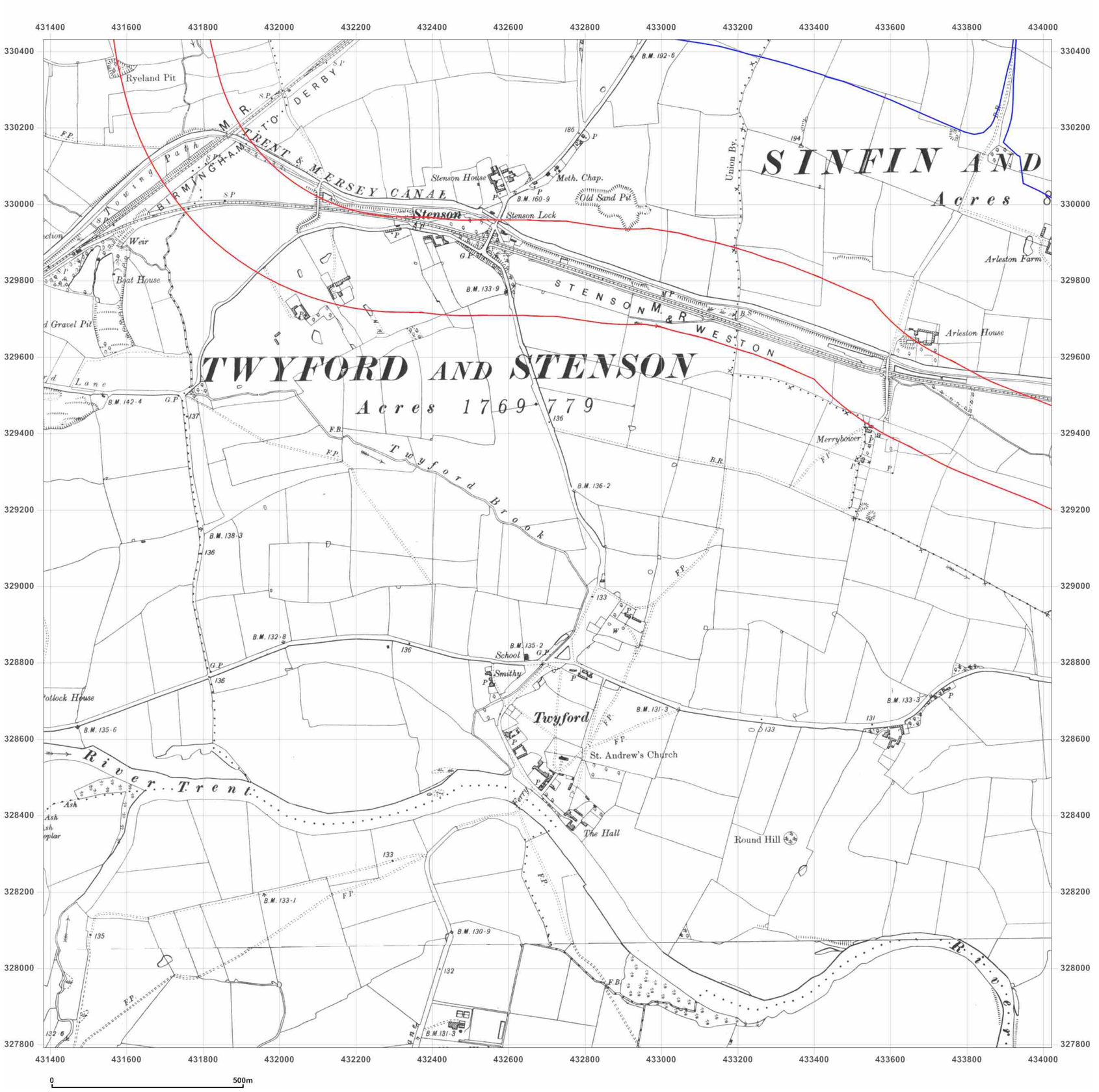
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: County Series

Map date: **1900-1901**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1881
Revised 1900
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
~~Revised 1899~~
Edition 1901
Copyright N/A
Levelled N/A

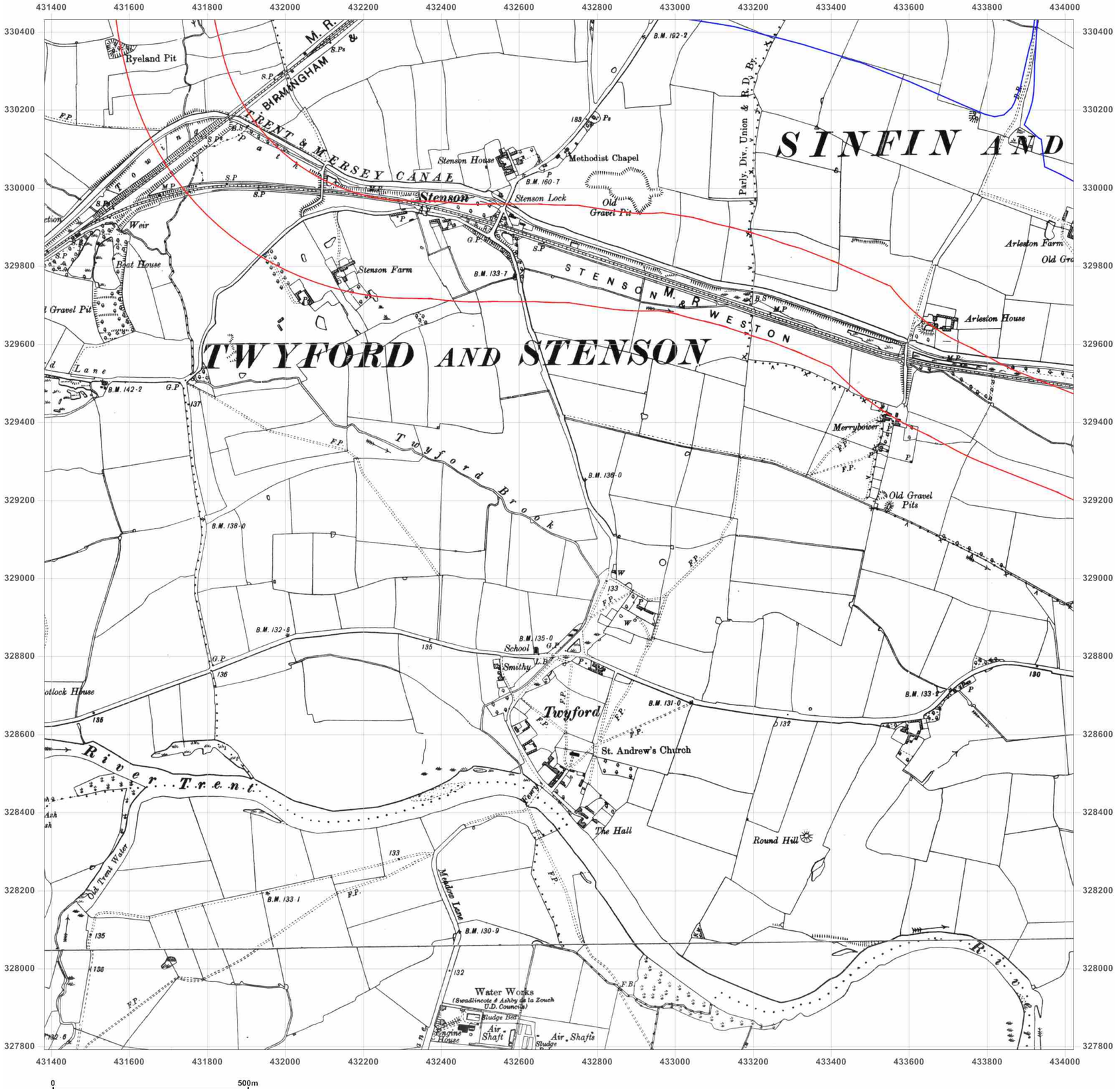
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Production date: 24 April 2019

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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

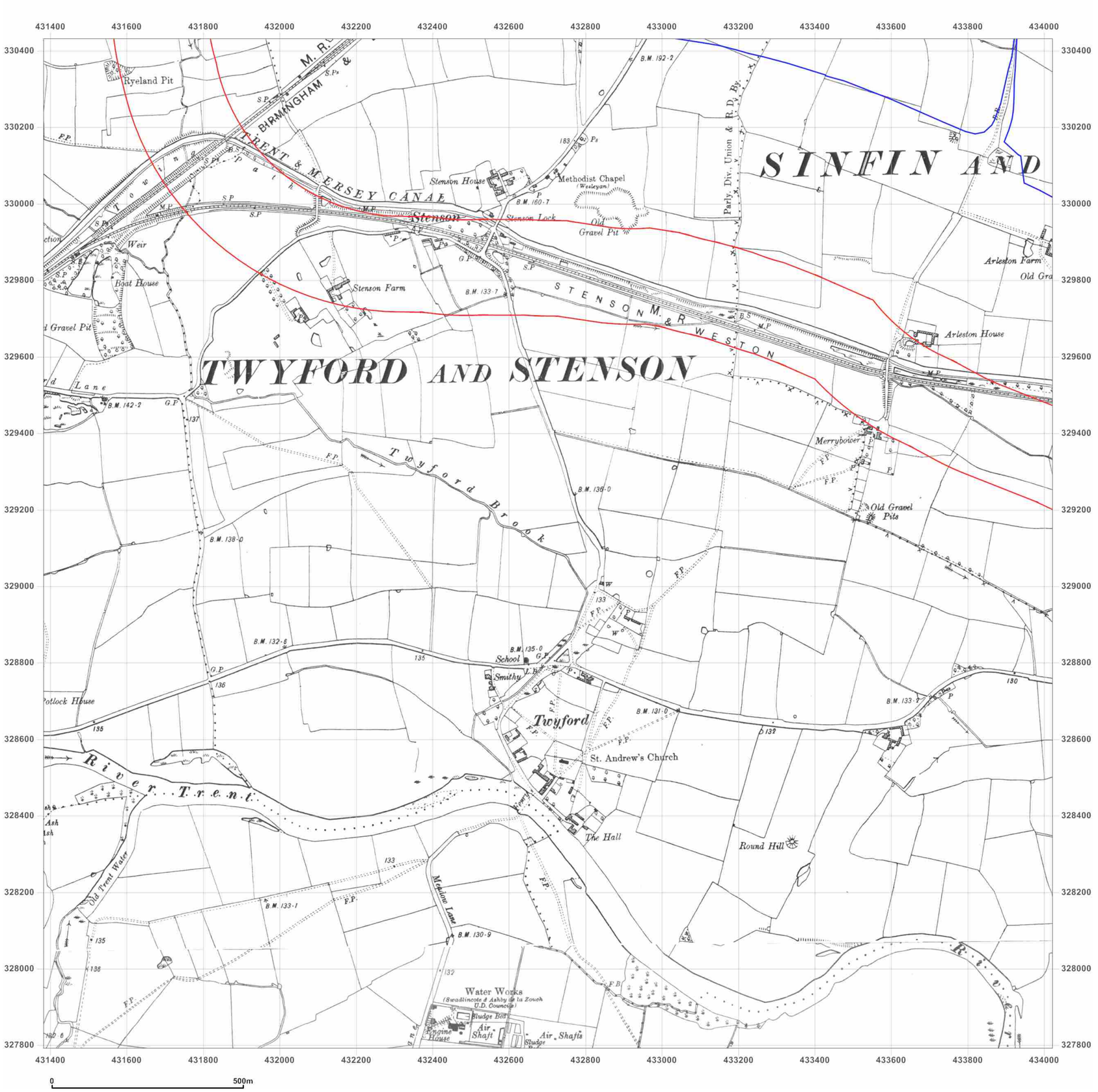
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: County Series

Map date: **1920-1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
~~Revised 1920~~
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

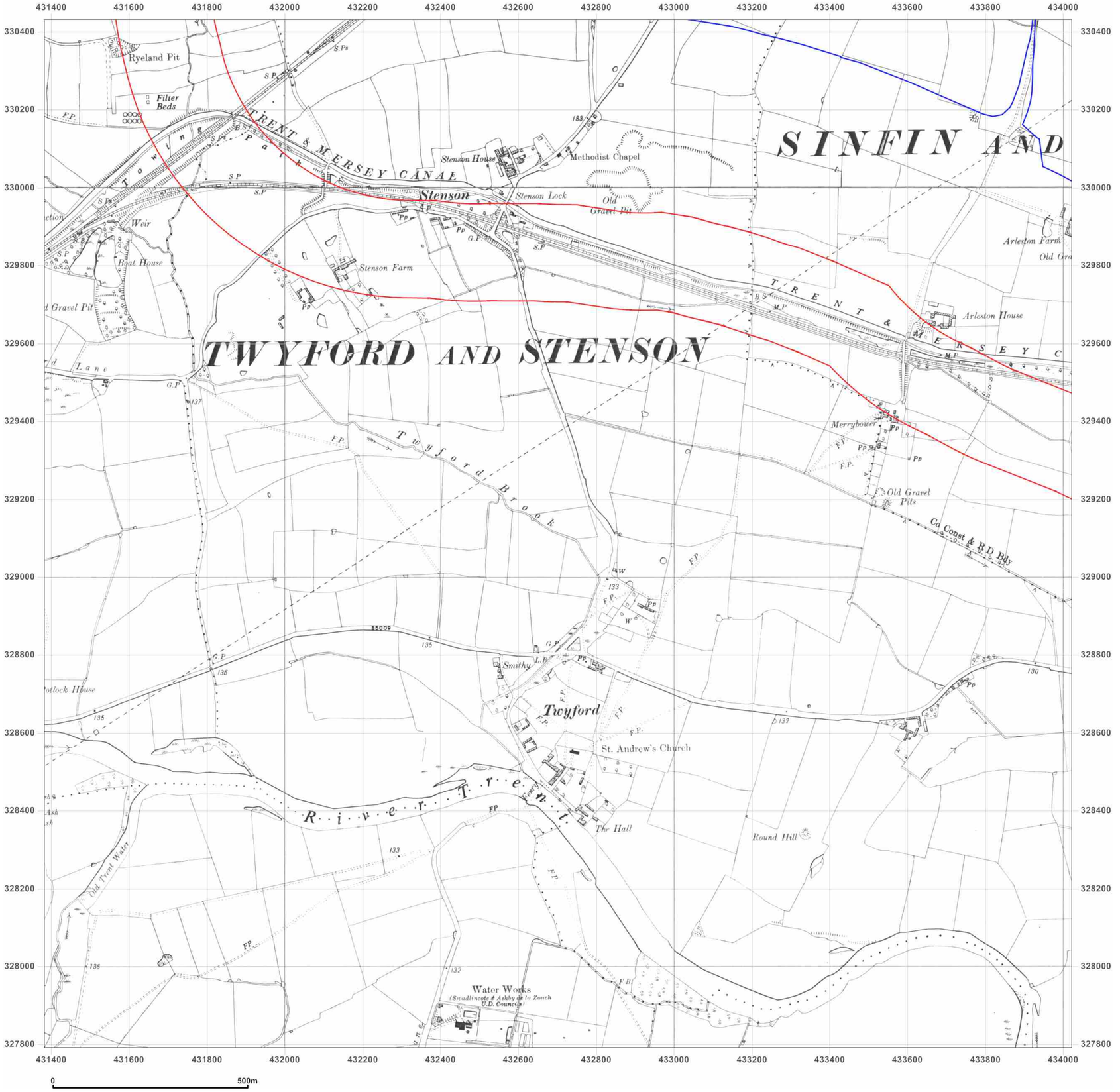
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: Provisional
Map date: **1954**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

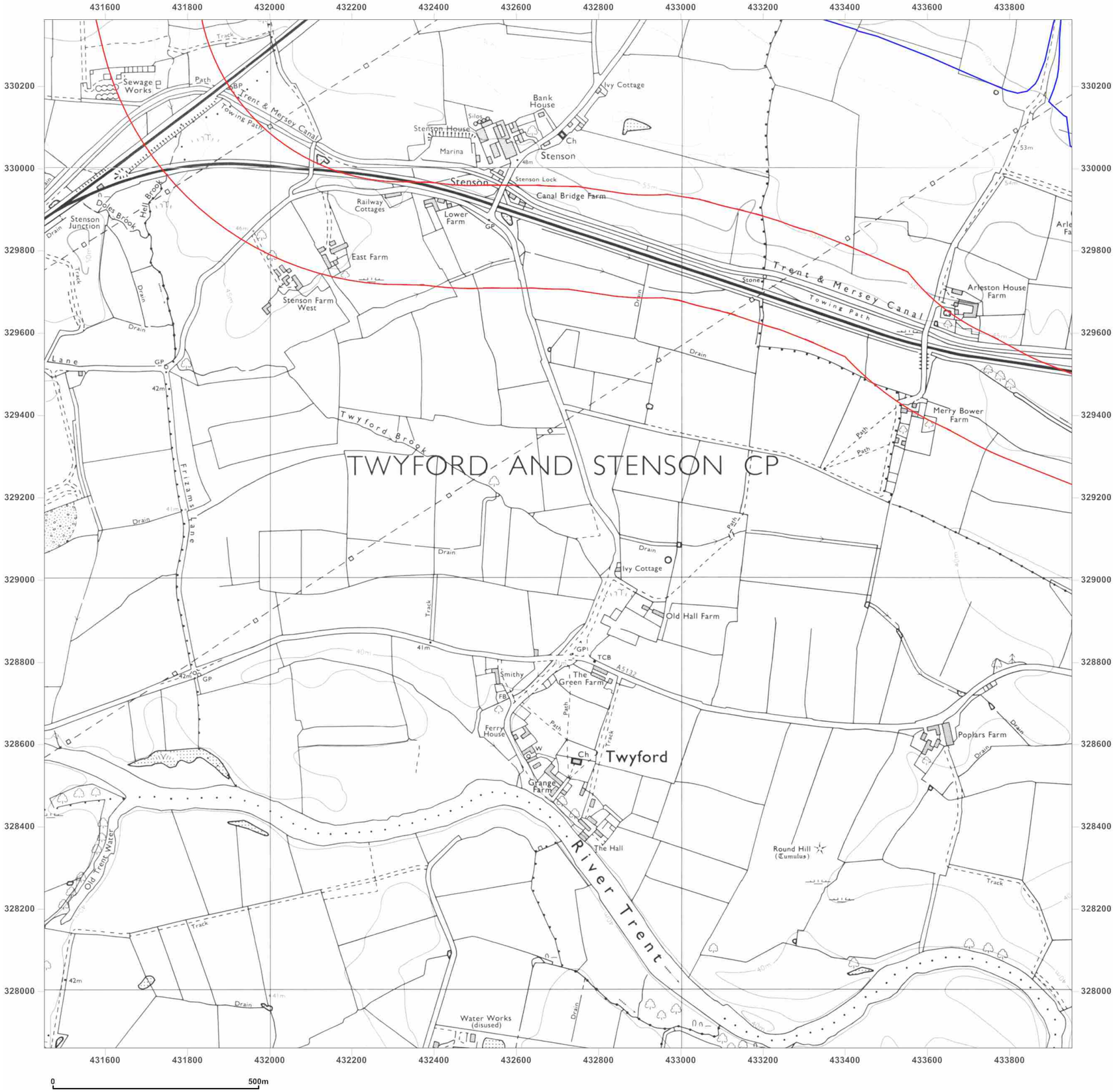
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: National Grid

Map date: **1978-1980**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1977
Revised 1980
Edition N/A
Copyright 1980
Levelled 1977

Surveyed 1969
Revised 1978
Edition N/A
Copyright 1978
Levelled 1975

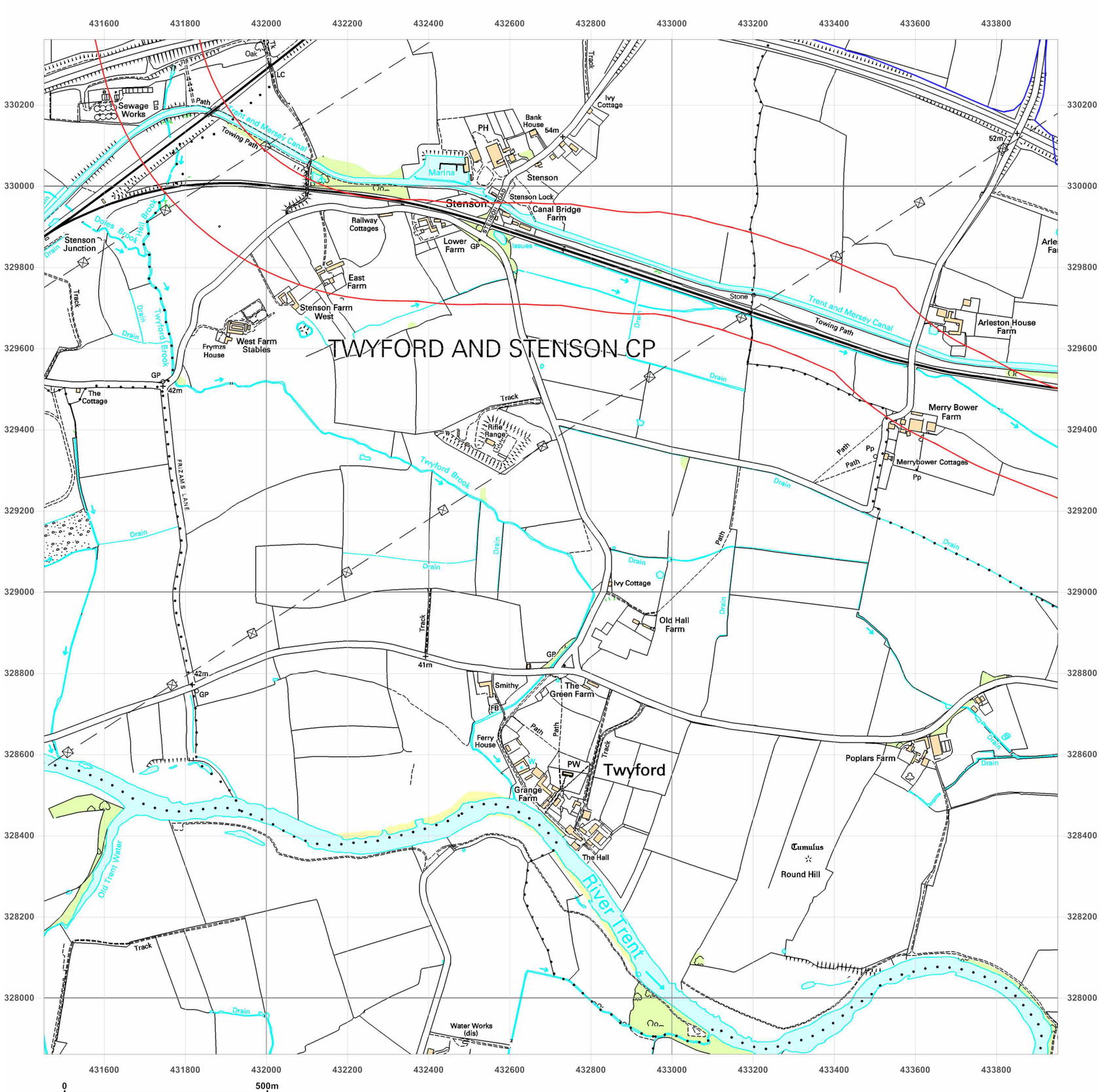
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

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

N
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2002

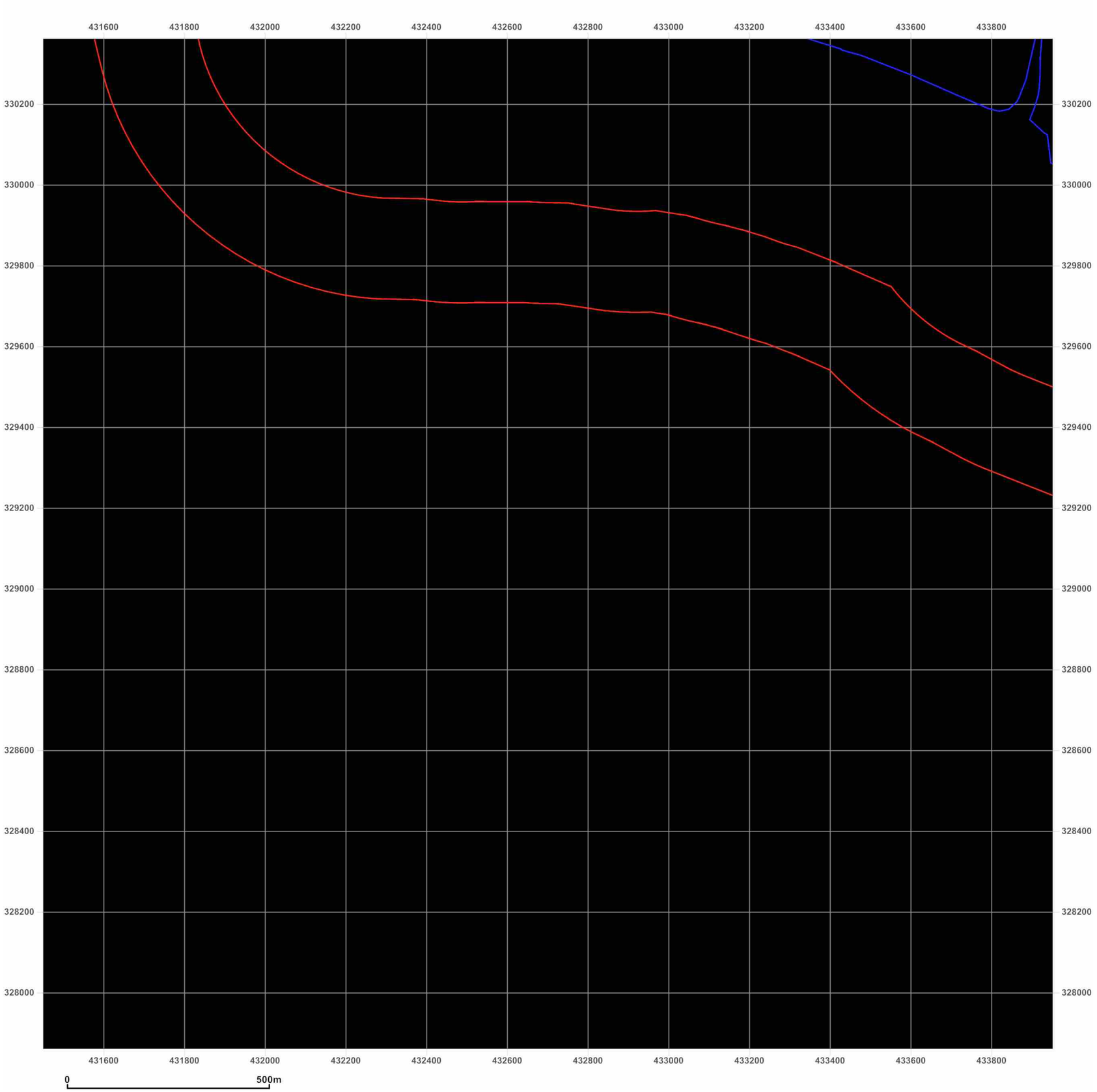
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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W E
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2010

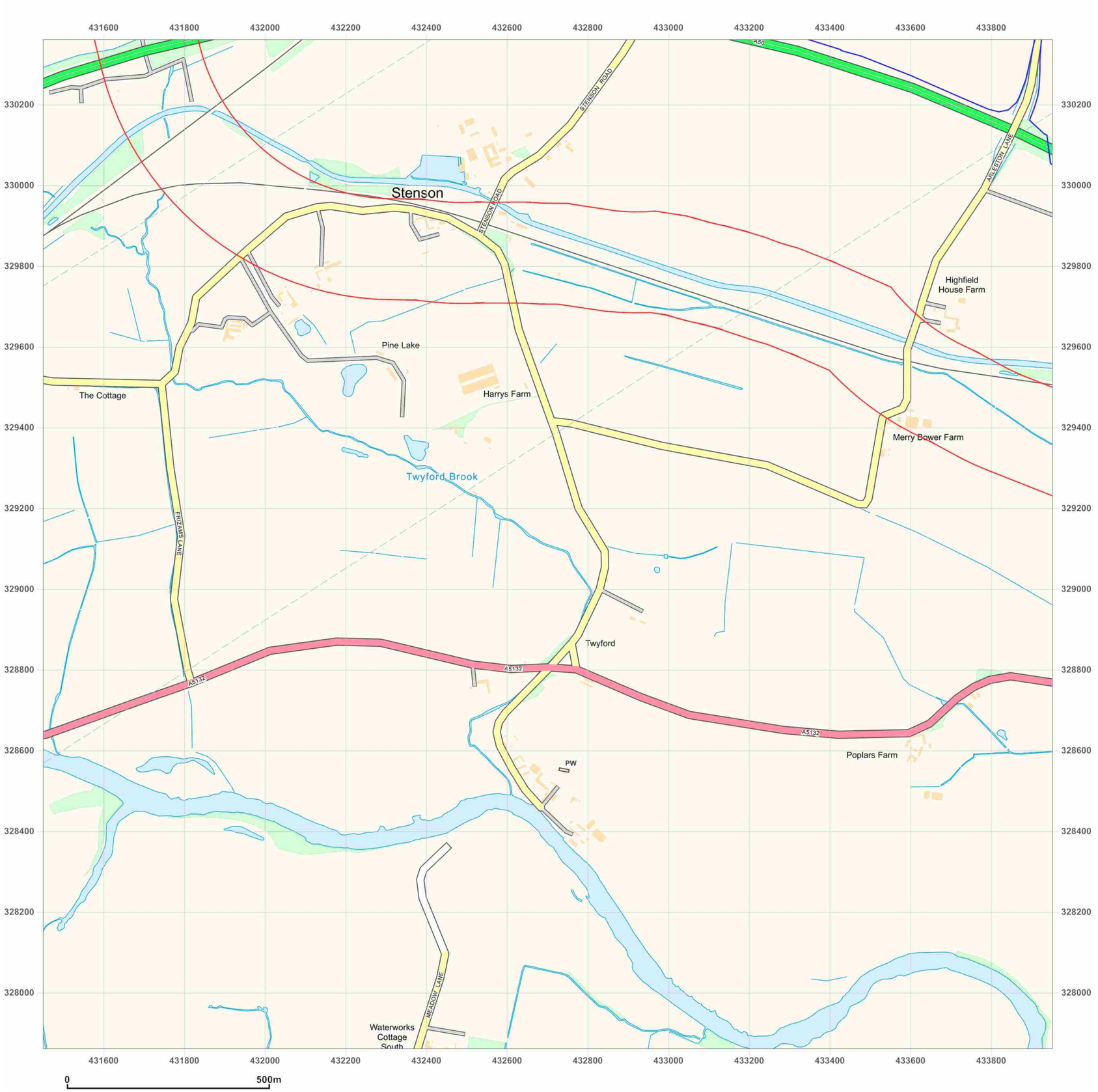
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_1
Grid Ref: 432701, 329111

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

N
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2014

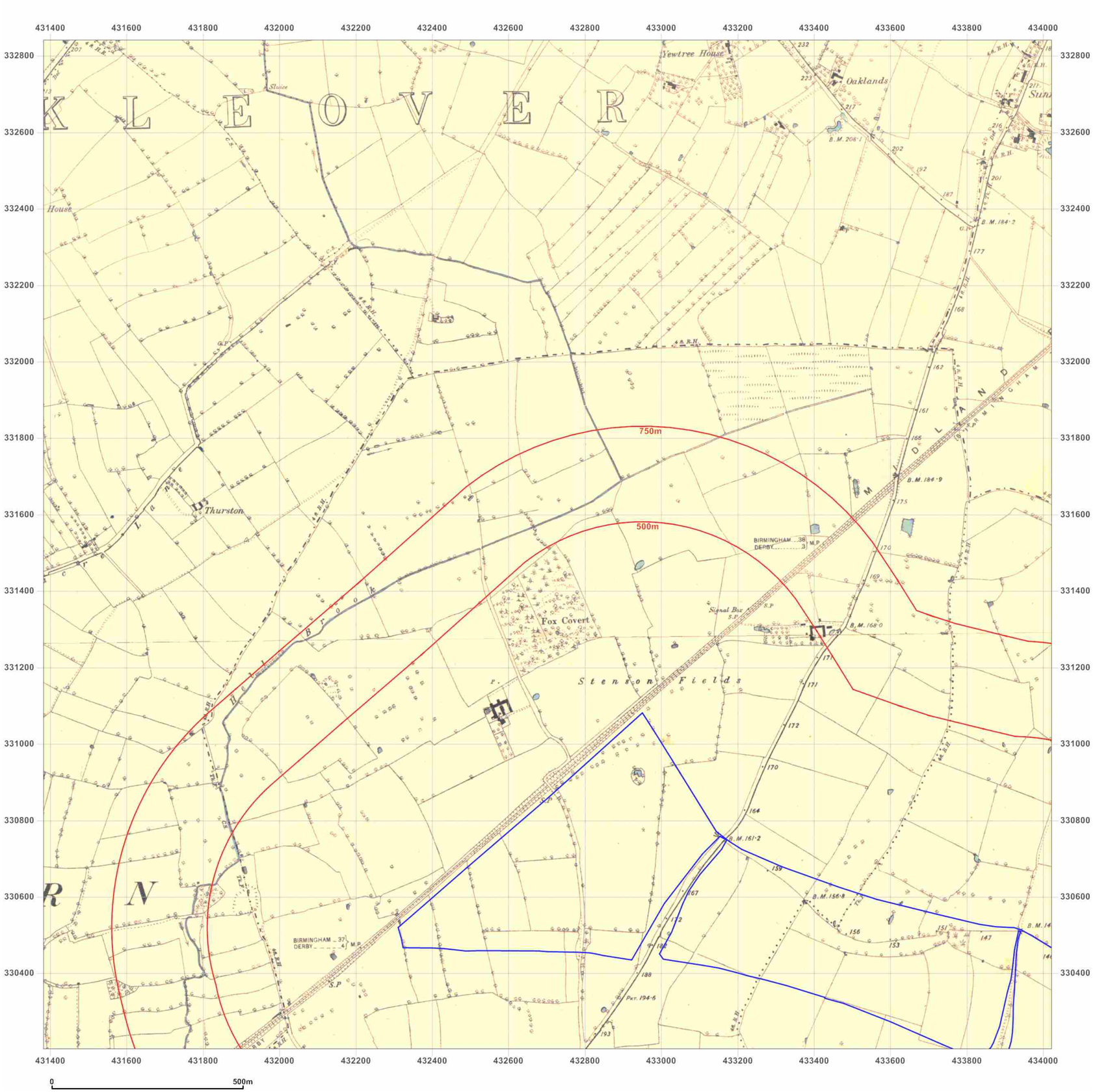
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series

Map date: **1881-1882**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

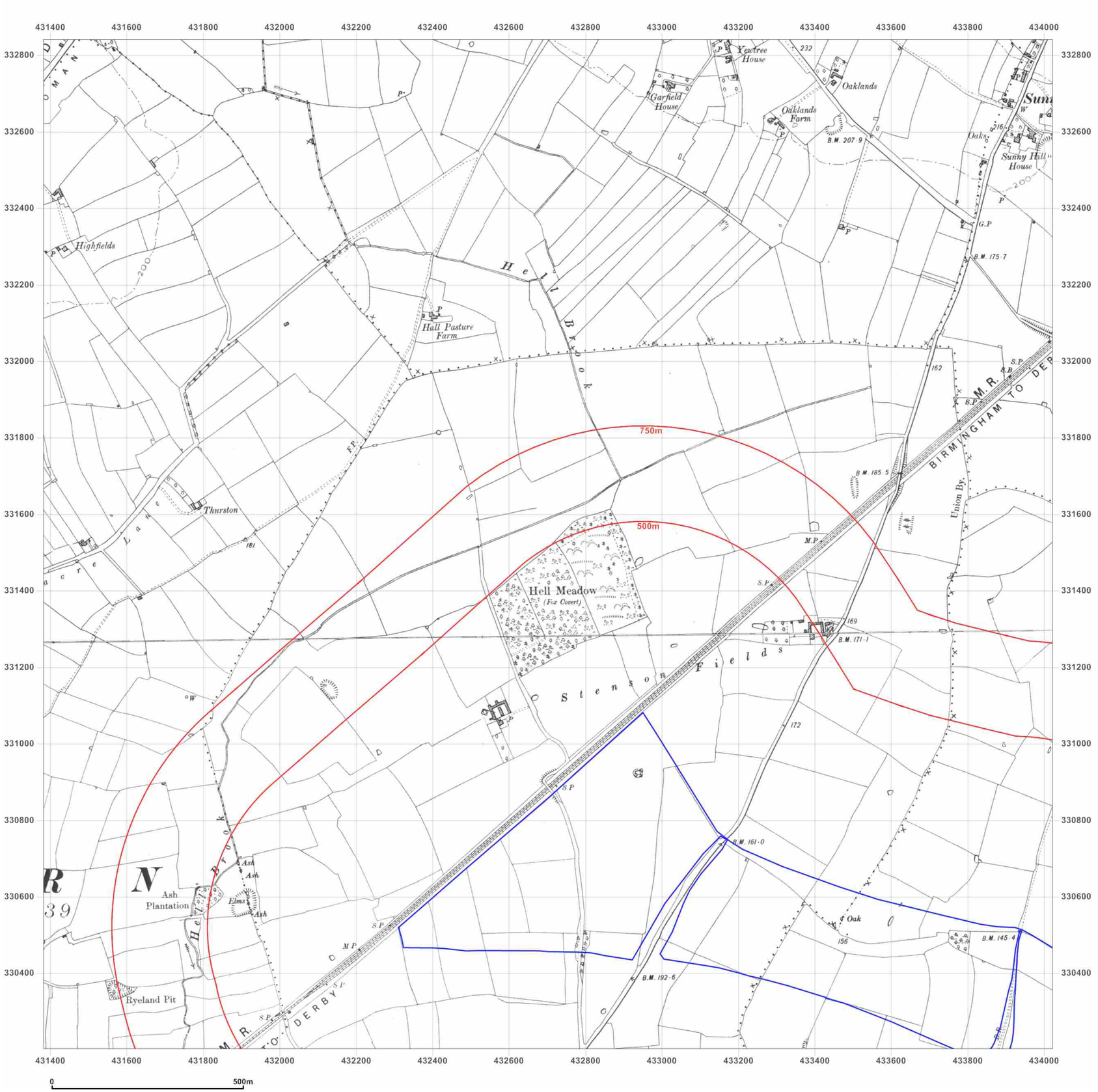
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series
Map date: **1899-1900**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
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Surveyed 1882
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1900
Edition N/A
Copyright N/A
Levelled N/A

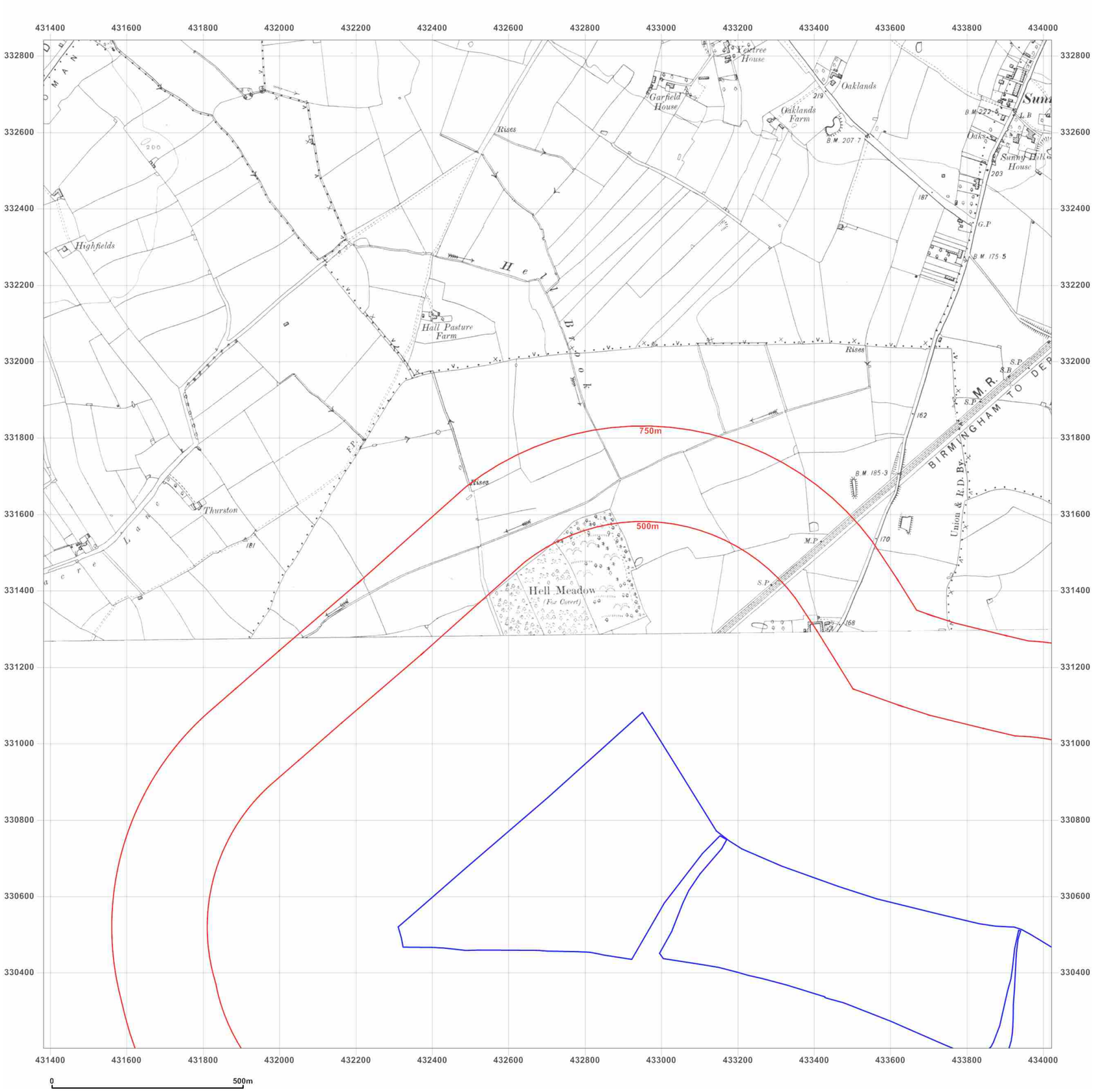
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Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series

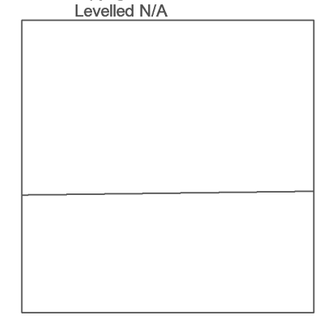
Map date: **1913**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1881
Revised 1913
Edition N/A
Copyright N/A
Levelled N/A



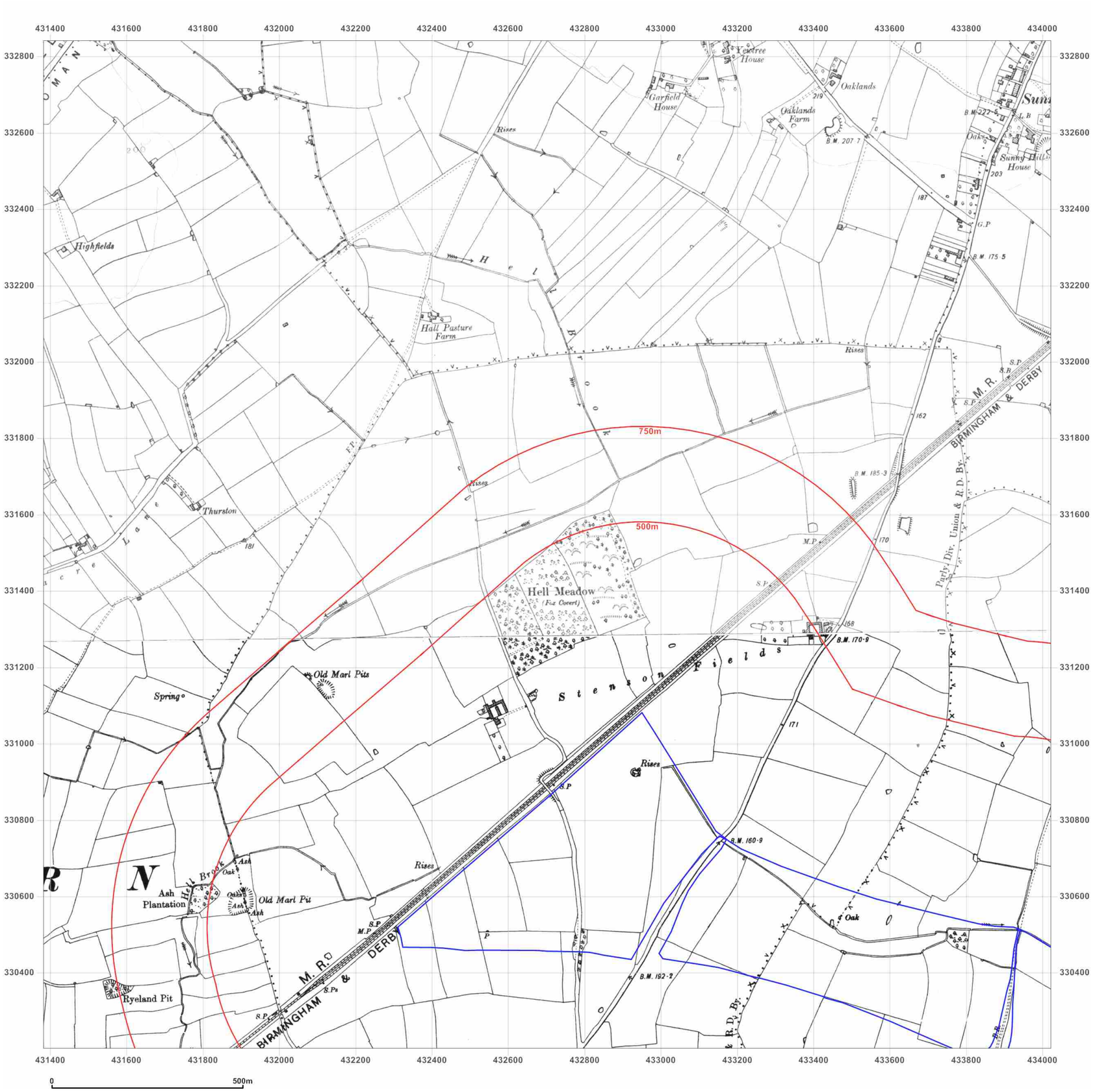
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1881
Revised 1924
Edition 1924
Copyright N/A
Levelled N/A

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

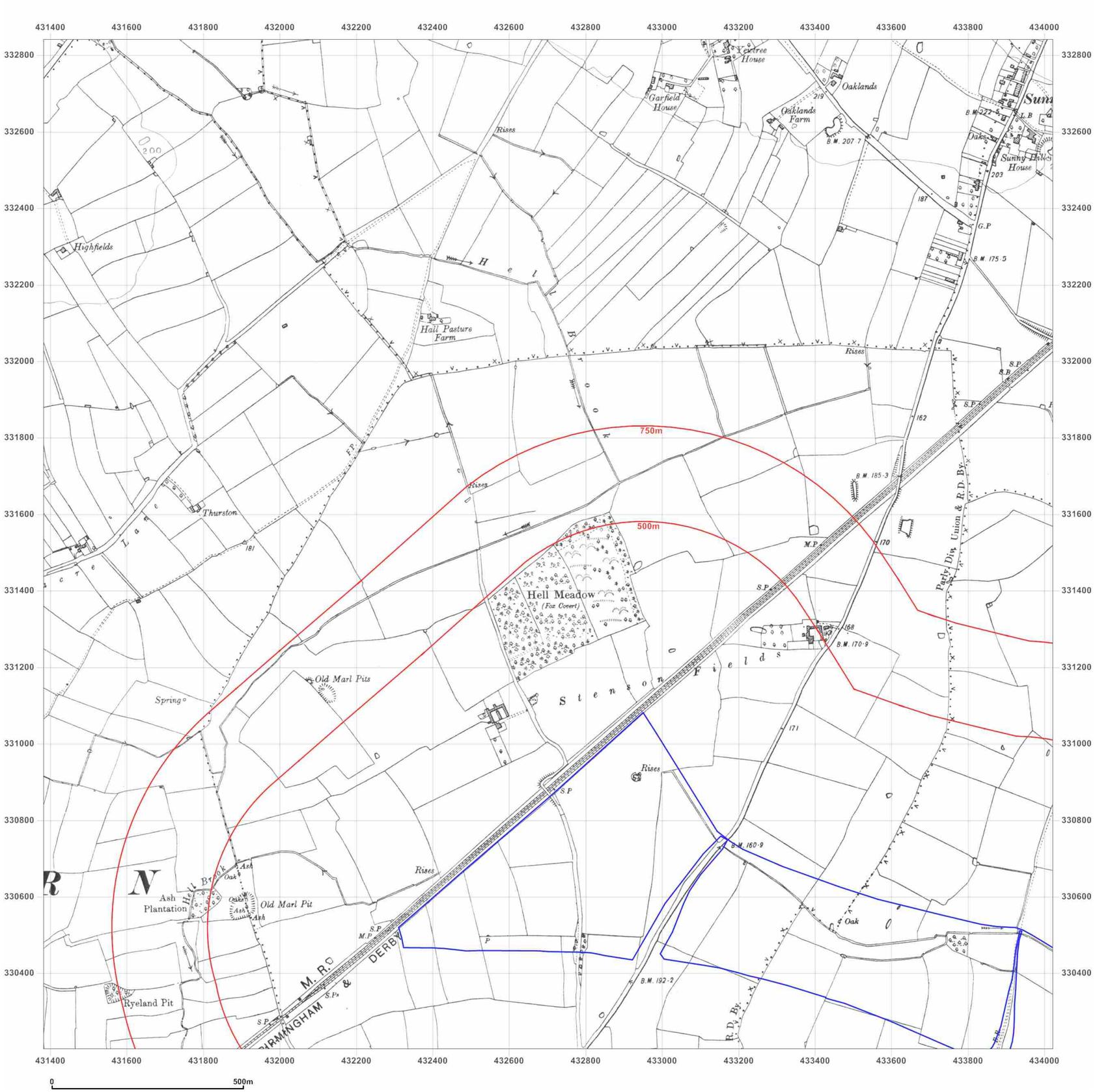
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series
Map date: **1924**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

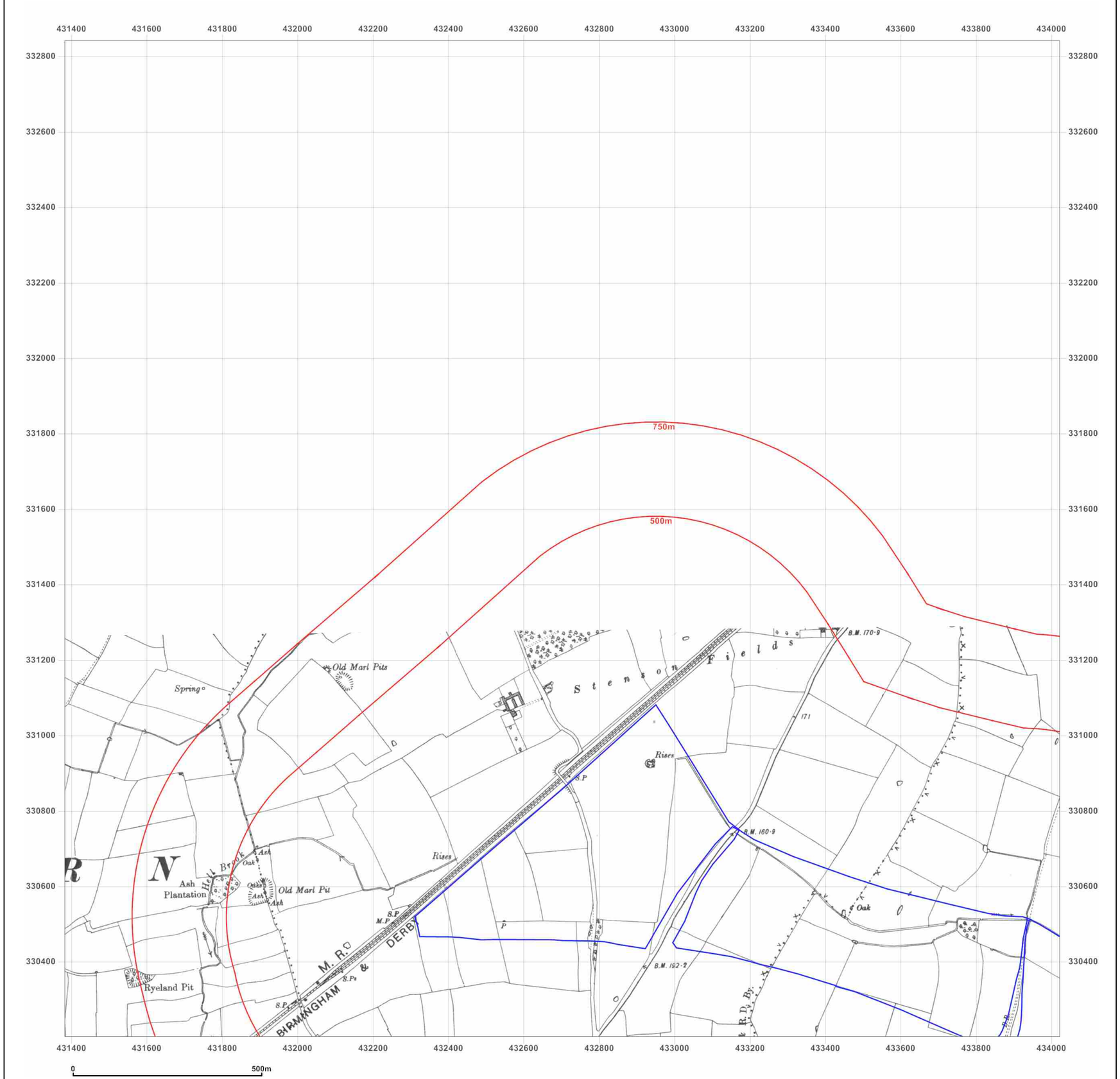
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

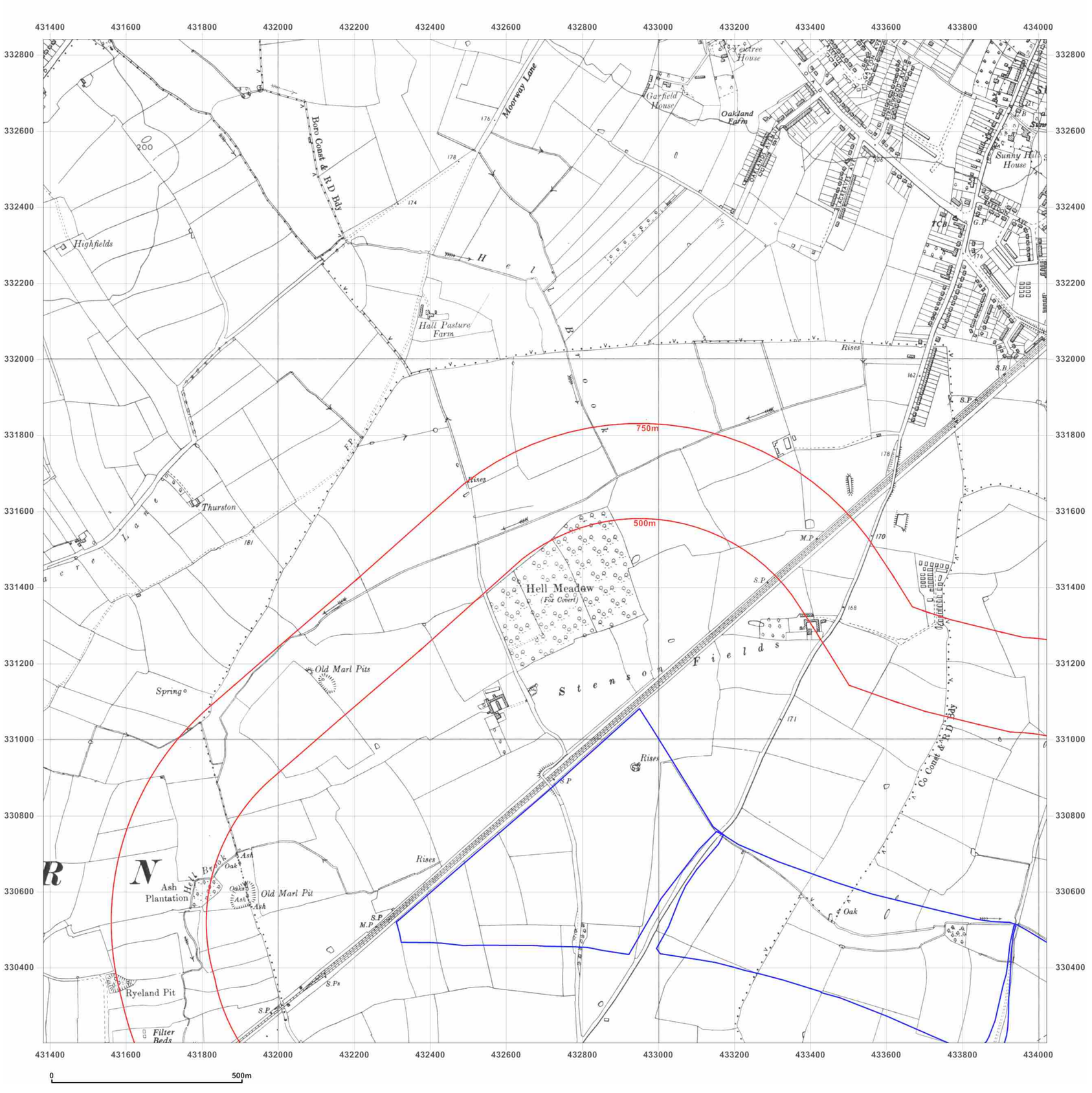
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: Provisional
Map date: **1954**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

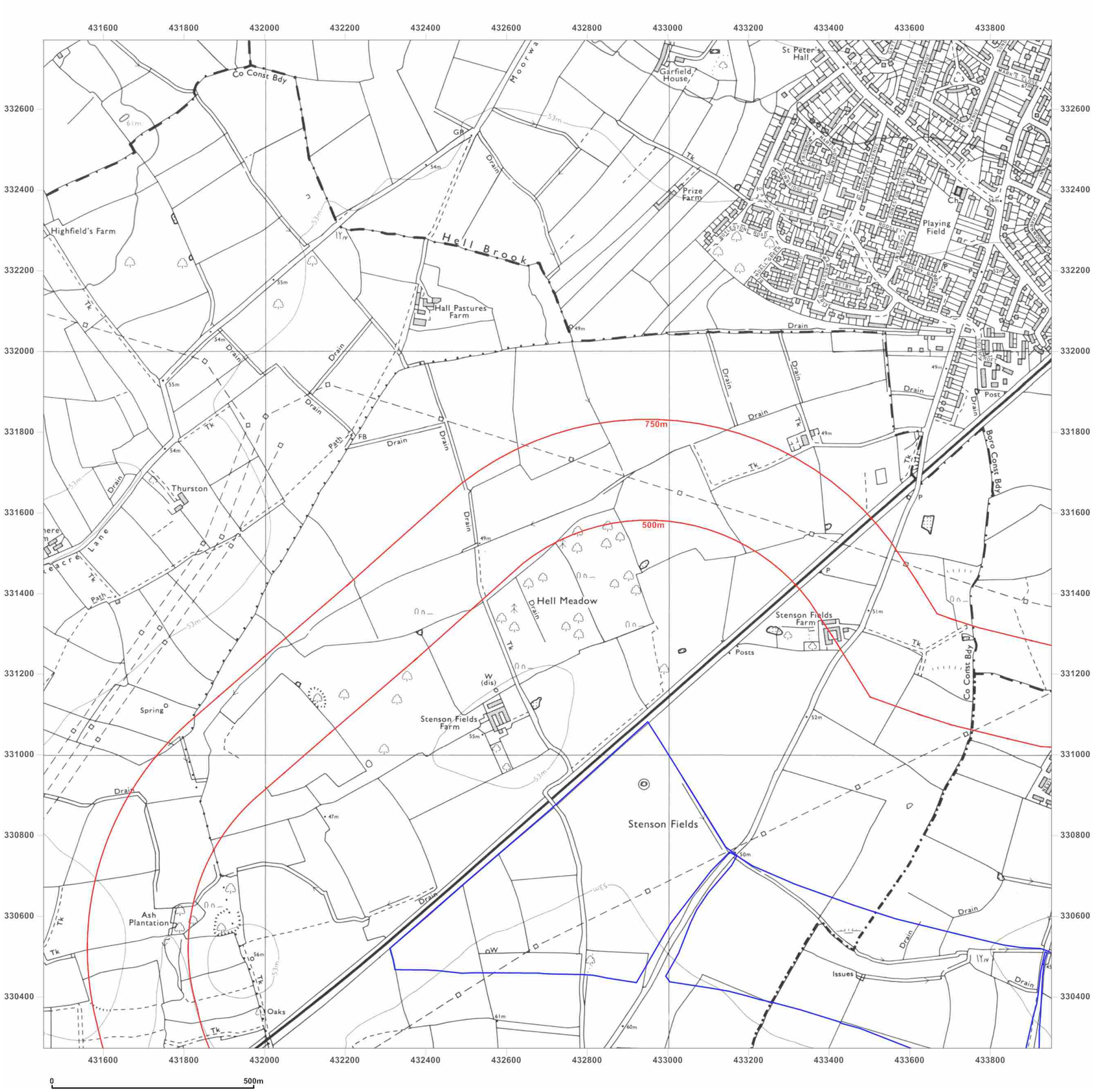
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: National Grid

Map date: **1972**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1970
Revised 1972
Edition N/A
Copyright 1972
Levelled 1969

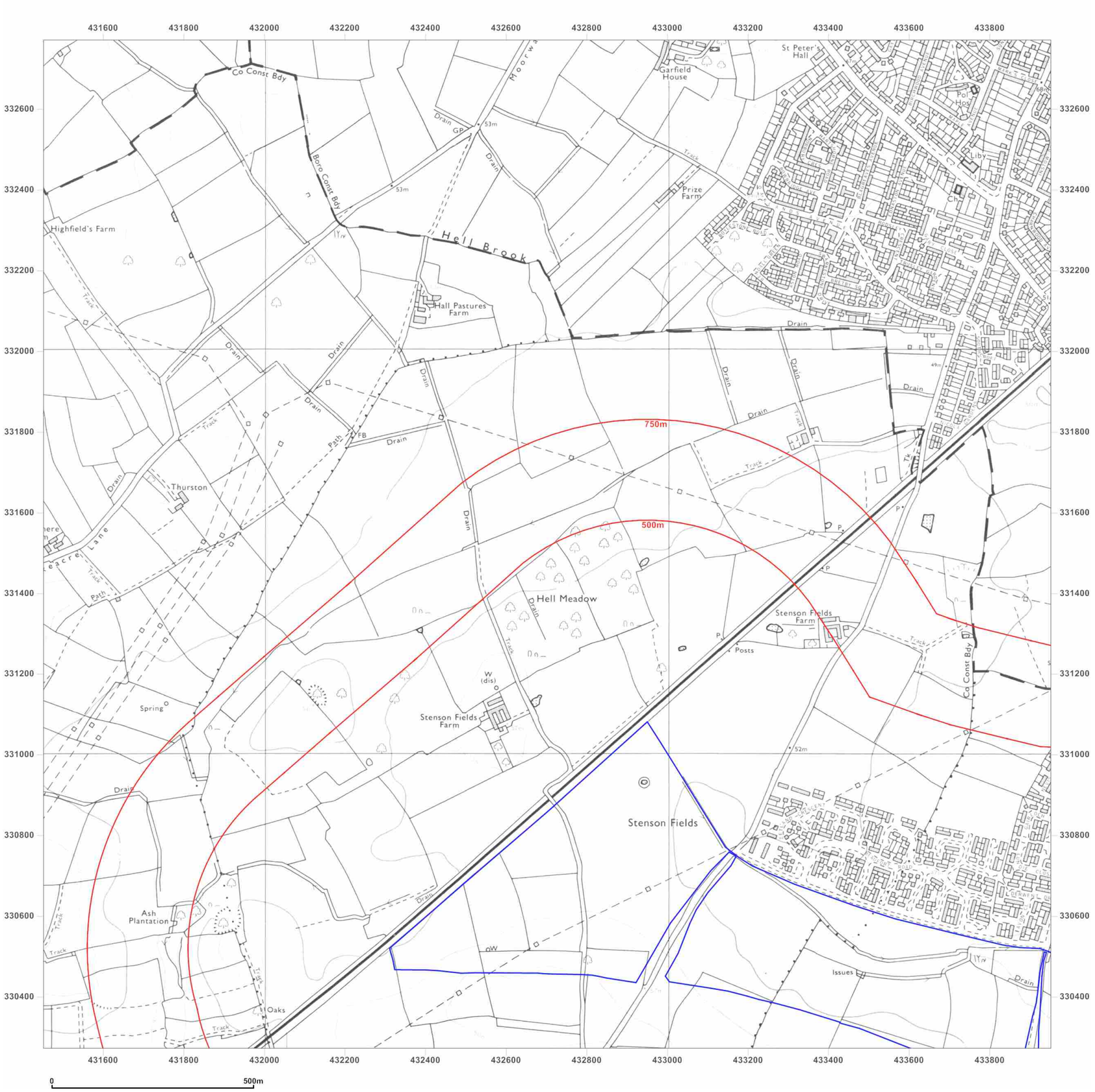
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: National Grid

Map date: **1980**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1977
Revised 1980
~~Edition N/A~~
Copyright 1980
Levelled 1977

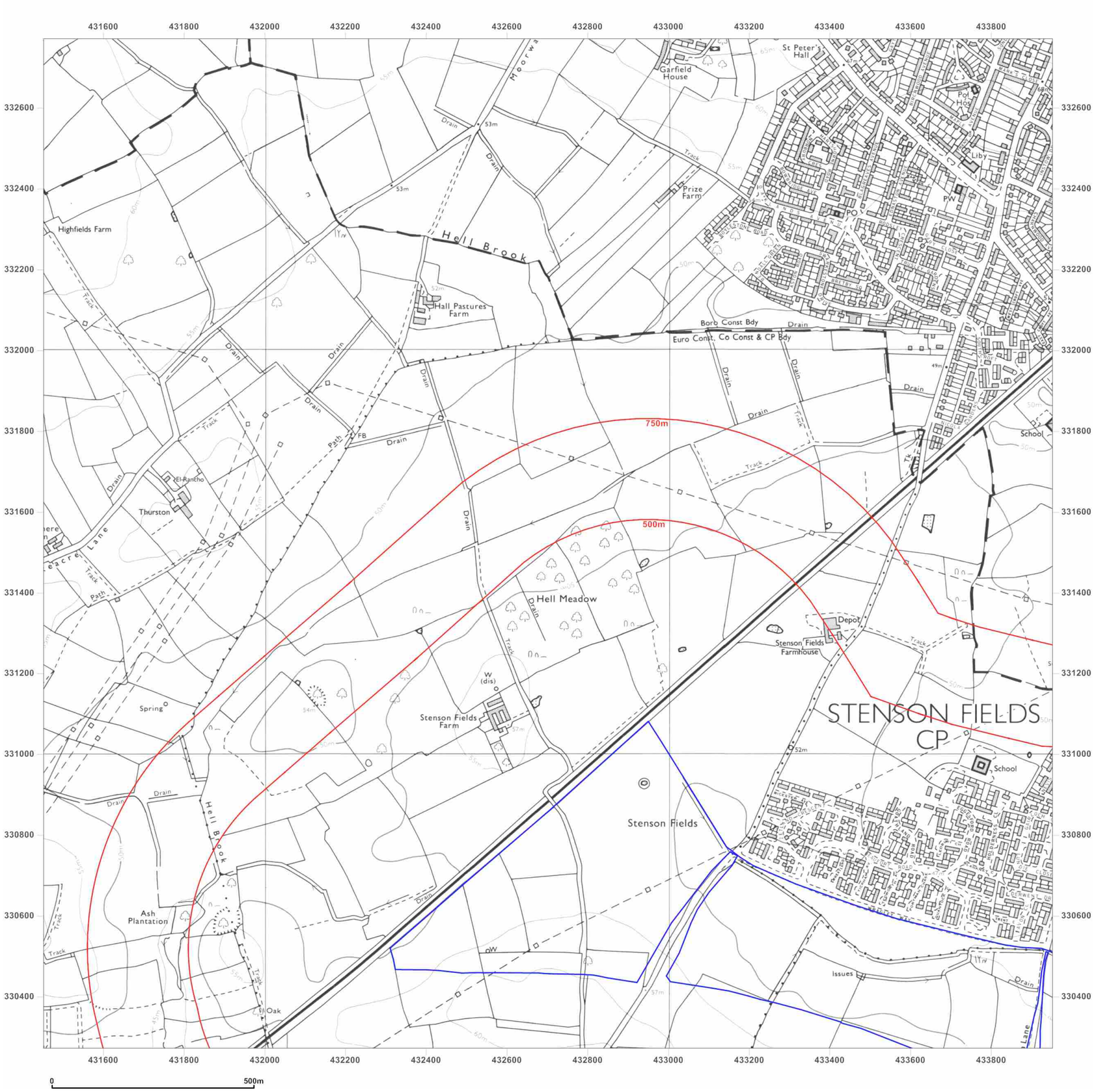
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: National Grid

Map date: **1987**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1985
Revised 1987
Edition N/A
Copyright N/A
Levelled N/A

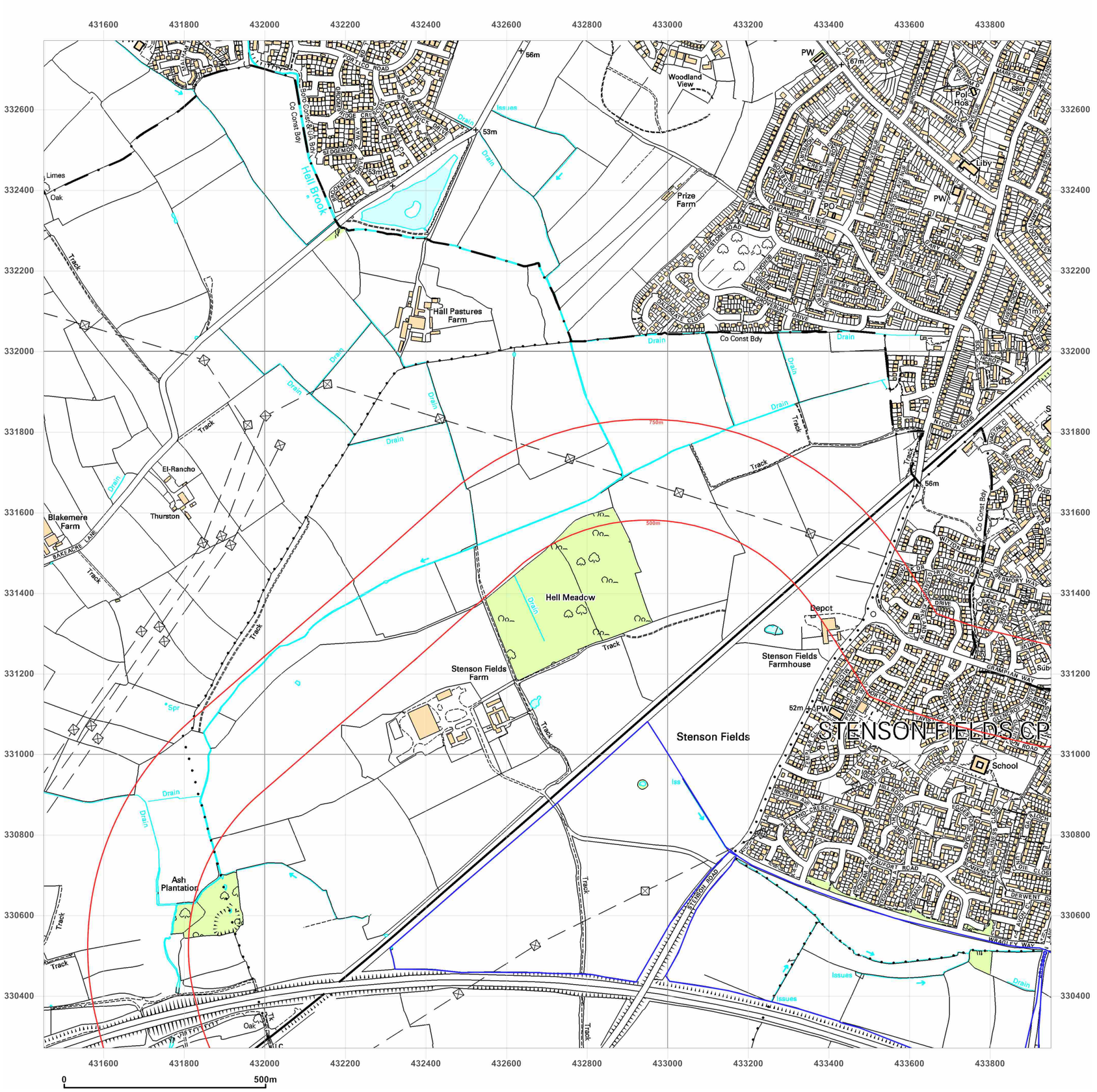
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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2002

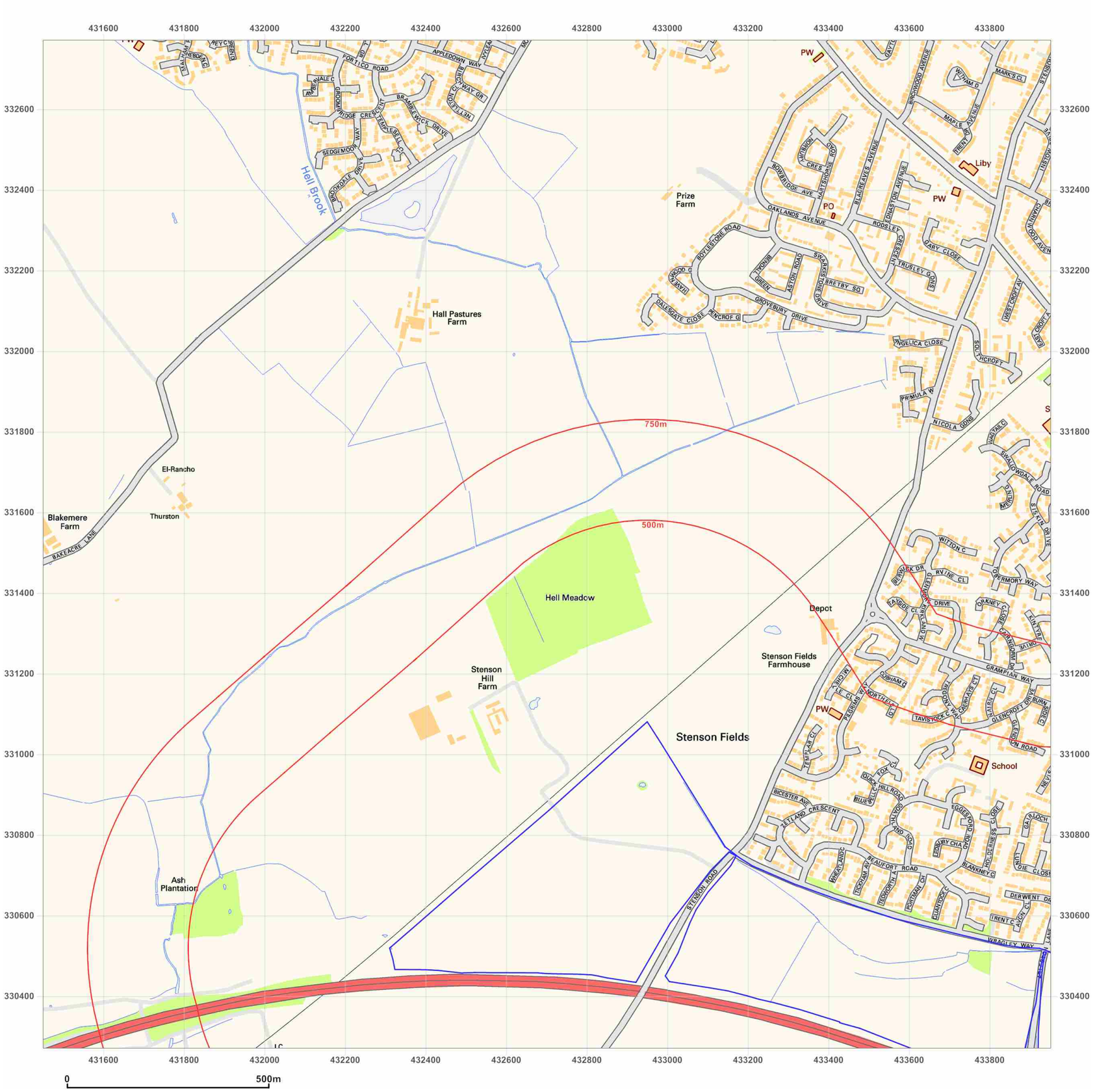
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

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

N
W E
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2010

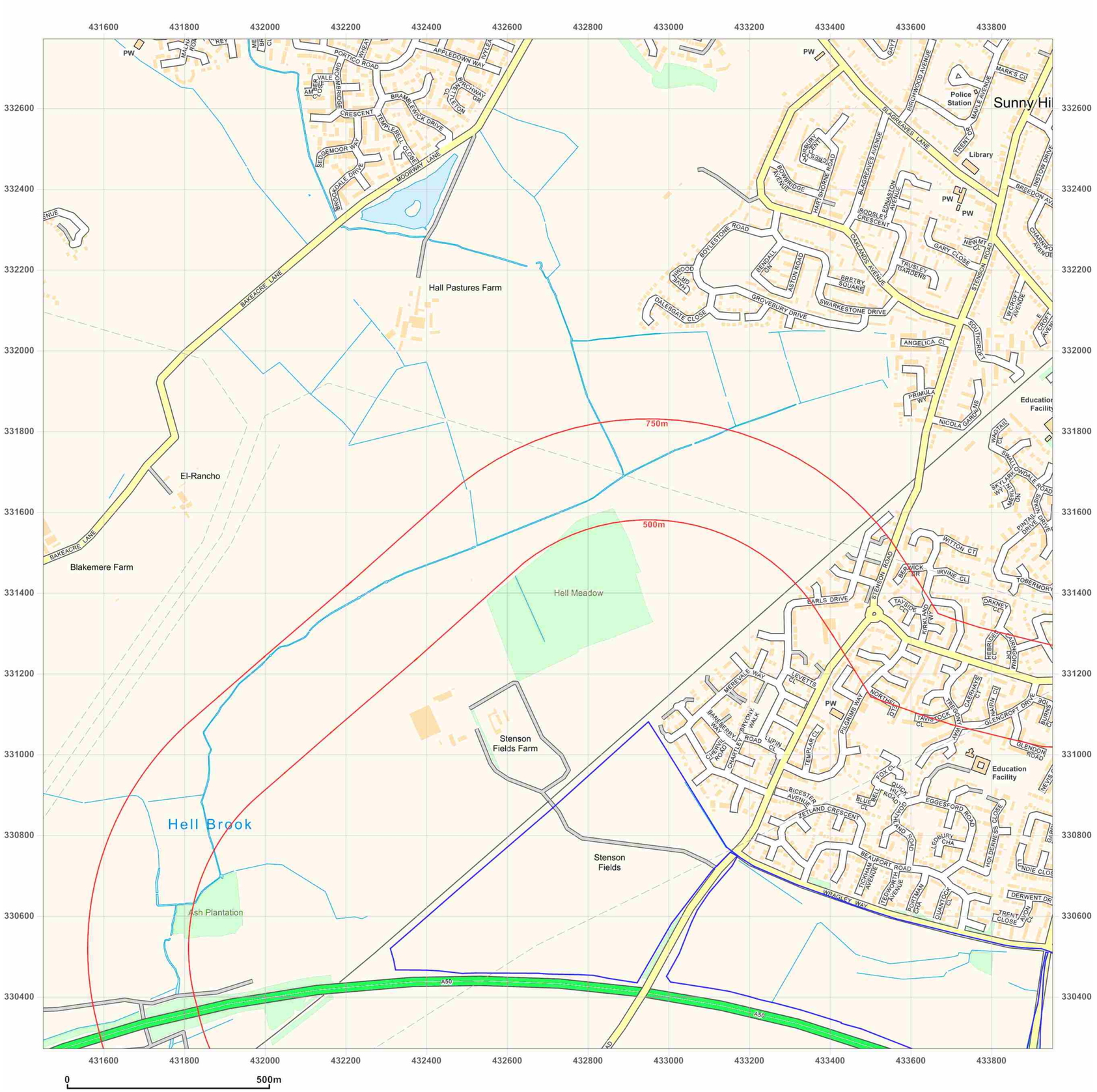
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_1_2
Grid Ref: 432701, 331521

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

N
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2014

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

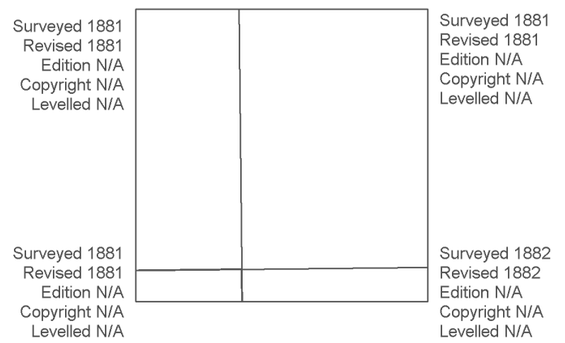
Map Name: County Series

Map date: **1881-1882**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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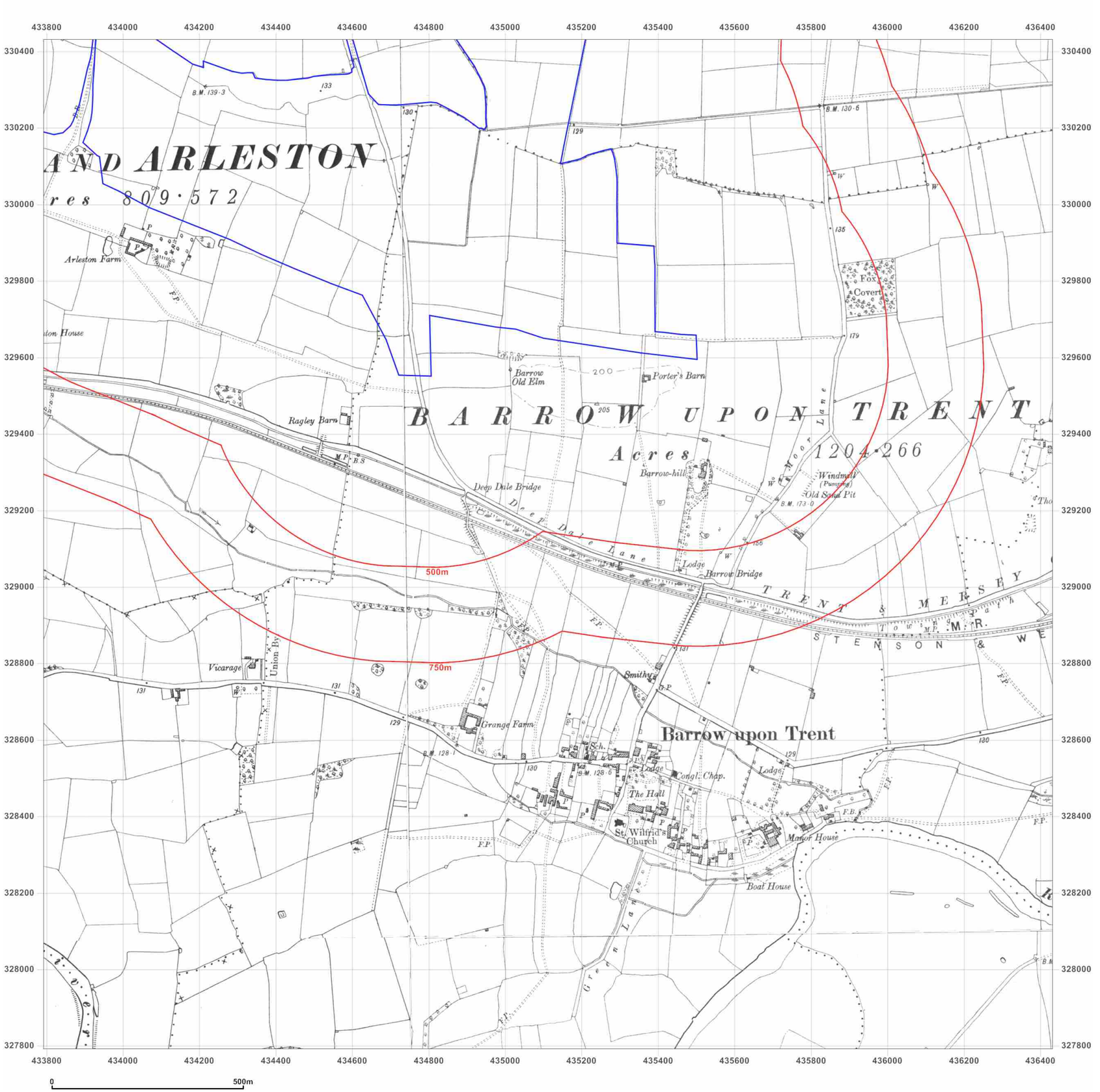
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Production date: 24 April 2019

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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

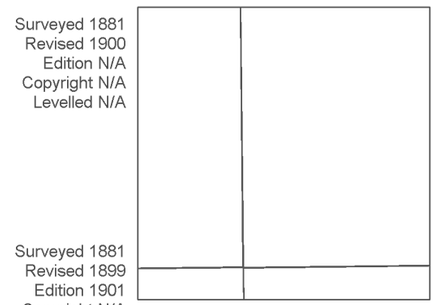
Map Name: County Series

Map date: **1899-1901**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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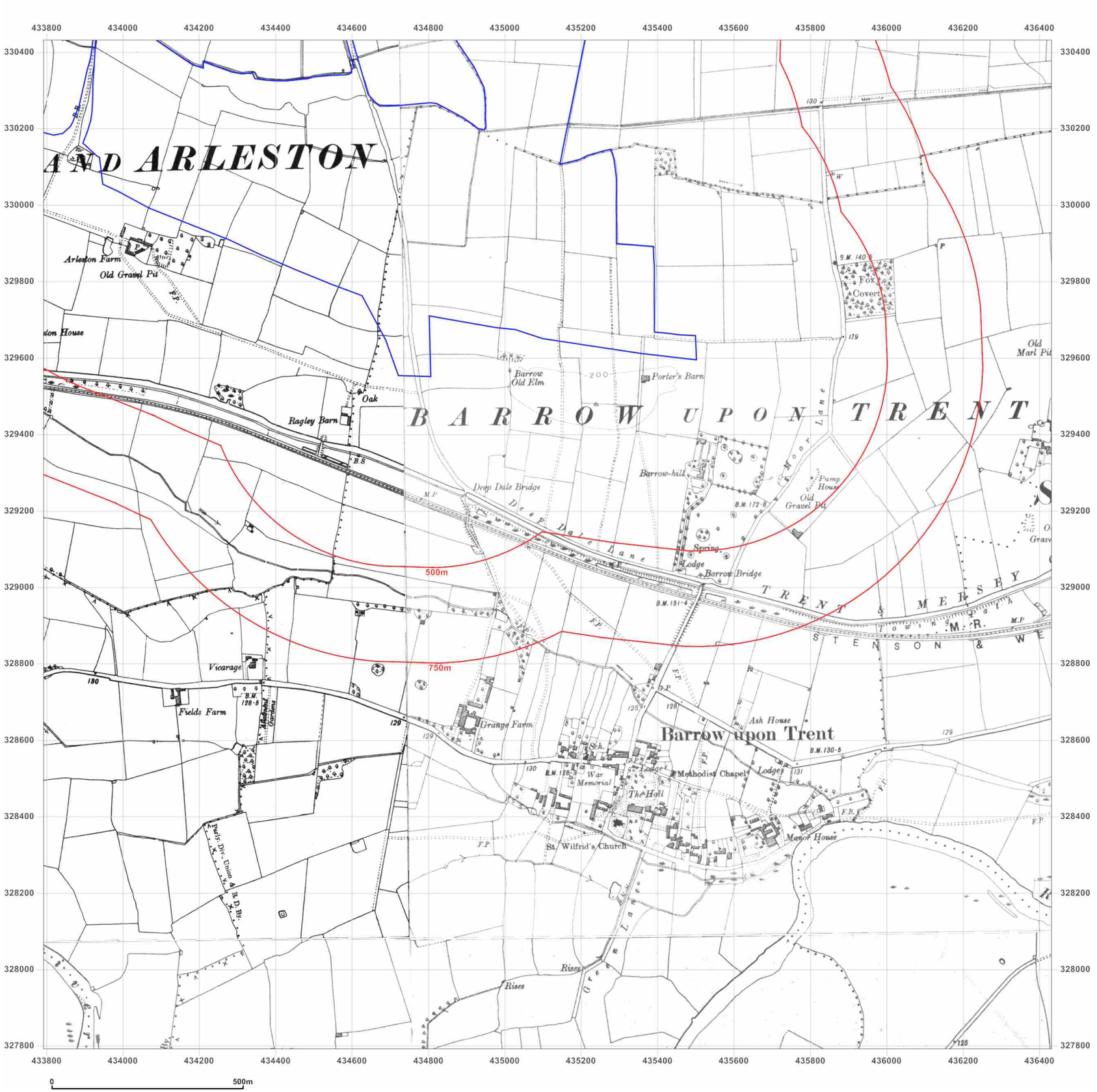
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Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: County Series
Map date: **1920-1924**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A	Surveyed 1881 Revised 1920 Edition N/A Copyright N/A Levelled N/A
Surveyed 1881 Revised 1920 Edition N/A Copyright N/A Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A

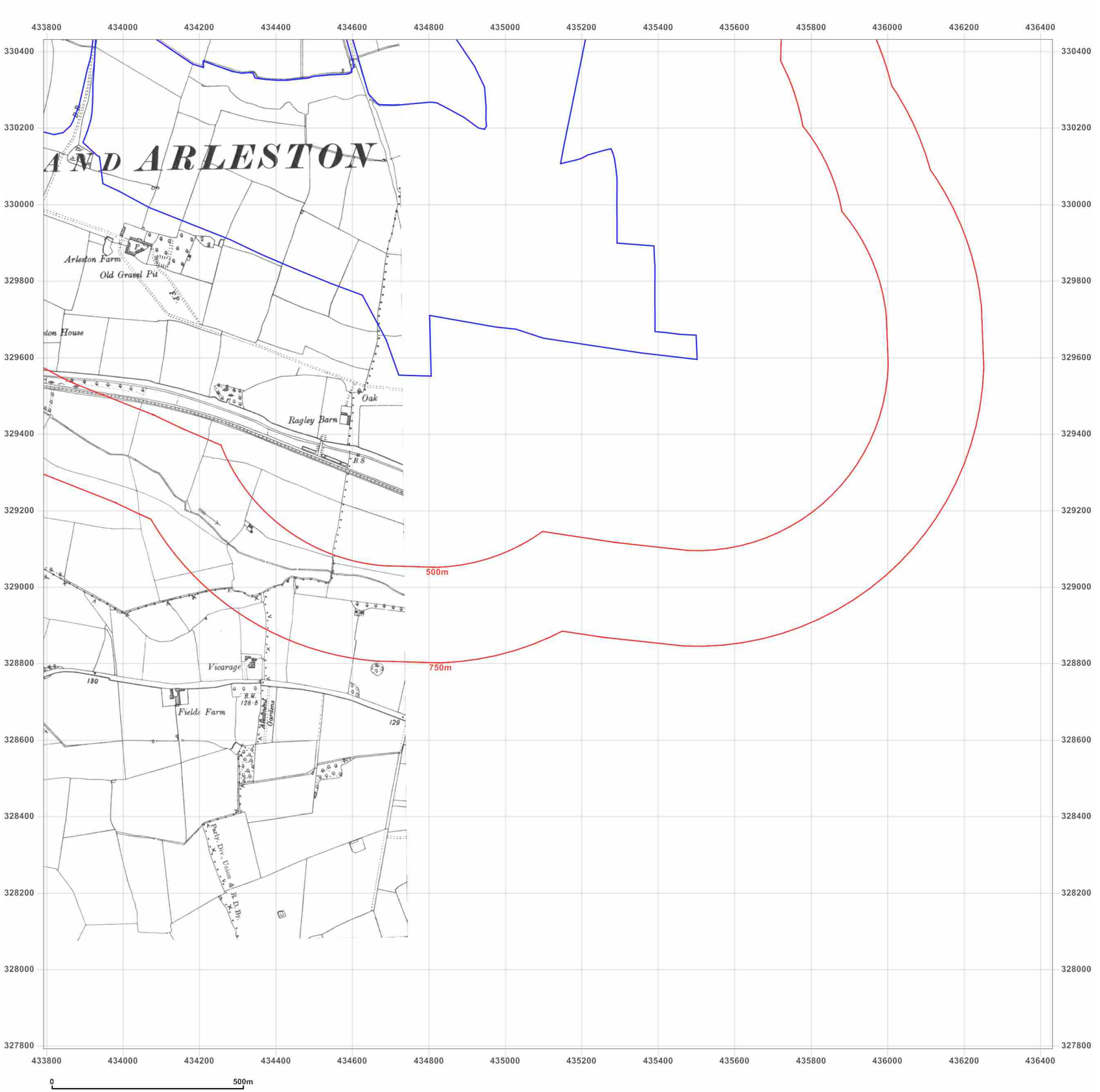
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: County Series

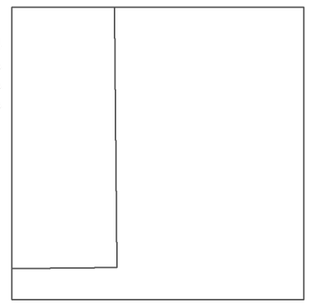
Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A



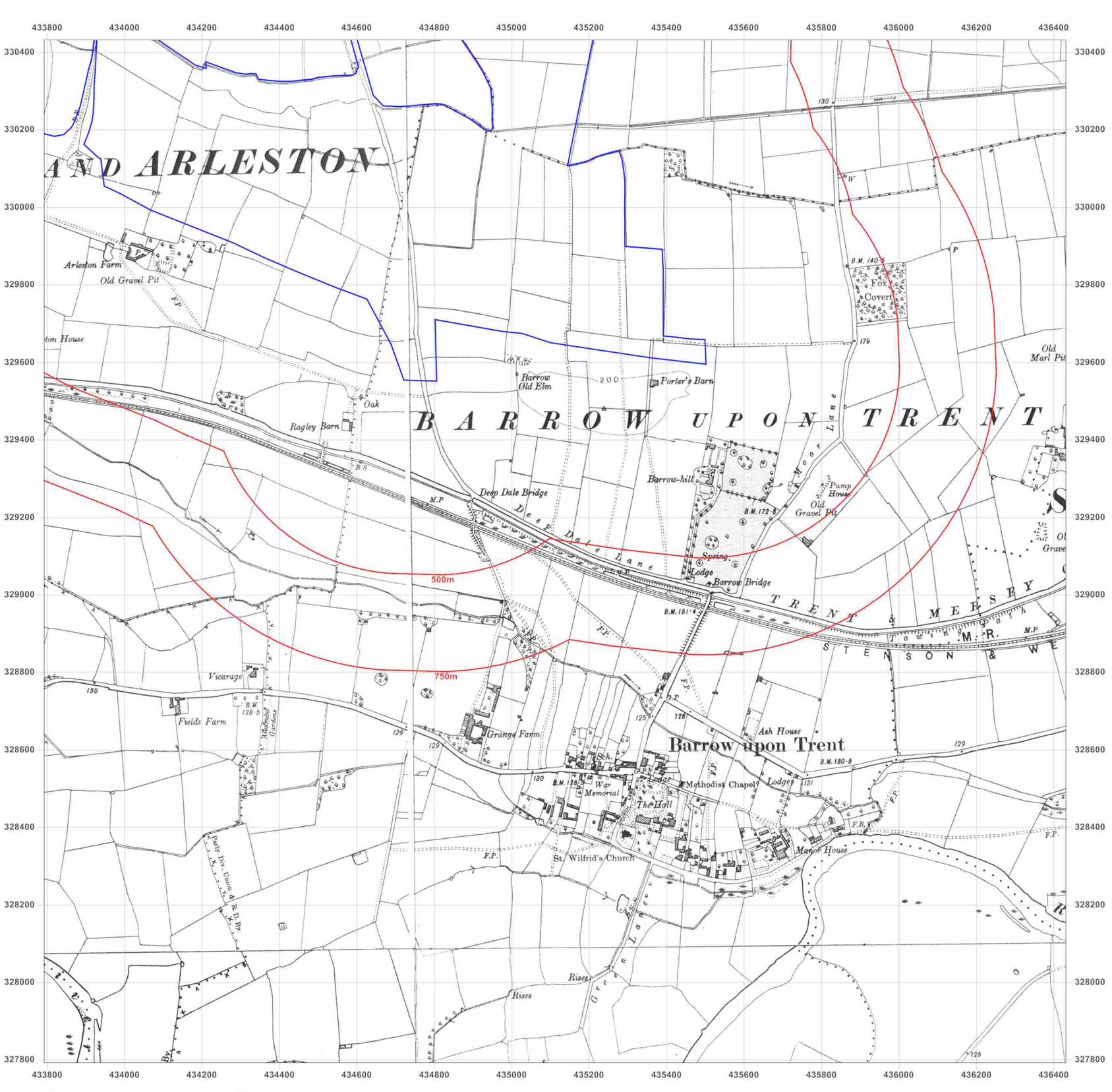
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Production date: 24 April 2019

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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: County Series

Map date: **1924-1925**

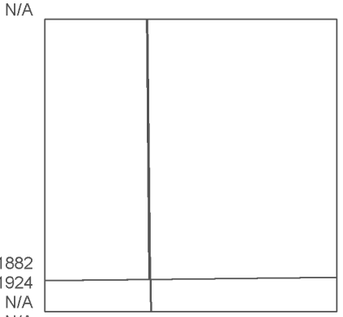
Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1882
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1915
Edition 1925
Copyright N/A
Levelled 1915

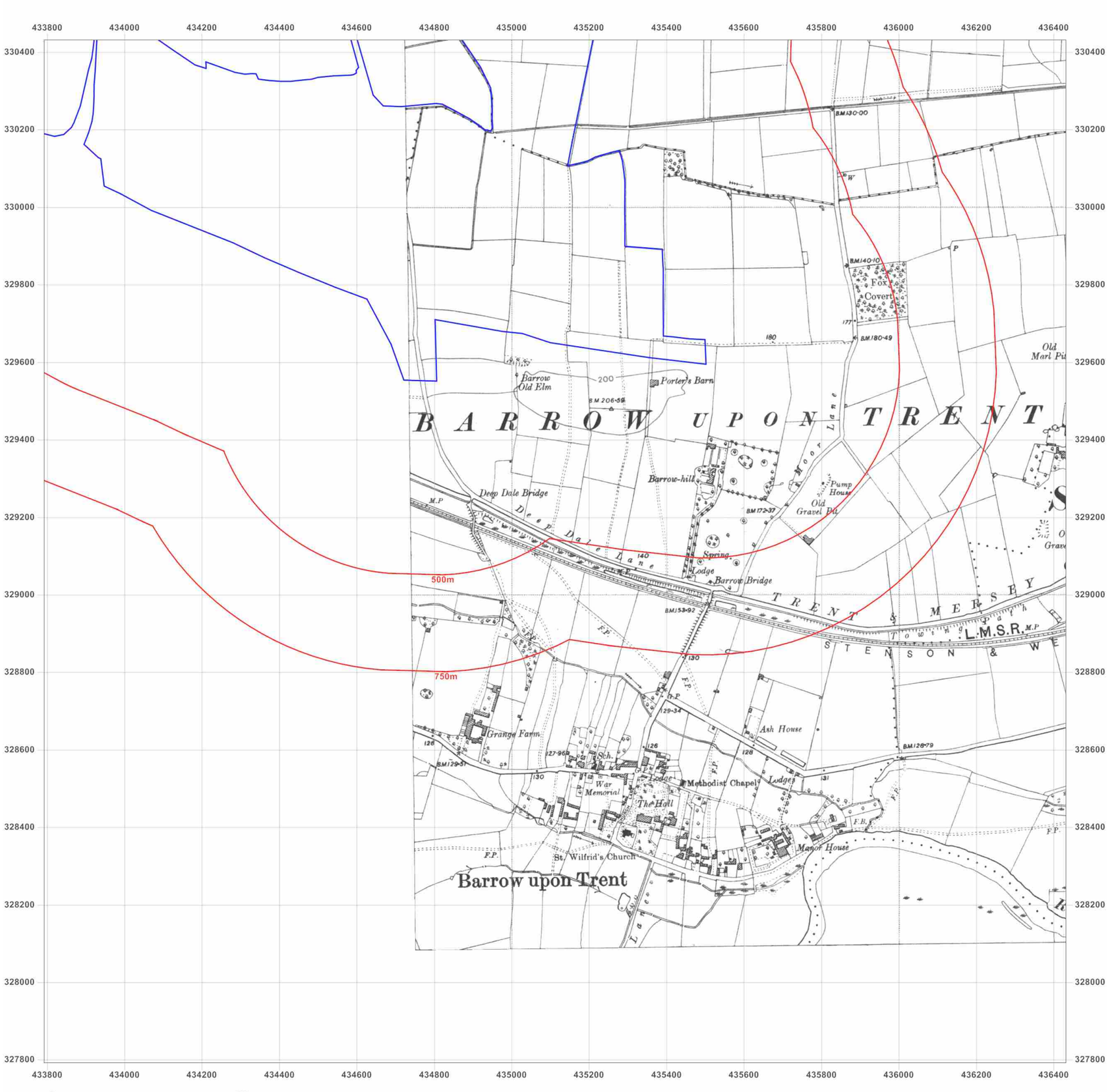
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

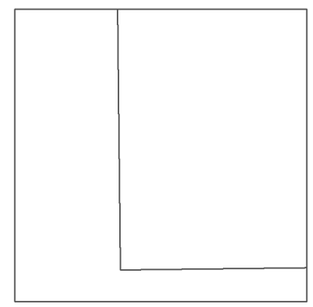
Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S



Surveyed 1881
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

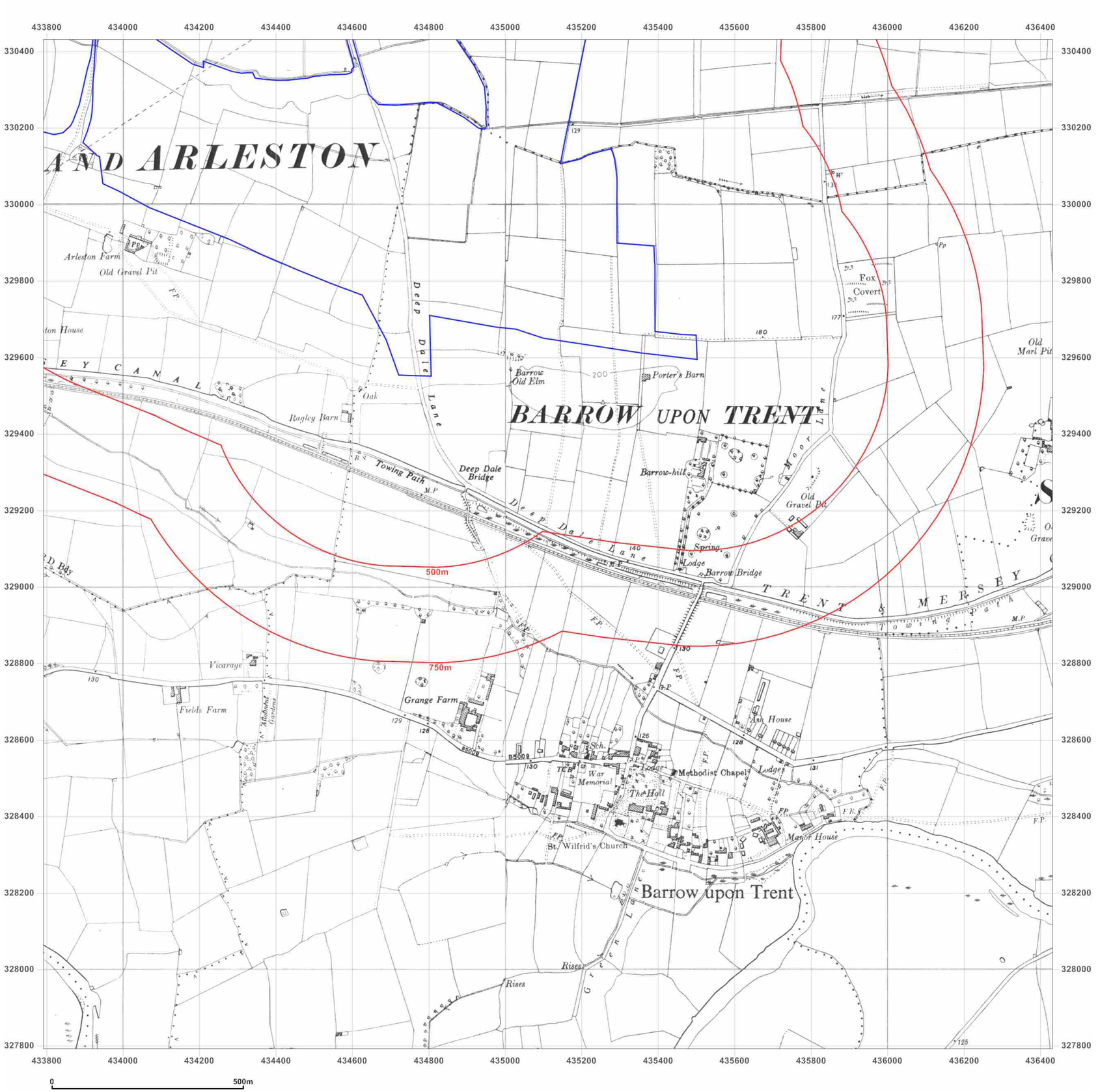
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: Provisional
Map date: **1954-1955**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
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Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1954
Edition N/A
Copyright 1955
Levelled N/A

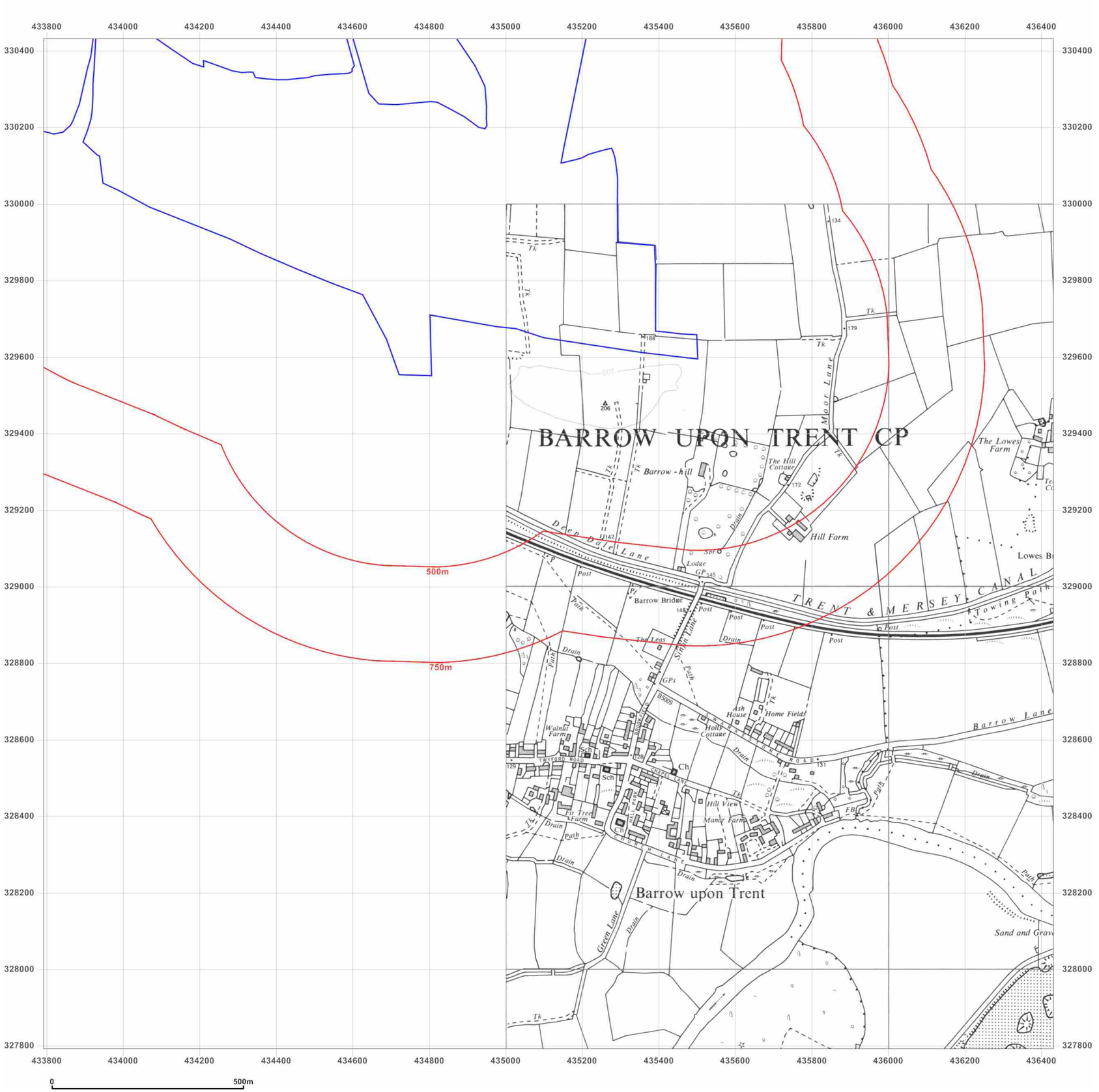
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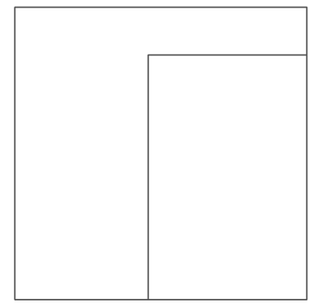
Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: Provisional
Map date: **1970**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S



Surveyed 1970
Revised 1970
Edition N/A
Copyright N/A
Levelled N/A

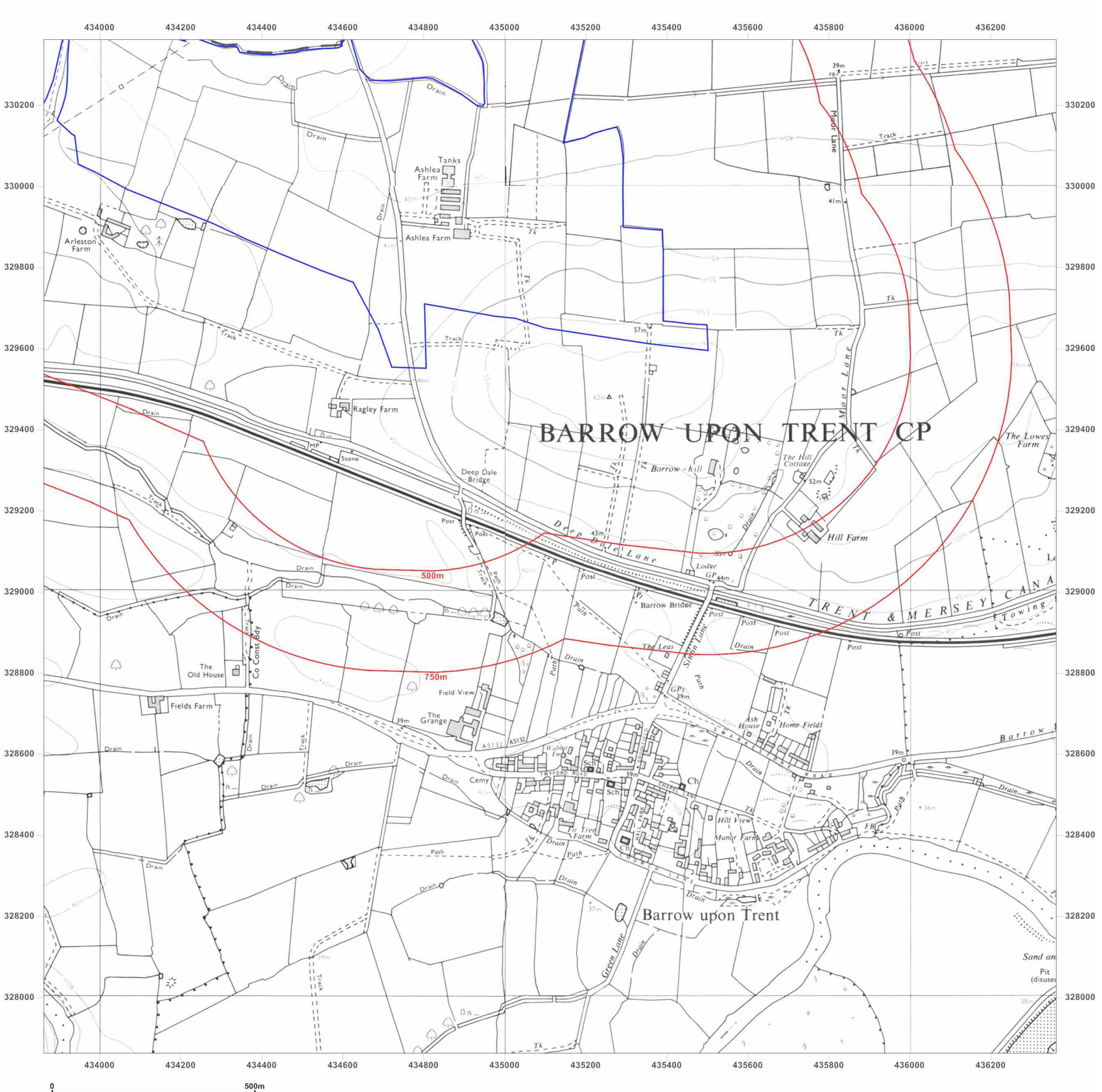
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: National Grid

Map date: **1978-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1977
Revised 1980
Edition N/A
Copyright 1980
Levelled 1977

Surveyed 1980
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1969
Revised 1978
Edition N/A
Copyright 1978
Levelled 1975

Surveyed 1967
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

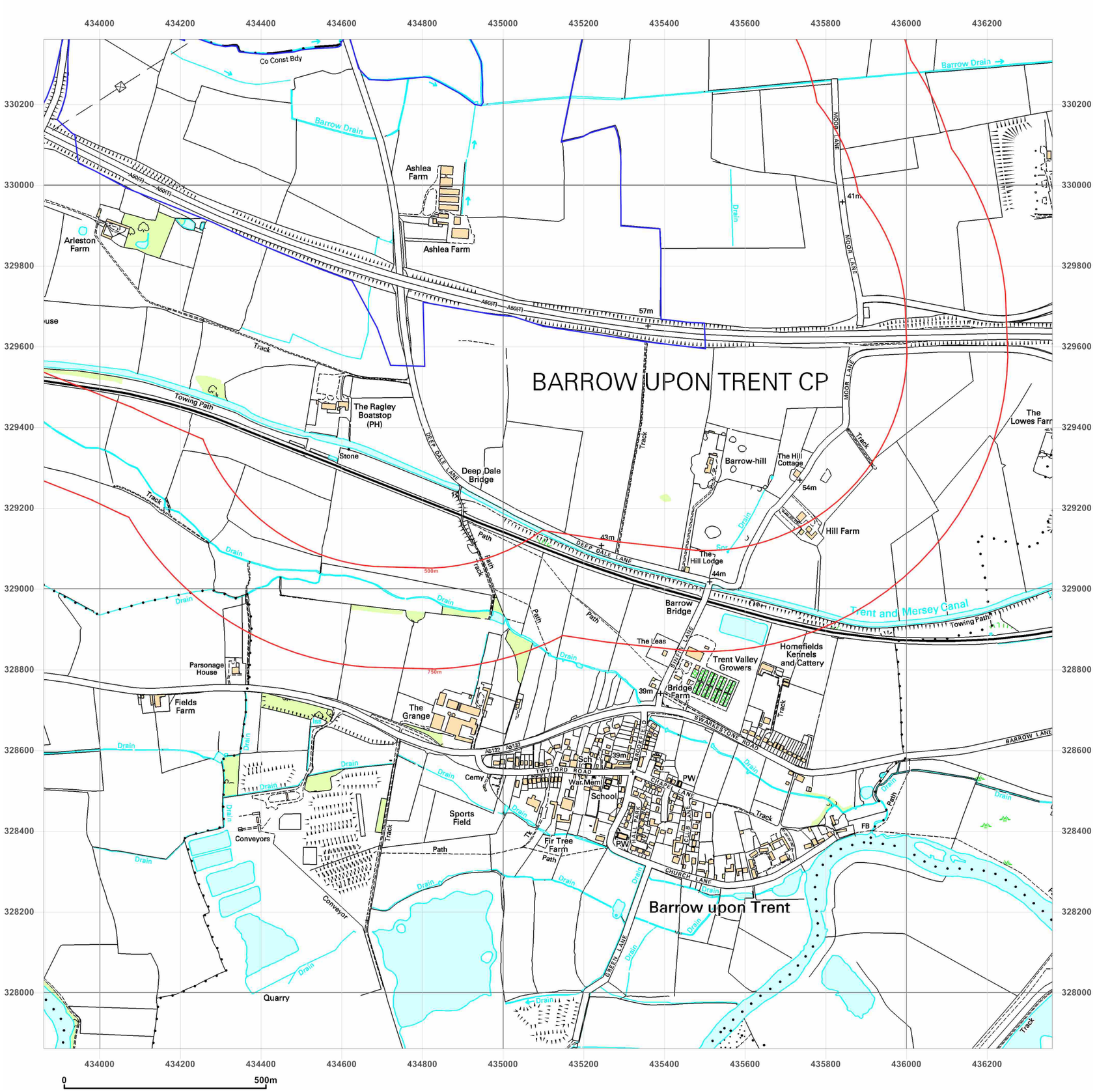
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

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

N
W E
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2002

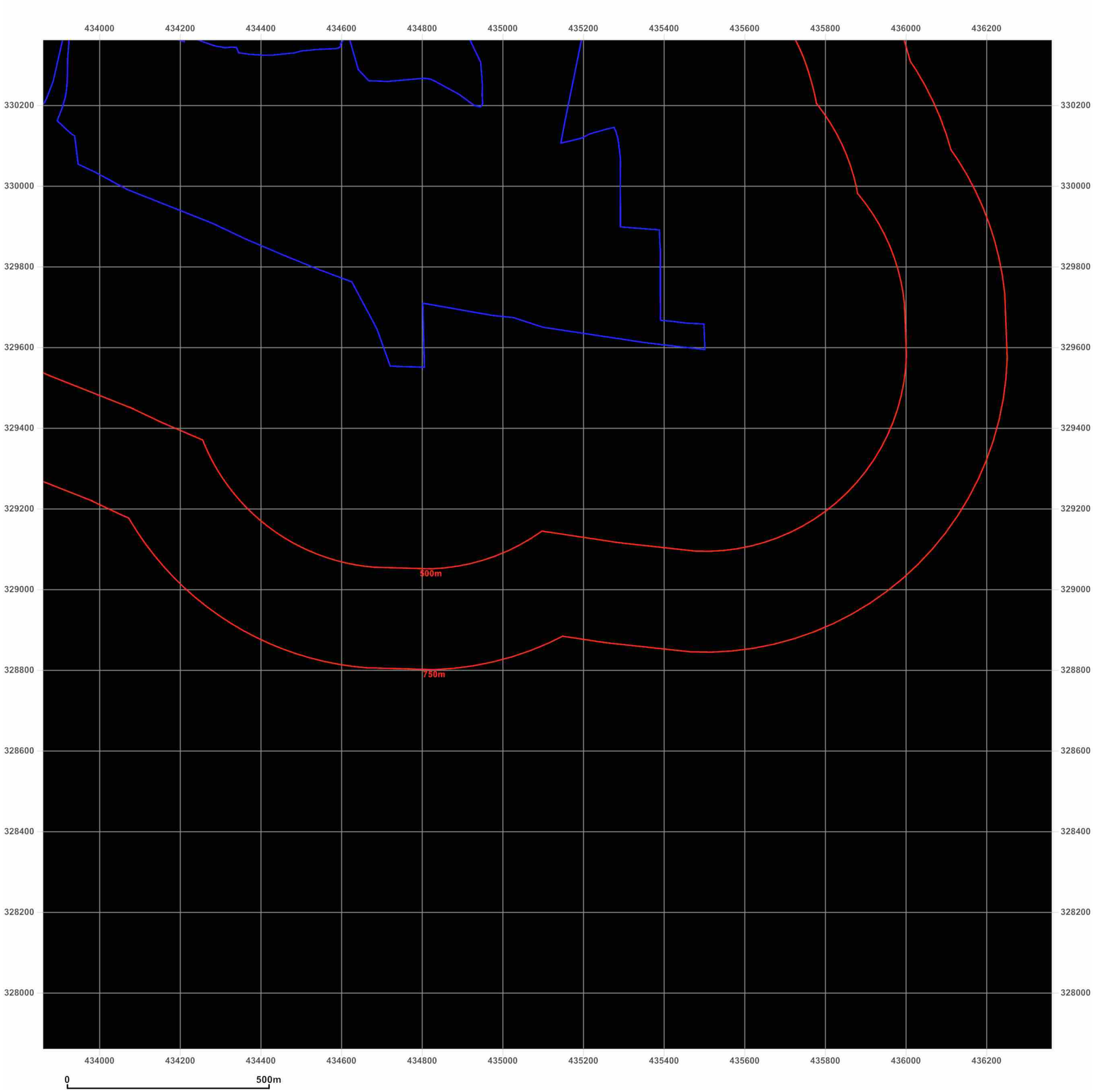
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Groundsure INSIGHTS

Site Details:

Wragley Way, DERBY, DE24 3AP

Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2010

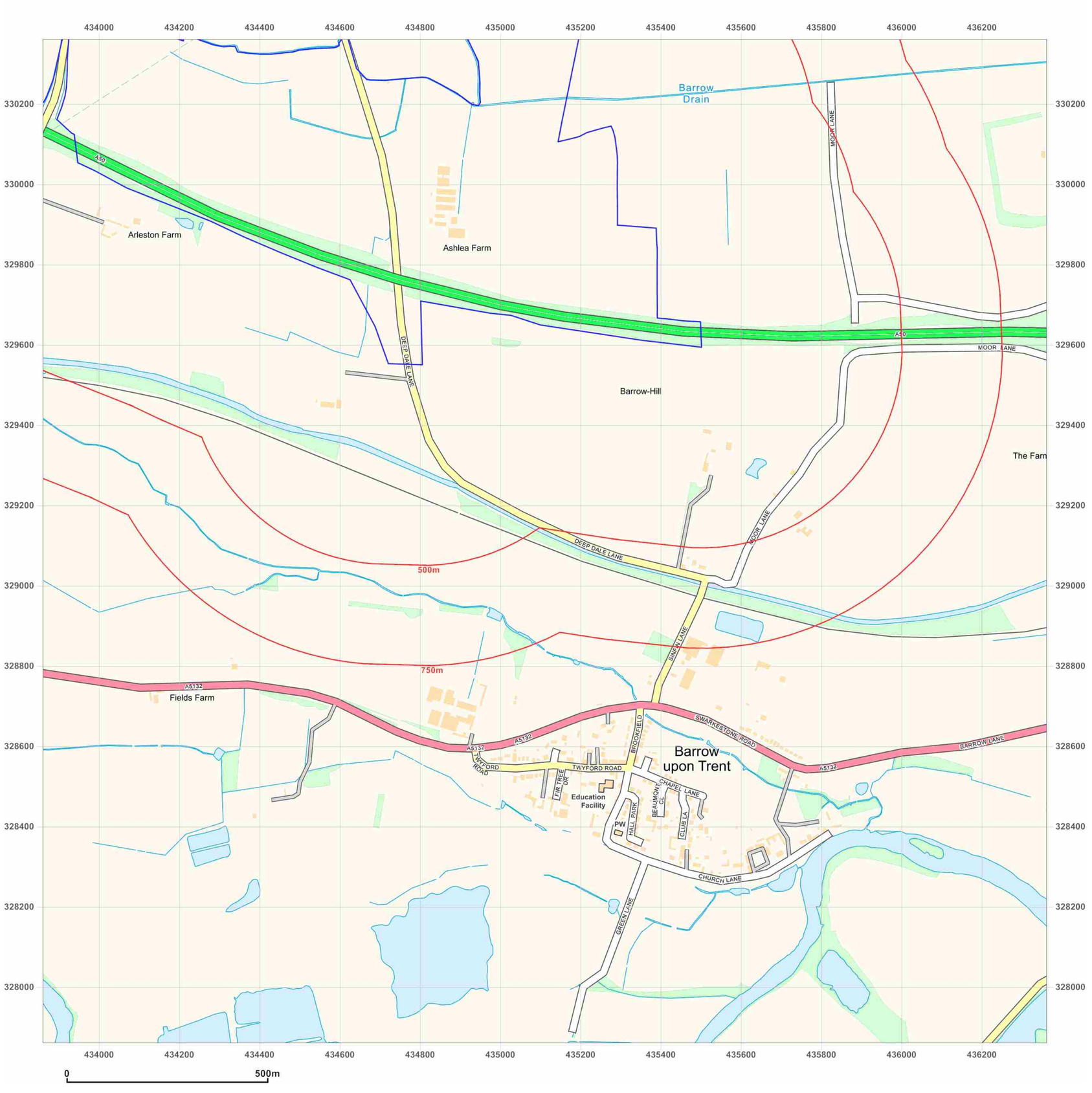
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_1
Grid Ref: 435111, 329111

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

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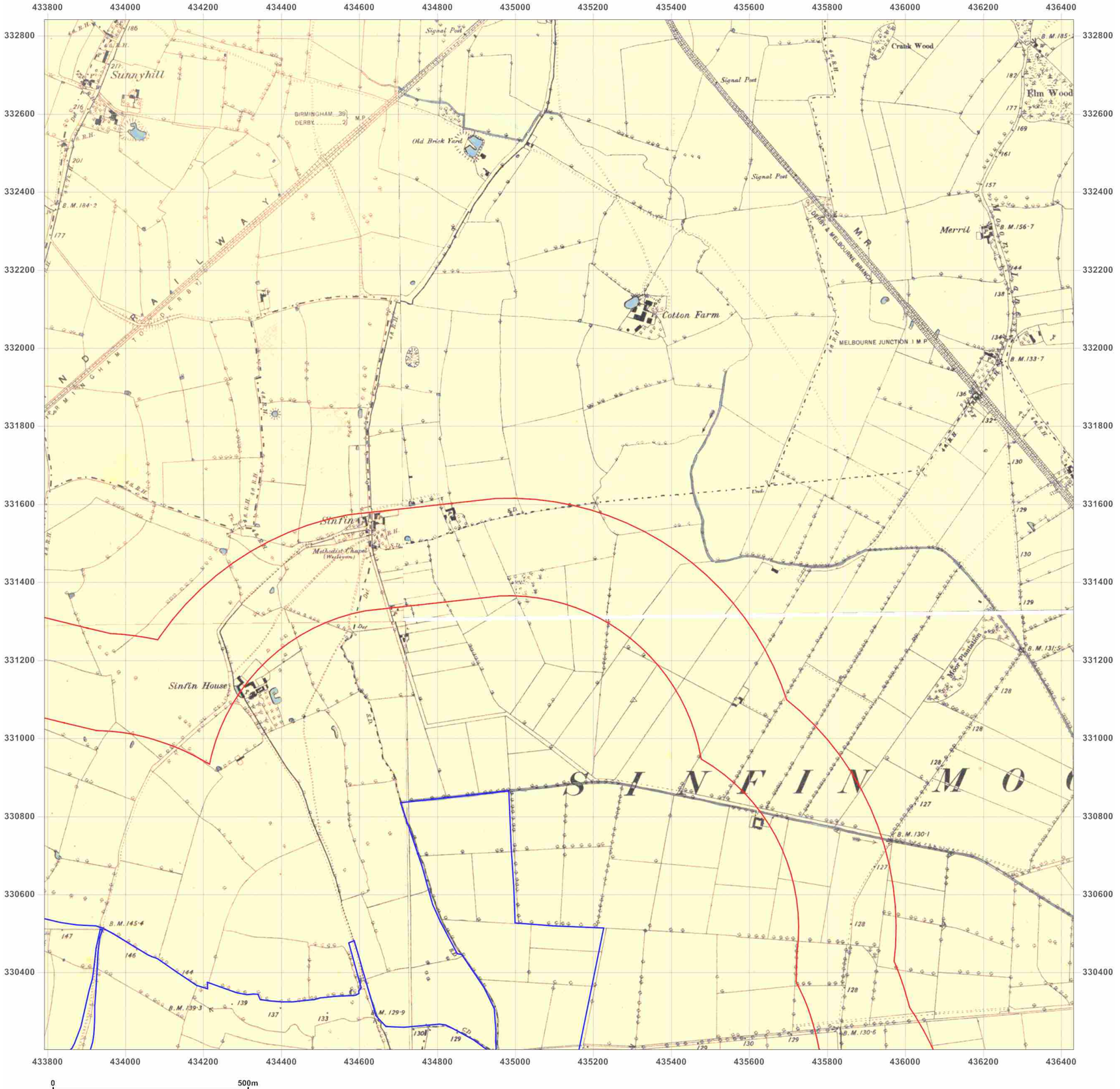
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1881-1882**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1882
Revised 1882
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1882
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Copyright N/A
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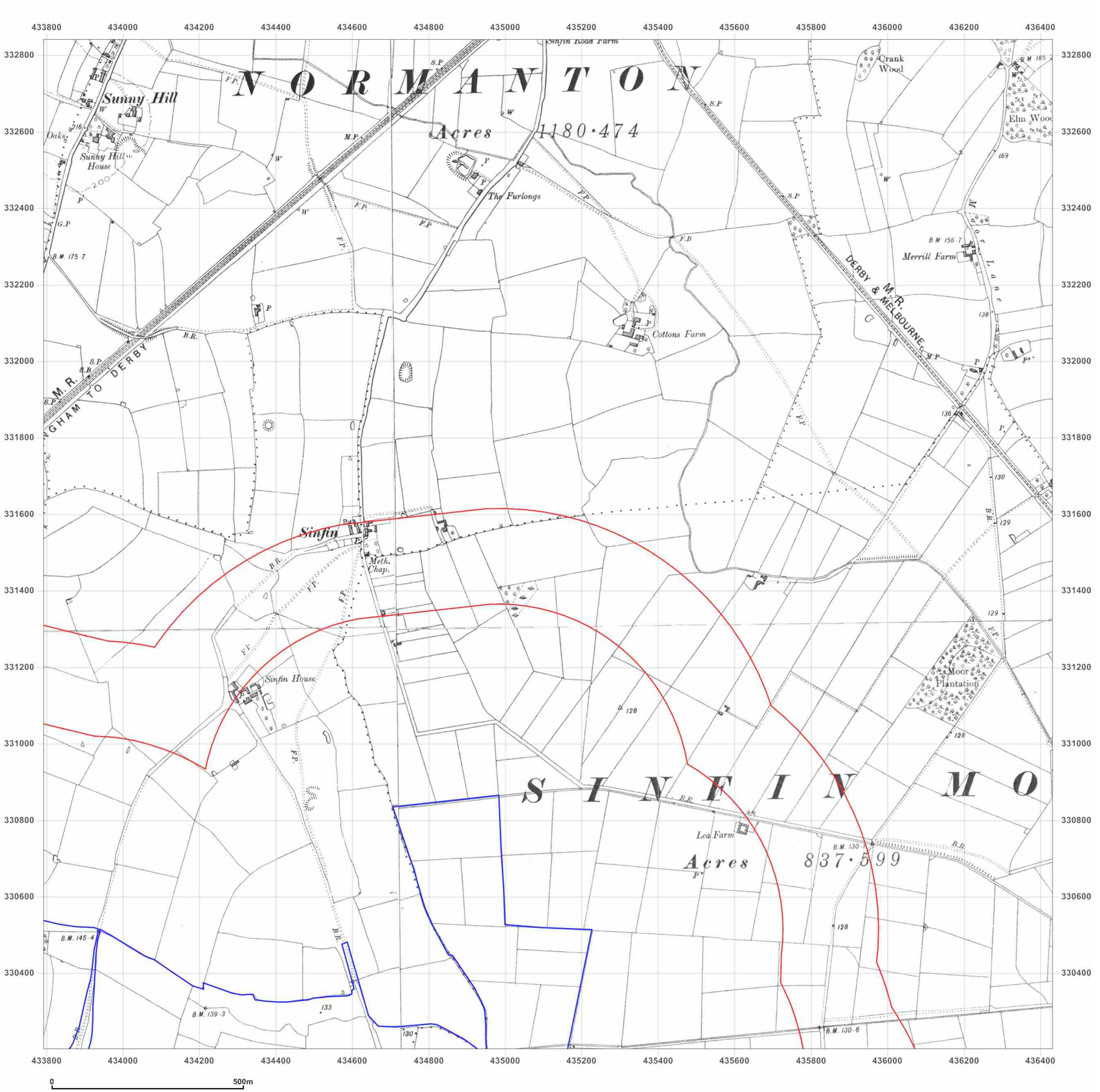
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Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1899-1900**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1882
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1900
Edition N/A
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Levelled N/A

Surveyed 1881
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

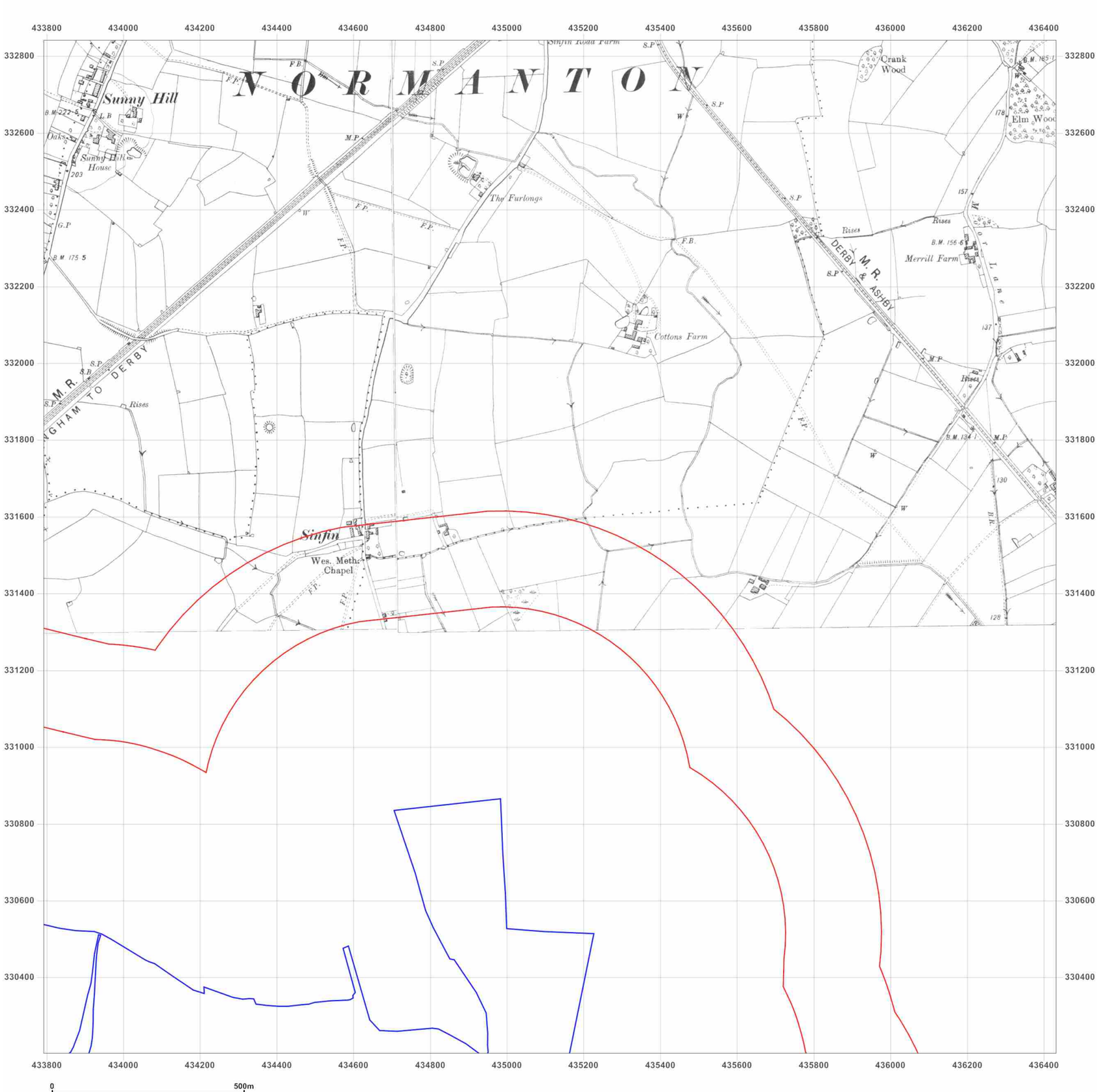
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1913**

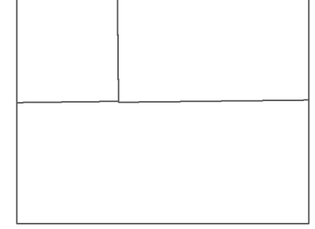
Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1881
Revised 1913
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1913
Edition N/A
Copyright N/A
Levelled N/A



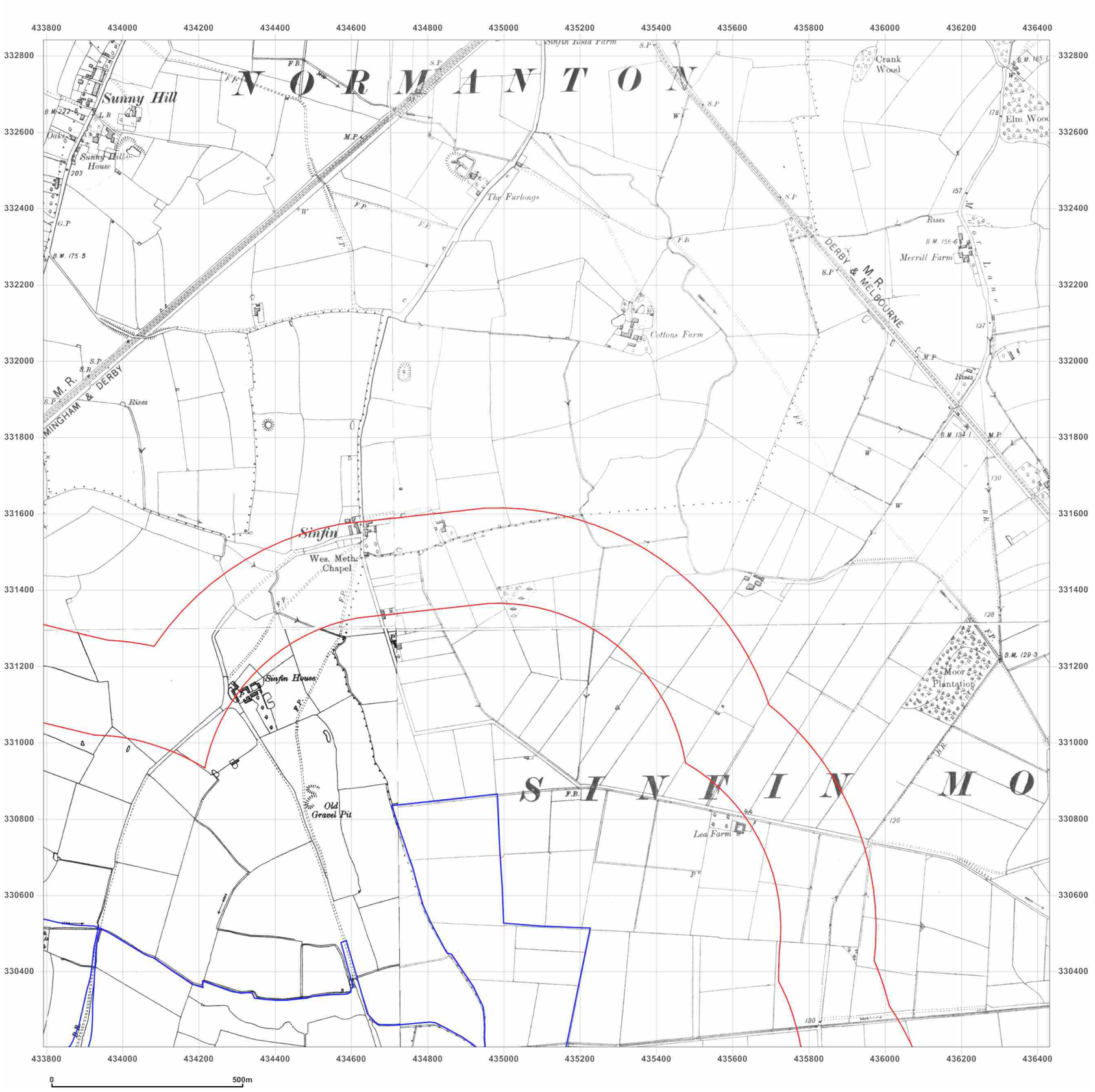
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1920-1924**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1881
Revised 1924
Edition 1924
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1923
Edition 1923
Copyright N/A
Levelled N/A

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

Surveyed 1881
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A

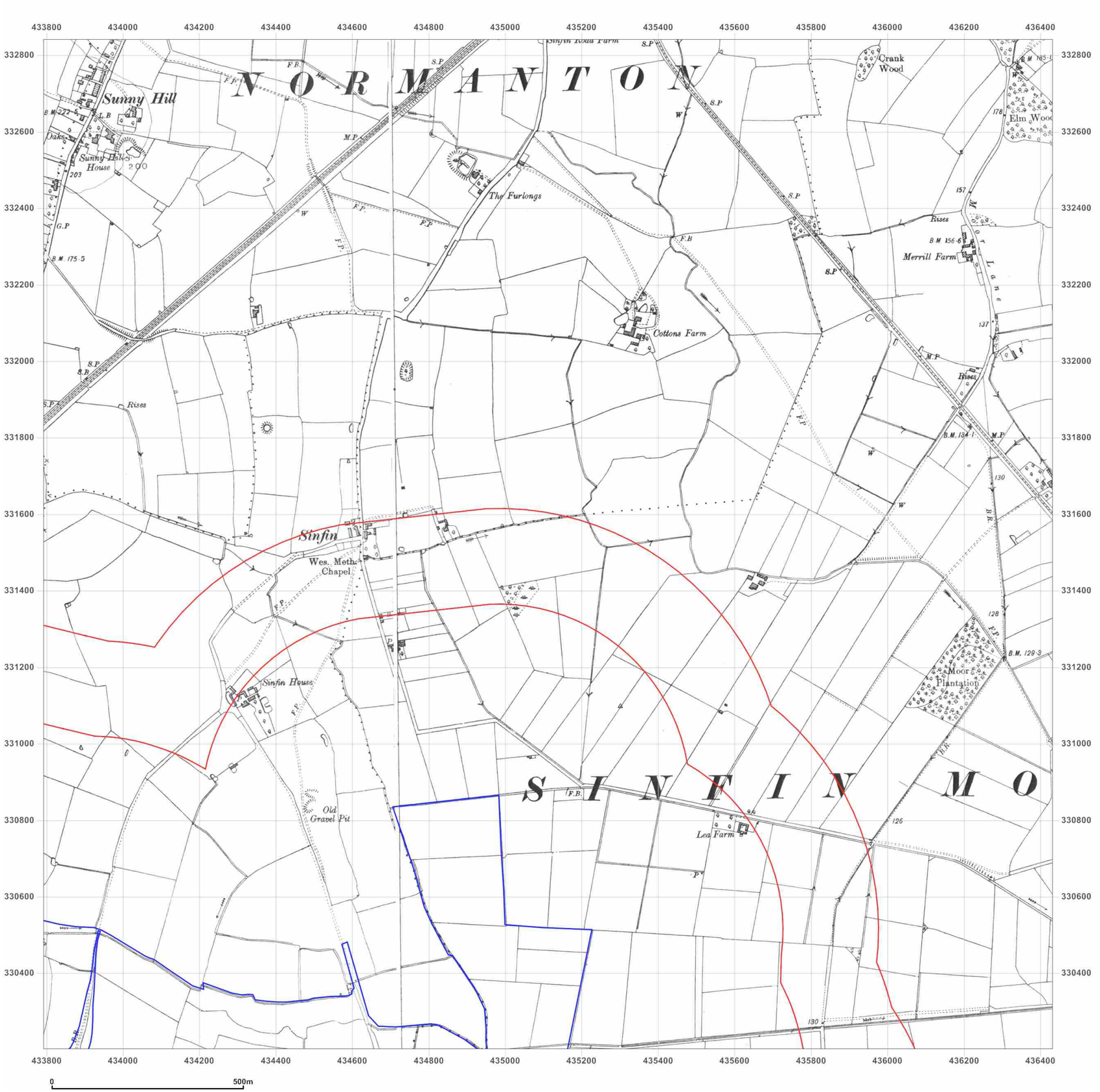
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1882
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

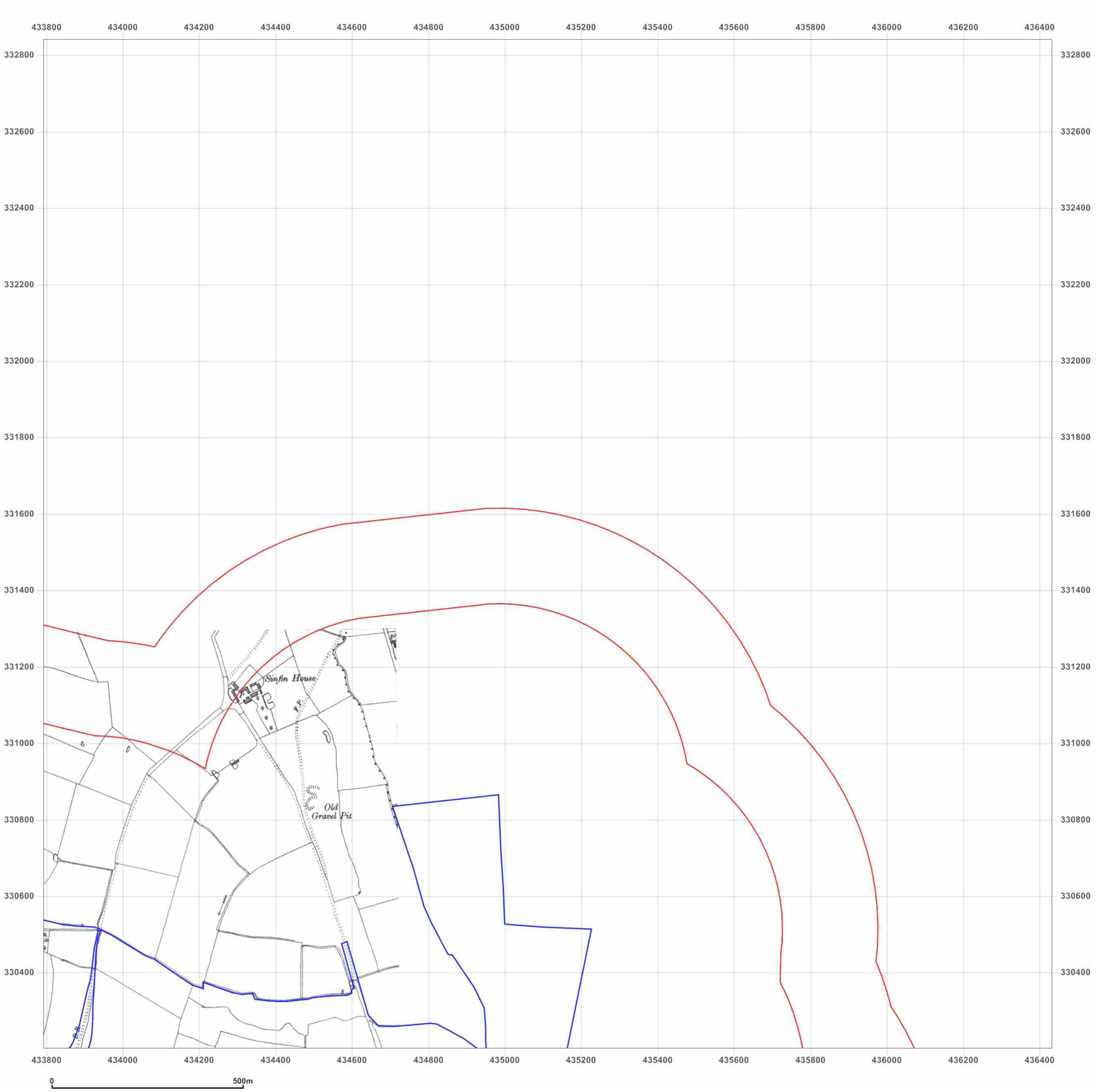
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: County Series

Map date: **1924**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1881
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

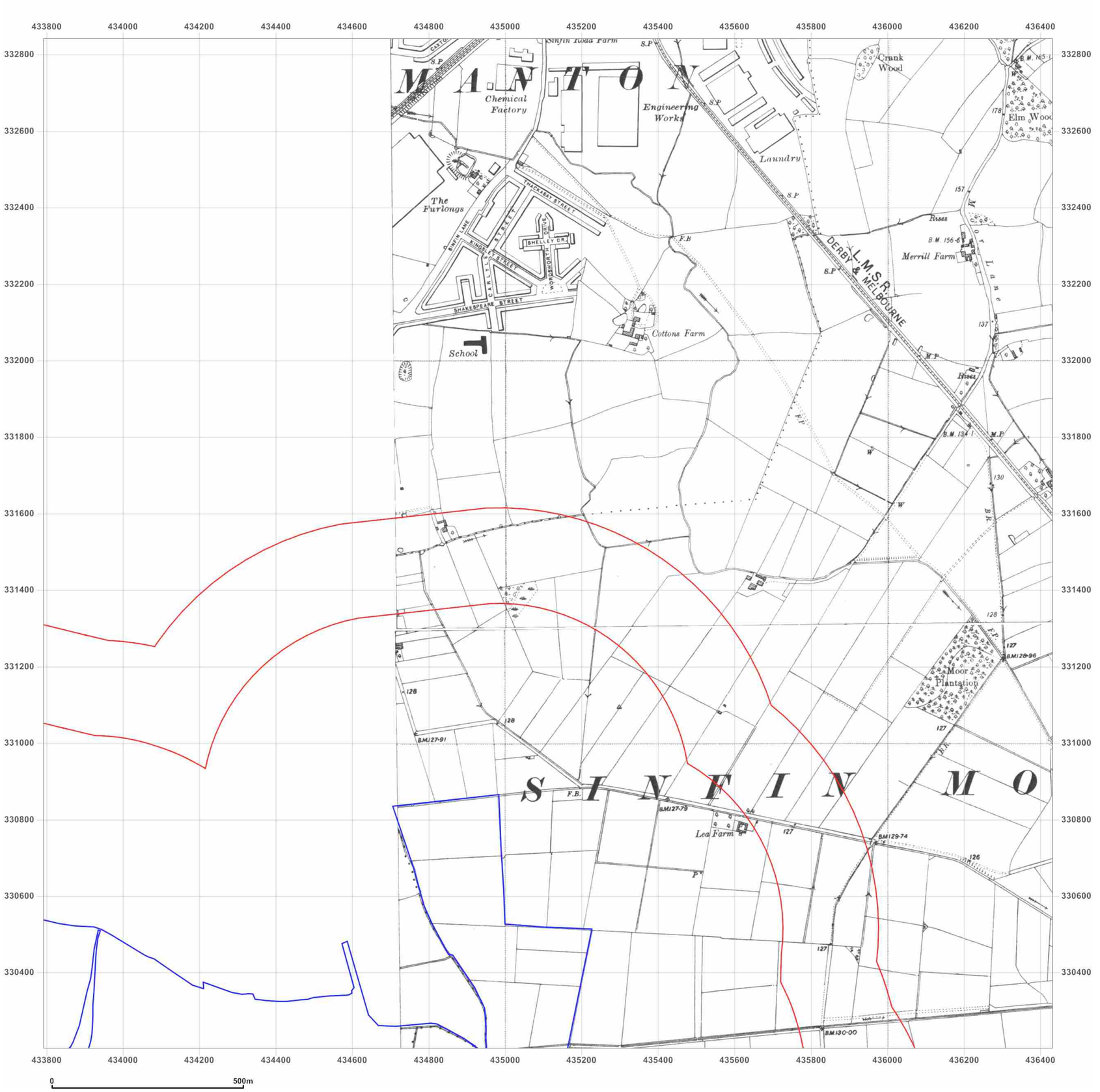
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

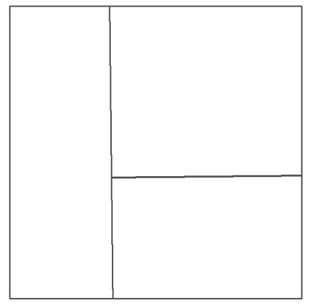
Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1882
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1881
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

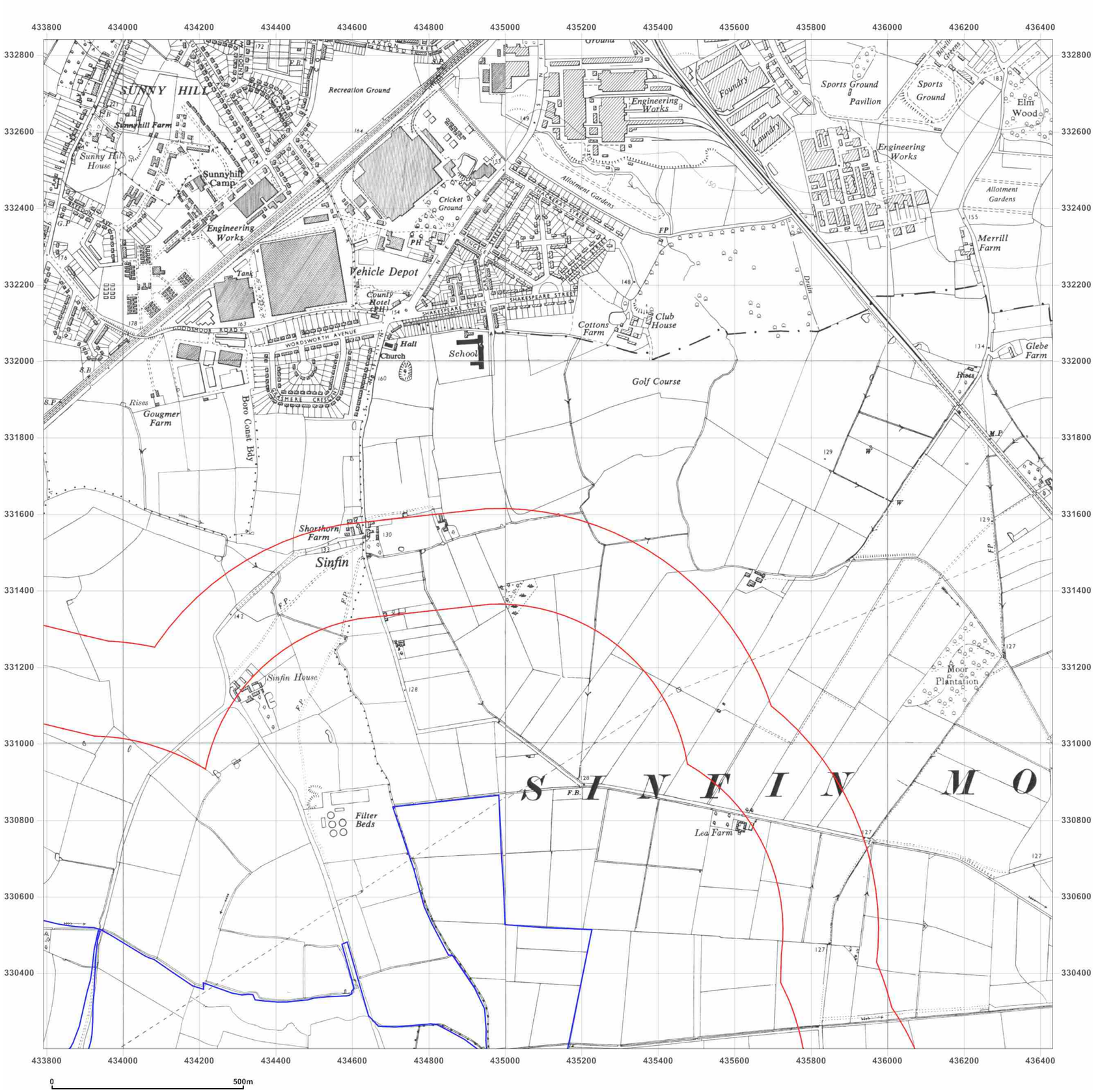
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: Provisional

Map date: **1954-1955**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1950
Revised 1954
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

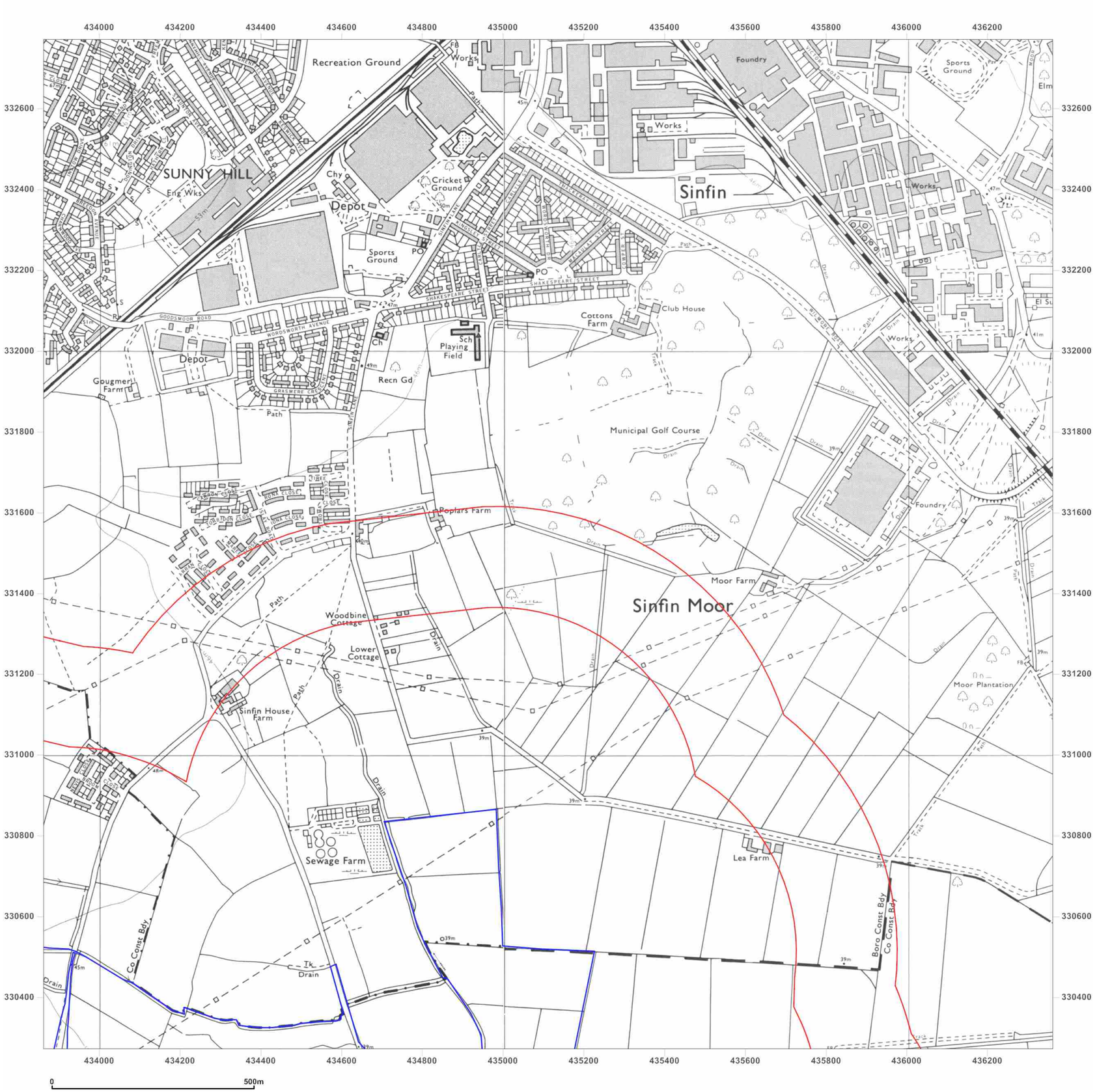
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: National Grid

Map date: **1972-1975**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1970
Revised 1972
Edition N/A
Copyright 1972
Levelled 1969

Surveyed 1973
Revised 1975
Edition N/A
Copyright 1975
Levelled 1964

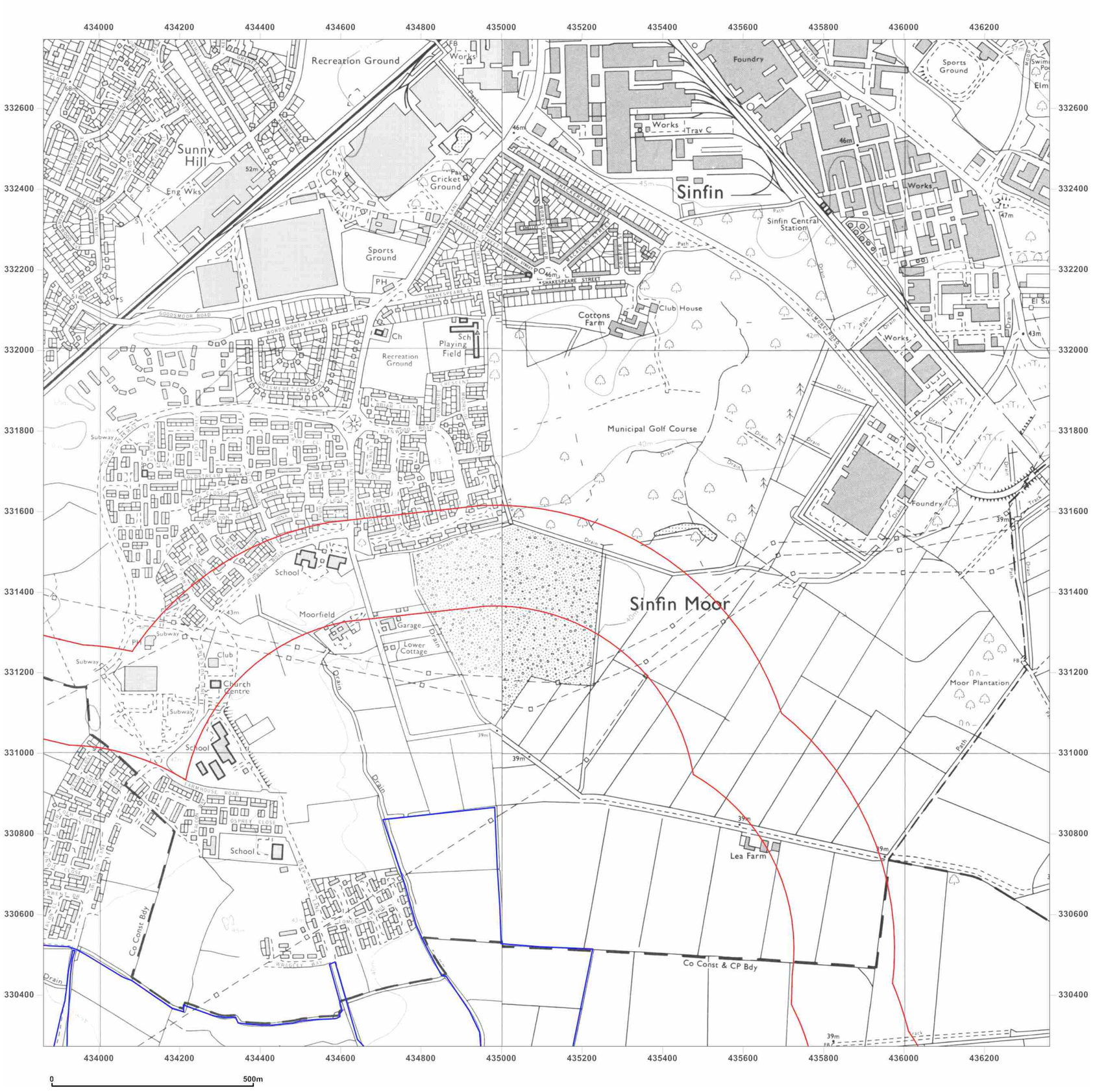
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: National Grid

Map date: **1980-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1977
Revised 1980
Edition N/A
Copyright 1980
Levelled 1977

Surveyed 1980
Revised 1983
Edition N/A
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: National Grid

Map date: **1987**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1985
Revised 1987
Edition N/A
Copyright N/A
Levelled N/A

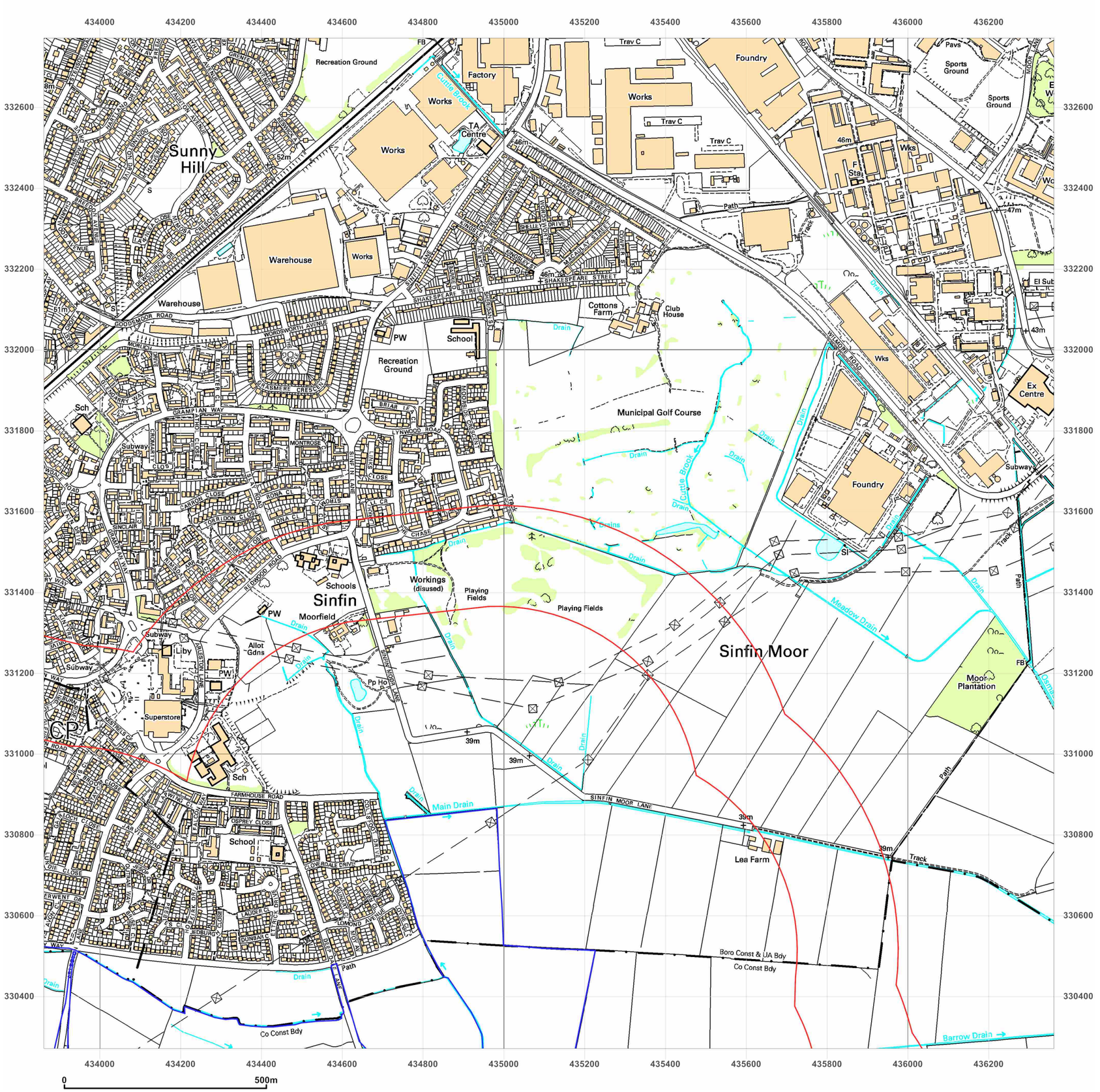
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Client Ref: POR025445
Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

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2002

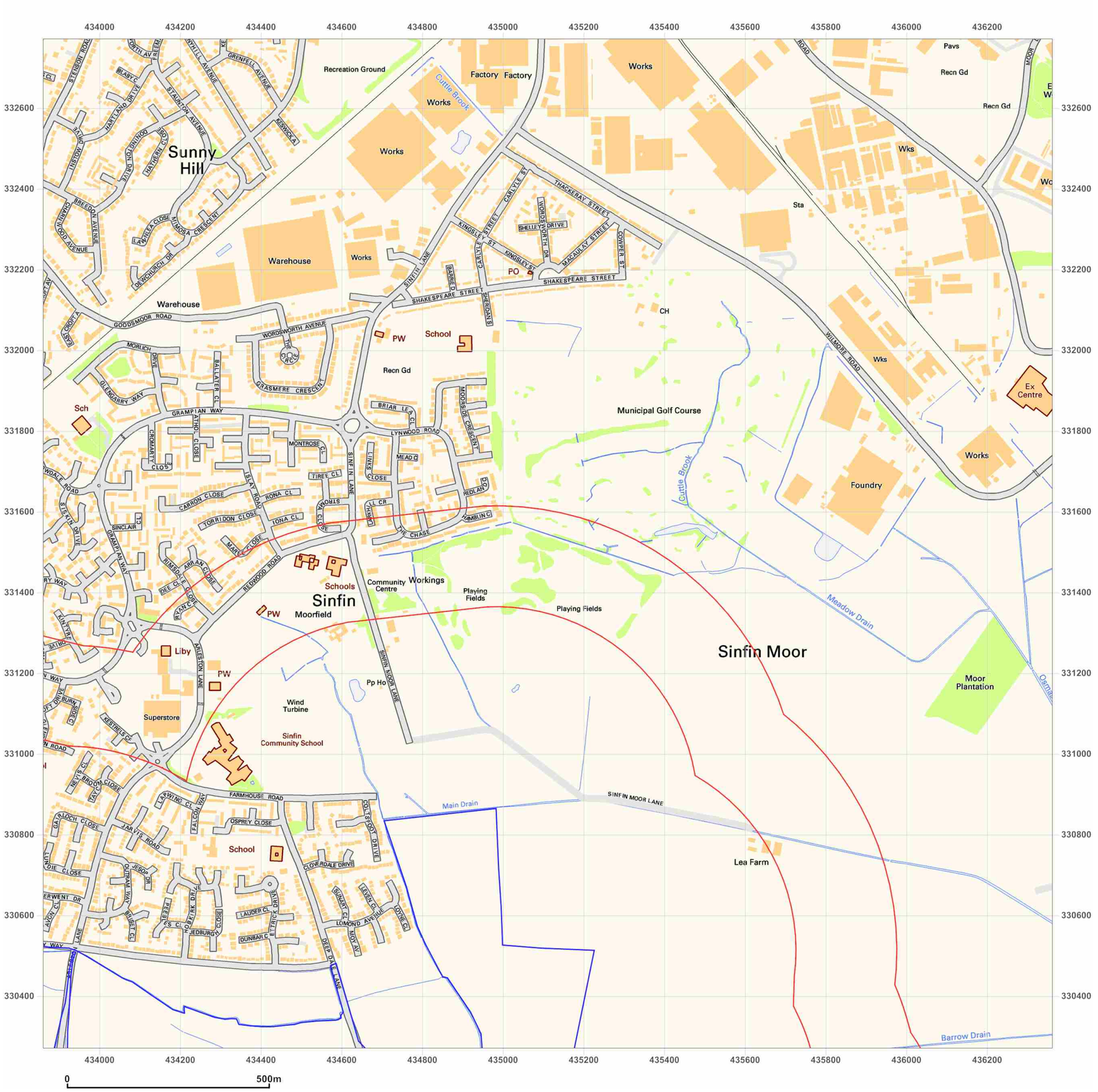
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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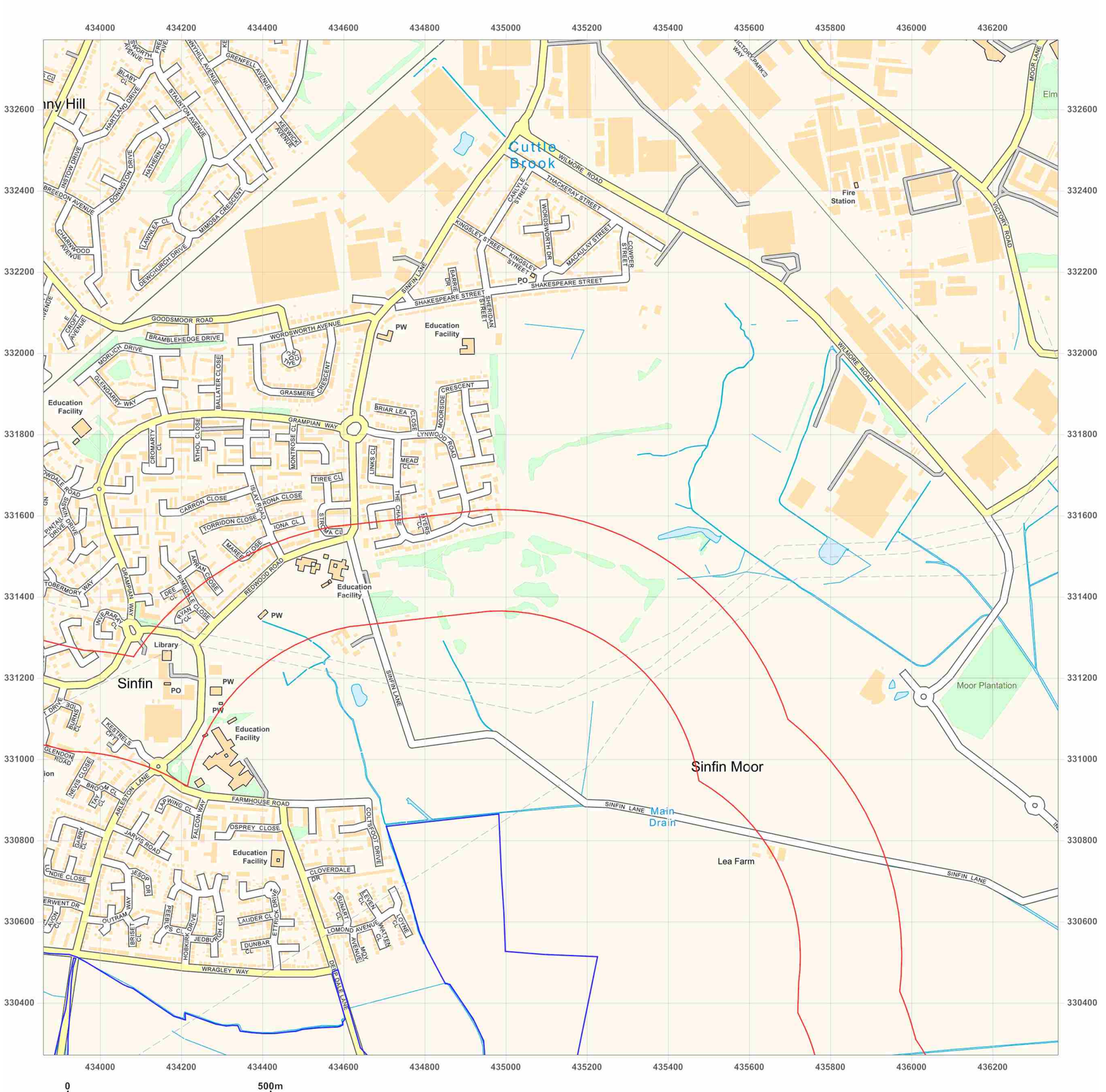
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Report Ref: HMD-214-5963301_SS_2_2
Grid Ref: 435111, 331521

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2014

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Appendix 3: Groundsure Report

BWB Consulting Limited

5th Floor, Waterfront House, Station Street,
Nottingham, NG2 3DQ

Groundsure Reference:	HMD-214-5963299
Your Reference:	POR025445
Report Date	24 Apr 2019
Report Delivery Method:	Email - pdf

Enviro Insight

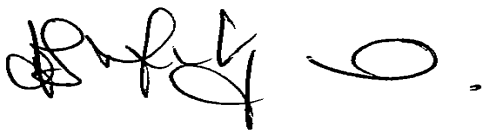
Address: Wragley Way, DERBY, DE24 3AP

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**Wragley Way, DERBY, DE24 3AP**
Date:	**24 Apr 2019**
Reference:	**HMD-214-5963299**
Client:	**BWB Consulting Limited**

NW N NE

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SW S SE

Aerial Photograph Capture date:	01-Jul-2018
Grid Reference:	434000,330292
Site Size:	145.4910ha

Report Reference: HMD-214-5963299
Client Reference: POR025445

Contents Page

Contents Page 3
Overview of Findings 6
Using this report 10
1. Historical Land Use 11
1. Historical Industrial Sites 12
1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping 12
1.2 Additional Information – Historical Tank Database 14
1.3 Additional Information – Historical Energy Features Database 14
1.4 Additional Information – Historical Petrol and Fuel Site Database 15
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database 15
1.6 Historical military sites 16
1.7 Potentially Infilled Land 16
2. Environmental Permits, Incidents and Registers Map 20
2. Environmental Permits, Incidents and Registers 21
2.1 Industrial Sites Holding Licences and/or Authorisations 21
2.1.1 Records of historic IPC Authorisations within 500m of the study site: 21
2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: 21
2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: 21
2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 21
2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 21
2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 22
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations: 22
2.1.8 Records of Licensed Discharge Consents within 500m of the study site: 22
2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 23
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 23
2.2 Dangerous or Hazardous Sites 23
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents 23
2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site: 23
2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site: 26
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990 26
3. Landfill and Other Waste Sites Map 27
3. Landfill and Other Waste Sites 28
3.1 Landfill Sites 28
3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site: 28
3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site: 28
3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 30
3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site: 30
3.2 Other Waste Sites 30
3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site: 30
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site: 30
4. Current Land Use Map 32
4. Current Land Uses 33
4.1 Current Industrial Data 33
4.2 Petrol and Fuel Sites 34
4.3 National Grid High Voltage Underground Electricity Transmission Cables 34
4.4 National Grid High Pressure Gas Transmission Pipelines 34

5. Geology 35
5.1 Artificial Ground and Made Ground 35
5.2 Superficial Ground and Drift Geology 35
5.3 Bedrock and Solid Geology 35
6 Hydrogeology and Hydrology 36
6a. Aquifer Within Superficial Geology 36
6b. Aquifer Within Bedrock Geology and Abstraction Licences 37
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences 38
6d. Hydrogeology – Source Protection Zones within confined aquifer 39
6e. Hydrology – Watercourse Network and River Quality 40
6.Hydrogeology and Hydrology 41
6.1 Aquifer within Superficial Deposits 41
6.2 Aquifer within Bedrock Deposits 42
6.3 Groundwater Abstraction Licences 43
6.4 Surface Water Abstraction Licences 45
6.5 Potable Water Abstraction Licences 47
6.6 Source Protection Zones 47
6.7 Source Protection Zones within Confined Aquifer 48
6.8 Groundwater Vulnerability and Soil Leaching Potential 49
6.9 River Quality 50
6.9.1 Biological Quality: 50
6.9.2 Chemical Quality: 50
6.10 Ordnance Survey MasterMap Water Network 51
6.11 Surface Water Features 63
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea) 65
7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map 66
7 Flooding 67
7.1 River and Coastal Zone 2 Flooding 67
7.2 River and Coastal Zone 3 Flooding 68
7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating 69
7.4 Flood Defences 70
7.5 Areas benefiting from Flood Defences 70
7.6 Areas benefiting from Flood Storage 70
7.7 Groundwater Flooding Susceptibility Areas 71
7.8 Groundwater Flooding Confidence Areas 71
8. Designated Environmentally Sensitive Sites Map 72
8. Designated Environmentally Sensitive Sites 73
8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 73
8.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 73
8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 73
8.4 Records of Special Protection Areas (SPA) within 2000m of the study site: 73
8.5 Records of Ramsar sites within 2000m of the study site: 73
8.6 Records of Ancient Woodland within 2000m of the study site: 74
8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site: 74
8.8 Records of World Heritage Sites within 2000m of the study site: 74
8.9 Records of Environmentally Sensitive Areas within 2000m of the study site: 74
8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: 74
8.11 Records of National Parks (NP) within 2000m of the study site: 74
8.12 Records of Nitrate Sensitive Areas within 2000m of the study site: 75
8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site: 75

8.14 Records of Green Belt land within 2000m of the study site: 75
9. Natural Hazards Findings 76
9.1 Detailed BGS GeoSure Data 76
9.1.1 Shrink Swell 76
9.1.2 Landslides 76
9.1.3 Soluble Rocks 76
9.1.4 Compressible Ground 77
9.1.5 Collapsible Rocks 77
9.1.6 Running Sand 77
9.2 Radon 78
9.2.1 Radon Affected Areas 78
9.2.2 Radon Protection 78
10. Mining 79
10.1 Coal Mining 79
10.2 Non-Coal Mining 79
10.3 Brine Affected Areas 79
Contact Details 80
Standard Terms and Conditions 82

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	3	6	27	41
1.2 Additional Information – Historical Tank Database	16	0	3	3
1.3 Additional Information – Historical Energy Features Database	0	0	15	13
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	4
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	10	43	79

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	1
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	2	3	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	7	1	6	8
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	1	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	1	1	3	4
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	4	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	7	2	16	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	Identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	4	6	7
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	2	1	9
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	4	2	3	2	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	62	14	22	40	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	Identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	High
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Potential at Surface
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	High

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	1	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	2	0	0	0	1	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Moderate
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licences, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

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

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

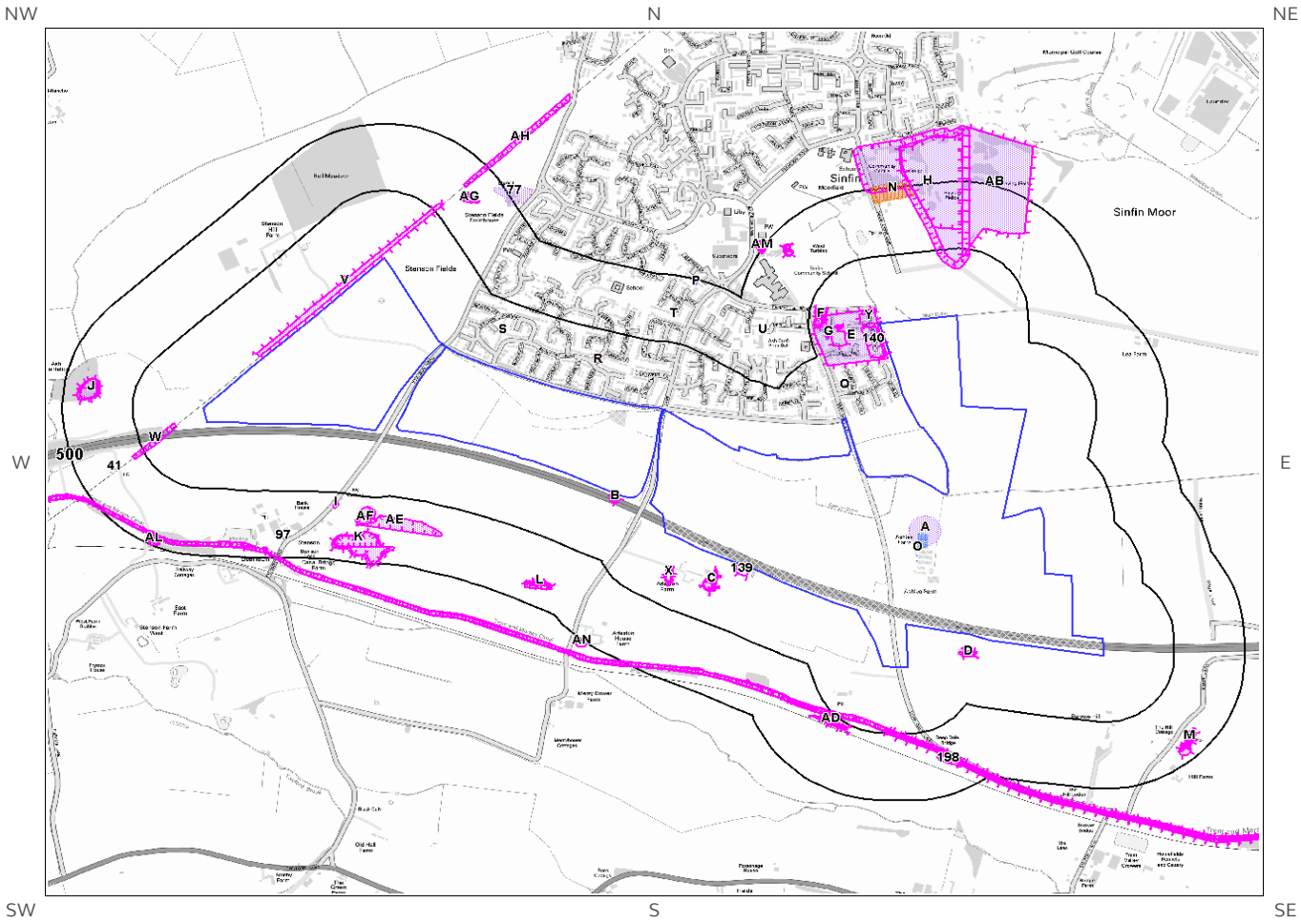
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 77

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Unspecified Tanks	1987
2A	0	On Site	Unspecified Tanks	1978
3A	0	On Site	Unspecified Tanks	1971
4B	3	SW	Unspecified Pit	1954
5E	6	W	Sewage Farm	1971
6B	7	SW	Unspecified Pit	1924
7B	7	SW	Unspecified Pit	1900
8V	10	NW	Cuttings	1881
9C	49	S	Old Gravel Pit	1954
10C	55	S	Old Gravel Pit	1924
11C	55	S	Old Gravel Pit	1924
12D	56	S	Unspecified Ground Workings	1920
13D	56	S	Unspecified Ground Workings	1899
14D	56	S	Unspecified Ground Workings	1938
15D	56	S	Unspecified Ground Workings	1924
16D	57	S	Unspecified Pit	1970
17D	57	S	Unspecified Pit	1950
18D	57	S	Unspecified Pit	1981
19C	61	S	Unspecified Pit	1924
20C	103	S	Unspecified Pit	1900
21C	103	S	Unspecified Pit	1881
22C	103	S	Old Gravel Pit	1924
23W	108	W	Cuttings	1881
24E	126	W	Unspecified Tanks	1971
25E	126	W	Filter Beds	1954
26E	127	W	Filter Beds	1954
27H	174	N	Unspecified Workings	1987
28G	181	W	Filter Beds	1954
29F	188	W	Unspecified Pits	1954
30F	195	W	Old Gravel Pit	1924
31F	195	W	Unspecified Pit	1924
32F	196	W	Unspecified Pits	1900

33F	196	W	Old Gravel Pit	1924
34G	198	W	Old Gravel Pit	1924
35H	199	N	Refuse Heap	1987
36AB	219	N	Refuse Heap	1983
37I	284	S	Unspecified Pit	1900
38I	284	S	Unspecified Pit	1924
39AE	286	S	Unspecified Pit	1954
40H	322	N	Refuse Heap	1978
41	361	SW	Railway Building	1881
42J	371	W	Unspecified Pit	1900
43J	371	W	Old Marl Pit	1924
44J	371	W	Old Marl Pit	1924
45J	371	W	Unspecified Pit	1881
46J	376	W	Unspecified Pit	1978
47J	376	W	Unspecified Pit	1987
48J	376	W	Unspecified Pit	1971
49J	376	W	Old Marl Pit	1954
50K	380	S	Unspecified Pit	1954
51K	380	S	Old Gravel Pit	1924
52K	380	S	Old Gravel Pit	1924
53K	380	S	Old Sand Pit	1900
54K	380	S	Sand Pit	1881
55K	381	S	Old Gravel Pit	1924
56J	383	W	Old Marl Pit	1924
57AH	394	NE	Cuttings	1882
58L	400	SW	Unspecified Ground Workings	1954
59L	401	SW	Unspecified Ground Workings	1900
60L	401	SW	Unspecified Ground Workings	1881
61L	401	SW	Unspecified Ground Workings	1924
62L	409	SW	Unspecified Pit	1924
63M	422	SE	Old Gravel Pit	1950
64M	423	SE	Old Gravel Pit	1924
65M	424	SE	Old Gravel Pit	1938
66M	424	SE	Old Gravel Pit	1920
67M	425	SE	Refuse Heap	1881
68M	425	SE	Unspecified Pit	1970
69M	425	SE	Unspecified Pit	1981
70M	427	SE	Pump House	1924
71M	428	SE	Old Sand Pit	1899
72M	428	SE	Pump House	1938
73M	428	SE	Pump House	1920
74K	436	S	Old Gravel Pit	1954
75N	454	N	Garage	1987

76N	454	N	Garage	1978
77	464	NE	Unspecified Depot	1987

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 22

ID	Distance (m)	Direction	Use	Date
78O	0	On Site	Unspecified Tank	1996
79O	0	On Site	Unspecified Tank	1996
80O	0	On Site	Unspecified Tank	1996
81O	0	On Site	Unspecified Tank	1998
82O	0	On Site	Unspecified Tank	1994
83O	0	On Site	Unspecified Tank	1994
84O	0	On Site	Unspecified Tank	1998
85O	0	On Site	Unspecified Tank	1998
86A	0	On Site	Unspecified Tank	1967
87A	0	On Site	Unspecified Tank	1988
88A	0	On Site	Unspecified Tank	1967
89A	0	On Site	Unspecified Tank	1988
90O	0	On Site	Unspecified Tank	1967
91O	0	On Site	Unspecified Tank	1967
92O	0	On Site	Unspecified Tank	1967
93O	0	On Site	Unspecified Tank	1994
94E	133	W	Settling Tanks	1967
95G	186	W	Settling Tanks	1967
96F	191	W	Settling Tanks	1967
97	428	S	Unspecified Tank	1966
98P	477	N	Unspecified Tank	1988
99P	477	N	Unspecified Tank	1986

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 28

ID	Distance (m)	Direction	Use	Date

100Q	112	N	Electricity Substation	1990
101Q	112	N	Electricity Substation	1991
102Q	112	N	Electricity Substation	1990
103Q	119	N	Electricity Substation	1980
104R	125	N	Electricity Substation	1993
105R	125	N	Electricity Substation	1980
106R	126	N	Electricity Substation	1989
107R	126	N	Electricity Substation	1988
108R	126	N	Electricity Substation	1989
109R	126	N	Electricity Substation	1986
110S	131	N	Electricity Substation	1989
111S	131	N	Electricity Substation	1991
112S	131	N	Electricity Substation	1980
113F	221	W	Electricity Substation	1991
114F	222	W	Electricity Substation	1993
115T	343	N	Electricity Substation	1989
116T	343	N	Electricity Substation	1988
117T	343	N	Electricity Substation	1986
118T	343	N	Electricity Substation	1989
119T	343	N	Electricity Substation	1980
120T	343	N	Electricity Substation	1993
121U	412	W	Electricity Substation	1993
122U	414	W	Electricity Substation	1988
123U	414	W	Electricity Substation	1986
124U	414	W	Electricity Substation	1990
125U	414	W	Electricity Substation	1991
126U	414	W	Electricity Substation	1990
127U	416	W	Electricity Substation	1982

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 4

ID	Distance (m)	Direction	Use	Date
128N	447	N	Garage	1980
129N	447	N	Garage	1990
130N	447	N	Garage	1990
131N	449	N	Garage	1967

1.6 Historical military sites

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

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 132

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

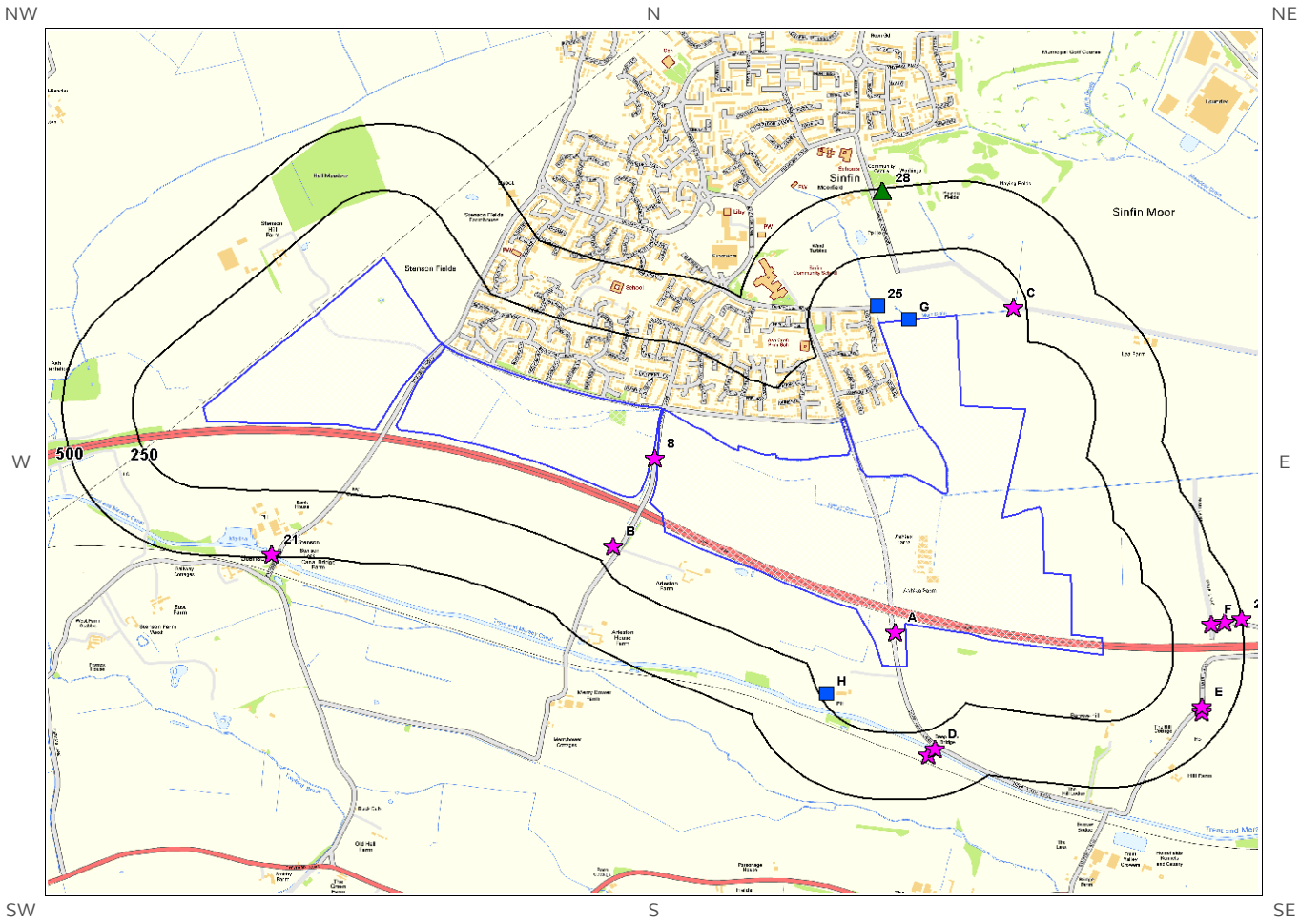
ID	Distance(m)	Direction	Use	Date
132B	3	SW	Unspecified Pit	1954
133E	6	W	Sewage Farm	1971
134Y	6	W	Ponds	1971
135B	7	SW	Unspecified Pit	1924
136B	7	SW	Unspecified Pit	1900
137B	7	SW	Ponds	1924
138V	10	NW	Cuttings	1881
139	12	S	Pond	1976
140	13	W	Water Body	1971
141C	49	S	Old Gravel Pit	1954
142C	55	S	Old Gravel Pit	1924
143C	55	S	Old Gravel Pit	1924
144D	56	S	Unspecified Ground Workings	1924
145D	56	S	Unspecified Ground Workings	1938
146D	56	S	Unspecified Ground Workings	1920
147D	56	S	Unspecified Ground Workings	1899
148D	57	S	Unspecified Pit	1970
149D	57	S	Unspecified Pit	1950

150D	57	S	Unspecified Pit	1981
151C	61	S	Unspecified Pit	1924
152C	103	S	Old Gravel Pit	1924
153C	103	S	Unspecified Pit	1881
154C	103	S	Unspecified Pit	1900
155W	108	W	Cuttings	1881
156X	113	SW	Pond	1954
157X	116	SW	Pond	1924
158X	116	SW	Pond	1900
159X	116	SW	Pond	1924
160X	116	SW	Pond	1881
161X	117	SW	Pond	1924
162G	126	W	Filter Beds	1954
163Y	127	W	Filter Beds	1954
164H	174	N	Unspecified Workings	1987
165G	181	W	Filter Beds	1954
166F	188	W	Unspecified Pits	1954
167F	195	W	Old Gravel Pit	1924
168F	195	W	Unspecified Pit	1924
169F	196	W	Old Gravel Pit	1924
170F	196	W	Unspecified Pits	1900
171G	198	W	Old Gravel Pit	1924
172H	199	N	Refuse Heap	1987
173Z	207	S	Canal	1976
174Z	207	S	Canal	1954
175AA	210	S	Canal	1924
176AA	210	S	Canal	1924
177AA	210	S	Canal	1900
178AA	210	S	Canal	1881
179AB	219	N	Refuse Heap	1983
180	236	S	Canal	1924
181AC	237	S	Canal	1938
182AC	237	S	Canal	1899
183AC	237	S	Canal	1881
184AC	237	S	Canal	1920
185AD	263	SW	Ponds	1954
186AD	264	SW	Ponds	1924
187AD	264	SW	Ponds	1900
188AD	264	SW	Ponds	1881
189AD	264	SW	Water Body	1924
190AD	269	SW	Pond	1924
191I	284	S	Unspecified Pit	1924
192I	284	S	Unspecified Pit	1900
193AE	286	S	Unspecified Pit	1954
194AF	320	S	Pond	1971
195AF	320	S	Pond	1987

196AF	320	S	Pond	1978
197H	322	N	Refuse Heap	1978
198	349	S	Pond	1954
199AG	354	NE	Pond	1924
200AG	362	NE	Pond	1938
201AG	363	NE	Pond	1924
202AG	363	NE	Pond	1899
203AG	363	NE	Pond	1987
204AG	363	NE	Pond	1954
205AG	363	NE	Pond	1971
206AG	363	NE	Pond	1978
207AG	364	NE	Pond	1913
208AG	365	NE	Pond	1882
209J	371	W	Old Marl Pit	1924
210J	371	W	Old Marl Pit	1924
211J	371	W	Unspecified Pit	1881
212J	371	W	Unspecified Pit	1900
213J	376	W	Old Marl Pit	1954
214J	376	W	Unspecified Pit	1978
215J	376	W	Unspecified Pit	1987
216J	376	W	Unspecified Pit	1971
217K	380	S	Unspecified Pit	1954
218K	380	S	Old Gravel Pit	1924
219K	380	S	Old Gravel Pit	1924
220K	380	S	Old Sand Pit	1900
221K	380	S	Sand Pit	1881
222K	381	S	Old Gravel Pit	1924
223J	383	W	Old Marl Pit	1924
224AH	394	NE	Cuttings	1882
225L	400	SW	Unspecified Ground Workings	1954
226AI	400	NW	Pond	1924
227AI	400	NW	Pond	1881
228AI	400	NW	Pond	1924
229AI	400	NW	Pond	1900
230L	401	SW	Unspecified Ground Workings	1924
231L	401	SW	Unspecified Ground Workings	1881
232L	401	SW	Unspecified Ground Workings	1900
233AI	402	NW	Pond	1954
234	403	SE	Canal	1950
235AJ	403	SE	Canal	1981
236AJ	403	SE	Canal	1970
237AI	405	NW	Pond	1924
238L	409	SW	Unspecified Pit	1924

239M	422	SE	Old Gravel Pit	1950
240M	423	SE	Old Gravel Pit	1924
241M	424	SE	Old Gravel Pit	1938
242M	424	SE	Old Gravel Pit	1920
243M	425	SE	Refuse Heap	1881
244M	425	SE	Unspecified Pit	1970
245M	425	SE	Unspecified Pit	1981
246M	428	SE	Old Sand Pit	1899
247K	436	S	Old Gravel Pit	1954
248AK	444	S	Canal	1987
249AK	444	S	Canal	1971
250AK	444	S	Canal	1954
251AK	444	S	Canal	1978
252AL	475	SW	Ponds	1924
253AL	475	SW	Ponds	1924
254AL	475	SW	Ponds	1900
255AL	475	SW	Ponds	1881
256AI	487	NW	Pond	1954
257AM	487	NW	Pond	1881
258AM	487	NW	Pond	1900
259AM	488	NW	Pond	1924
260AM	492	NW	Pond	1924
261AN	496	SW	Pond	1924
262AN	496	SW	Pond	1924
263AN	496	SW	Pond	1900

2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- 250 / 500 Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
28	484	N	434719 331325	Address: Woodbine Garage Limited, Sinfin Lane, Sinfin, Derby, DE24 9HW Process: Waste Oil Burner <0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

5

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
23G	3	N	434810 330850	Address: SINFIN MOOR SPS - EMEG & SWS, SINFIN MOOR, DERBY Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: T/36/08920/O Permit Version: 1	Receiving Water: SINFIN BROOK Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 19/11/1982 Effective Date: 19-Nov-1982 Revocation Date: 28/03/2011
24G	3	N	434810 330850	Address: SINFIN MOOR SPS - EMEG & SWS, SINFIN MOOR, DERBY Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: T/36/08920/O Permit Version: 2	Receiving Water: SINFIN BROOK Status: VARIED UNDER EPR 2010 Issue date: 29/03/2011 Effective Date: 29-Mar-2011 Revocation Date: -
25	65	N	434700 330900	Address: SINFIN MOOR HOUSING DEVEL - SWS, SINFIN MOOR, DERBY Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: T/36/02801/O Permit Version: 1	Receiving Water: RIVER TRENT (NON TIDAL TRIB) Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 06/10/1970 Effective Date: 06-Oct-1970 Revocation Date: 02/04/2000
26H	226	SW	434520 329450	Address: RAGLEY BOAT STOP, SUNFIN LANE, BARROW UPON TRENT, DERBYSHIRE, DERBYSHIRE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: T/36/40101/SG Permit Version: 1	Receiving Water: LAND (SOAKAWAY) Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 17/02/1995 Effective Date: 17-Feb-1995 Revocation Date: 01/04/2012

ID	Distance (m)	Direction	NGR	Details	
27H	226	SW	434520 329450	Address: RAGLEY BOAT STOP, SUNFIN LANE, BARROW UPON TRENT, DERBYSHIRE, DERBYSHIRE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: T/36/40101/SG Permit Version: 2	Receiving Water: LAND (SOAKAWAY) Status: VARIED UNDER EPR 2010 Issue date: 02/04/2012 Effective Date: 02-Apr-2012 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

22

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: Specific Waste Materials Pollutant Description: Vehicles and Vehicle Parts	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: Specific Waste Materials	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
				Pollutant Description: Household Waste	
3A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: Inert Materials and Wastes:General Biodegradable Materials and Wastes:General Biodegradable Materials and Wastes:Specific Waste Materials:Specific Waste Materials:Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes:Vegetable Cuttings and Deposits:Other General Biodegradable Material or Waste:Commercial Waste:Household Waste:Vehicles and Vehicle Parts	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
4A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
5A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
6A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Vegetable Cuttings and Deposits	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7A	0	On Site	434760.0 329678.0	Incident Date: 01-Nov-2002 Incident Identification: 118238.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
8	9	E	433910.0 330330.0	Incident Date: 18-Dec-2002 Incident Identification: 126678.0 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
9B	192	S	433760.0 330000.0	Incident Date: 27-Jul-2002 Incident Identification: 94857.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
10B	192	S	433760.0 330000.0	Incident Date: 27-Jul-2002 Incident Identification: 94857.0 Pollutant: Inert Materials and Wastes Pollutant Description: Other Inert Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
11B	192	S	433760.0 330000.0	Incident Date: 27-Jul-2002 Incident Identification: 94857.0 Pollutant: Inert Materials and Wastes:General Biodegradable Materials and Wastes Pollutant Description: Other Inert Material or Waste:Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
12C	202	E	435182.0	Incident Date: 01-Oct-2002	Water Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
			330894.0	Incident Identification: 111692.0 Pollutant: Specific Waste Materials Pollutant Description: Other Non-Metal Wastes	Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
13C	202	E	435182.0 330894.0	Incident Date: 01-Oct-2002 Incident Identification: 111692.0 Pollutant: Specific Waste Materials:Specific Waste Materials Pollutant Description: Asbestos:Other Non-Metal Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
14C	202	E	435182.0 330894.0	Incident Date: 01-Oct-2002 Incident Identification: 111692.0 Pollutant: Specific Waste Materials Pollutant Description: Asbestos	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
15D	323	S	434902.0 329243.0	Incident Date: 19-Mar-2002 Incident Identification: 65106.0 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
16D	340	S	434880.0 329220.0	Incident Date: 20-Mar-2002 Incident Identification: 65422.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
17F	387	E	435882.0 329711.0	Incident Date: 01-Oct-2001 Incident Identification: 34205.0 Pollutant: Inert Materials and Wastes Pollutant Description: Other Inert Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
18E	399	SE	435848.0 329399.0	Incident Date: 27-Feb-2003 Incident Identification: 139756.0 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
19E	410	SE	435850.0 329380.0	Incident Date: 01-Nov-2001 Incident Identification: 40444.0 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
20F	435	E	435930.0 329715.0	Incident Date: 08-Jul-2002 Incident Identification: 90025.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
21	490	S	432550.0 329970.0	Incident Date: 02-Oct-2002 Incident Identification: 112165.0 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
22	497	E	435990.0 329730.0	Incident Date: 12-Apr-2002 Incident Identification: 78675.0 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

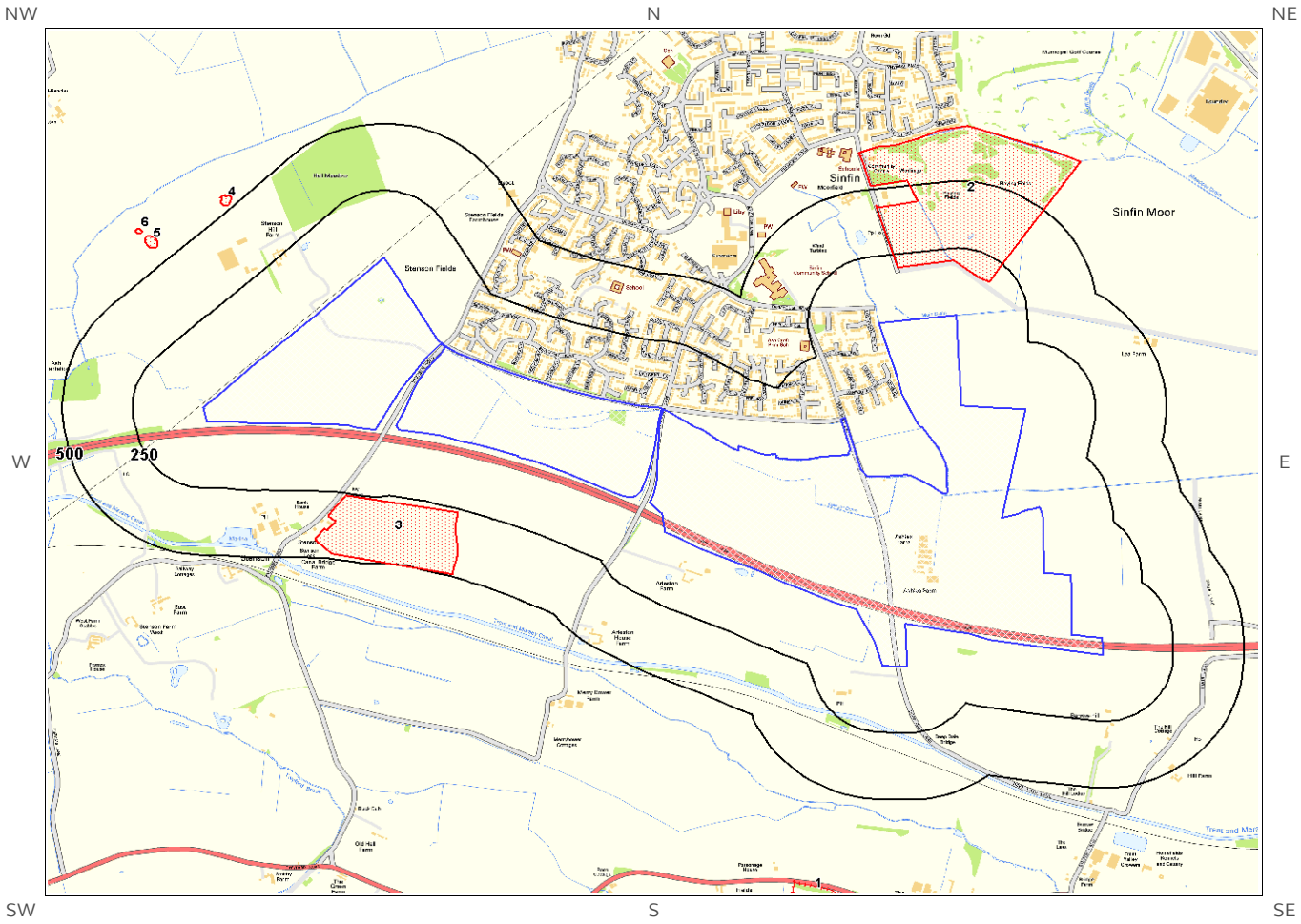
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site 0

Database searched and no data found.

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3. Landfill and Other Waste Sites Map



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Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

1

The following Environment Agency/Natural Resources Wales landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
1	859	S	434739 328628	Address: Swarkestone Quarry, Twyford Road, Barrow On Trent, Derby, Derbyshire, DE73 1HA Landfill Reference: 43247.0 Environmental Permitting Regulations (Waste) Reference: LAF001 Landfill Type: A06: Landfill taking other wastes	Operator: Tarmac Aggregates Limited Status: To PPC IPPC Reference: EPR Reference:

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

9

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

ID	Distance (m)	Direction	NGR	Details	
2	161	NE		Site Address: Sinfin Moor Park, Sinfin Lane, Derby Waste Licence: Yes Site Reference: LD20 Waste Type: Inert, Industrial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 14-Jul-1977 Licence Surrendered: 02-Apr-1982 Licence Holder Address: Castlefields House, Main Centre, Derby Operator: Chief Parks Officer, Derby City Council Licence Holder: Chief Parks Officer, Derby City Council First Recorded: 30-Nov-1972 Last Recorded: 31-Mar-1982
3	257	S		Site Address: Stenson Road, Stenson, Derbyshire Waste Licence: Yes Site Reference: LS21, LD12, 354, 168 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 20-Jul-1977 Licence Surrendered: 23-Dec-1986 Licence Holder Address: 22 Bridge Street, Derby Operator: W M Ealkerdine Limted Licence Holder: W M Walkerdene Limited First Recorded: 31-Dec-1976 Last Recorded: 31-Dec-1985

ID	Distance (m)	Direction	NGR	Details	
4	514	NW		Site Address: Stenson Fields Farm, Stenson Fields, Derby Road, Stenson, Barrow-on-Trent, Derbyshire Waste Licence: Yes Site Reference: LT18, 320 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Aug-1989 Licence Surrendered: 31-Jan-1990 Licence Holder Address: Stenson Fields Farm, Stenson Fields, Derby Operator: Mr M S Atwall Licence Holder: Mr M S Atwall First Recorded: 31-Aug-1989 Last Recorded: 31-Dec-1989
5	561	NW		Site Address: Stenson Fields Farm, Stenson Fields, Derby Road, Stenson, Barrow-on-Trent, Derbyshire Waste Licence: Yes Site Reference: LT18, 320 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Aug-1989 Licence Surrendered: 31-Jan-1990 Licence Holder Address: Stenson Fields Farm, Stenson Fields, Derby Operator: Mr M S Atwall Licence Holder: Mr M S Atwall First Recorded: 31-Aug-1989 Last Recorded: 31-Dec-1989
6	637	NW		Site Address: Stenson Fields Farm, Stenson Fields, Derby Road, Stenson, Barrow-on-Trent, Derbyshire Waste Licence: Yes Site Reference: LT18, 320 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Aug-1989 Licence Surrendered: 31-Jan-1990 Licence Holder Address: Stenson Fields Farm, Stenson Fields, Derby Operator: Mr M S Atwall Licence Holder: Mr M S Atwall First Recorded: 31-Aug-1989 Last Recorded: 31-Dec-1989
Not shown	1259	S		Site Address: Manor Farm, Barrow Upon Trent, Derbyshire Waste Licence: Yes Site Reference: LB72, 37, 251 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 12-Nov-1990 Licence Surrendered: 22-Apr-1994 Licence Holder Address: Waste Diposal Division, The Old Rectory, Misterton, Lutterworth, Leicestershire Operator: - Licence Holder: Steetley Quarry Products First Recorded: 13-Jun-1991 Last Recorded: 31-Mar-1994
Not shown	1301	S		Site Address: National Power PLC, Derby Quarry, Ingleby Lane, Swarkestone Waste Licence: Yes Site Reference: LS31 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: BC3/L/NAT001	Licence Issue: 17-Nov-1977 Licence Surrendered: 17-Oct-2001 Licence Holder Address: Willington Power Station, PO Box 27, Derby Operator: - Licence Holder: National Power Plc First Recorded: - Last Recorded: -
Not shown	1411	NW		Site Address: Sunnyhill: Former Qualcast site, Sunnyhill, Derby Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: Sunnyhill, Derby Operator: Sunnyhill: Former Qualcast site Licence Holder: Sunnyhill: Formaer Qualcast site First Recorded: - Last Recorded: 01-Jan-1991
Not shown	1486	SW		Site Address: Potlocks Farm, Potlocks Farm, Findern, Derbyshire Waste Licence: Yes Site Reference: LF/02 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 17-Nov-1977 Licence Surrendered: 23-Feb-1982 Licence Holder Address: Great Northern Road, Derby Operator: J H Fryer Limited Licence Holder: J H Fryer Limited First Recorded: 31-Dec-1950 Last Recorded: 31-Jan-1981

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

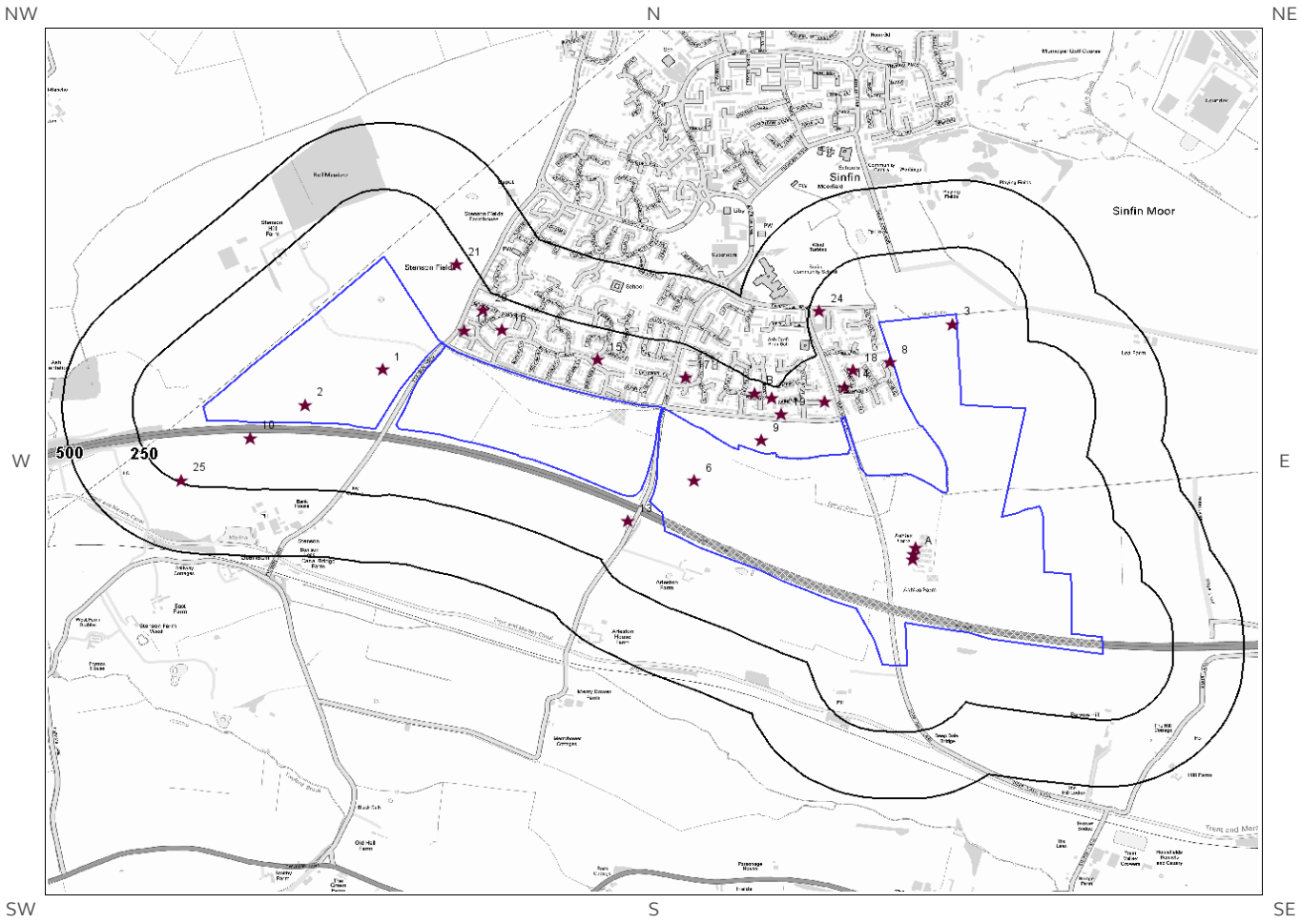
4

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	925	S	434739 328628	Site Address: Swarkestone Quarry, Twyford Road, Barrow On Trent, Derby, Derbyshire, DE73 1HA Type: Landfill taking other wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF001 EPR reference: EA/EPR/XP3793CF/V002 Operator: Lafarge Aggregates Ltd Waste Management licence No: 43247 Annual Tonnage: 100000.0	Issue Date: 24/08/1998 Effective Date: - Modified: 04/05/2000 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Swarkestone Landfill Correspondence Address: -
Not shown	925	S	434739 328628	Site Address: Swarkestone Quarry, Twyford Road, Barrow On Trent, Derby, Derbyshire, DE73 1HA Type: Landfill taking other wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF001 EPR reference: EA/EPR/XP3793CF/V003 Operator: Tarmac Aggregates Limited Waste Management licence No: 43247 Annual Tonnage: 100000.0	Issue Date: 24/08/1998 Effective Date: - Modified: 08/01/2016 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: To PPC Site Name: Swarkestone Landfill Correspondence Address: -
Not	925	S	434739	Site Address: Swarkestone Quarry,	Issue Date: 8/24/1998

ID	Distance (m)	Direction	NGR	Details	
shown			328628	Twyford Road, Barrow On Trent, Derby, Derbyshire, DE73 1HA Type: Landfill taking other wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF001 EPR reference: - Operator: Lafarge Aggregates Limited Waste Management licence No: 43247 Annual Tonnage: 100000.0	Effective Date: - Modified: 5/4/2000 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Swarkestone Landfill Correspondence Address: P O Box 7388, Syston, Leicester, Leicestershire, LE7 1WA
Not shown	926	S	434739 328627	Site Address: Twyford Road, Barrow On Trent, Derby, Derbyshire, DE7 1JB Type: Landfill taking other wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF001 EPR reference: - Operator: Lafarge Redland Aggregates Ltd Waste Management licence No: 43247 Annual Tonnage: 0.0	Issue Date: 24/08/1998 Effective Date: - Modified: 04/05/2000 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Swarkestone Landfill Correspondence Address: Six Hills, Melton Mowbray, Leicestershire, LE14 3PD

4. Current Land Use Map



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Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 25

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Pylon	432944 330660	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
2	0	On Site	Pylon	432672 330527	Derbyshire, DE73	Electrical Features	Infrastructure and Facilities
3	0	On Site	Pylon	434967 330830	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
4A	0	On Site	Tank	434827 329970	Derbyshire, DE73	Tanks (Generic)	Industrial Features
5A	0	On Site	Tank	434826 329949	Derbyshire, DE73	Tanks (Generic)	Industrial Features
6	0	On Site	Pylon	434051 330243	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
7A	0	On Site	Tank	434834 329993	Derbyshire, DE73	Tanks (Generic)	Industrial Features
8	11	W	Pylon	434743 330686	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
9	45	N	Pylon	434288 330395	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
10	56	S	Pylon	432477 330403	Derbyshire, DE73	Electrical Features	Infrastructure and Facilities
11	80	NE	Pylon	433234 330804	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
12	85	NW	Pylon	434514 330539	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
13	91	S	Pylon	433815 330092	Derbyshire, DE73	Electrical Features	Infrastructure and Facilities
14	113	N	Electricity Sub Station	434584 330595	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
15	134	N	Electricity Sub Station	433708 330696	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
16	139	N	Electricity Sub Station	433367 330808	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
17	140	NE	Electricity Sub Station	434020 330630	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
18	144	W	Auto1car Care Products Ltd	434613 330656	10, Sunart Close, Sinfin, Derby, Derbyshire, DE24 3HQ	Cleaning Equipment and Supplies	Industrial Products
19	149	N	Dental Devices UK Ltd	434360 330492	126, Wragley Way, Stenson Fields, Derby, Derbyshire, DE24 3DZ	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
20	181	NE	The Unlimited Company	433303 330881	7, Bicester Avenue, Stenson Fields, Derby, Derbyshire, DE24 3AX	Disability and Mobility Equipment	Consumer Products
21	202	NE	Electricity Sub Station	433207 331052	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
22B	203	N	Electricity Sub Station	434263 330571	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
23B	207	N	Hitchcock Colour Suppliers	434324 330554	16, Dunbar Close, Sinfin, Derby, Derbyshire, DE24 3ED	Colours, Chemicals and Water Softeners and Supplies	Industrial Products
24	217	W	Electricity Sub Station	434492 330878	Derbyshire, DE24	Electrical Features	Infrastructure and Facilities
25	240	SW	Pylon	432231 330246	Derbyshire, DE73	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

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

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
LDE-XCZ	LACUSTRINE DEPOSITS	CLAY AND SILT
HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
LDE1-XCZS	LACUSTRINE DEPOSITS, 1	CLAY, SILT AND SAND
ODT-DMTN	OADBY MEMBER	DIAMICTON
LDE-XCZ	LACUSTRINE DEPOSITS	CLAY AND SILT
BSSG-XSV	BEESTON SAND AND GRAVEL MEMBER	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

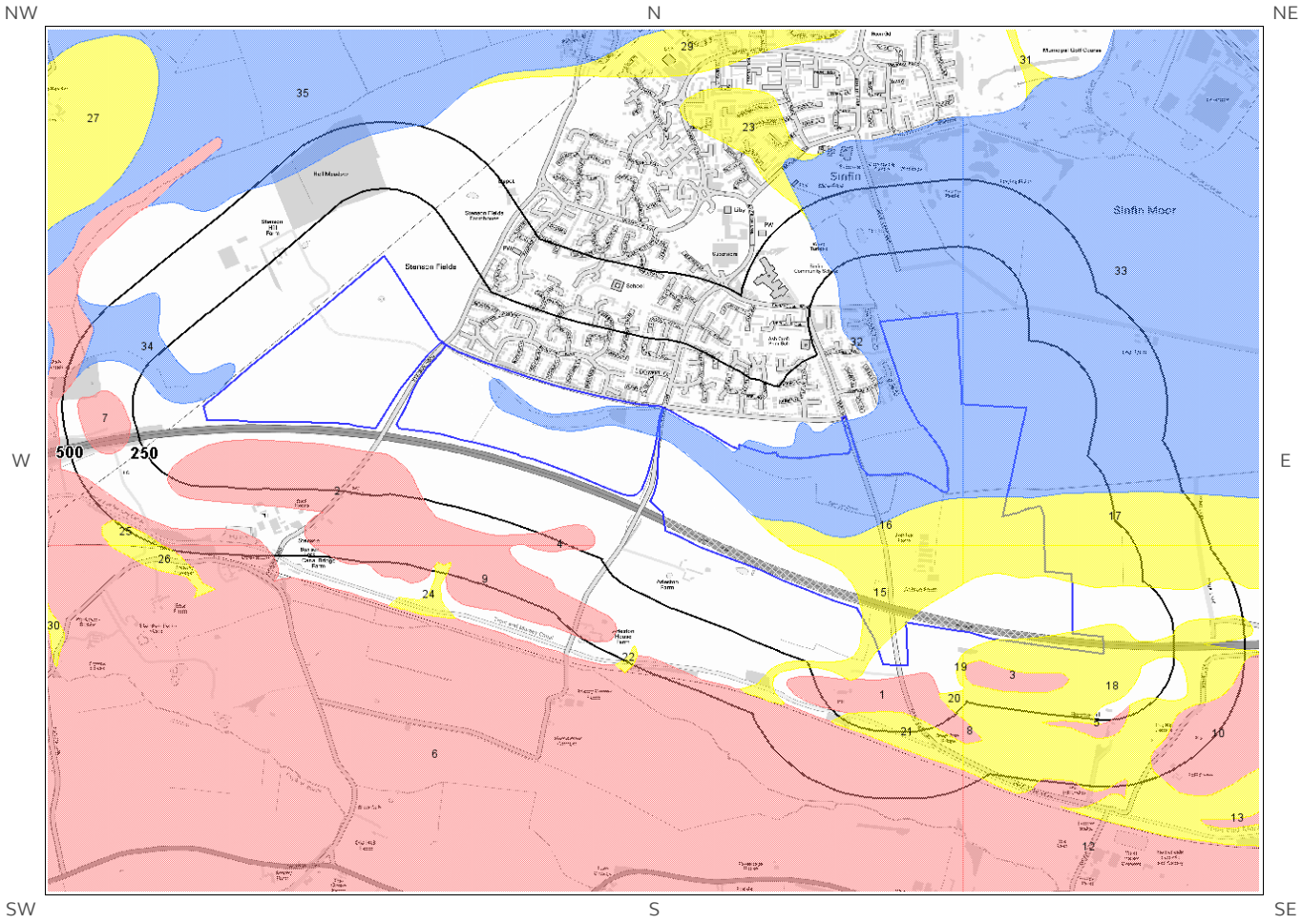
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GUN-MDST	GUNTHORPE MEMBER	MUDSTONE
BCMU-MDST	BRANSCOMBE MUDSTONE FORMATION	MUDSTONE
EDW-MDST	EDWALTON MEMBER	MUDSTONE
COT-SDST	COTGRAVE SANDSTONE MEMBER	SANDSTONE

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

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

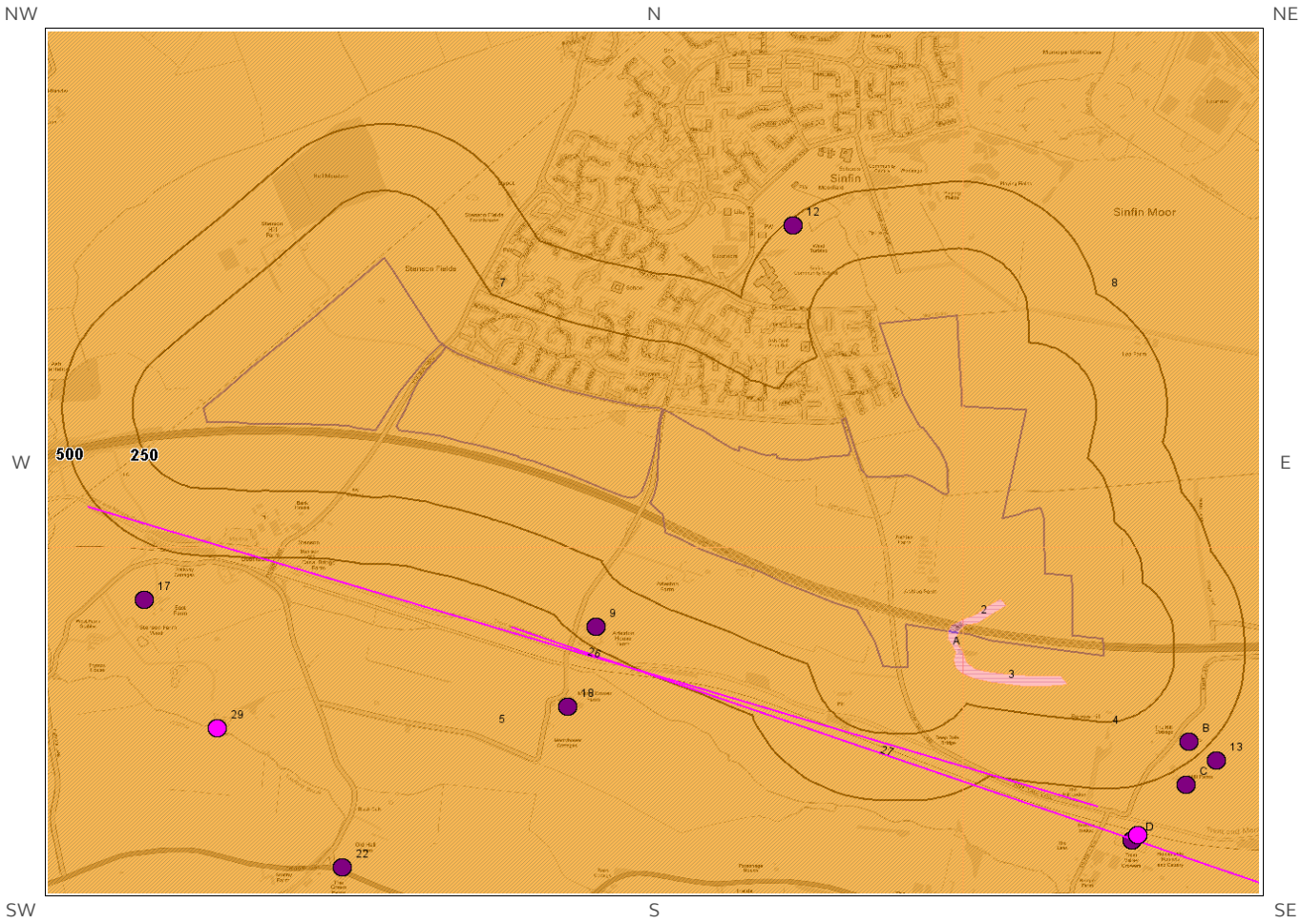
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licences



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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

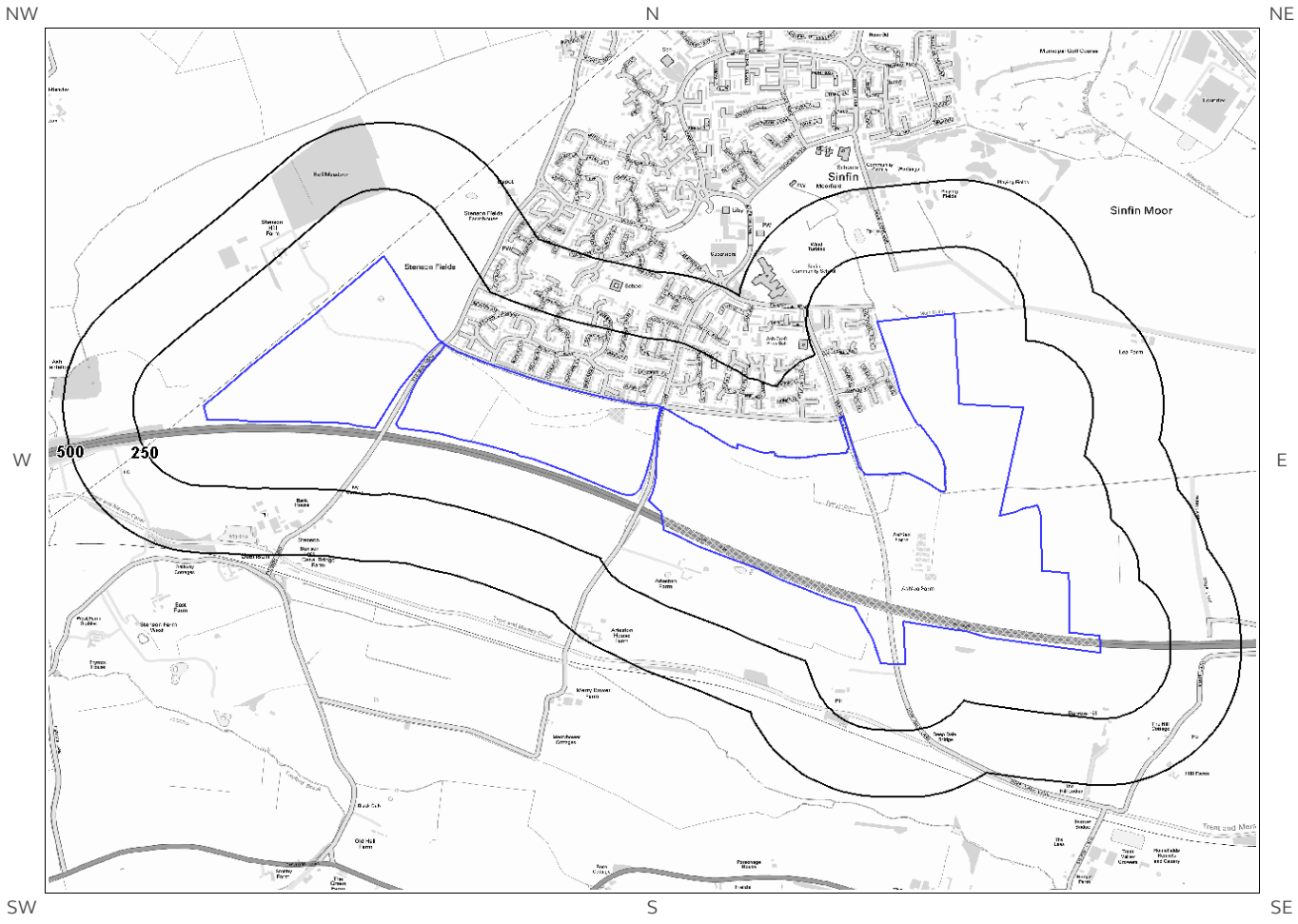
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

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



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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

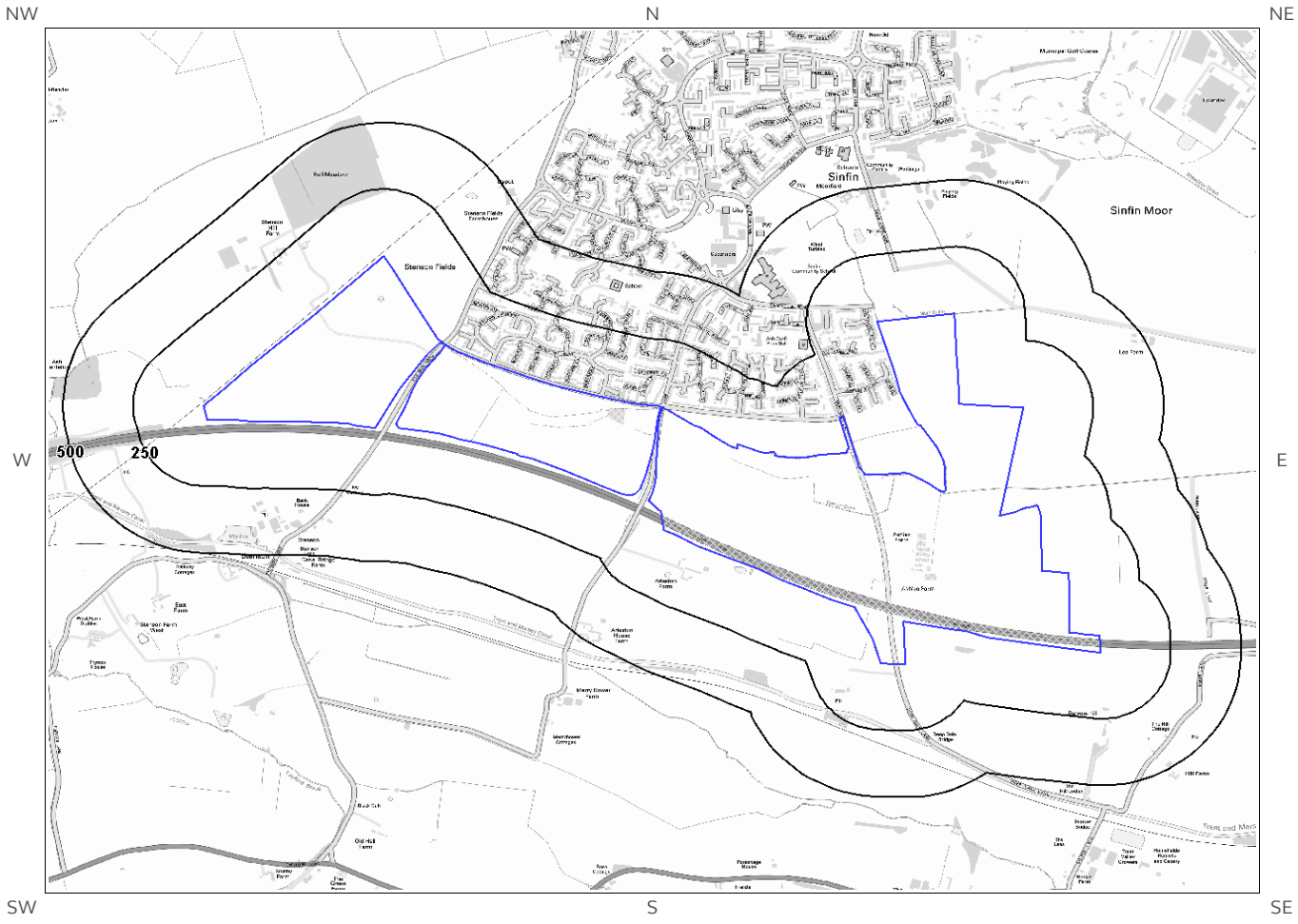
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

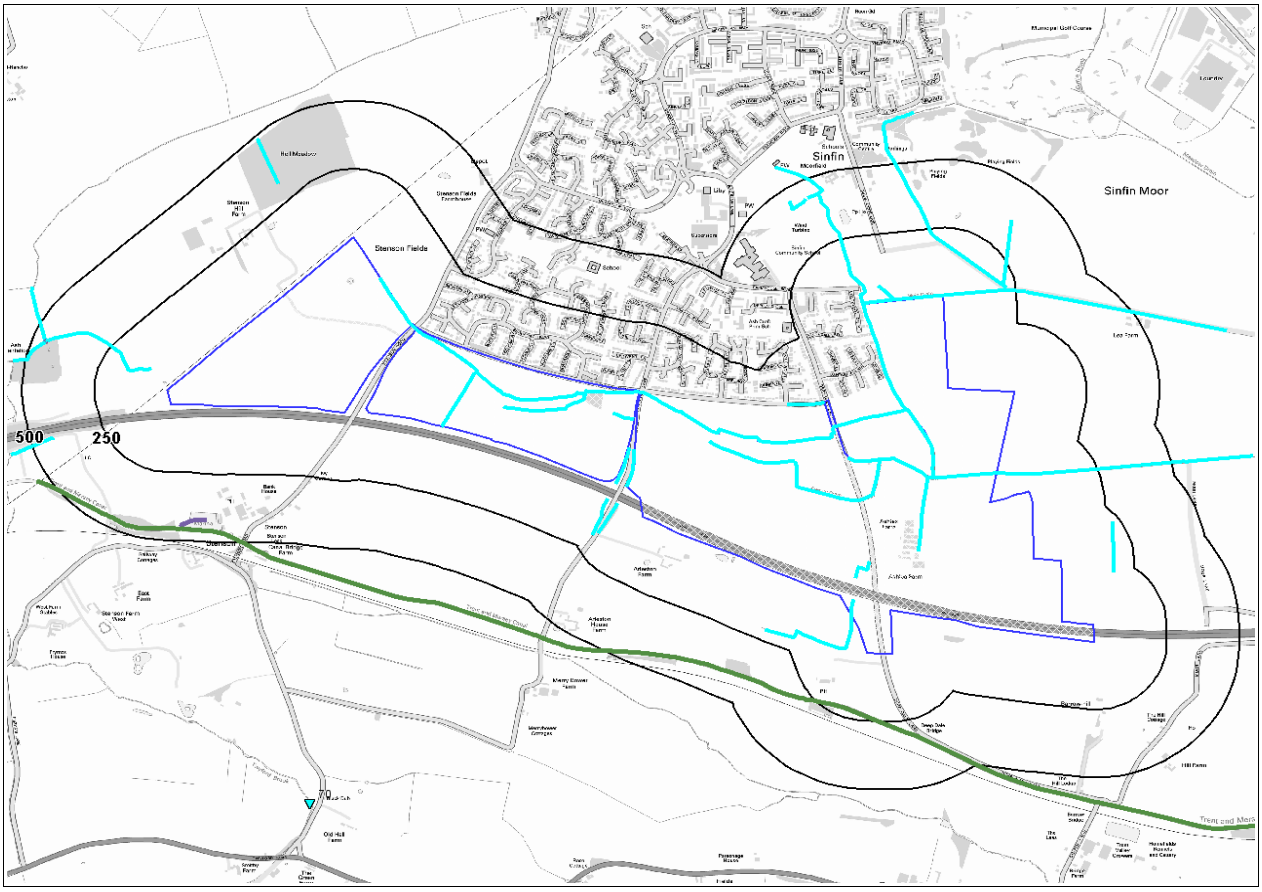
Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

NW N NE



W E

SW S SE

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Site Outline

250
500
Search Buffers (m)

Watercourse type

- Tidal River
- Inland River
- Canal
- Lock or Flight of Locks
- Lake, Reservoir, or Marsh
- Foreshore
- Drain or Transfer

Watercourse level

- On ground surface
- Underground or Elevated
- Level unknown

General Quality Assessment: Biology

General Quality Assessment: Chemistry

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
15	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
16	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
17	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
18	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
32	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
33	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
34	8	NW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	37	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	63	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
19	85	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
3	89	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
20	153	SE	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
21	174	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	214	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	215	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than

ID	Distance (m)	Direction	Designation	Description
				strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	266	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	268	W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
8	279	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
9	324	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
10	346	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
11	403	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
35	426	NW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
22	434	SW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
12	436	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
23	440	NW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
24	453	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
25	478	SW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
26	493	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1A	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

ID	Distance (m)	Direction	Designation	Description
				These are generally aquifers formerly classified as minor aquifers
2	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
5	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
6A	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
7	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
8	0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
3	65	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site — Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
9	432	SW	433700 329700	Status: Historical Licence No: 03/28/36/0099 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: ARLESTON HOUSE FARM - WELL Data Type: Point Name: SANDERS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
10B	442	SE	435800 329270	Status: Historical Licence No: 03/28/36/0175 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwater Midlands Region Point: HILL FARM, BURTON ON TRENT - WELL B Data Type: Point Name: COTTON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/07/1997 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
11B	442	SE	435800 329270	Status: Historical Licence No: 03/28/36/0175 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: HILL FARM, BURTON ON TRENT - WELL B Data Type: Point Name: COTTON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/07/1997 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
12	475	NW	434400 331200	Status: Historical Licence No: 03/28/36/0086 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: SINFIN HOUSE FARM - WELL Data Type: Point Name: SMITH	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
13	562	SE	435900 329200	Status: Historical Licence No: 03/28/36/0011 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: HILL FARM - BOREHOLE Data Type: Point Name: GOODWIN	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 29/10/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
14C	565	SE	435790 329110	Status: Historical Licence No: 03/28/36/0175 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: HILL FARM, BURTON ON TRENT - WELL A Data Type: Point Name: COTTON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/07/1997 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
15C	565	SE	435790 329110	Status: Historical Licence No: 03/28/36/0175 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwater Midlands Region Point: HILL FARM, BURTON ON TRENT - WELL A Data Type: Point Name: COTTON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/07/1997 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
16D	702	S	435600 328900	Status: Historical Licence No: 03/28/36/0166 Details: Spray Irrigation - Direct Direct Source: Groundwater Midlands Region Point: BARROW-UPON-TRENT & SWARKESTONE - LAGOON Data Type: Point Name: BARROW GROWERS LTD	Annual Volume (m^3): 16000 Max Daily Volume (m^3): 400 Original Application No: - Original Start Date: 21/01/1994 Expiry Date: - Issue No: 102 Version Start Date: 01/04/2000 Version End Date:
17	703	S	432100 329800	Status: Historical Licence No: 03/28/36/0104 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: EAST FARM, STENSON - WELL Data Type: Point Name: COTTON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
18	741	SW	433600 329400	Status: Historical Licence No: 03/28/36/0109 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: MERRYBOWER FARM - WELLS Data Type: Point Name: RADFORD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
Not shown	1157	NW	432400 332100	Status: Historical Licence No: 03/28/36/0018 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: HALL PASTURES FARM - WELL Data Type: Point Name: PARNELL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 29/10/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1260	S	434350 328350	Status: Active Licence No: 03/28/36/0172 Details: Mineral Washing Direct Source: Groundwater Midlands Region Point: SWARKESTONE QUARRY - CATCHPIT Data Type: Point Name: Tarmac Aggregates Limited	Annual Volume (m^3): 1e+006 Max Daily Volume (m^3): 6000 Original Application No: - Original Start Date: 22/08/1996 Expiry Date: - Issue No: 106 Version Start Date: 26/10/2015 Version End Date:
Not shown	1467	S	433600 328600	Status: Historical Licence No: 03/28/36/0112 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: POPLARS FARM - WELL Data Type: Point Name: WOODWARD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
22	1640	S	432800 328800	Status: Historical Licence No: 03/28/36/0098 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: GREEN FARM - WELL Data Type: Point Name: MEAKIN	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
Not shown	1930	SE	436630 328030	Status: Active Licence No: 03/28/36/0155 Details: Mineral Washing Direct Source: Groundwater Midlands Region Point: SWARKESTONE QUARRY - POOL Data Type: Point Name: Tarmac Aggregates Limited	Annual Volume (m^3): 1e+006 Max Daily Volume (m^3): 8000 Original Application No: - Original Start Date: 10/02/1988 Expiry Date: - Issue No: 106 Version Start Date: 26/10/2015 Version End Date:
Not shown	1959	S	432600 328500	Status: Historical Licence No: 03/28/36/0110 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: GRANGE FARM - WELL Data Type: Point Name: J W AND C N COX	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:
Not shown	1969	SE	437200 328600	Status: Historical Licence No: 03/28/36/0113 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: TRENT SIDE FARM - WELL Data Type: Point Name: SMITH	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — Identified

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
26	274	S	431900 330150	Status: Historical Licence No: 03/28/36/0177	Annual Volume (m^3): - Max Daily Volume (m^3): -

ID	Distance (m)	Direction	NGR	Details	
				Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TRENT & MERSEY CNL - STENSON FIELDS FRM & ARLASTON LANE FRM Data Type: Line Name: BRITISH WATERWAYS BOARD	Application No: - Original Start Date: 27/04/2000 Expiry Date: - Issue No: 1 Version Start Date: 27/04/2000 Version End Date:
27	310	S	433400 329700	Status: Historical Licence No: 03/28/36/0159 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: ARLESTON HOUSE - TRENT & MERSEY CANAL Data Type: Line Name: BRITISH WATERWAYS BOARD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 31/01/1991 Expiry Date: - Issue No: 100 Version Start Date: 17/08/1998 Version End Date:
28D	686	S	435620 328920	Status: Historical Licence No: 03/28/36/0159 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: ARLESTON HOUSE - TRENT & MERSEY CANAL - 3 Data Type: Point Name: BRITISH WATERWAYS BOARD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 31/01/1991 Expiry Date: - Issue No: 100 Version Start Date: 17/08/1998 Version End Date:
29	1146	S	432360 329320	Status: Historical Licence No: 03/28/36/0185 Details: Fish Farm/Cress Pond Throughflow Direct Source: Surface Water Midlands Region Point: TWYFORD PISTOL CLUB - TWYFORD BROOK Data Type: Point Name: THE TRUSTEES OF THE DERBY RIFLE AND PISTOL CLUB	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 11/11/2003 Expiry Date: 31/03/2015 Issue No: 1 Version Start Date: 11/11/2003 Version End Date:
Not shown	1735	SE	436730 328370	Status: Active Licence No: 03/28/36/0145 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: SWARKESTONE - RIVER TRENT Data Type: Point Name: SAMUEL JACKSON GROWERS LTD	Annual Volume (m^3): 30000 Max Daily Volume (m^3): 4640 Application No: - Original Start Date: 01/05/1985 Expiry Date: - Issue No: 106 Version Start Date: 15/09/2016 Version End Date:
Not shown	1757	SW	433855 328025	Status: Active Licence No: MD/028/0036/005 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT D Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650 Application No: - Original Start Date: 03/10/2014 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 03/10/2014 Version End Date:
Not shown	1760	SW	433767 328075	Status: Active Licence No: MD/028/0036/005 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT C Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650 Application No: - Original Start Date: 03/10/2014 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 03/10/2014 Version End Date:
Not shown	1762	SW	433770 328070	Status: Historical Licence No: 03/28/36/0188 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT C Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650 Application No: - Original Start Date: 01/11/2005 Expiry Date: - Issue No: 3 Version Start Date: 26/06/2010 Version End Date:
Not shown	1764	SW	433850 328020	Status: Historical Licence No: 03/28/36/0188	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650

ID	Distance (m)	Direction	NGR	Details	
				Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT D Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Application No: - Original Start Date: 01/11/2005 Expiry Date: - Issue No: 3 Version Start Date: 26/06/2010 Version End Date:
Not shown	1822	SE	435720 327430	Status: Active Licence No: 03/28/36/0154 Details: Transfer Between Sources (Pre Water Act 2003) Direct Source: Surface Water Midlands Region Point: SWARKESTONE QUARRY - R. TRENT TRANSFER Data Type: Line Name: Tarmac Aggregates Limited	Annual Volume (m^3): 250000 Max Daily Volume (m^3): 8000 Application No: - Original Start Date: 10/02/1988 Expiry Date: - Issue No: 106 Version Start Date: 26/10/2015 Version End Date:
Not shown	1952	SW	433482 328045	Status: Active Licence No: MD/028/0036/005 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT B Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650 Application No: - Original Start Date: 03/10/2014 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 03/10/2014 Version End Date:
Not shown	1957	SW	433480 328040	Status: Historical Licence No: 03/28/36/0188 Details: Spray Irrigation - Direct Direct Source: Surface Water Midlands Region Point: TWYFORD - RIVER TRENT B Data Type: Point Name: EUROFINS AGROSCIENCE SERVICES LTD	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 1650 Application No: - Original Start Date: 01/11/2005 Expiry Date: - Issue No: 3 Version Start Date: 26/06/2010 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

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

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

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

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
0	On Site	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
0	On Site	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
37	S	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
40	S	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
103	NW	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
144	SW	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
182	N	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
319	S	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
461	S	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.

6.9 River Quality

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

6.9.1 Biological Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
70	1440	S	432800 329000	River Name: Twyford Brook Reach: Conf Trib From Barrow To Conf R.trent End/Start of Stretch: Start of Stretch NGR	B	B	A	A	A

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
Not shown	1400	E	436606 330746	River Name: Cuttle Bk Reach: Moor Lane Bridge To Conf R Trent End/Start of Stretch: Sample Point NGR	C	B	B	B	B
Not shown	1486	E	436700 330700	River Name: Cuttle Bk Reach: Moor Lane Bridge To Conf R Trent End/Start of Stretch: Start of Stretch NGR	C	B	B	B	B
Not shown	1486	E	436700 330700	River Name: Cuttle Bk Reach: Us Of Reckitts To Moor Lane Bridge End/Start of Stretch: End of Stretch NGR	C	B	B	B	B

6.10 Ordnance Survey MasterMap Water Network

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

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

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

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.0
4	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
5	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
8	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
9	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.1

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
10	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
11	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
12	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
13	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
14	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
15	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4
16	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
17	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
18	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
19	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
20	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
21	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
22	0	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	On Site			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
23	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
24	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
25	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
26	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
27	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.1
28	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
29	0 On Site	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 6.6
30	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
31	0 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
53	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
54	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
55	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): 1.0
56	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
57	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
58	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
59	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
60	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
61	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.1
62	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
63	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
64	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
65	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
66	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
67	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
68	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
69	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
70	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
71	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
72	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
73	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
74	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
75	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
76	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
77	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
78	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
79	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.1
80	0	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	On Site			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
81	0 On Site	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 6.6
82	0 On Site	Barrow Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
83	0 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
32	2 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.0
84	2 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.0
33	3 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
34	3 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
35	3 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
36	3 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
85	3 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
86	3 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
87	3 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): 2.2
88	3 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
37	4 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.6
89	4 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.6
38	49 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4
90	49 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4
39	52 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
91	52 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
40	65 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
92	65 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
41	67 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
42	67 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
93	67 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
94	67 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
43	71 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
95	71 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
44	96 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
96	96 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
45	156 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
97	156 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
46	178 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
98	178 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
47	207 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
48	207 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
99	207 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
100	207	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	E			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
49	216 S	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.1
101	216 S	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.1
50	279 E	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
102	279 E	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
51	283 E	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
103	283 E	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
52	318 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
104	318 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
53	419 S	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
105	419 S	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
54	421 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	421 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): Not Provided
55	423 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
107	423 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.5
56	430 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
57	430 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
108	430 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
109	430 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
58	437 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
110	437 N	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
59	450 S	-	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 17.3
111	450 S	-	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 17.3
60	452 NW	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	452 NW	-	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
61	456 S	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.2
62	456 NW	Hell Brook	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
63	456 NW	Hell Brook	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
64	456 NW	Hell Brook	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
113	456 S	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.2
Not shown	456 NW	Hell Brook	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	456 NW	Hell Brook	Lake, loch or reservoir.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	456 NW	Hell Brook	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
65	457 NW	Hell Brook	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
Not shown	457 NW	Hell Brook	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
66	462 SW	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.2
118	462 SW	Trent and Mersey Canal	Canal. A manmade watercourse for inland navigation.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 12.2
67	486	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	N			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
119	486 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
68	487 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
120	487 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
69	490 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
121	490 N	Main Drain	Inland river not influenced by normal tidal action.	Catchment Area: Trent Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3

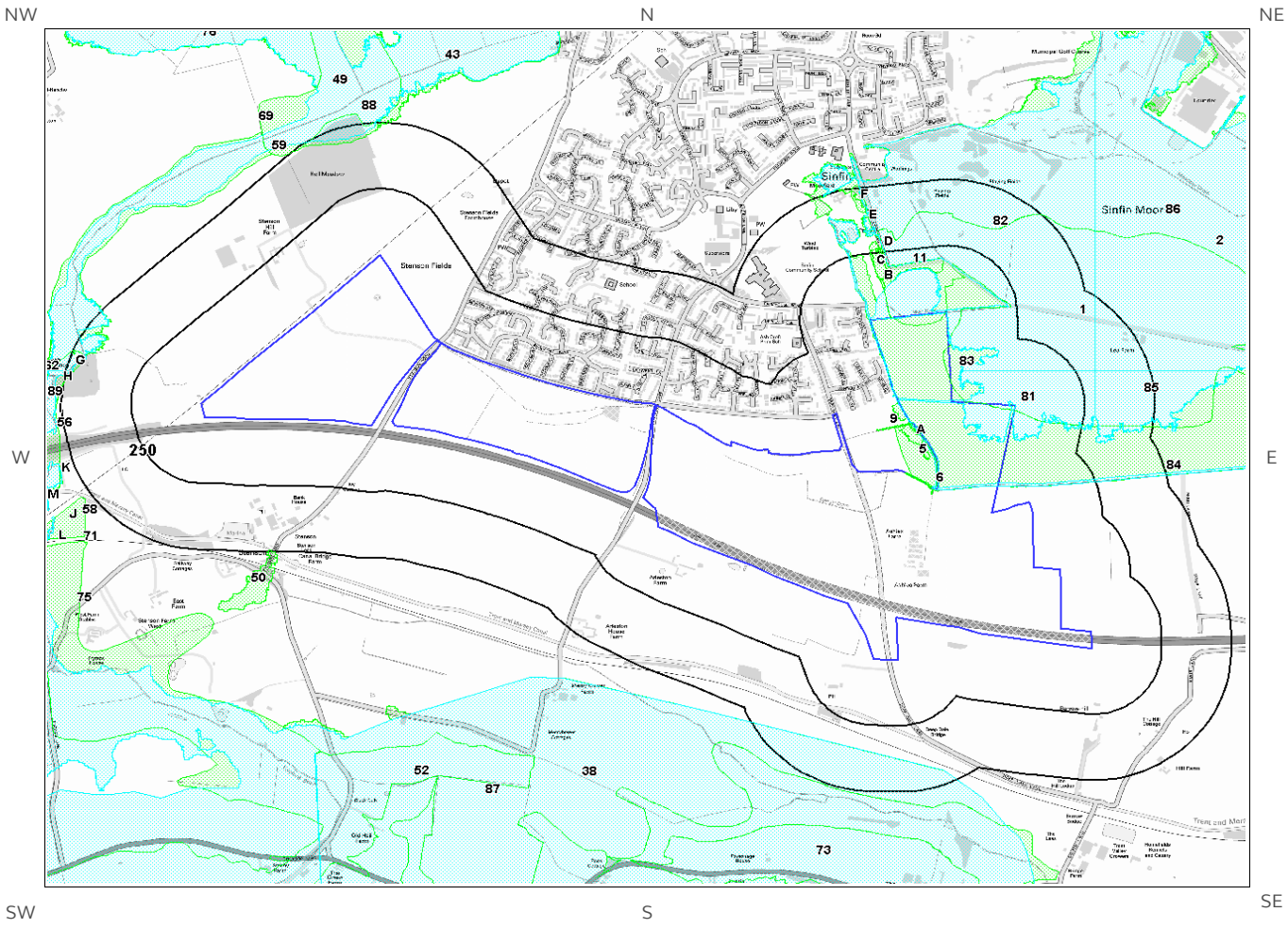
6.11 Surface Water Features

Surface water features within 250m of the study site	Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	E
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	W
1	N
2	E
3	W
10	S
15	S
65	S
67	N
67	SW
96	NW
155	NE
161	N
178	E
194	N
200	N
208	E
209	S
213	E
237	E

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



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Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

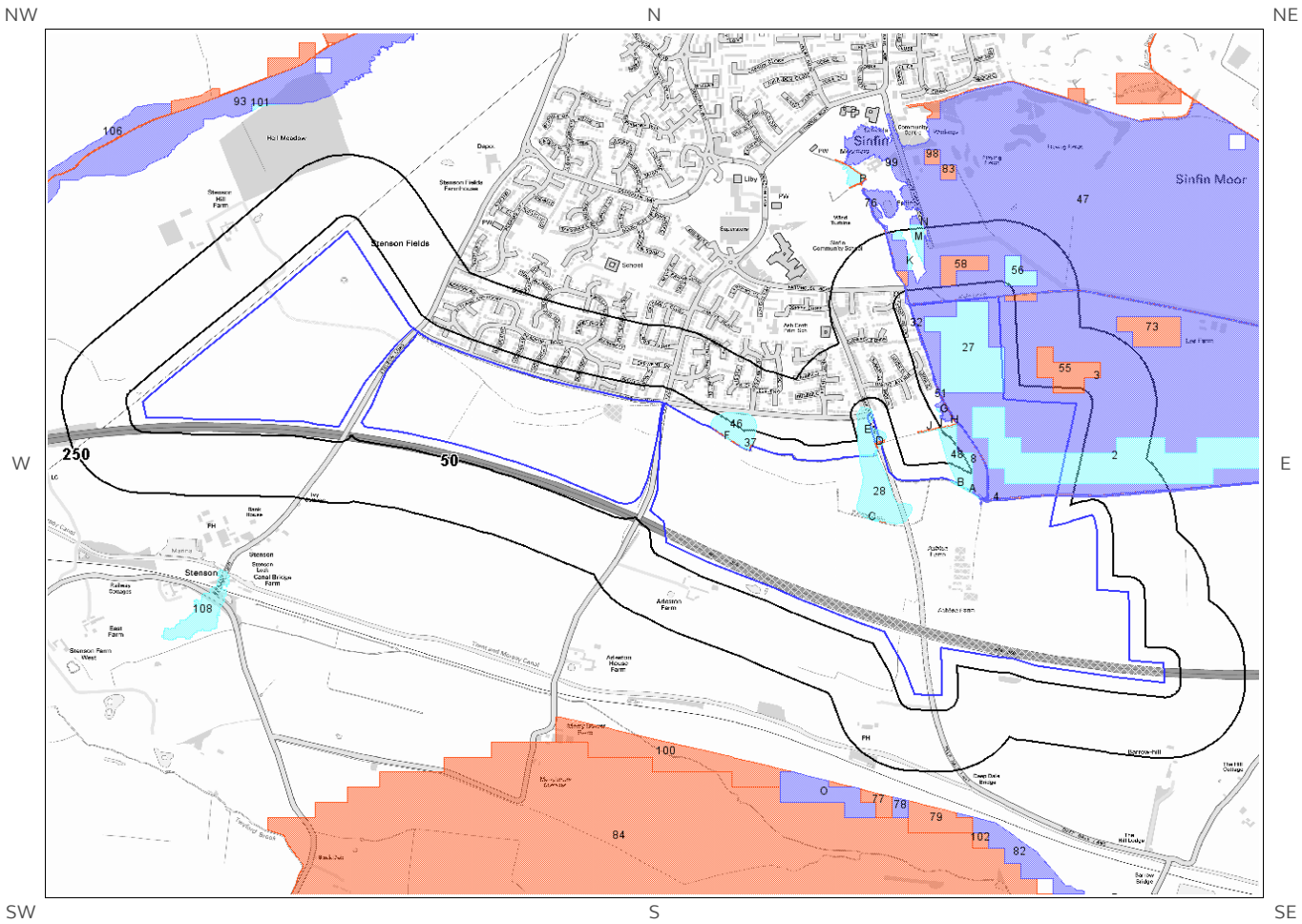
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

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



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Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

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

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
2	0	On Site	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
3A	1	S	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
4	2	W	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
5	3	NE	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
6	5	NE	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
7A	6	S	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
8A	6	SW	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
9	40	SW	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
10B	104	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
11	134	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
12B	143	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
13B	147	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
14B	153	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
15B	157	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
16B	166	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
17B	169	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
18B	174	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
19B	177	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)

20B	181	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
21C	184	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
22C	194	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
23C	203	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
24C	206	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
25C	207	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
26C	209	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
27C	211	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
28C	212	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
29C	214	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
30C	222	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)
31D	230	N	21-Feb-2019	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — Identified

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	0	On Site	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
2	0	On Site	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
3A	40	E	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)
4	246	E	21-Feb-2019	Zone 3 - (Fluvial /Tidal Models)

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

Highest risk of flooding onsite High

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year.

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

ID	Distance (m)	Direction	RoFRas flood Risk
1	0.0	On Site	Medium
2	0.0	On Site	Low
3	0.0	On Site	Medium
4	0.0	On Site	Medium
5A	0.0	On Site	Medium
6A	0.0	On Site	Low
7A	0.0	On Site	Low
8	0.0	On Site	Medium
9A	0.0	On Site	Low
10A	0.0	On Site	Low
11A	0.0	On Site	Low
12A	0.0	On Site	Low
13A	0.0	On Site	Low
14A	0.0	On Site	Low
15A	0.0	On Site	Low
16B	0.0	On Site	Low
17B	0.0	On Site	Low
18B	0.0	On Site	Low
19B	0.0	On Site	Low
20B	0.0	On Site	Low
21B	0.0	On Site	Low
22B	0.0	On Site	Low
23B	0.0	On Site	Low
24B	0.0	On Site	Low
25B	0.0	On Site	Low
26B	0.0	On Site	Low
27	0.0	On Site	Low
28	0.0	On Site	Low
29D	0.0	On Site	Low
30C	0.0	On Site	Low
31E	0.0	On Site	Low
32	0.0	On Site	Medium
33	0.0	On Site	High

34C	0.0	On Site	High
35D	0.0	On Site	High
36E	0.0	On Site	High
37	0.0	On Site	High
38F	0.0	On Site	Low
39A	0.0	NE	Medium
40A	0.0	NE	Medium
41F	0.0	NE	High
42A	0.0	NE	Medium
43A	0.0	NE	Medium
44A	0.0	NE	Medium
45A	1.0	NE	Medium
46	1.0	W	Low
47	3.0	N	Medium
48	3.0	NE	Low
49G	4.0	SW	Medium
50H	4.0	SW	Low
51	4.0	SW	Medium
52G	20.0	SW	Low
53H	29.0	SW	Low
54G	32.0	SW	Low
55	33.0	N	High
56	39.0	NE	Low
57I	47.0	SW	Low
58	48.0	N	High

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

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

7.7 Groundwater Flooding Susceptibility Areas

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

Clearwater Flooding or Superficial Deposits Flooding | Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

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

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

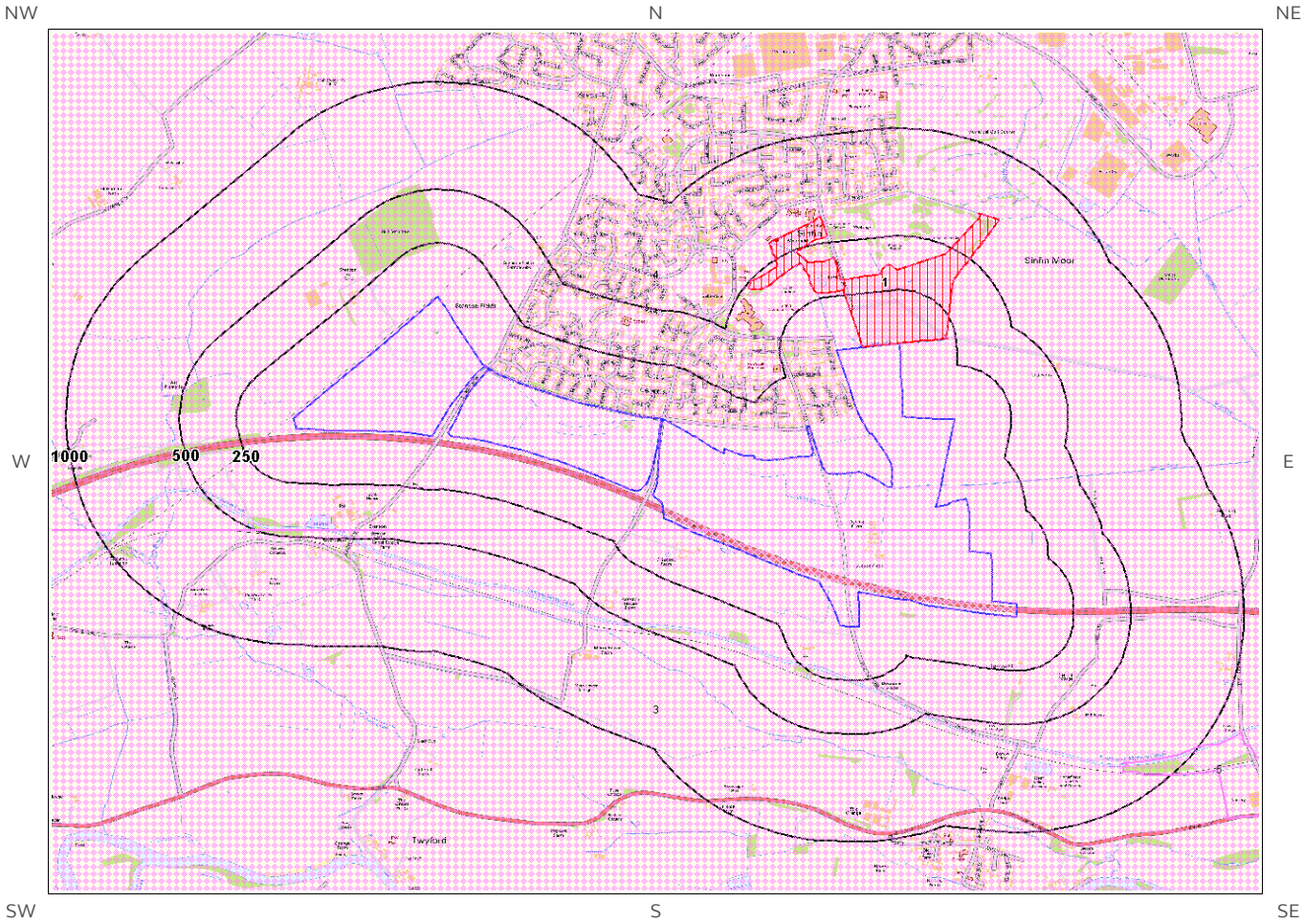
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result | High

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

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

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

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

2

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	3	N	Sinfin Moor	Natural England
Not shown	1818	N	Sunnydale Park	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

3

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
3	0	On Site	Modified	DEFRA
4	0	On Site	Modified	DEFRA
5	825	SE	Existing	DEFRA

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

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

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

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

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

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

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

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
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Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: South Derbyshire District Council
Phone: 01283 595 795
Web: http://www.south-derbys.gov.uk/
Address: Civic Offices, Civic Way, Swadlincote, Derbyshire, DE11 0AH

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

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Groundsure
LOCATION INTELLIGENCE

BWB Consulting Limited

5th Floor, Waterfront House, Station Street,
Nottingham, NG2 3DQ

Groundsure Reference:	HMD-214-5963300
Your Reference:	POR025445
Report Date	24 Apr 2019
Report Delivery Method:	Email - pdf

Geo Insight

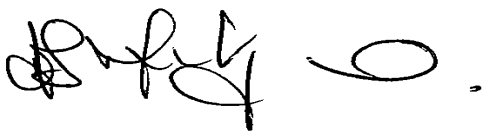
Address: Wragley Way, DERBY, DE24 3AP

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**Wragley Way, DERBY, DE24 3AP**
Date:	**24 Apr 2019**
Reference:	**HMD-214-5963300**
Client:	**BWB Consulting Limited**

NW N NE

W E



SW S SE

Aerial Photograph Capture date:	01-Jul-2018
Grid Reference:	434000,330292
Site Size:	145.4910ha

Groundsure
LOCATION INTELLIGENCE

Contents Page

Contents Page ... 3
Overview of Findings ... 5
1:10,000 Scale Availability ... 8
Availability of 1:10,000 Scale Geology Mapping ... 9
1 Geology (1:10,000 scale) ... 10
1.1 Artificial Ground map (1:10,000 scale) ... 10
1. Geology 1:10,000 scale ... 11
1.1 Artificial Ground ... 11
1.2 Superficial Deposits and Landslips map (1:10,000 scale) ... 13
1.2 Superficial Deposits and Landslips ... 14
1.2.1 Superficial Deposits/ Drift Geology ... 14
1.2.2 Landslip ... 14
1.3 Bedrock and linear features map (1:10,000 scale) ... 15
1.3 Bedrock and linear features ... 16
1.3.1 Bedrock/ Solid Geology ... 16
1.3.2 Linear features ... 16
2 Geology 1:50,000 Scale ... 17
2.1 Artificial Ground map ... 17
2. Geology 1:50,000 scale ... 18
2.1 Artificial Ground ... 18
2.1.1 Artificial/ Made Ground ... 18
2.1.2 Permeability of Artificial Ground ... 18
2.2 Superficial Deposits and Landslips map (1:50,000 scale) ... 19
2.2 Superficial Deposits and Landslips ... 20
2.2.1 Superficial Deposits/ Drift Geology ... 20
2.2.2 Permeability of Superficial Ground ... 21
2.2.3 Landslip ... 21
2.2.4 Landslip Permeability ... 21
2.3 Bedrock and linear features map (1:50,000 scale) ... 22
2.3 Bedrock, Solid Geology & linear features ... 23
2.3.1 Bedrock/Solid Geology ... 23
2.3.2 Permeability of Bedrock Ground ... 23
2.3.3 Linear features ... 23
3 Radon Data ... 25
3.1 Radon Affected Areas ... 25
3.2 Radon Protection ... 25
4 Ground Workings map ... 26
4 Ground Workings ... 27
4.1 Historical Surface Ground Working Features derived from Historical Mapping ... 27
4.2 Historical Underground Working Features derived from Historical Mapping ... 29
4.3 Current Ground Workings ... 29
5 Mining, Extraction & Natural Cavities ... 32
5.1 Historical Mining ... 32
5.2 Coal Mining ... 32
5.3 Johnson Poole and Bloomer ... 32
5.4 Non-Coal Mining ... 32
5.5 Non-Coal Mining Cavities ... 33
5.6 Natural Cavities ... 33
5.7 Brine Extraction ... 33
5.8 Gypsum Extraction ... 33
5.9 Tin Mining ... 33
5.10 Clay Mining ... 34
6 Natural Ground Subsidence ... 35
6.1 Shrink-Swell Clay map ... 35
6.2 Landslides map ... 36
6.3 Ground Dissolution of Soluble Rocks map ... 37
6.4 Compressible Deposits map ... 38
6.5 Collapsible Deposits map ... 39
6.6 Running Sand map ... 40

6 Natural Ground Subsidence..... 41
6.1 Shrink-Swell Clays.....41
6.2 Landslides.....43
6.3 Ground Dissolution of Soluble Rocks.....44
6.4 Compressible Deposits.....45
6.5 Collapsible Deposits.....46
6.6 Running Sands.....46
7 Borehole Records..... 50
8 Estimated Background Soil Chemistry..... 60
9 Railways and Tunnels map..... 62
9 Railways and Tunnels..... 63
9.1 Tunnels 63
9.2 Historical Railway and Tunnel Features 63
9.3 Historical Railways.....64
9.4 Active Railways.....64
9.5 Railway Projects.....64

Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	Yes
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and linear features	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale?	Yes

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	Yes
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	Yes
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of linear features within 500m of the study site boundary?	Yes

Section 3: Radon

3. Radon	3.1Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	10	43	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	2	3	8

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

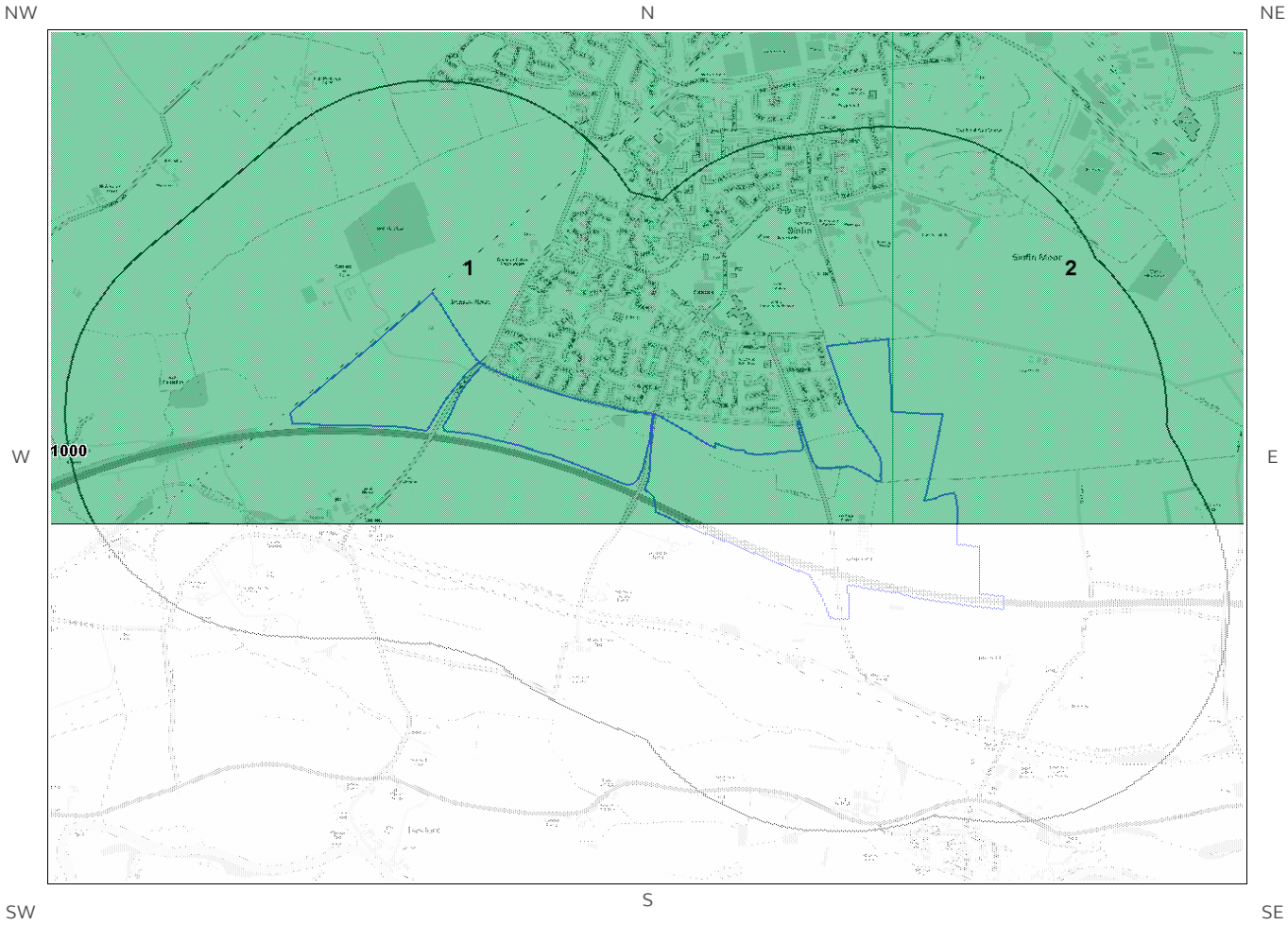
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Low
6.2 Landslides	Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Moderate
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	50	39	32

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	54	8	0

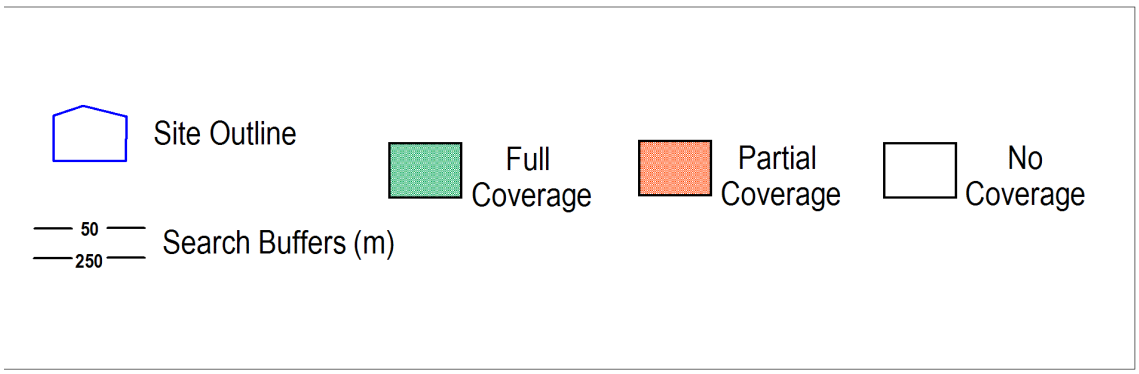
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
9.3 Historical Railways	0	0	0	Not Searched
9.4 Active Railways	0	8	2	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
2	0.0	Some deposits are mapped	Full	Full	No coverage
3	0.0	No deposits are mapped	No coverage	No coverage	No coverage

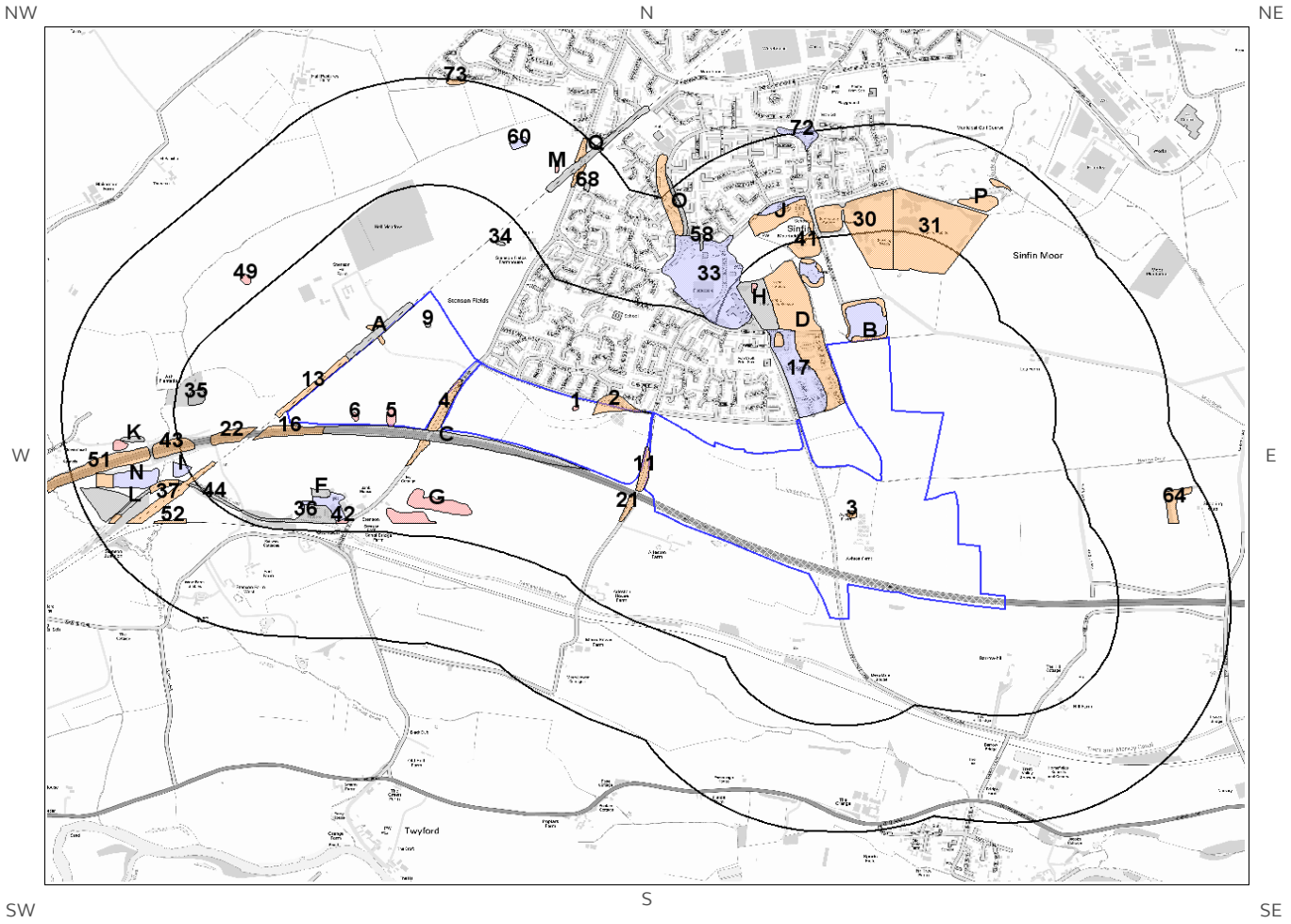
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

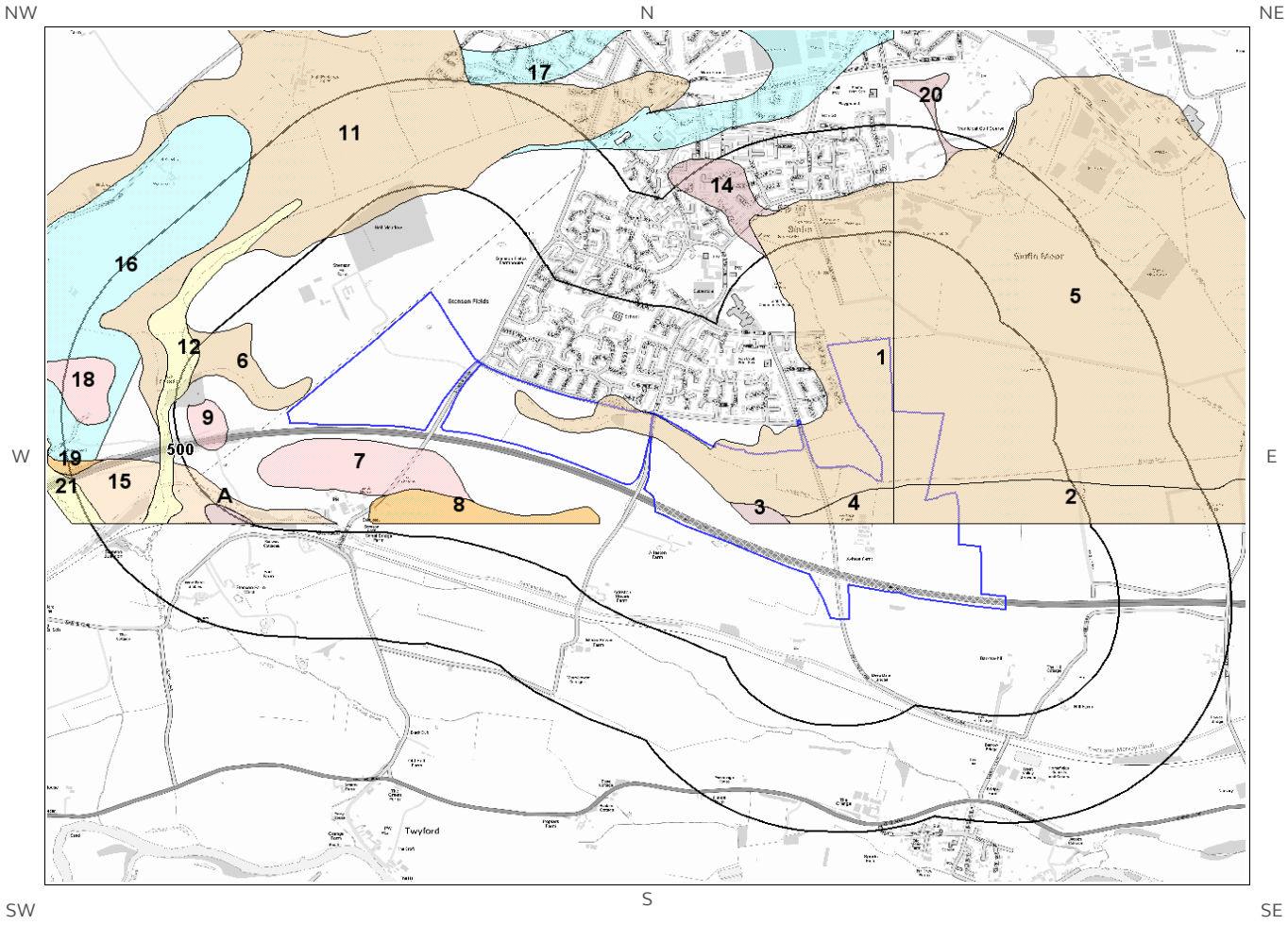
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
5	0.0	On Site	WMGR-ARTDP	Infilled Ground	Artificial Deposit
6	0.0	On Site	WMGR-ARTDP	Infilled Ground	Artificial Deposit
7A	0.0	On Site	WGR-VOID	Worked Ground (Undivided)	Void
8A	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
9	0.0	On Site	WGR-VOID	Worked Ground (Undivided)	Void
10B	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
11	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
12C	0.0	On Site	WGR-VOID	Worked Ground (Undivided)	Void
13	1.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
14D	4.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
15B	4.0	N	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry
16	6.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
17	12.0	N	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry
18	23.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
19A	33.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
20C	46.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
21	49.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
22	147.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
23D	191.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
24H	218.0	W	WGR-VOID	Worked Ground (Undivided)	Void
25E	272.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
26G	277.0	S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
27E	291.0	N	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry
28F	301.0	S	WGR-VOID	Worked Ground (Undivided)	Void
29F	314.0	S	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry
30	321.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
31	321.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
32E	341.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
33	359.0	W	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry
34	369.0	NE	WGR-VOID	Worked Ground (Undivided)	Void
35	370.0	W	WGR-VOID	Worked Ground (Undivided)	Void
36	376.0	S	WGR-VOID	Worked Ground (Undivided)	Void
37	381.0	SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
38G	382.0	S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
39E	385.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
40H	403.0	NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
41	417.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
42	433.0	S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
43	435.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
44	458.0	SW	WGR-VOID	Worked Ground (Undivided)	Void
45I	483.0	SW	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry

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



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	LDE-C	Lacustrine Deposits - Clay	Clay
2	0.0	On Site	LDE1-C	Lacustrine Deposits, 1 - Clay	Clay
3	0.0	On Site	HEAD-DMTN	Head - Diamicton	Diamicton
4	0.0	On Site	LDE1-C	Lacustrine Deposits, 1 - Clay	Clay
5	0.0	On Site	LDE-C	Lacustrine Deposits - Clay	Clay
6	9.0	NW	LDE-C	Lacustrine Deposits - Clay	Clay
7	61.0	S	ETSG-XSV	Etwall Sand And Gravel Member - Sand And Gravel	Sand And Gravel
8	162.0	SW	EGSG-XSV	Egginton Common Sand And Gravel Member - Sand And Gravel	Sand And Gravel
9	273.0	W	ETSG-XSV	Etwall Sand And Gravel Member - Sand And Gravel	Sand And Gravel
10A	400.0	S	BSSG-XSV	Beeston Sand And Gravel Member - Sand And Gravel	Sand And Gravel
11	426.0	NW	LDE-C	Lacustrine Deposits - Clay	Clay
12	455.0	W	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt
13A	479.0	SW	HEAD-DMTN	Head - Diamicton	Diamicton
14	480.0	NW	HEAD-DMTN	Head - Diamicton	Diamicton

1.2.2 Landslip

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

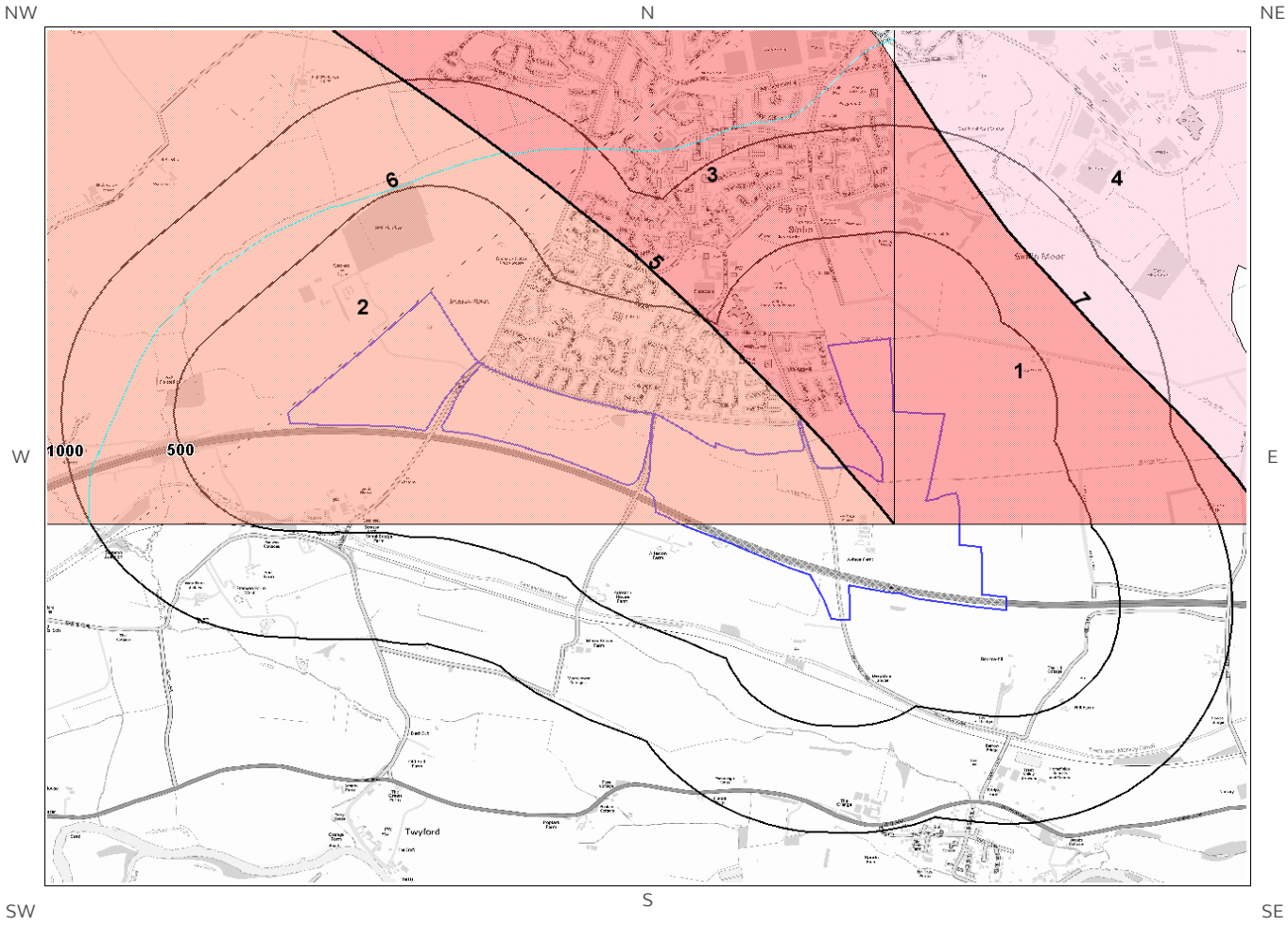
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

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

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



Bedrock and linear features Legend

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Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	BCMU-MDST	Branscombe Mudstone Formation - Mudstone	Rhaetian Age - Norian Age
2	0.0	On Site	GUN-MDST	Gunthorpe Member - Mudstone	Ladinian Age - Anisian Age
3	0.0	On Site	BCMU-MDST	Branscombe Mudstone Formation - Mudstone	Rhaetian Age - Norian Age

1.3.2 Linear features

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

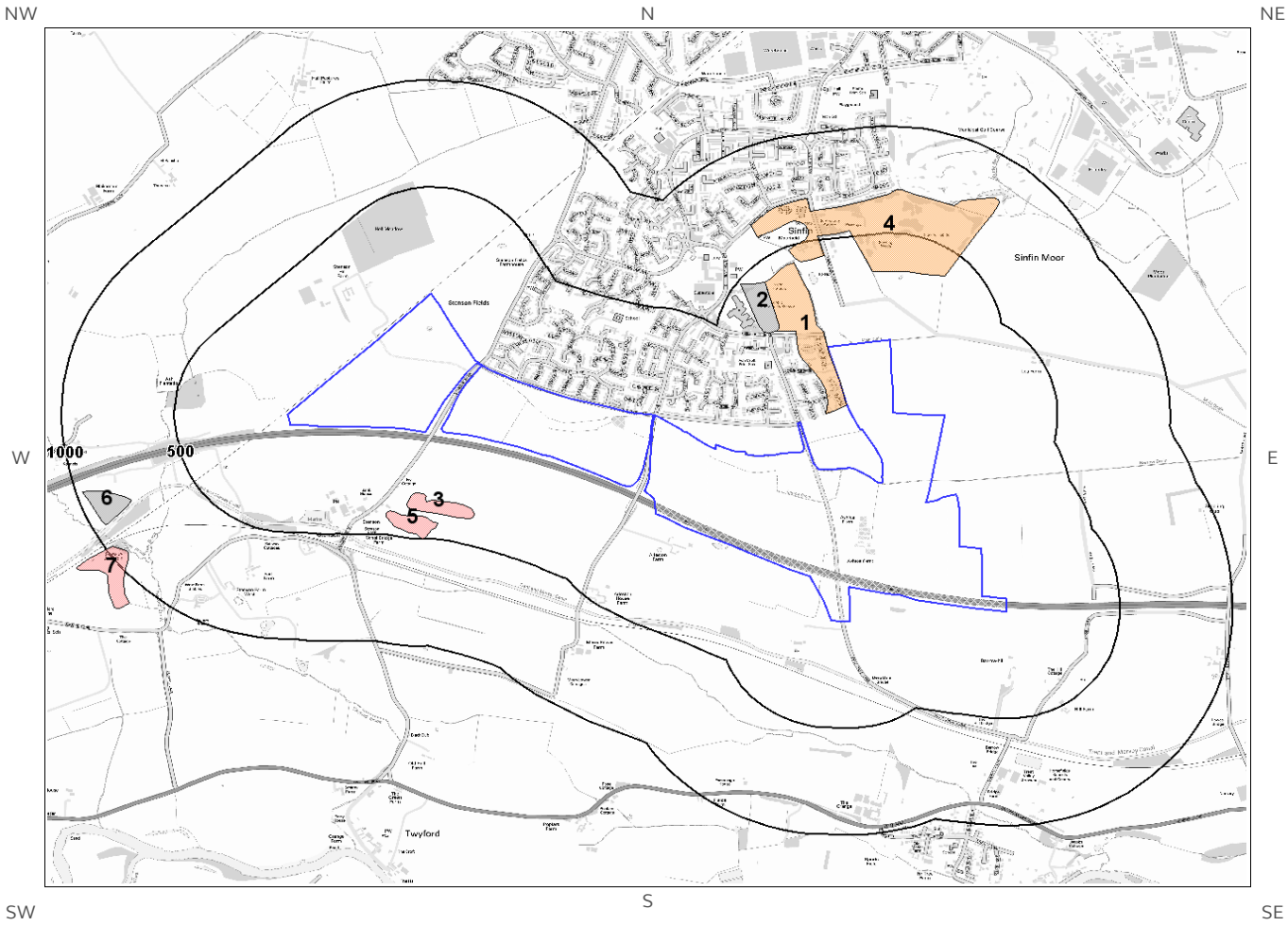
ID	Distance (m)	Direction	Category Description	Feature Description
5	0.0	On Site	FAULT	Normal fault, inferred; crossmarks on downthrow side

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

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

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 141

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

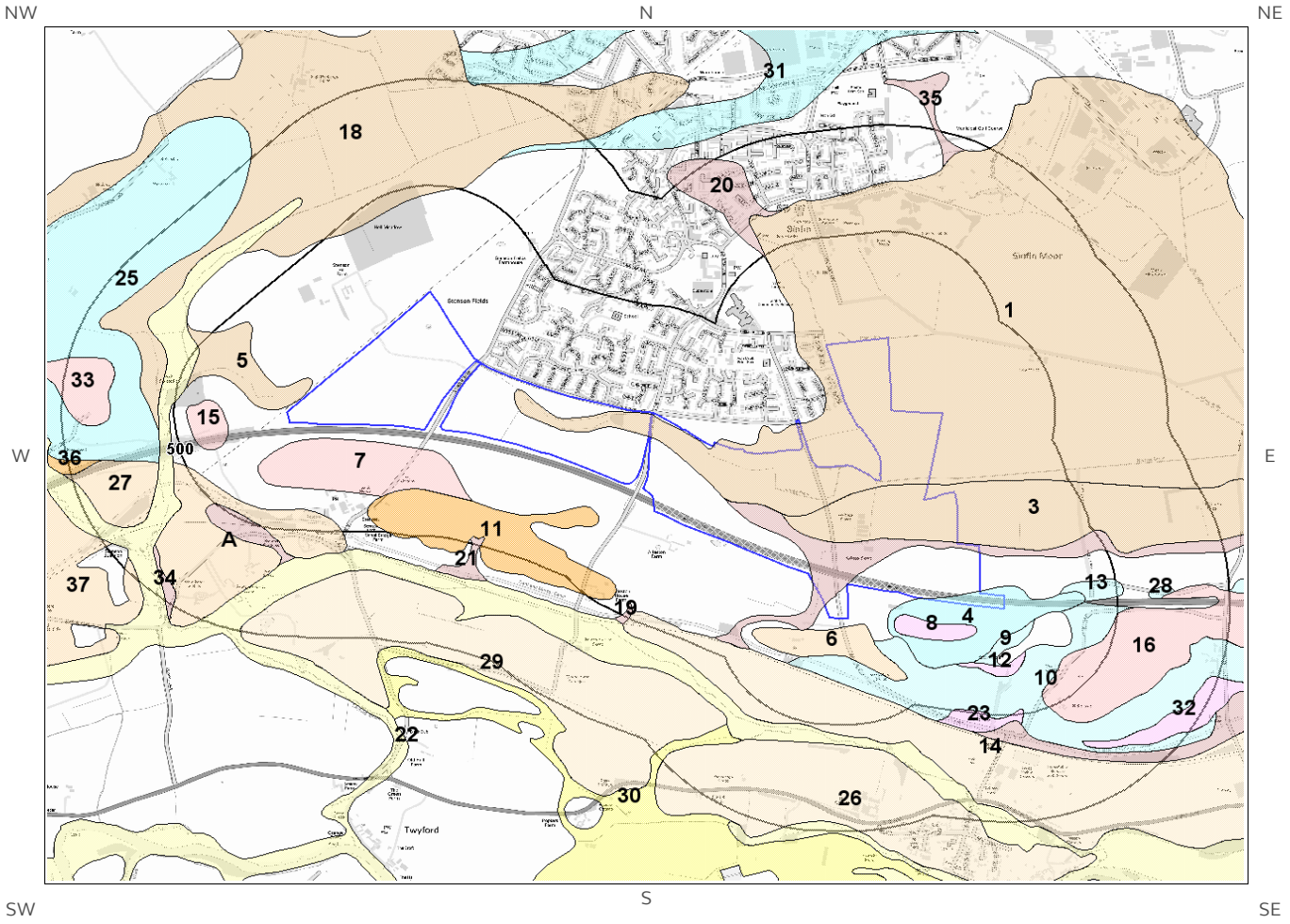
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	231.0	W	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
3	284.0	S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
4	320.0	N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
5	385.0	S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

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

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



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Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	LDE-XCZ	LACUSTRINE DEPOSITS	CLAY AND SILT
2	0.0	On Site	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
3	0.0	On Site	LDE1-XCZS	LACUSTRINE DEPOSITS, 1	CLAY, SILT AND SAND
4	0.0	On Site	ODT-DMTN	OADBY MEMBER	DIAMICTON
5	8.0	NW	LDE-XCZ	LACUSTRINE DEPOSITS	CLAY AND SILT
6	37.0	S	BSSG-XSV	BEESTON SAND AND GRAVEL MEMBER	SAND AND GRAVEL
7	63.0	S	ETSG-XSV	ETWALL SAND AND GRAVEL MEMBER	SAND AND GRAVEL
8	89.0	S	EMSG-XSV	EAGLE MOOR SAND AND GRAVEL MEMBER	SAND AND GRAVEL
9	119.0	SE	THT-DMTN	THRUSSINGTON MEMBER	DIAMICTON
10	153.0	SE	THT-DMTN	THRUSSINGTON MEMBER	DIAMICTON
11	161.0	SW	EGSG-XSV	EGGINTON COMMON SAND AND GRAVEL MEMBER	SAND AND GRAVEL
12	215.0	SE	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
13	247.0	E	THT-DMTN	THRUSSINGTON MEMBER	DIAMICTON
14	266.0	S	HPSG-XSV	HOLME PIERREPONT SAND AND GRAVEL MEMBER	SAND AND GRAVEL
15	268.0	W	ETSG-XSV	ETWALL SAND AND GRAVEL MEMBER	SAND AND GRAVEL
16	346.0	SE	ETSG-XSV	ETWALL SAND AND GRAVEL MEMBER	SAND AND GRAVEL
17A	403.0	S	BSSG-XSV	BEESTON SAND AND GRAVEL MEMBER	SAND AND GRAVEL
18	426.0	NW	LDE-XCZ	LACUSTRINE DEPOSITS	CLAY AND SILT
19	434.0	SW	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
20	440.0	NW	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

ID	Distance	Direction	LEX Code	Description	Rock Description
21	453.0	S	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
22	459.0	W	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
23	475.0	S	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
24A	478.0	SW	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Very Low
0.0	On Site	Mixed	Moderate	Low
0.0	On Site	Mixed	Low	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	Low	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	Moderate	Very Low
0.0	On Site	Mixed	Moderate	Very Low
0.0	On Site	Mixed	Moderate	Very Low
0.0	On Site	Mixed	High	Very Low
8.0	NW	Mixed	Low	Very Low
37.0	S	Intergranular	Very High	High

2.2.3 Landslip

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

Database searched and no data found.

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

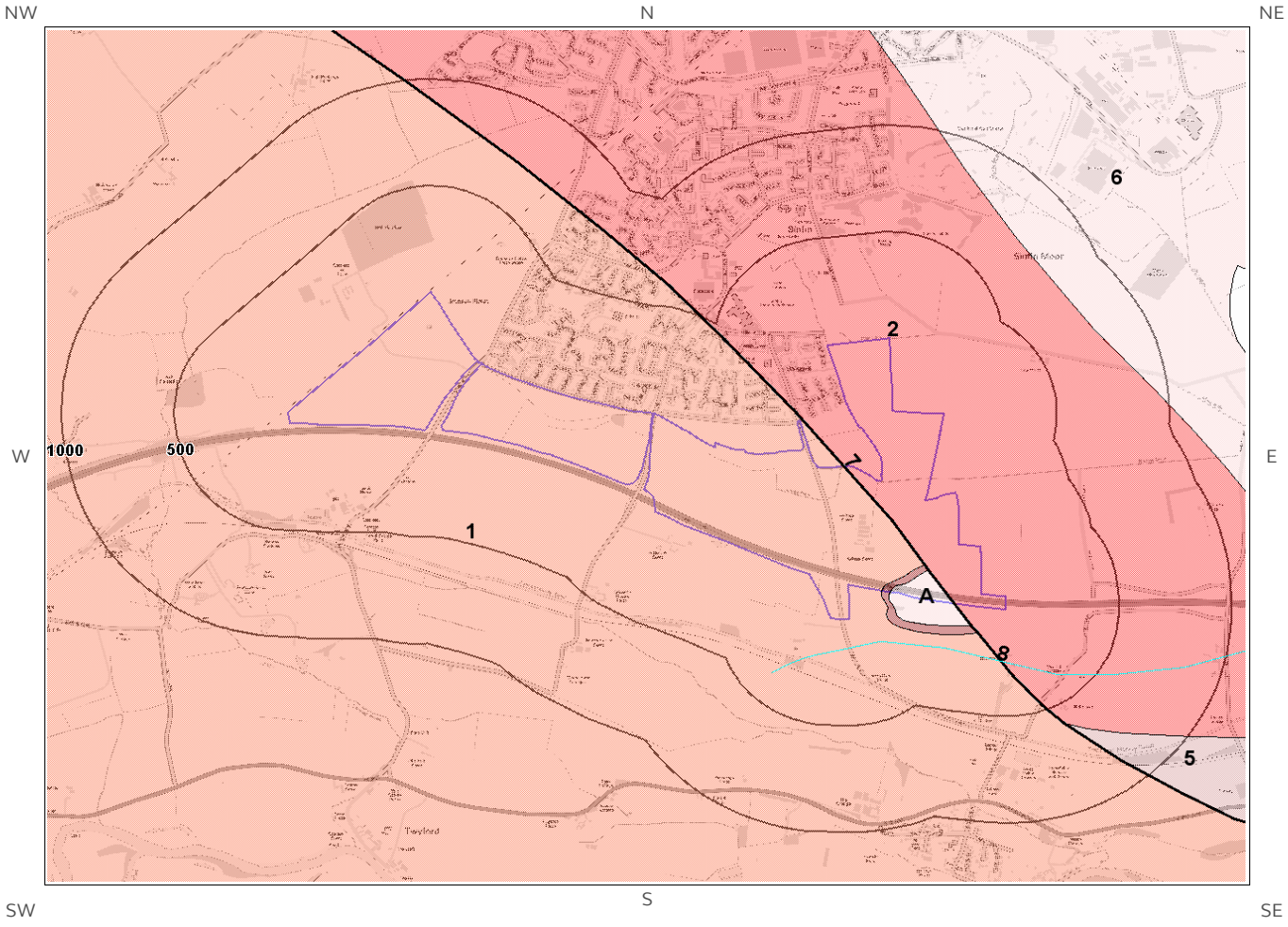
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

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

Database searched and no data found.

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



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Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 141

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	GUN-MDST	GUNTHORPE MEMBER - MUDSTONE	ANISIAN
2	0.0	On Site	BCMU-MDST	BRANSCOMBE MUDSTONE FORMATION - MUDSTONE	NORIAN
3A	0.0	On Site	EDW-MDST	EDWALTON MEMBER - MUDSTONE	CARNIAN
4A	0.0	On Site	COT-SDST	COTGRAVE SANDSTONE MEMBER - SANDSTONE	CARNIAN

2.3.2 Permeability of Bedrock Ground

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

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	Low	Low

2.3.3 Linear features

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

ID	Distance	Direction	Category Description	Feature Description
7	0.0	On Site	FAULT	Fault, inferred
8	132.0	S	LANDFORM	Approximate margin of buried (superficial deposit-filled) channel or valley

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

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

3 Radon Data

3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

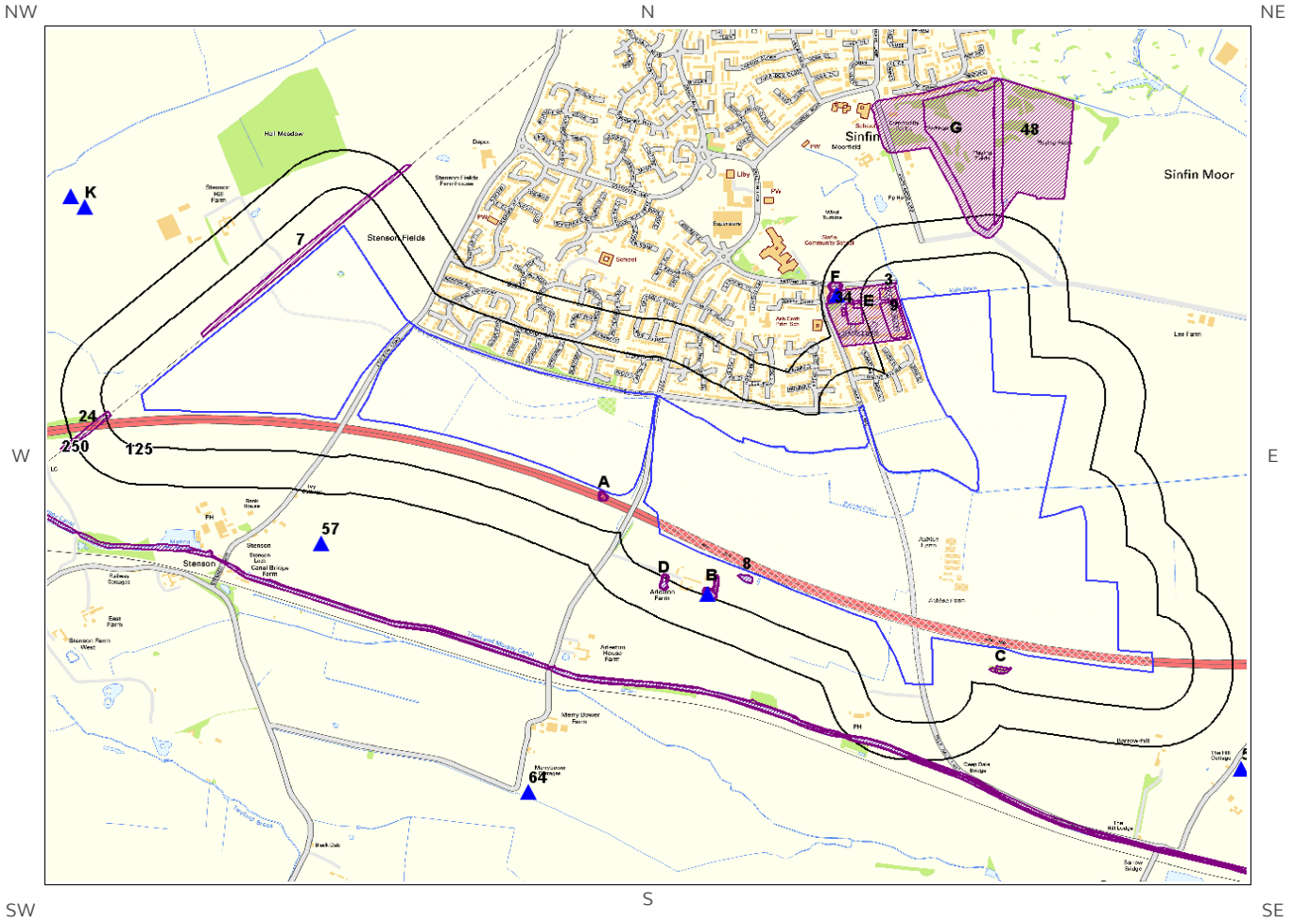
The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland,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

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

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4 Ground Workings map



Ground Workings Legend

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1A	3.0	SW	433770 330182	Unspecified Pit	1954
2E	6.0	W	434604 330784	Sewage Farm	1971
3	6.0	W	434668 330855	Ponds	1971
4A	7.0	SW	433764 330180	Unspecified Pit	1924
5A	7.0	SW	433764 330180	Ponds	1924
6A	7.0	SW	433764 330180	Unspecified Pit	1900
7	10.0	NW	432930 331084	Cuttings	1881
8	12.0	S	434215 329904	Pond	1976
9	13.0	W	434683 330767	Water Body	1971
10B	49.0	S	434121 329878	Old Gravel Pit	1954
11B	55.0	S	434104 329852	Old Gravel Pit	1924
12B	55.0	S	434122 329871	Old Gravel Pit	1924
13C	56.0	S	435019 329600	Unspecified Ground Workings	1938
14C	56.0	S	435019 329600	Unspecified Ground Workings	1924
15C	56.0	S	435019 329600	Unspecified Ground Workings	1920
16C	56.0	S	435019 329600	Unspecified Ground Workings	1899
17C	57.0	S	435027 329602	Unspecified Pit	1950
18C	57.0	S	435027 329602	Unspecified Pit	1970
19C	57.0	S	435027 329602	Unspecified Pit	1981
20B	61.0	S	434123 329880	Unspecified Pit	1924
21B	103.0	S	434104 329852	Unspecified Pit	1900

ID	Distance (m)	Direction	NGR	Use	Date
22B	103.0	S	434104 329852	Unspecified Pit	1881
23B	103.0	S	434104 329852	Old Gravel Pit	1924
24	108.0	W	432137 330396	Cuttings	1881
25D	113.0	SW	433959 329897	Pond	1954
26D	116.0	SW	433959 329892	Pond	1900
27D	116.0	SW	433959 329892	Pond	1881
28D	116.0	SW	433959 329892	Pond	1924
29D	116.0	SW	433959 329892	Pond	1924
30D	117.0	SW	433960 329892	Pond	1924
31E	126.0	W	434559 330787	Filter Beds	1954
32E	127.0	W	434566 330827	Filter Beds	1954
33G	174.0	N	434920 331306	Unspecified Workings	1987
34	181.0	W	434523 330792	Filter Beds	1954
35F	188.0	W	434501 330860	Unspecified Pits	1954
36F	195.0	W	434495 330857	Old Gravel Pit	1924
37F	195.0	W	434495 330878	Unspecified Pit	1924
38F	196.0	W	434496 330858	Old Gravel Pit	1924
39F	196.0	W	434496 330858	Unspecified Pits	1900
40F	198.0	W	434491 330843	Old Gravel Pit	1924
41G	199.0	N	434888 331306	Refuse Heap	1987
42H	207.0	S	433632 329597	Canal	1954
43H	207.0	S	433632 329597	Canal	1976
44I	210.0	S	430813 329524	Canal	1924
45I	210.0	S	430813 329524	Canal	1900
46I	210.0	S	430813 329524	Canal	1881
47I	210.0	S	430813 329524	Canal	1924
48	219.0	N	435124 331326	Refuse Heap	1983
49	236.0	S	437559 331331	Canal	1924
50J	237.0	S	437219 329731	Canal	1881

ID	Distance (m)	Direction	NGR	Use	Date
51J	237.0	S	437219 329731	Canal	1899
52J	237.0	S	437219 329731	Canal	1938
53J	237.0	S	437219 329731	Canal	1920

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

4.3 Current Ground Workings

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

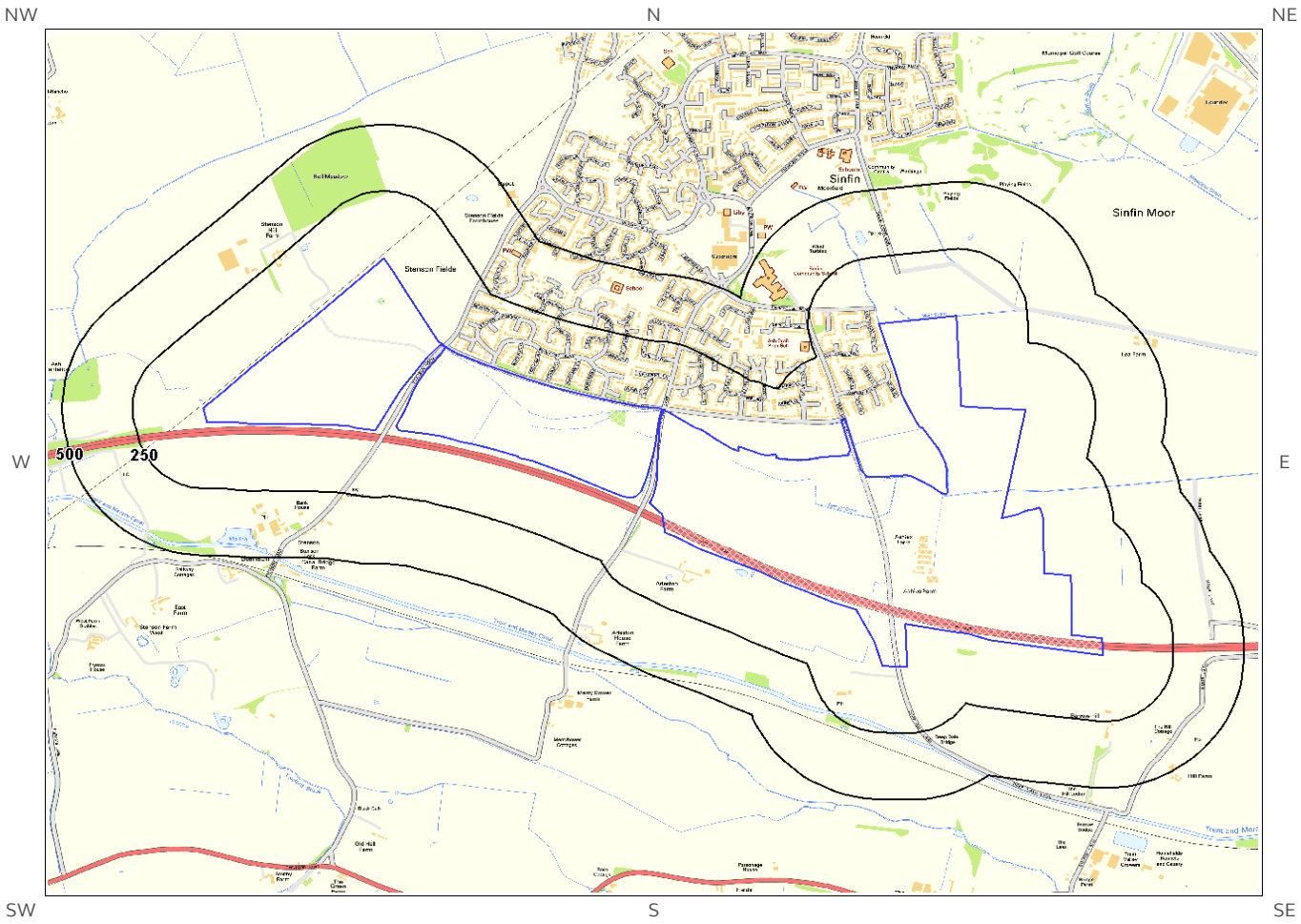
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
54B	120.0	S	434096 329852	Sand & Gravel	Arleston Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
55F	203.0	W	434502 330848	Sand & Gravel	Sinfin House	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	414.0	W	431901 330587	Clay & Shale	Ash Plantation	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
57	417.0	S	432876 330021	Sand	Stenson House	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
58	425.0	SE	435775 329270	Sand	Barrow Hill	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
59K	587.0	NW	432131 331142	Clay & Shale	Findern Marl Pits	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
60K	642.0	NW	432088 331178	Clay & Shale	Findern Marl Pits	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	746.0	W	431580 330365	Mineral	Ryeland Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	919.0	SW	431961 329622	Sand & Gravel	Twyford	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	923.0	SE	436175 328965	Sand & Gravel	Swarkeston Lowes	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
64	957.0	SW	433529 329194	Sand & Gravel	Merrybower	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	962.0	E	436462 329633	Clay & Shale	Swarkestone Lowes	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	964.0	SE	436364 329166	Sand & Gravel	Swarkestone Lowes	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

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Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities (point data)

Natural Cavities (polygon data)

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

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

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

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

Database searched and no data found.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

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

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

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

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

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

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

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

Database searched and no data found.

5.10 Clay Mining

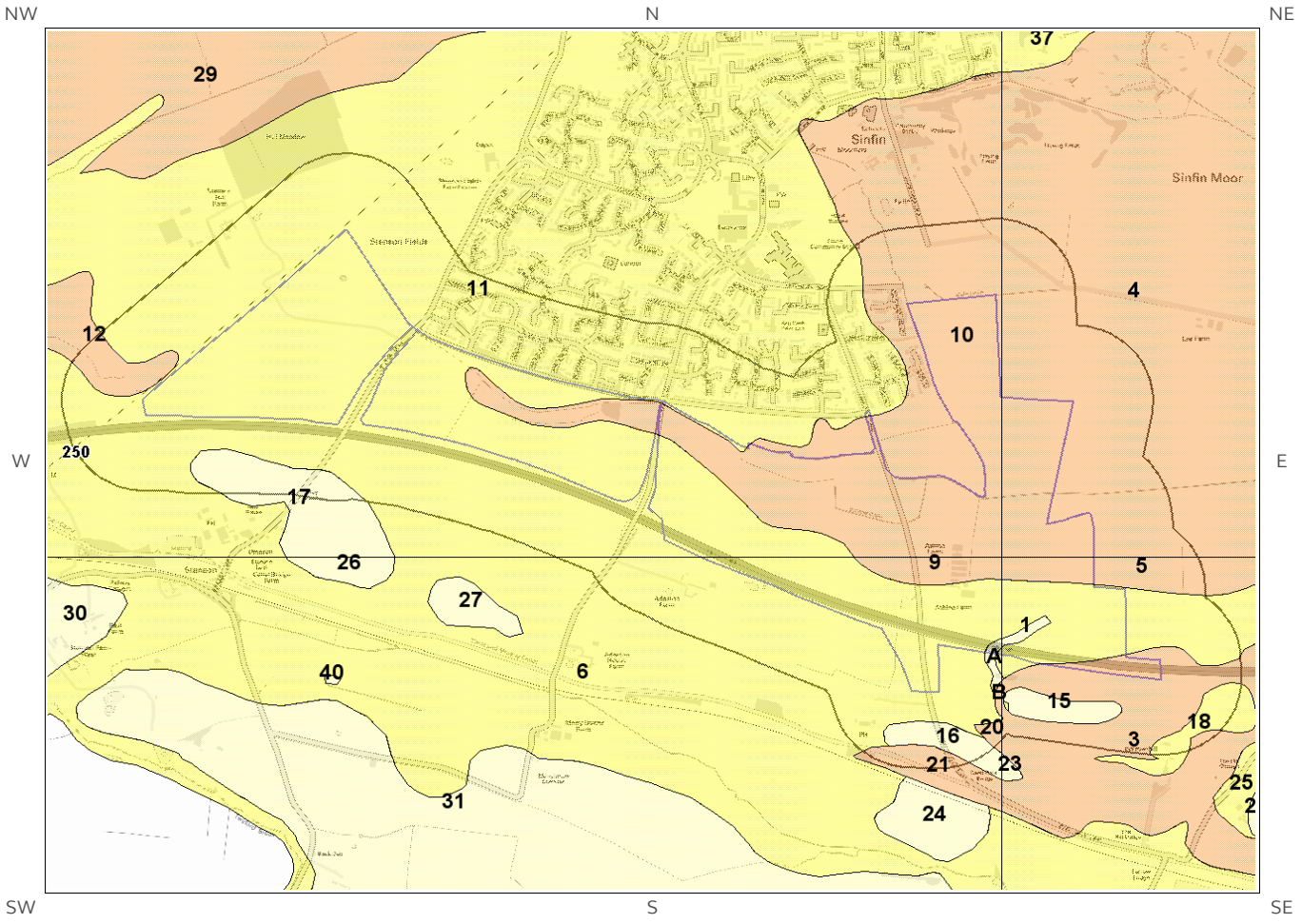
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

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

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map

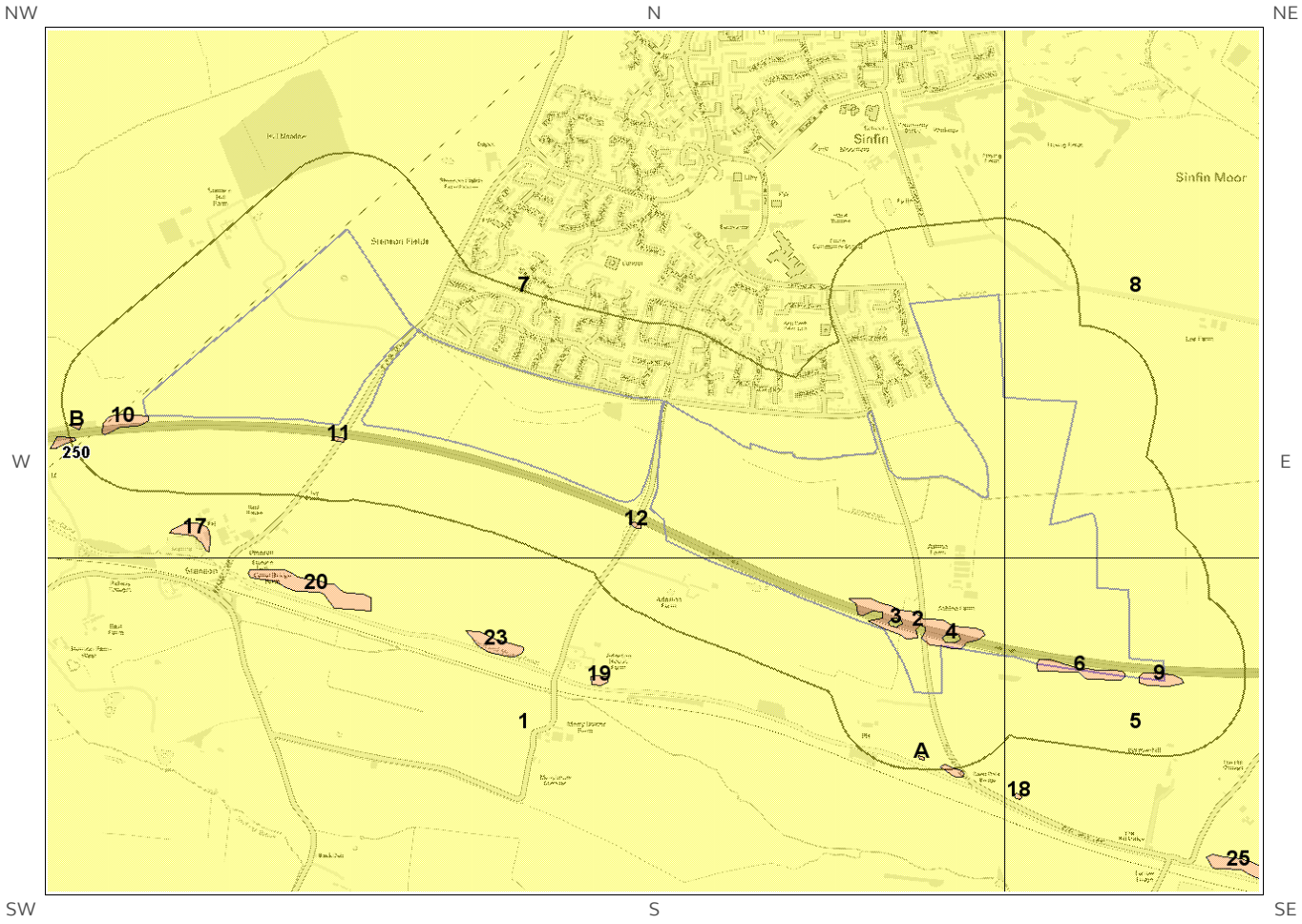


Shrink Swell Clay Legend

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6.2 Landslides map



Landslides Legend

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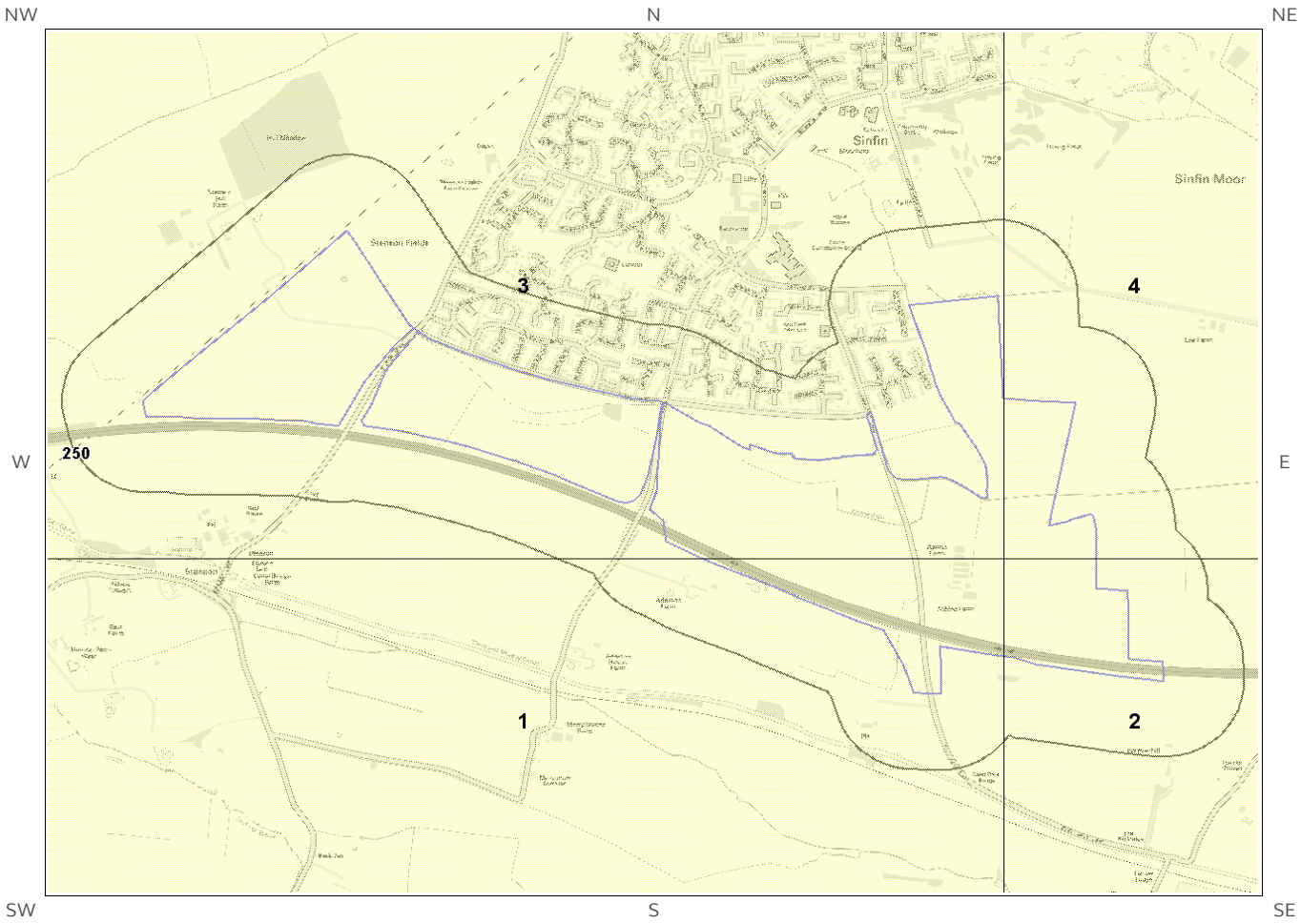
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.3 Ground Dissolution of Soluble Rocks map

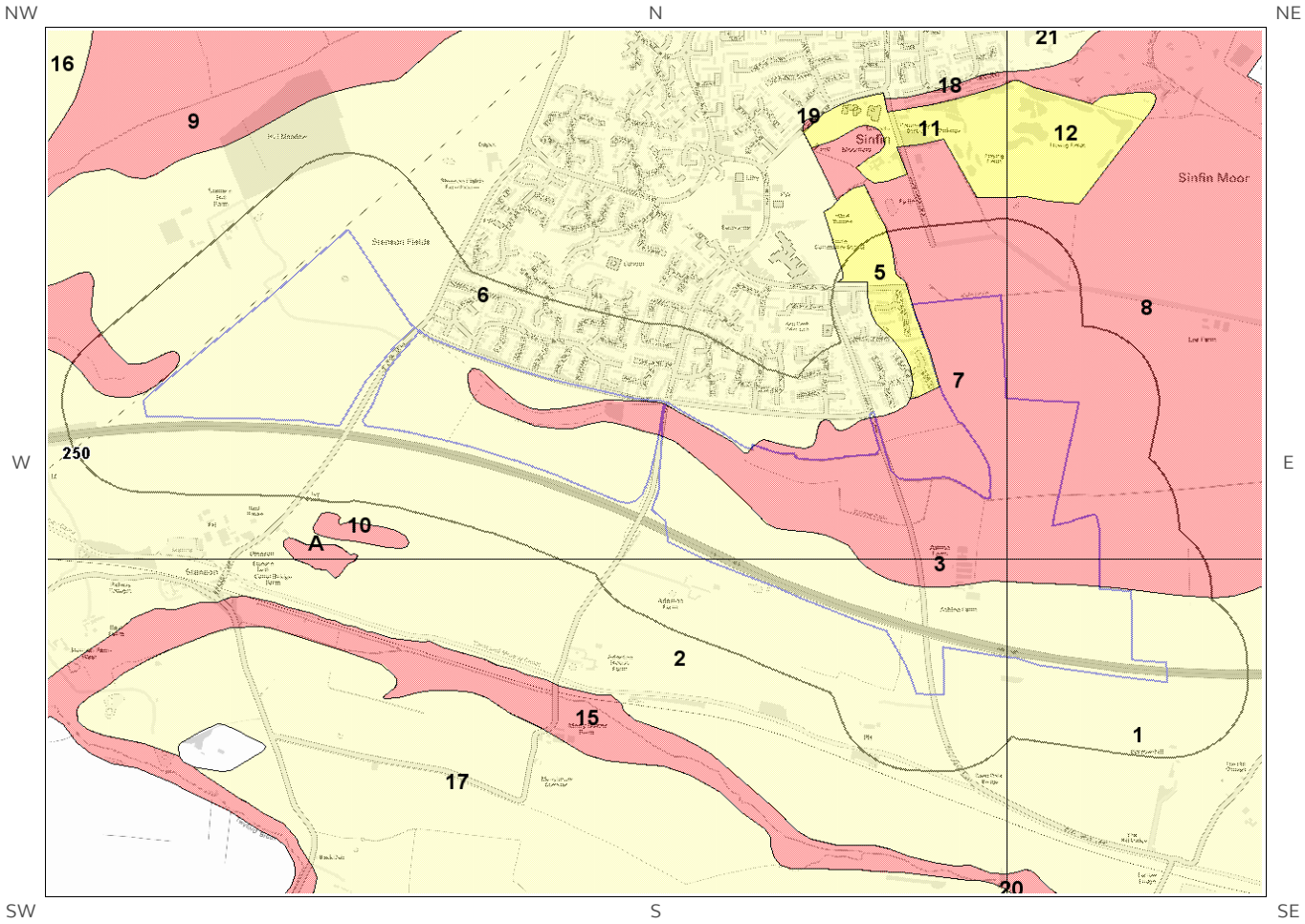


Ground Dissolution Soluble Rocks Legend

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6.4 Compressible Deposits map

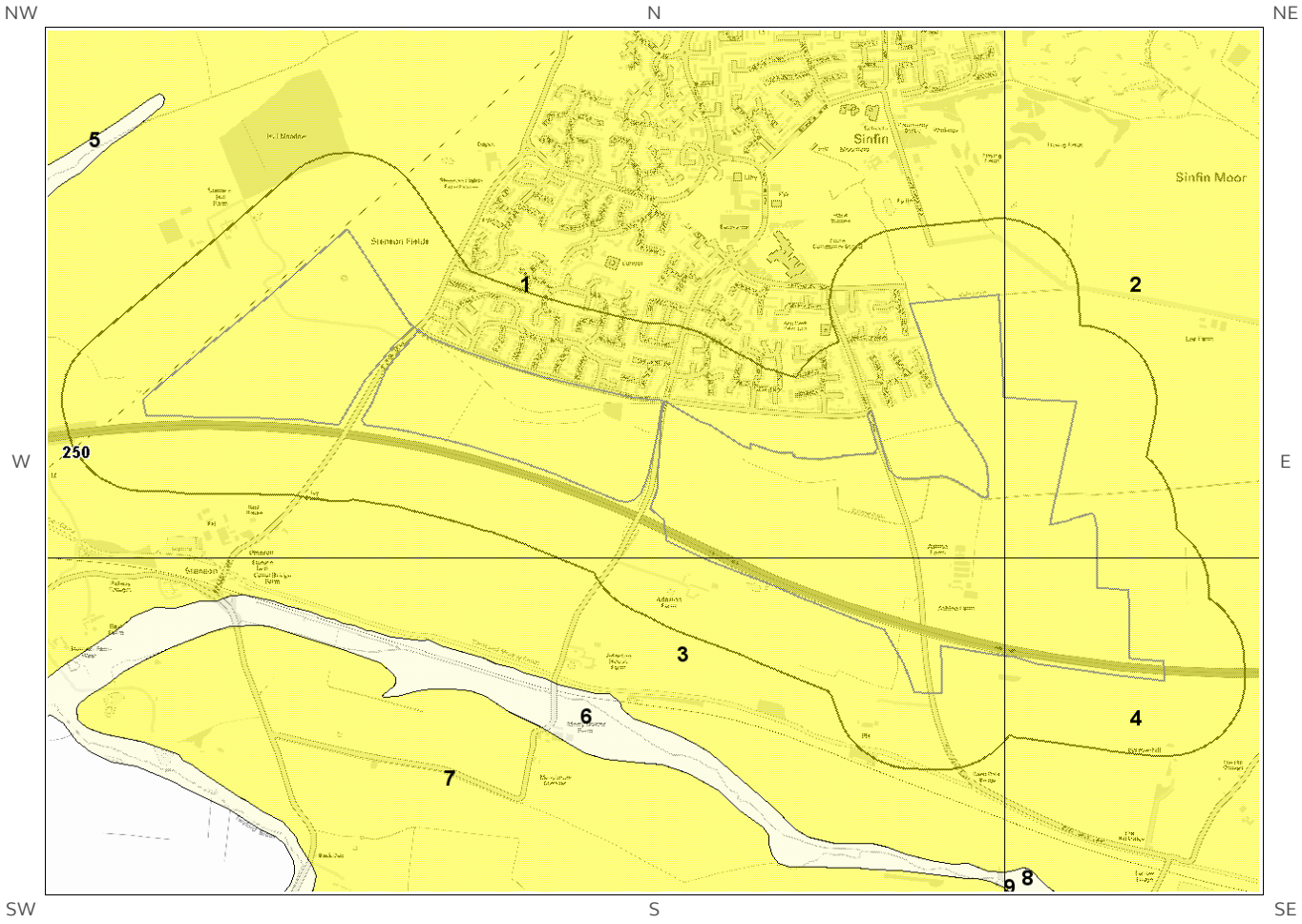


Compressible Deposits Legend

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6.5 Collapsible Deposits map

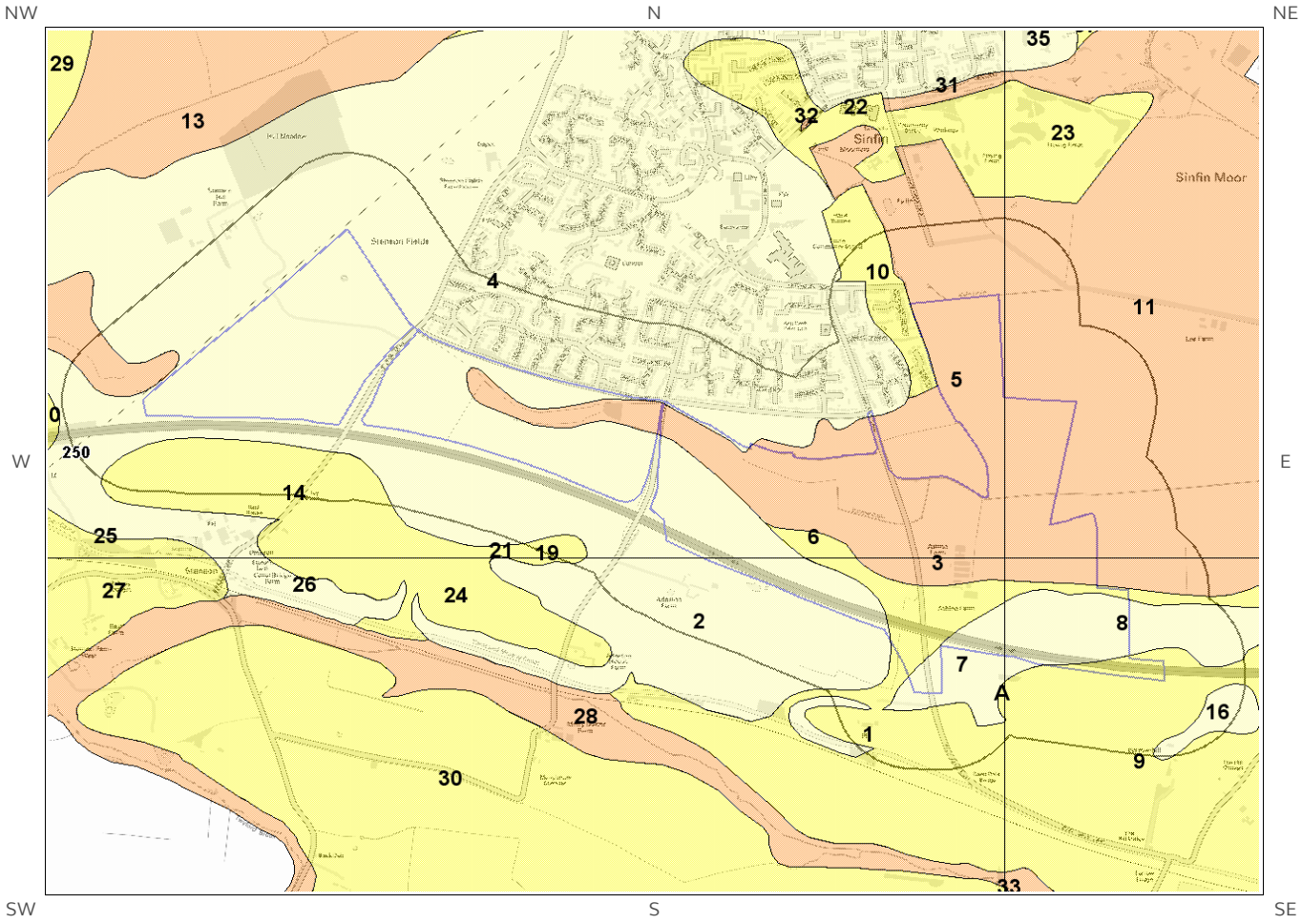


Collapsible Deposits Legend

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6.6 Running Sand map



Running Sand Legend

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6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

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

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Moderate

6.1 Shrink-Swell Clays

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
3	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
4	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

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

ID	Distance (m)	Direction	Hazard Rating	Details
5	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
6	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
7A	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
8A	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
9	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
10	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
11	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

ID	Distance (m)	Direction	Hazard Rating	Details
12	8.0	NW	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
3	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
4	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
5	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

ID	Distance (m)	Direction	Hazard Rating	Details
6	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
7	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
8	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
9	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
10	2.0	S	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
11	39.0	S	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.
3	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.
4	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.
4	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.
5	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
6	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
7	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

ID	Distance (m)	Direction	Hazard Rating	Details
8	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.
9	8.0	NW	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

6.5 Collapsible Deposits

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
3	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
4	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

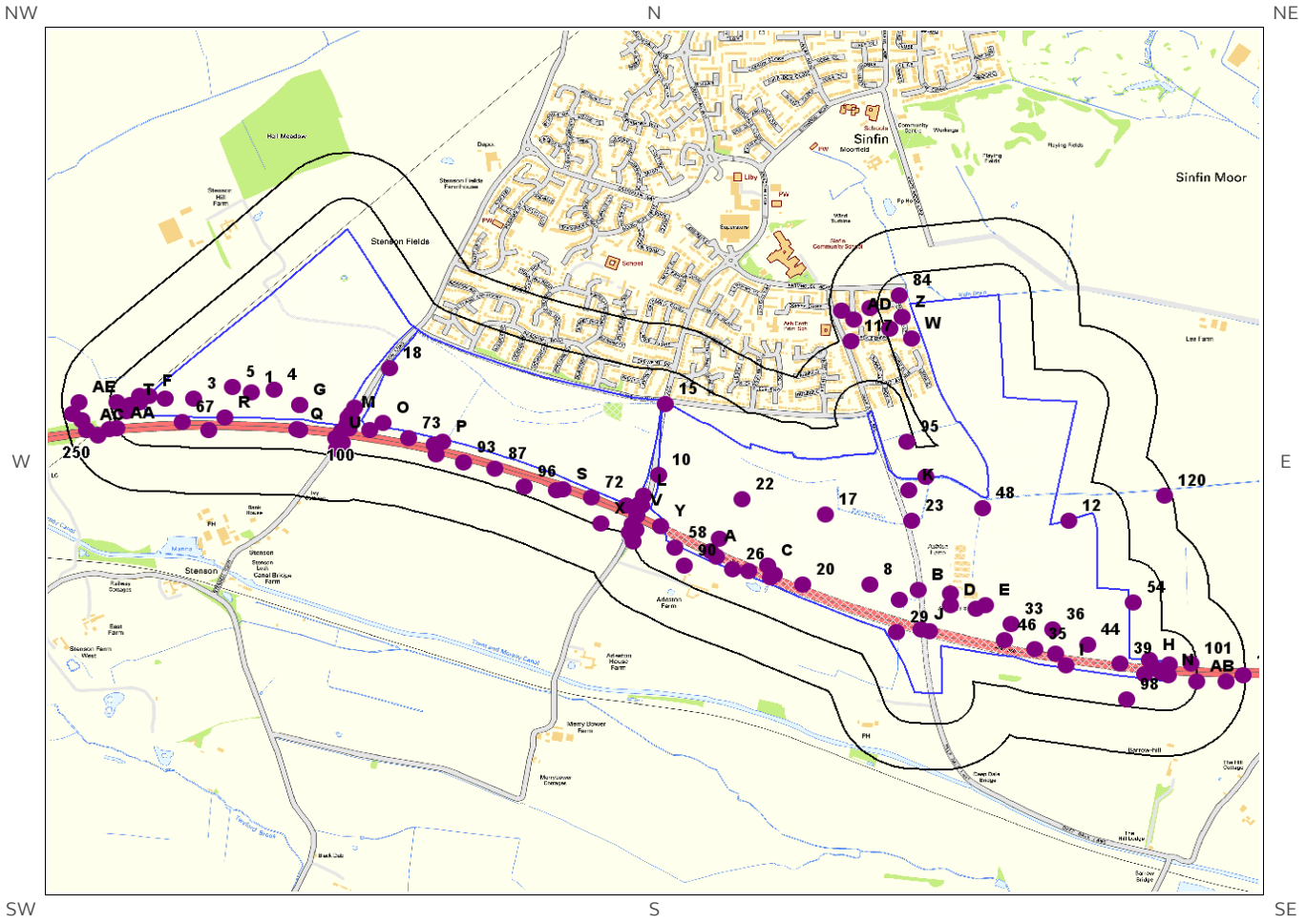
The following Running Sands information provided by the British Geological Survey:

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

ID	Distance (m)	Direction	Hazard Rating	Details
3	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
4	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
5	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
6	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
7	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
8	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
9	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
10	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
11	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
12	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

ID	Distance (m)	Direction	Hazard Rating	Details
13	8.0	NW	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

7 Borehole Records map



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7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 121

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	0.0	On Site	432650 330540	SK33SW333	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 155
2O	0.0	On Site	433060 330440	SK33SW338	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 163
3	0.0	On Site	432470 330520	SK33SW331	9.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 153
4	0.0	On Site	432720 330550	SK33SW334	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 156
5	0.0	On Site	432590 330560	SK33SW332	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 154
6B	0.0	On Site	434730 329890	SK32NW320	9.0	STOKE-DERBY MOTORWAY M64 B181
7G	0.0	On Site	432800 330500	SK33SW336	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 158
8	0.0	On Site	434580 329910	SK32NW318	6.0	STOKE-DERBY MOTORWAY M64 B179
9A	0.0	On Site	434082 330017	SK33SW158	3.0	A564 DERBY SOUTH'BYPASS TP564
10	0.0	On Site	433920 330270	SK33SW197	3.0	A564 STOKE - DERBY LINK TP 1
11I	0.0	On Site	435192 329642	SK32NE302	8.0	A564 DERBY SOUTH'BYPASS BH571
12	0.0	On Site	435200 330120	SK33SE353	3.0	A564 STOKE - DERBY LINK TP 7
13A	0.0	On Site	434100 330000	SK33SW348	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 175
14B	0.0	On Site	434670 329860	SK32NW319	8.0	STOKE-DERBY MOTORWAY M64 B180
15	0.0	On Site	433942 330502	SK33SW174	3.0	A564 DERBY SOUTH'BYPASS TP5134
16H	0.0	On Site	435450 329660	SK32NE452	10.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 190
17	0.0	On Site	434440 330140	SK33SW199	3.0	A564 STOKE - DERBY LINK TP 3
18	0.0	On Site	433080 330620	SK33SW337	7.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 162A

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
19E	0.0	On Site	434940 329840	SK32NW322	6.0	STOKE-DERBY MOTORWAY M64 B186
20	0.0	On Site	434370 329910	SK32NW317	5.0	STOKE-DERBY MOTORWAY M64 B178
21C	0.0	On Site	434260 329970	SK32NW316	5.0	STOKE-DERBY MOTORWAY M64 B177
22	0.0	On Site	434180 330190	SK33SW198	2.0	A564 STOKE - DERBY LINK TP 2
23	0.0	On Site	434710 330120	SK33SW201	3.0	A564 STOKE - DERBY LINK TP 5
24K	0.0	On Site	434700 330220	SK33SW200	3.0	A564 STOKE - DERBY LINK TP 4
25A	0.0	On Site	434110 330060	SK33SW94	4.0	STOKE-DERBY M64 MOTORWAY BH140
26	0.0	On Site	434150 329960	SK32NW315	5.0	STOKE-DERBY MOTORWAY M64 B176
27C	0.0	On Site	434200 329954	SK32NW161	3.0	A564 DERBY SOUTH'BYPASS TP565
28C	0.0	On Site	434268 329931	SK32NW162	3.0	A564 DERBY SOUTH'BYPASS TP566
29	0.0	On Site	434662 329752	SK32NW160	4.0	A564 DERBY SOUTH'BYPASS TP559
30D	0.0	On Site	434830 329840	SK32NW305	15.0	STOKE-DERBY MOTORWAY M64 B183
31D	0.0	On Site	434830 329880	SK32NW304	15.0	STOKE-DERBY MOTORWAY M64 B182
32E	0.0	On Site	434910 329830	SK32NW321	9.0	STOKE-DERBY MOTORWAY M64 B185
33	0.0	On Site	435020 329780	SK32NE449	5.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 187
34F	0.0	On Site	432330 330530	SK33SW306	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B151
35	0.0	On Site	435094 329696	SK32NE301	3.0	A564 DERBY SOUTH'BYPASS TP570
36	0.0	On Site	435150 329760	SK32NE450	8.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 188
37F	0.0	On Site	432380 330520	SK33SW330	9.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 152
38G	0.0	On Site	432800 330500	SK33SW335	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 157
39	0.0	On Site	435360 329650	SK32NE29	5.0	STOKE-DERBY M64 MOTORWAY BH143
40H	0.0	On Site	435490 329620	SK32NE453	9.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 191
41H	0.0	On Site	435436 329612	SK32NE303	10.0	A564 DERBY SOUTH'BYPASS BH574
42H	0.0	On Site	435477 329629	SK32NE292	10.0	A564 DERBY S BYPASS SPUR BH1031
43I	0.0	On Site	435160 329680	SK32NE28	3.0	STOKE-DERBY M64 MOTORWAY BH142

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
44	0.0	On Site	435260 329710	SK32NE451	7.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 189
45C	0.0	On Site	434280 329940	SK32NW15	11.0	STOKE-DERBY M64 M/WAY BH141 FINDERN
46	0.0	On Site	435000 329726	SK32NE300	3.0	A564 DERBY SOUTH'BYPASS TP568
47J	0.0	On Site	434740 329760	SK32NW16	15.0	STOKE-DERBY M64 M/WAY BH65 FINDERN
48	0.0	On Site	434930 330160	SK33SW202	3.0	A564 STOKE - DERBY LINK TP 6
49J	0.0	On Site	434766 329754	SK32NW163	8.0	A564 DERBY SOUTH'BYPASS BH567
50K	0.0	N	434755 330264	SK33SW176	3.0	A564 DERBY SOUTH'BYPASS TP5136
51R	1.0	S	432566 330458	SK33SW139	3.0	A564 DERBY SOUTH'BYPASS TP539
52P	9.0	S	433245 330380	SK33SW149	3.0	A564 DERBY SOUTH'BYPASS TP551
53N	10.0	E	435510 329610	SK32NE454	10.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 191P
54	10.0	E	435400 329850	SK32NE214	29.0	SINFIN MOOR
55F	12.0	W	432300 330510	SK33SW305	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B150
56L	12.0	SE	433873 330201	SK33SW155	3.0	A564 DERBY SOUTH'BYPASS TP561
57M	12.0	SE	432950 330460	SK33SW309	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B161
58	13.0	SW	433970 330030	SK33SW347	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 173
59L	14.0	S	433821 330170	SK33SW156	4.0	A564 DERBY SOUTH'BYPASS TP562
60F	14.0	NW	432300 330530	SK33SW303	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B148
61M	15.0	SE	432970 330490	SK33SW307	16.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B159
62Y	15.0	W	433926 330100	SK33SW157	4.0	A564 DERBY SOUTH'BYPASS TP563
63N	15.0	E	435514 329647	SK32NE304	4.0	A564 DERBY SOUTH'BYPASS TP575
64M	16.0	SE	432960 330470	SK33SW308	16.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B160
65M	18.0	SE	432955 330458	SK33SW145	3.0	A564 DERBY SOUTH'BYPASS TP548
66O	19.0	S	433018 330416	SK33SW148	3.0	A564 DERBY SOUTH'BYPASS TP550
67	20.0	S	432434 330444	SK33SW137	3.0	A564 DERBY SOUTH'BYPASS TP536
68M	22.0	SE	432948 330438	SK33SW165	30.0	A564 DERBY SOUTH'BYPASS BH5444

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
69M	22.0	SE	432931 330415	SK33SW144	13.0	A564 DERBY SOUTH'BYPASS BH545
70L	23.0	SE	433861 330174	SK33SW154	15.0	A564 DERBY SOUTH'BYPASS BH560
71P	24.0	S	433220 330370	SK33SW340	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 165
72	25.0	SW	433711 330197	SK33SW152	10.0	A564 DERBY SOUTH'BYPASS BH555
73	25.0	S	433140 330390	SK33SW339	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 164
74M	26.0	SE	432954 330440	SK33SW166	13.0	A564 DERBY SOUTH'BYPASSBH5444X
75L	28.0	W	433867 330168	SK33SW168	30.0	A564 DERBY SOUTH'BYPASS BH5464
76W	32.0	W	434710 330720	SK33SW277	4.0	DEEPDALE LANE SINFIN 4
77M	34.0	SE	432954 330424	SK33SW147	14.0	A564 DERBY SOUTH'BYPASS BH549A
78M	34.0	SE	432954 330424	SK33SW146	4.0	A564 DERBY SOUTH'BYPASS BH549
79Q	34.0	S	432791 330421	SK33SW109	8.0	A564 DERBY S BYPASS BH1030
80Q	37.0	S	432800 330417	SK33SW141	8.0	A564 DERBY SOUTH'BYPASS BH541
81Z	38.0	W	434680 330790	SK33SW276	4.0	DEEPDALE LANE SINFIN 3
82S	38.0	SW	433622 330222	SK33SW151	4.0	A564 DERBY SOUTH'BYPASS TP554
83R	41.0	S	432516 330418	SK33SW138	8.0	A564 DERBY SOUTH'BYPASS BH538
84	43.0	NW	434670 330860	SK33SW275	4.0	DEEPDALE LANE SINFIN 2
85T	44.0	W	432270 330500	SK33SW302	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B147
86U	46.0	S	432913 330390	SK33SW142	12.0	A564 DERBY SOUTH'BYPASS BH543
87	49.0	S	433410 330290	SK33SW342	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 167
88S	49.0	SW	433600 330220	SK33SW344	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 169
89V	50.0	SW	433851 330137	SK33SW153	10.0	A564 DERBY SOUTH'BYPASS BH558
90	52.0	SW	434000 329970	SK32NW314	5.0	STOKE-DERBY MOTORWAY M64 B174
91P	54.0	S	433225 330338	SK33SW150	3.0	A564 DERBY SOUTH'BYPASS TP552
92T	59.0	W	432260 330480	SK33SW304	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B149
93	61.0	S	433310 330310	SK33SW341	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 166
94U	61.0	S	432933 330375	SK33SW164	30.0	A564 DERBY SOUTH'BYPASS BH5443

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
95	76.0	E	434694 330380	SK33SW175	4.0	A564 DERBY SOUTH'BYPASS TP5135
96	77.0	S	433500 330230	SK33SW343	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 168
97V	79.0	S	433838 330107	SK33SW167	30.0	A564 DERBY SOUTH'BYPASS BH5463
98	79.0	S	435380 329530	SK32NE215	49.0	SINFIN MOOR
99U	79.0	S	432916 330356	SK33SW143	3.0	A564 DERBY SOUTH'BYPASS TP544
100T	81.0	W	432230 330510	SK33SW329	9.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 145
101	81.0	E	435580 329650	SK32NE30	3.0	STOKE-DERBY M64 MOTORWAY BH144
102V	83.0	SW	433850 330090	SK33SW310	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B171
103W	89.0	W	434640 330750	SK33SW281	4.0	DEEPDALE LANE SINFIN 8
104X	94.0	SW	433740 330110	SK33SW345	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 170
105AB	99.0	E	435600 329590	SK32NE455	5.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 192
106AA	102.0	SW	432231 330422	SK33SW178	4.0	A564 DERBY SOUTH'BYPASS TP5314
107X	104.0	S	433830 330080	SK33SW346	8.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 171P
108Y	106.0	W	433840 330050	SK33SW311	15.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON B172
109Z	126.0	W	434580 330820	SK33SW280	9.0	DEEPDALE LANE SINFIN 7
110AA	126.0	W	432206 330419	SK33SW136	9.0	A564 DERBY SOUTH'BYPASS BH535
111AA	167.0	SW	432170 330400	SK33SW86	12.0	STOKE-DERBY M64 MOTORWAY BH62/2
112AD	183.0	W	434530 330780	SK33SW278	10.0	DEEPDALE LANE SINFIN 5
113AB	189.0	E	435690 329590	SK32NE456	5.0	STOKE-DERBY MOTORWAY M64 MILTON TO CHELLASTON 193
114AC	195.0	W	432135 330416	SK33SW135	7.0	A564 DERBY SOUTH'BYPASS BH534
115AE	200.0	W	432110 330510	SK33SW285	8.0	A564 DERBY SOUTH BYPASS HBC2
116AC	202.0	W	432120 330450	SK33SW328	5.0	STOKE DERBY MOTORWAY M64 HILTON CHELLASTON 144
117	215.0	W	434520 330710	SK33SW279	10.0	DEEPDALE LANE SINFIN 6
118AD	216.0	W	434490 330810	SK33SW274	8.0	DEEPDALE LANE SINFIN 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
119AE	226.0	W	432090 330470	SK33SW284	8.0	A564 DERBY SOUTH BYPASS HBC1
120	229.0	E	435500 330200	SK33SE102	14.0	SINFIN MOOR NR CHELLASTON
121	243.0	E	435744 329610	SK32NE305	3.0	A564 DERBY SOUTH'BYPASS TP577

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/211953
#2O: scans.bgs.ac.uk/sobi_scans/boreholes/211958
#3: scans.bgs.ac.uk/sobi_scans/boreholes/211951
#4: scans.bgs.ac.uk/sobi_scans/boreholes/211954
#5: scans.bgs.ac.uk/sobi_scans/boreholes/211952
#6B: scans.bgs.ac.uk/sobi_scans/boreholes/209837
#7G: scans.bgs.ac.uk/sobi_scans/boreholes/211956
#8: scans.bgs.ac.uk/sobi_scans/boreholes/209835
#9A: scans.bgs.ac.uk/sobi_scans/boreholes/211778
#10: scans.bgs.ac.uk/sobi_scans/boreholes/211817
#11I: scans.bgs.ac.uk/sobi_scans/boreholes/209343
#12: scans.bgs.ac.uk/sobi_scans/boreholes/211524
#13A: scans.bgs.ac.uk/sobi_scans/boreholes/211968
#14B: scans.bgs.ac.uk/sobi_scans/boreholes/209836
#15: scans.bgs.ac.uk/sobi_scans/boreholes/211794
#16H: scans.bgs.ac.uk/sobi_scans/boreholes/209493
#17: scans.bgs.ac.uk/sobi_scans/boreholes/211819
#18: scans.bgs.ac.uk/sobi_scans/boreholes/211957
#19E: scans.bgs.ac.uk/sobi_scans/boreholes/209839
#20: scans.bgs.ac.uk/sobi_scans/boreholes/209834
#21C: scans.bgs.ac.uk/sobi_scans/boreholes/209833
#22: scans.bgs.ac.uk/sobi_scans/boreholes/211818
#23: scans.bgs.ac.uk/sobi_scans/boreholes/211821
#24K: scans.bgs.ac.uk/sobi_scans/boreholes/211820
#25A: scans.bgs.ac.uk/sobi_scans/boreholes/211714
#26: scans.bgs.ac.uk/sobi_scans/boreholes/209832
#27C: scans.bgs.ac.uk/sobi_scans/boreholes/209678
#28C: scans.bgs.ac.uk/sobi_scans/boreholes/209679
#29: scans.bgs.ac.uk/sobi_scans/boreholes/209677
#30D: scans.bgs.ac.uk/sobi_scans/boreholes/209822
#31D: scans.bgs.ac.uk/sobi_scans/boreholes/209821
#32E: scans.bgs.ac.uk/sobi_scans/boreholes/209838
#33: scans.bgs.ac.uk/sobi_scans/boreholes/209490
#34F: scans.bgs.ac.uk/sobi_scans/boreholes/211926
#35: scans.bgs.ac.uk/sobi_scans/boreholes/209342
#36: scans.bgs.ac.uk/sobi_scans/boreholes/209491
#37F: scans.bgs.ac.uk/sobi_scans/boreholes/211950
#38G: scans.bgs.ac.uk/sobi_scans/boreholes/211955
#39: scans.bgs.ac.uk/sobi_scans/boreholes/209070
#40H: scans.bgs.ac.uk/sobi_scans/boreholes/209494
#41H: scans.bgs.ac.uk/sobi_scans/boreholes/209344
#42H: scans.bgs.ac.uk/sobi_scans/boreholes/209333
#43I: scans.bgs.ac.uk/sobi_scans/boreholes/209069
#44: scans.bgs.ac.uk/sobi_scans/boreholes/209492
#45C: scans.bgs.ac.uk/sobi_scans/boreholes/209532
#46: scans.bgs.ac.uk/sobi_scans/boreholes/209341
#47J: scans.bgs.ac.uk/sobi_scans/boreholes/209533
#48: scans.bgs.ac.uk/sobi_scans/boreholes/211822
#49J: scans.bgs.ac.uk/sobi_scans/boreholes/209680
#50K: scans.bgs.ac.uk/sobi_scans/boreholes/211796
#51R: scans.bgs.ac.uk/sobi_scans/boreholes/211759
#52P: scans.bgs.ac.uk/sobi_scans/boreholes/211769
#53N: scans.bgs.ac.uk/sobi_scans/boreholes/209495
#54: scans.bgs.ac.uk/sobi_scans/boreholes/209255
#55F: scans.bgs.ac.uk/sobi_scans/boreholes/211925
#56L: scans.bgs.ac.uk/sobi_scans/boreholes/211775

#57M: scans.bgs.ac.uk/sobi_scans/boreholes/211929
#58: scans.bgs.ac.uk/sobi_scans/boreholes/211967
#59L: scans.bgs.ac.uk/sobi_scans/boreholes/211776
#60F: scans.bgs.ac.uk/sobi_scans/boreholes/211923
#61M: scans.bgs.ac.uk/sobi_scans/boreholes/211927
#62Y: scans.bgs.ac.uk/sobi_scans/boreholes/211777
#63N: scans.bgs.ac.uk/sobi_scans/boreholes/209345
#64M: scans.bgs.ac.uk/sobi_scans/boreholes/211928
#65M: scans.bgs.ac.uk/sobi_scans/boreholes/211765
#66O: scans.bgs.ac.uk/sobi_scans/boreholes/211768
#67: scans.bgs.ac.uk/sobi_scans/boreholes/211757
#68M: scans.bgs.ac.uk/sobi_scans/boreholes/211785
#69M: scans.bgs.ac.uk/sobi_scans/boreholes/211764
#70L: scans.bgs.ac.uk/sobi_scans/boreholes/211774
#71P: scans.bgs.ac.uk/sobi_scans/boreholes/211960
#72: scans.bgs.ac.uk/sobi_scans/boreholes/211772
#73: scans.bgs.ac.uk/sobi_scans/boreholes/211959
#74M: scans.bgs.ac.uk/sobi_scans/boreholes/211786
#75L: scans.bgs.ac.uk/sobi_scans/boreholes/211788
#76W: scans.bgs.ac.uk/sobi_scans/boreholes/211897
#77M: scans.bgs.ac.uk/sobi_scans/boreholes/211767
#78M: scans.bgs.ac.uk/sobi_scans/boreholes/211766
#79Q: scans.bgs.ac.uk/sobi_scans/boreholes/211729
#80Q: scans.bgs.ac.uk/sobi_scans/boreholes/211761
#81Z: scans.bgs.ac.uk/sobi_scans/boreholes/211896
#82S: scans.bgs.ac.uk/sobi_scans/boreholes/211771
#83R: scans.bgs.ac.uk/sobi_scans/boreholes/211758
#84: scans.bgs.ac.uk/sobi_scans/boreholes/211895
#85T: scans.bgs.ac.uk/sobi_scans/boreholes/211922
#86U: scans.bgs.ac.uk/sobi_scans/boreholes/211762
#87: scans.bgs.ac.uk/sobi_scans/boreholes/211962
#88S: scans.bgs.ac.uk/sobi_scans/boreholes/211964
#89V: scans.bgs.ac.uk/sobi_scans/boreholes/211773
#90: scans.bgs.ac.uk/sobi_scans/boreholes/209831
#91P: scans.bgs.ac.uk/sobi_scans/boreholes/211770
#92T: scans.bgs.ac.uk/sobi_scans/boreholes/211924
#93: scans.bgs.ac.uk/sobi_scans/boreholes/211961
#94U: scans.bgs.ac.uk/sobi_scans/boreholes/211784
#95: scans.bgs.ac.uk/sobi_scans/boreholes/211795
#96: scans.bgs.ac.uk/sobi_scans/boreholes/211963
#97V: scans.bgs.ac.uk/sobi_scans/boreholes/211787
#98: scans.bgs.ac.uk/sobi_scans/boreholes/209256
#99U: scans.bgs.ac.uk/sobi_scans/boreholes/211763
#100T: scans.bgs.ac.uk/sobi_scans/boreholes/211949
#101: scans.bgs.ac.uk/sobi_scans/boreholes/209071
#102V: scans.bgs.ac.uk/sobi_scans/boreholes/211930
#103W: scans.bgs.ac.uk/sobi_scans/boreholes/211901
#104X: scans.bgs.ac.uk/sobi_scans/boreholes/211965
#105AB: scans.bgs.ac.uk/sobi_scans/boreholes/209496
#106AA: scans.bgs.ac.uk/sobi_scans/boreholes/211798
#107X: scans.bgs.ac.uk/sobi_scans/boreholes/211966
#108Y: scans.bgs.ac.uk/sobi_scans/boreholes/211931
#109Z: scans.bgs.ac.uk/sobi_scans/boreholes/211900
#110AA: scans.bgs.ac.uk/sobi_scans/boreholes/211756
#111AA: scans.bgs.ac.uk/sobi_scans/boreholes/211706
#112AD: scans.bgs.ac.uk/sobi_scans/boreholes/211898

#113AB: scans.bgs.ac.uk/sobi_scans/boreholes/209497
#114AC: scans.bgs.ac.uk/sobi_scans/boreholes/211755
#115AE: scans.bgs.ac.uk/sobi_scans/boreholes/211905
#116AC: scans.bgs.ac.uk/sobi_scans/boreholes/211948
#117: scans.bgs.ac.uk/sobi_scans/boreholes/211899
#118AD: scans.bgs.ac.uk/sobi_scans/boreholes/211894
#119AE: scans.bgs.ac.uk/sobi_scans/boreholes/211904
#120: scans.bgs.ac.uk/sobi_scans/boreholes/211273
#121: scans.bgs.ac.uk/sobi_scans/boreholes/209346

8 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary: 62

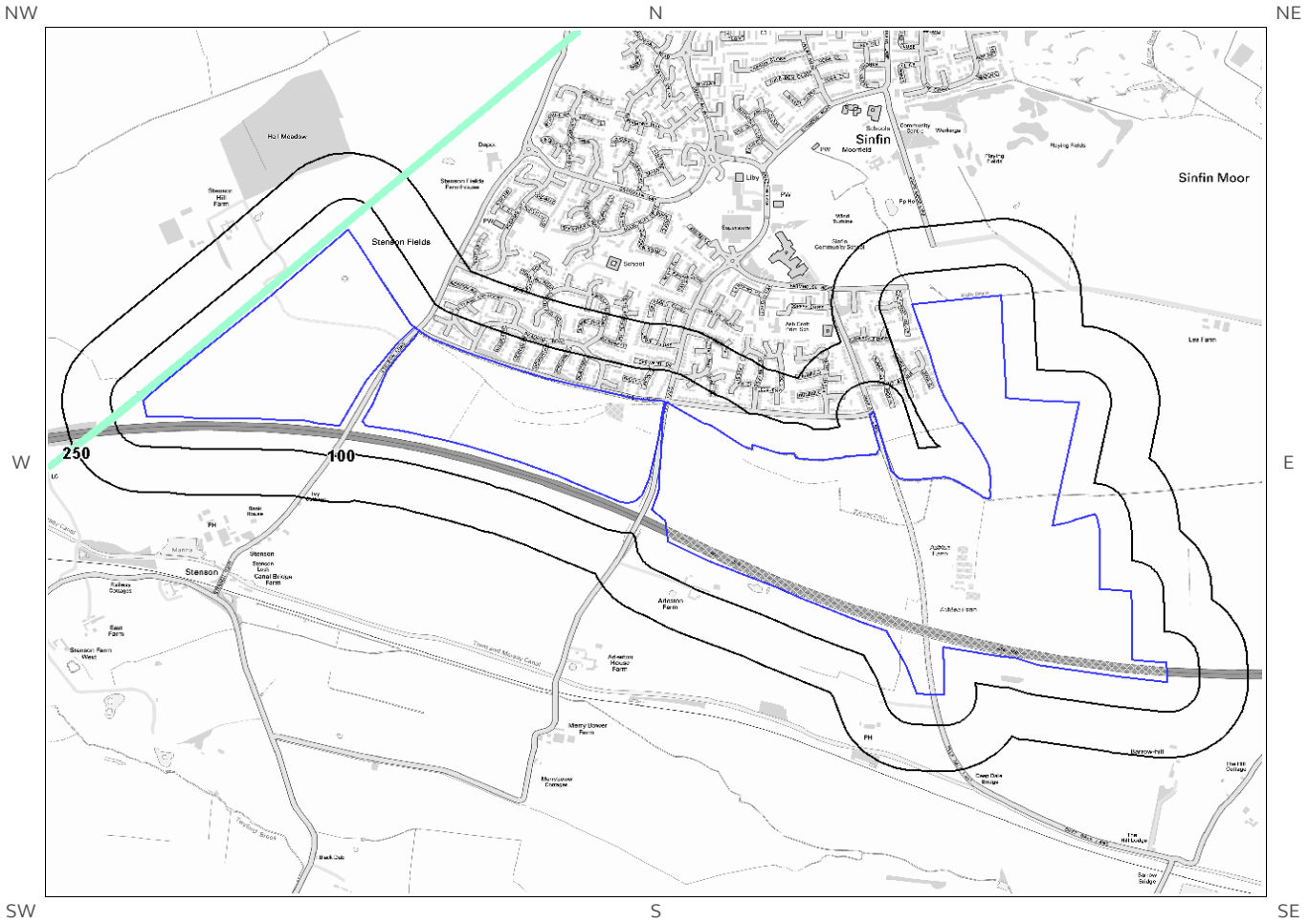
For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
8.0	NW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
12.0	NE	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
17.0	NE	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
18.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
18.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
25.0	SW	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
37.0	S	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
44.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels map



Railways and Tunnels Legend

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Ordnance Survey licence 100035207.
© OpenStreetMapContributors

- Site Outline
- Search Buffers (m): 250, 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary?	No
Have any underground railway lines been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary?	No
Have any other railway tunnels been identified within 250m of the site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary?	No
Have any historical railway or tunnel features been identified within 250m of the study site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Name	Type
15	NW	Not given	rail
15	NW	Not given	Multi Track
15	NW	Not given	Multi Track
15	NW	Not given	Multi Track
15	NW	Not given	Multi Track
15	NW	Not given	rail
18	NW	Not given	rail
18	NW	Not given	rail
187	W	Not given	Multi Track
187	W	Not given	Multi Track

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

*Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a **Groundsure HS2 and Crossrail 1 Report**.*

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

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Appendix 4: CIRA Risk Classification

BWB RISK ASSESSMENT CLASSIFICATION (AFTER CIRIA REPORT C552, CONTAMINATED LAND RISK ASSESSMENT: A GUIDE TO GOOD PRACTICE, 2001)

CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001 sets out a methodology for estimating risk. The methodology for risk evaluation is a qualitative method for interpreting the output for the risk estimation stage of the assessment. It involves the classification of the:

- Magnitude of the potential consequence (severity) of risk occurring
- Magnitude of the probability (likelihood) of the risk occurring

The classification of consequence and probability are set out in table A1 and A2 below

Table A1 Classification of Consequence

Classification	Definition	Examples
Severe (Sv)	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment protection Act 1990, Part IIA. Short term risk of pollution of controlled waters. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem	High concentrations of cyanide on the surface of an informal recreation area Major spillage of contaminants from site into controlled water. Explosion causing building collapse (can also equate to a short term human health risk if buildings are occupied.)
Medium (Md)	Chronic damage to Human Health ("significant harm"). Pollution of controlled waters. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of contaminants from site exceeding generic or site specific screening criteria Leaching of contaminants into a major or minor aquifer. Death of species within a designated nature reserve.
Mild (Mi)	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment	Pollution of non-classified groundwater Damage to building rendering it unsafe to occupy. (e.g. foundation damage resulting in instability)
Minor (Mr)	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by measures such as protective clothing etc). Easily reparable effects of damage to buildings, structures and services	The presence of contaminants at such concentration that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

The classification of consequence does not take into account the probability of the consequence being realised. Therefore there may be more than one consequence for a particular pollutant linkage. Both a severe and medium classification can result in death. Severe relates to short term (acute) risk while medium relates to long term (chronic) risk. Mild relates to significant harm but to less sensitive receptors. Minor classification relates to harm which is not significant but could have a financial cost.

Table A2 Classification of Probability

Classification	Definition
High likelihood (Hi)	There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable in the long term, or there is evidence at the receptor or harm or pollution
Likely (Li)	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood (Lw)	There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term.
Unlikely (Ul)	There is a pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

The classification gives a guide as to the severity and consequence of identified risk when compared with other risk presented on the site. It should be noted that if a risk is identified it cannot be classified as "no risk" but as "very low risk". Differing stakeholders may have a different view on the acceptability of a risk.

Once the consequence and probability have been classified these can be compared using a matrix(Table A3) to identify an overall risk category. These categories and the actions required are categorised in Table A4

Table A3 Risk Evaluation Matrix

		Consequence			
		Severe (Sv)	**Medium (Md)**	**Mild (Mi)**	**Minor (Mr)**
Probability	High likelihood (Hi)	Very high risk (VH)	High Risk (H)	Moderate Risk (M)	Mod/low risk (M/L)
	Likely (Li)	High risk (H)	Moderate risk (M)	Mod/low risk (M/L)	Low risk (L)
	Low likelihood (Lw)	Moderate risk (M)	Mod/low risk (M/L)	Low risk (L)	Very low risk (VL)
	Unlikely (Ul)	Mod/low risk (M/L)	Low risk (L)	Very low risk (VL)	Very low risk (VL)

Table A4 Risk Categorisations

Very high risk (VH)	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk (H)	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.
Moderate risk (M)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (L)	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk (VL)	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Reference

Rudland, D J, Lancefield, R M, Mayell, P N; 2001; Contaminated land Risk Assessment. A guide to Good Practice; CIRIA Report C552.

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Detailed Unexploded Ordnance (UXO) Risk Assessment

Project Name	Wragley Way Park
Client	BWB Consulting Limited
Site Address	Wragley Way Park, Derby, DE24 3AP
Report Reference	DA8642-00
Date	15th May 2019
Originator	JS

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Executive Summary

Site Location and Description

The area of works is located within Derbyshire across the southern periphery Stenson Fields, a large residential suburb situated southwards of Sinfin and northwards of Stenson. It is positioned approximately 6km south of Derby city centre,

The planned site area is split into three sections generally situated across the northern perimeter of the A50, which are characterised as the following. A western section occupying fields between railway sidings operated by East Midlands Trains and Stenson Road. A central section occupying fields between Stenson Road and Arleston Lane and a eastern section, the largest of the three, which occupies fields between Arleston Lane and an area where the Moor Lane access roadway concludes. These site areas will henceforth be referred to in the report as the western, central and eastern site areas respectively for the purpose of this report.

The site is approximately centred on the OS grid reference: **SK 3385330339.**

Proposed Works

The proposed works are understood to currently constitute a phase 1 geo-environmental assessment associated with the development of Wragley Way Park. No scope of works have been disclosed to 1st Line Defence at the time of the production of this report.

Geology and Bomb Penetration Depth

The British Geological Survey (BGS) map shows the site to generally be underlain by Gunthorpe Member – Mudstone, save for a section in the easternmost parts of the site that were underlain by Branscombe Mudstone Formation – Mudstone.

The superficial deposits that underlay the site also differ across the entirety of the site. The eastern site area is generally underlain by Lacustrine Deposits – clay and silt. A section of the site where Deep Dale Lane meets with the A50 is underlain by Head – clay, silt, sand and gravel. No superficial deposits are recorded across the remainder of the site; save for a slither of Lacustrine Deposits that traverse the central site area from the east.

Site-specific geotechnical information was not available to 1st Line Defence at the time of the production of this report. An assessment of maximum bomb penetration depth can be made once such data becomes available, or by a UXO specialist during on-site support.

It should be noted that the maximum depth that a bomb could reach will likely vary on account of the size of the site area and will be largely dependent on the specific underlying geological strata and its density.

UXO Risk Assessment

1st Line Defence has assessed that there is a **Low-Medium Risk** from both items of German aerial delivered UXO and Allied UXO across the site. This assessment is based on the following factors:

- The site area traversed the Repton and Shardlow Rural Districts, both of which are understood to have sustained low densities of bombing, in accordance with Home Office bombing statistics, likely due to their rural composition and distance from any significant targets within the city of Derby. This constituted to an average of 2.1 items dropped per 1,000 acres in the Repton R.D. and 6.5 items per 1,000 acres in the Shardlow R.D.
- The site area encompassed numerous fields that traversed the civil parishes of Twyford and Stenson, Sinfin and Arleston, Barrow-upon-Trent and Sinfin Moor. Available bomb census data recorded in the air raid files, compiled by Civil Defence Region 3 and discussed in **Section 11.6**, does not indicate any bombs to have fallen across these areas of the Repton and Shardlow Rural District. However, it must be noted that this record set is not considered comprehensive.
- To gain a greater understanding of the density of bombing sustained by the Repton and Shardlow Rural Districts, the Derbyshire Record Office was contacted. However, as discussed in **Sections 11.4 and 11.5**, no relevant records were found. As a result, the absence of this record set perhaps indicates that personnel reported to Derby, although no reference was found to the areas surrounding the site area in consulted Derby record sets.
- The closest confirmed strike to the site area is understood to have fallen in the vicinity of an RAF decoy site specified as SF4(c), situated at Lea Farm approximately a kilometre east of the site. Bomb census papers, presented across

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UXO Risk Assessment

Annex K, includes a supplementary map plotting the approximate location of the bomb strike, which is understood to have fallen 1.75km eastwards of the site, during an isolated raid in January 1942. No reference to any other raids could be found on this decoy.

- OS mapping presented in **Annex D** indicates that the site occupied a portion of an open area of agricultural land. Due to the soft underlying strata generally typical to grass fields, evidence of UXO can take the form of bomb entry holes measuring as little as 20cm in diameter and can be missed or obscured by any natural features. However, this possibility is considered to be significantly reduced by the low bomb density of the region and the lack of recorded incidents in the site locality.
- WWII-era photography presented in **Annexes J** show the grounds within the site area were well-maintained following the war, with evidence of agricultural farming in the vicinity indicated across the surrounding fields in the obtained photography. The site would therefore have been subjected to general agricultural use to tend the grounds and maintenance of the fields. Discovery of evidence of bombing would rely on the vigilance of local inhabitants and those tending the fields, although access across this general area is considered to have been largely infrequent during the war.
- Despite these conditions, due to the relatively low number of raids and incidents within the site locality the risk from UXO is not considered significant enough to warrant proactive risk mitigation measures. However, due to the references found to sporadic bomb strikes in the site locality and the discovery of live ordnance at Arleston Farm, approximately 400m south of the site, in 1985, the risk from UXO contamination cannot be discounted entirely. It is therefore recommended that UXO awareness briefings are provided to all personal carrying out intrusive works as a minimum precaution.
- One concern raised in this assessment has centred on the understanding that an Explosive Ordnance Clearance (EOC) task was carried out across the southern perimeter of the eastern site area at Arleston Farm, in 1985. The task uncovered four live items of ordnance, although no further information was made available regarding the nature of the ordnance. It has therefore, not been possible to determine whether these items were historic Allied ordnance or German air delivered bombs, although the former is considered more likely.
- It must be noted that it is understood that the EOC the task covered a relatively small surface area of 2.5 hectares, indicating these items of ordnance were situated close together. It is possible that this area was known to have been contaminated, thus the small scale of this task could indicate it was part of a planned clearance of ordnance in a specific location. Should this be the case, then the presence of a task such as this does not significantly elevate the likelihood that the general site area is as contaminated as this small area of land within the confines of Arleston Farm.
- Personnel associated with local Home Guard battalions are known to have utilised vast agricultural areas of land, such as the site area, for training purposes during the war. It is possible that Arleston Farm was requisitioned by the Home Guard for these very purposes, thus accounting for the discovery of items of live ordnance during EOC tasks carried out in this area. Should this be the case, it is possible that the Home Guard would have used the surrounding fields to the farm, which may have included the site area. However, no evidence could be found to suggest this was the case, although the possibility cannot be discounted given a known discovery of ordnance in the vicinity.

Recommended Risk Mitigation Measures

The following risk mitigation measures are recommended to support the proposed works at Wragley Way Park, Derby:

All Works

- UXO Risk Management Plan
- Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.
- Provision of Site Specific Safety Package (SSSP) – training to allow the client to undertake basic safety and awareness briefings

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Glossary

Abbreviation	Definition
AA	Anti-Aircraft
AFS	Auxiliary Fire Service
AP	Anti-Personnel
ARP	Air Raid Precautions
DA	Delay-action
EOC	Explosive Ordnance Clearance
EOD	Explosive Ordnance Disposal
FP	Fire Pot
GM	G Mine (Parachute mine)
HAA	Heavy Anti-Aircraft
HE	High Explosive
IB	Incendiary Bomb
JSEODOC	Joint Services Explosive Ordnance Disposal Operation Centre
LAA	Light Anti-Aircraft
LCC	London County Council
LRRB	Long Range Rocket Bomb (V-2)
LSA	Land Service Ammunition
NFF	National Filling Factory
OB	Oil Bomb
PAC	Pilotless Aircraft (V-1)
PB	Phosphorous Bomb
PM	Parachute Mine
POW	Prisoner Of War
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RFC	Royal Flying Corps
RNAS	Royal Naval Air Service
ROF	Royal Ordnance Factory
SA	Small Arms
SAA	Small Arms Ammunition
SD2	Anti-personnel “Butterfly Bomb”
SIP	Self-Igniting Phosphorous
U/C	Unclassified bomb
UP	Unrotated Projectile (rocket)
USAAF	United States Army Air Force
UX	Unexploded
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	Flying Bomb (Doodlebug)
V-2	Long Range Rocket
WAAF	Women’s Auxiliary Air Force
X	Exploded

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Contents

Executive Summary ..... **II**

Glossary ..... **IV**

Contents ..... **V**

Annexes ..... **VII**

1. Introduction **1**

1.1. Background *1*

2. Method Statement **1**

2.1. Report Objectives *1*

2.2. Risk Assessment Process *1*

2.3. Sources of Information *1*

3. Background to Bombing Records **2**

3.1. General Considerations of Historical Research *2*

3.2. German Bombing Records *2*

3.3. Allied Records *2*

4. UK Regulatory Environment and Guidelines **3**

4.1. General *3*

4.2. CDM Regulations 2015 ..... *3*

4.3. The 1974 Health and Safety at Work etc. Act *3*

4.4. CIRIA C681 ..... *4*

4.5. Additional Legislation *4*

5. The Role of Commercial UXO Contractors and The Authorities **5**

5.1. Commercial UXO Specialists *5*

5.2. The Authorities *5*

6. The Site **6**

6.1. Site Location *6*

6.2. Site Description *6*

7. Scope of the Proposed Works **6**

7.1. General *6*

8. Ground Conditions **7**

8.1. General Geology *7*

8.2. Site Specific Geology *7*

9. Site History **8**

9.1. Introduction *8*

9.2. Ordnance Survey Historical Maps *8*

9.2.1. OS Mapping – Western Site Area OS Mapping *8*

9.2.2. OS Mapping - Central Site Area *9*

9.2.3. OS Mapping - Eastern Site Area *9*

10. Introduction to German Aerial Delivered Ordnance **10**

10.1. General *10*

10.2. Generic Types of WWII German Aerial Delivered Ordnance *10*

10.3. Failure Rate of German Aerial Delivered Ordnance *11*

10.4. UXB Ground Penetration *11*

10.4.1. The J-Curve Effect *11*

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10.4.2. WWII UXB Ground Penetration Studies 11
10.4.3. Site Specific Bomb Penetration Considerations 12
10.5. V-Weapons 12
11. The Likelihood of Contamination from German Aerial Delivered UXBs 13
11.1. World War I 13
11.2. World War II Bombing of Southern Derbyshire 13
11.3. WWII Home Office Bombing Statistics 14
11.4. Bombing Records for the Repton Rural District 14
11.5. Bombing Records for the Shardlow Rural District 15
11.6. Civil Defence Region 3 Air Raid Summary Files 15
11.7. WWII-Era Aerial Photography 16
11.8. Introduction to WWII-era Bombing Decoy Sites 16
11.9. RAF Decoy Site Bomb Census Papers 17
11.10. Abandoned Bombs 17
11.11. Bomb Disposal Tasks 18
11.12. Evaluation of German Aerial Delivered UXO Records 18
12. Introduction to Allied Explosive Ordnance 20
12.1. General 20
12.2. Land Service Ammunition 20
12.3. Small Arms Ammunition 21
12.4. Home Guard 21
12.5. Defending the UK From Aerial Attack 21
12.5.1. Anti-Aircraft Artillery (AAA) 22
13. The Likelihood of Contamination from Allied Ordnance 23
13.1. Introduction 23
13.2. Evaluation of Contamination Risk from Allied UXO 23
14. The Likelihood of UXO Contamination Summary 25
15. The Likelihood that UXO Remains 27
15.1. Introduction 27
15.2. UXO Clearance 27
15.3. Post-war Redevelopment 27
16. The Likelihood of UXO Encounter 28
16.1. Introduction 28
16.2. Encountering Aerial Delivered Ordnance 28
16.3. Land Service/Small Arms Ammunition Encounter 28
17. The Likelihood of UXO Initiation 29
17.1. Introduction 29
17.2. Initiating Aerial Delivered Ordnance 29
17.3. Land Service /Small Arms Ammunition Initiation 29
18. Consequences of Initiation/Encounter 30
18.1. Introduction 30
18.2. Consequences of Detonation 30
19. 1st Line Defence Risk Assessment 31
19.2. Assessed Risk Level 31
20. Proposed Risk Mitigation Methodology 32

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20.1. General 32

Bibliography 33

Annexes

List of Report Annexes	
Annex A	Site Location Maps
Annex B	Recent Aerial Photography
Annex C	Client Provided Site Plan
Annex D	Pre and Post-WWII Historical Maps
Annex E	Examples of German Air-Delivered Ordnance
Annex F	The 'J-Curve' Effect
Annex G	Examples of UXO Incidents
Annex H	WWI Map of Air Raids and Naval Bombardments
Annex I	WWII-era Boundary Map of Derbyshire
Annex J	RAF Aerial Photography of the Site
Annex K	RAF Decoy Site Bomb Census Papers
Annex L	Examples of LSA
Annex M	Examples of SAA
Annex N	Home Guard Information
Annex O	Examples of Anti-Aircraft Projectiles

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1st Line Defence Limited
Detailed Unexploded Ordnance (UXO) Risk Assessment

Site: Wragley Way Park, Derby
Client: BWB Consulting Limited

1. Introduction

1.1. Background

1st Line Defence has been commissioned by BWB Consulting Limited to conduct a Detailed Unexploded Ordnance (UXO) Risk Assessment for the proposed works at the proposed Wragley Way Park site in Derby.

Buried UXO can present a significant risk to construction works and development projects. The discovery of a suspect device during works can cause considerable disruption to operations as well as cause unwanted delays and expense.

UXO in the UK can originate from three principal sources:

1. Munitions resulting from wartime activities including German bombing in WWI and WWII, long range shelling, and defensive activities.
2. Munitions deposited as a result of military training and exercises.
3. Munitions lost, burnt, buried or otherwise discarded either deliberately, accidentally, or ineffectively.

This report will assess the potential factors that may contribute to the risk of UXO contamination. If an elevated risk is identified at the site, this report will recommend appropriate mitigation measures, in order to reduce the risk to as low as is reasonably practicable. Detailed analysis and evidence will be provided to ensure an understanding of the basis for the assessed risk level and any recommendations.

This report complies with the guidelines outlined in *CIRIA C681*, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'

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2. Method Statement

2.1. Report Objectives

The aim of this report is to conduct a comprehensive assessment of the potential risk from UXO at the proposed Wragley Way Park site in Derby. The report will also recommend appropriate site and work-specific risk mitigation measures to reduce the risk from explosive ordnance during the envisaged works to a level that is as low as reasonably practicable.

2.2. Risk Assessment Process

1st Line Defence has undertaken a five-step process for assessing the risk of UXO contamination:

1. The likelihood that the site was contaminated with UXO.
2. The likelihood that UXO remains on the site.
3. The likelihood that UXO may be encountered during the proposed works.
4. The likelihood that UXO may be initiated.
5. The consequences of initiating or encountering UXO.

In order to address the above, 1st Line Defence has taken into consideration the following factors:

- Evidence of WWI and WWII German aerial delivered bombing as well as the legacy of Allied occupation.
- The nature and conditions of the site during WWII.
- The extent of post-war development and UXO clearance operations on site.
- The scope and nature of the proposed works and the maximum assessed bomb penetration depth.
- The nature of ordnance that may have contaminated the proposed site area.

2.3. Sources of Information

Every reasonable effort has been made to ensure that relevant evidence has been consulted and presented in order to produce a thorough and comprehensible report for the client. To achieve this the following, which includes military records and archive material held in the public domain, have been accessed:

- The National Archives and the Derby Local Studies and Family History Library.
- Historical mapping datasets.
- Historic England National Monuments Record.
- Relevant information supplied by BWB Consulting Limited.
- Available material from 33 Engineer Regiment (EOD) Archive (now 28 Regt).
- 1st Line Defence's extensive historical archives, library and UXO geo-datasets.
- Open sources such as published books and internet resources.

Research involved a visit to The National Archives and the Derby Local Studies and Family History Library.

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3. Background to Bombing Records

3.1. General Considerations of Historical Research

This desktop assessment is based largely upon analysis of historical evidence. Every reasonable effort has been made to locate and present significant and pertinent information. 1st Line Defence cannot be held accountable for any changes to the assessed risk level or risk mitigation measures, based on documentation or other data that may come to light at a later date, or which was not available to 1st Line Defence during the production of this report.

It is often problematic and sometimes impossible to verify the completeness and accuracy of WWII-era records. As a consequence, conclusions as to the exact location and nature of a UXO risk can rarely be quantified and are to a degree subjective. To counter this, a range of sources have been consulted, presented and analysed. The same methodology is applied to each report during the risk assessment process. 1st Line Defence cannot be held responsible for any inaccuracies or the incompleteness in available historical information.

3.2. German Bombing Records

During WWII, bombing records were generally gathered locally by the police, Air Raid Precaution (ARP) wardens and military personnel. These records typically contained information such as the date, the location, the amount of damage caused and the types of bombs that had fallen during an air raid. This information was made either through direct observation or post-raid surveys. The Ministry of Home Security Bomb Census Organisation would then receive this information, which was plotted onto maps, charts, and tracing sheets by regional technical officers. The collective record set (regional bomb census mapping and locally gathered incidents records) would then be processed and summarised into reports by the Ministry of Home Security Research and Experiments Branch. The latter were tasked with providing the government 'a complete picture of air raid patterns, types of weapons used and damage caused- in particular to strategic services and installations such as railways, shipyards, factories and public utilities.'[1]

The quality, detail and nature of record keeping could vary considerably between provincial towns, boroughs and cities. No two areas identically collated or recorded data. While some local authorities maintained records with a methodical approach, sources in certain areas can be considerably more vague, dispersed, and narrower in scope. In addition, the immediate priority was mostly focused on assisting casualties and minimising damage at the time. As a result, some records can be incomplete and contradictory. Furthermore, many records were even damaged or destroyed in subsequent air raids. Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are therefore not always reliable. Whereas records of attacks on military or strategic targets were often maintained separately and have not always survived.

3.3. Allied Records

During WWII considerable areas of land were requisitioned by the War Office for the purpose of defence, training, munitions production and the construction of airfields. Records relating to military features vary and some may remain censored. Within urban environments datasets will be consulted detailing the location of munition production as well as wartime air and land defences. In rural locations it may be possible to obtain plans of military establishments, such as airfields, as well as training logs, record books, plans and personal memoirs. As with bombing records, every reasonable effort will be made to access records of, and ascertain any evidence of, military land use. However, there are occasions where such evidence is not available, as records may not be accessible, have been lost/destroyed, or simply were not kept in the first place.

[1] http://www.nationalarchives.gov.uk/help-with-your-research/research-guides/bomb-census-survey-records-1940-1945/.

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4. UK Regulatory Environment and Guidelines

4.1. General

There is no formal obligation requiring a UXO risk assessment to be undertaken for construction projects in the UK, nor is there any specific legislation stipulating the management or mitigation of UXO risk. However, it is implicit in the legislation outlined below that those responsible for intrusive works (archaeology, site investigation, drilling, piling, excavation etc.) should undertake a comprehensive and robust assessment of the potential risks to employees and that mitigation measures are implemented to address any identified hazards.

4.2. CDM Regulations 2015

The Construction (Design and Management) Regulations 2015 (CDM 2015) define the responsibilities of parties involved in the construction of temporary or permanent structures.

The CDM 2015 establishes a duty of care extending from clients, principle co-ordinators, designers, and contractors to those working on, or affected by, a project. Those responsible for construction projects may therefore be accountable for the personal or proprietary loss of third parties, if correct health and safety procedure has not been applied.

Although the CDM does not specifically reference UXO, the risk presented by such items is both within the scope and purpose of the legislation. It is therefore implied that there is an obligation on parties to:

- Provide an appropriate assessment of potential UXO risks at the site (or ensure such an assessment is completed by others).
- Put in place appropriate risk mitigation measures if necessary.
- Supply all parties with information relevant to the risks presented by the project.
- Ensure the preparation of a suitably robust emergency response plan.

4.3. The 1974 Health and Safety at Work etc. Act

All employers have a responsibility under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, to ensure the health and safety of their employees and third parties, so far as is reasonably practicable and conduct suitable and sufficient risk assessments.

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4.4. CIRIA C681

In 2009, the Construction Industry Research and Information Association (CIRIA) produced a guide to UXO for the UK construction industry (CIRIA C681). CIRIA is a neutral, independent and not-for-profit body, linking organisations with common interests and facilitating a range of collaborative activities that help improve the industry.

The publication provides the UK construction industry with a defined process for the management of risks associated with UXO from WWI and WWII aerial bombardment. It is also broadly applicable to the risks from other forms of UXO that might be encountered. It focuses on construction professionals' needs, particularly if there is a suspected item of UXO on site and covers issues such as what to expect from a UXO specialist. The guidance also helps clients to fulfil their legal duty under CDM 2015 to provide designers and contractors with project specific health and safety information needed to identify hazards and risks associated with the design and construction work. This report conforms to this CIRIA guidance and to the various recommendations for good practice referenced therein. It is recommended that this document is acquired and studied where possible to allow a better understanding of the background to both the risk assessment process and the UXO issue in the UK in general.

4.5. Additional Legislation

In the event of a casualty resulting from the failure of an employer/client to address the risks relating to UXO, the organisation may be criminally liable under the Corporate Manslaughter and Corporate Homicide Act 2007.

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5. The Role of Commercial UXO Contractors and The Authorities

5.1. Commercial UXO Specialists

The role of a UXO Specialist (often referred to as UXO Consultant or UXO Contractor) such as 1st Line Defence is defined in CIRIA C681 as the provision of expert knowledge and guidance to the client on the most appropriate and cost-effective approach to UXO risk management at a site.

The principal role of UXO Specialists is to provide the client with an appropriate assessment of the risk posed by UXO for a specific project, and identify and carry out suitable methodology for the mitigation of any identified risks to reduce them to an acceptable level.

The requirement for a UXO Specialist should ideally be identified in the initial stages of a project, and it is recommended that this occur prior to the start of any detailed design. This will enable the client to budget for expenditure that may be required to address the risks from UXO, and may enable the project team to identify appropriate techniques to eliminate or reduce potential risks through considered design, without the need for UXO specific mitigation measures. The UXO Specialist should have suitable qualifications, levels of competency and insurances.

Please note 1st Line Defence has the capability to provide a complete range of required UXO risk mitigation services, in order to reduce a risk to as low as reasonably practicable. This can involve the provision of both ground investigation, and where appropriate, UXO clearance services.

5.2. The Authorities

The police have a responsibility to co-ordinate the emergency services in the event of an ordnance-related incident at a construction site. Upon inspection they may impose a safety cordon, order an evacuation, and call the military authorities Joint Services Explosive Ordnance Disposal Operation Centre (JSEODOC) to arrange for investigation and/or disposal. Within the Metropolitan Police Operational Area, SO15 EOD will be tasked to any discovery of suspected UXO. The request for Explosive Officer (Expo) support is well understood and practiced by all Metropolitan Boroughs. The requirement for any additional assets will then be coordinated by the Expo if required.

In the absence of a UXO specialist, police officers will usually employ such precautionary safety measures, thereby causing works to cease, and possibly requiring the evacuation of neighbouring businesses and properties.

The priority given to the police request will depend on the EOD teams judgement of the nature of the UXO risk, the location, people and assets at risk, as well as the availability of resources. The speed of response varies; authorities may respond immediately or in some cases it may take several days for the item of ordnance to be dealt with. Depending on the on-site risk assessment the item of ordnance may be removed from the site and/or destroyed by a controlled explosion.

Following the removal of an item of UXO, the military authorities will only undertake further investigations or clearances in high-risk situations. If there are regular UXO finds on a site the JSEODOC may not treat each occurrence as an emergency and will recommend the construction company puts in place alternative procedures, such as the appointment of a commercial contractor to manage the situation.

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6. The Site

6.1. Site Location

The area of works is located within Derbyshire across the southern periphery of Stenson Fields, a large residential suburb situated southwards of Sinfin and northwards of Stenson. It is positioned approximately 6km south of Derby city centre,

The planned site area is split into three sections generally situated across the northern perimeter of the A50, which are characterised as the following. A western section occupying fields between railway sidings operated by East Midlands Trains and Stenson Road. A central section occupying fields between Stenson Road and Arleston Lane and a eastern section, the largest of the three, which occupies fields between Arleston Lane and an area where the Moor Lane access roadway concludes. These site areas will henceforth be referred to in the report as the western, central and eastern site areas respectively for the purpose of this report.

The site is approximately centred on the OS grid reference: SK 3385330339.

Site location maps are presented in **Annex A**.

6.2. Site Description

The western site area covers three separate fields between Stenson Road, which establishes the eastern perimeter of this section of the site, and railway sidings further westwards. This railway track forms a section of the Derby-Crewe Line operated by East Midlands Trains and runs from south-west to north-east across the western perimeter of the site area. The northern perimeter borders residences across Sundew Court and Mallow Close off Chartley Road whilst the A50 defines the southern perimeter. A roadway dissects the site area, providing access to Stenson Hill Farm to the north-west of the site from Stenson Road.

The central site area occupies several separated fields framed by Wragley Way to the north, Arleston Lane to the east, the A50 to the south and Stenson Road to the west. Within this site area, dense vegetation can be found to line the different sections of the occupying fields.

The eastern site area, by far the largest, occupies several fields across the northern perimeter of the A50 situated eastwards from Arleston Lane. The northern perimeter generally follows the composition of the southern periphery of Stenson Fields, travels eastwards and then extends further northwards, keeping Coltsfoot Drive, Melfort Close and Loyne Close on the west. Deep Dale Lane runs from north to south and bisects the eastern site area; the site boundary extends southwards along Deep Dale Lane, traversing the A50. The easternmost point of this site area concludes close to Moor Lane, an access road situated to the east of the site. Small canals traverse the site area in several locations and agricultural structures occupy an area of land adjacent to Deep Dale Lane.

A recent aerial photograph and site plan are presented in **Annex B** and **Annex C** respectively.

7. Scope of the Proposed Works

7.1. General

The proposed works are understood to currently constitute a phase 1 geo-environmental assessment associated with the development of Wragley Way Park. No scope of works have been disclosed to 1st Line Defence at the time of the production of this report.

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8. Ground Conditions

8.1. General Geology

The British Geological Survey (BGS) map shows the site to generally be underlain by Gunthorpe Member – Mudstone, save for a section in the easternmost parts of the site that were underlain by Branscombe Mudstone Formation – Mudstone. The sedimentary bedrock is understood to have formed during different periods.

The sedimentary bedrock across the western and central site areas, as well as the western half of the eastern site area, were formed approximately 237 to 247 million years ago. The remainder of the eastern site area formed approximately 201 to 228 million years ago. Both these periods of time are understood to have fallen within the Triassic Period, and the entire site is indicated to have been previously dominated by hot deserts.

The superficial deposits that underlay the site also differ across the entirety of the site. The eastern site area is generally underlain by Lacustrine Deposits – clay and silt, save for a section close to the junction of Arleston Lane and the A50 in which no superficial deposits are recorded. A section of the site where Deep Dale Lane meets with the A50 is underlain by Head – clay, silt, sand and gravel. All of these aforementioned areas are understood to have formed up to 3 million years ago in the Quarternary Period, with the areas underlain by Lacustrine Deposits previously dominated by lakes and those underlain by Head previously dominated by subaerial slopes.

No superficial deposits are recorded across the remainder of the site, save for a slither of Lacustrine Deposits that traverse the central site area from the east.

8.2. Site Specific Geology

Site-specific geotechnical data was not available during the production of this report.

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9. Site History

9.1. Introduction

The purpose of this section is to identify the composition of the site pre and post-WWII. It is important to establish the historical use of the site, as this may indicate the site's relation to potential sources of UXO as well as help with determining factors such as the land use, groundcover, likely frequency of access and signs of bomb damage.

9.2. Ordnance Survey Historical Maps

To acquire an understanding as to the pre- and immediate post-WWII composition of the site area and surrounding vicinity, relevant historical Ordnance Survey (OS) maps were obtained from the Landmark Maps service.

The maps provide a visual representation of any substantial changes to the composition of the occupying structures that may potentially indicate damage sustained by incidents of bombing during the war. To show this, the obtained maps presented in **Annex D** show the composition of the site before and after the war. The maps are presented across **Annex D** are arranged in the following order: **Annex D1** and **Annex D2** show the pre- and post-WWII composition of the western site area, **Annex D3** and **Annex D4** show the central site area and **Annex D5** and **Annex D6** show the eastern site area.

The tables below discuss the map editions presented across **Annex D** and will discuss both site areas in their own individual right.

9.2.1. OS Mapping – Western Site Area OS Mapping

Pre WWII	
Date	**Description**
1923	The map presented in **Annex D1** shows the western site area in the conditions present during the pre-WWII period. The map shows the site encompasses several large fields within a vast area of open land across the eastern perimeter of railway sidings that formed the Crewe-Derby line. A roadway running from north to south can be seen to bisect this site area through the central; this roadway most likely provided access to *Stenson Farm* to the north of the site. The eastern perimeter of the site was formed by a roadway following the general composition of Stenson Road in the present day. No further structures or installations of note occupy the site area; the only features of note are rises specified in the northern section of the site.

Post-WWII	
Date	**Description**
1955	The map presented in **Annex D2** shows no substantial changes had occurred across the site area by the post-WWII period. The site still occupied fields devoid of any structural features of note framed between railway sidings and a roadway.

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9.2.2. OS Mapping - Central Site Area

Pre WWII	
Date	**Description**
1923	The map presented in **Annex D3** shows the central site area occupied several fields either side of the parliamentary and rural district boundary line dividing the Repton Rural District and the Shardlow Rural District. No structural features or installations of note occupy the site area, which itself is framed by a roadway to the west and a pathway to the east. An area of dense vegetation can be seen to occupy the north-eastern section of this site area.

Post-WWII	
Date	**Description**
1955	The map presented in **Annex D4** shows no substantial changes had occurred across the site area by the post-WWII period. The site still occupied fields devoid of any structural features of note framed between a roadway to the west and a pathway to the east.

9.2.3. OS Mapping - Eastern Site Area

Pre WWII	
Date	**Description**
1923	The map presented in **Annex D5** shows the eastern site area to occupy a large area of land devoid, as with the other site areas, of any structural features or installations of note. However, several structures are visible across the southern perimeter of the site area on this map edition. Southwards of the western section of the site, a small compound is specified as *Arleston Farm* of which is formed by residences and an *old gravel pit*. As the site continues eastwards, *Barrow Old Elm* and *Porter's Barn* can be seen to border the southern perimeter of the site. This site area can be seen to have been bisected by a roadway through the centre, although this is obscured by the presentation of this particular map edition.

Post-WWII	
Date	**Description**
1955	The map presented in **Annex D6** shows no substantial changes had occurred across the site area by the post-WWII period. The site still occupied fields devoid of any structural features of note bordered by pre-WWII structures that have survived onto this post-war map edition. The roadway through the centre of the site is not obscured on this map edition and is specified as Deep Dale Lane. Whilst slightly obscured by the scale of this map two circular structures can be seen at the top of the image. These structures are actually representations of filter bed installations associated with a sewage farm that was developed adjacent to the northernmost section of this site area in the post-war period.

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10. Introduction to German Aerial Delivered Ordnance

10.1. General

During WWI and WWII, the UK was subjected to bombing which often resulted in extensive damage to city centres, docks, rail infrastructure and industrial areas. The poor accuracy of WWII targeting technology and the nature of bombing techniques often resulted in neighbouring areas to targets sustaining collateral damage.

In addition to raids which concentrated on specific targets, indiscriminate bombing of large areas also took place, this occurred most prominently in the London 'Blitz', though affected many other towns and cities. As discussed in the following sections, a proportion of the bombs dropped on the UK did not detonate as designed. Although extensive efforts were made to locate and deal with these UXBs at the time, many still remain buried and can present a potential risk to construction projects.

The main focus of research for this section of the report will concern German aerial delivered ordnance dropped during WWII, although WWI bombing will also be considered.

10.2. Generic Types of WWII German Aerial Delivered Ordnance

To provide an informed assessment of the hazards posed by any items of unexploded ordnance that may remain in situ on site, the table below provides information on the types of German aerial delivered ordnance most commonly used by the Luftwaffe during WWII. Images and brief summaries of the characteristics of these items of ordnance are listed in **Annex E**.

Generic Types of WWII German Aerial Delivered Ordnance		
Type	**Frequency**	**Likelihood of detection**
High Explosive (HE) bombs	In terms of weight of ordnance dropped, HE bombs were the most frequently deployed by the Luftwaffe during WWII.	Although efforts were made to identify the presence of unexploded ordnance following an air raid, often the damage and destruction caused by detonated bombs made observation of UXB entry holes impossible. The entry hole of an unexploded bomb can be as little as 20cm in diameter and was easily overlooked in certain ground conditions (see **Annex F**). Furthermore, ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded smaller bomb. UXBs therefore present the greatest risk to present–day intrusive works.
1kg Incendiary bombs (IB)	In terms of the number of weapons dropped, small IBs were the most numerous. Millions of these were dropped throughout WWII.	IBs had very limited penetration capability and in urban areas would often have been located in post-raid surveys. If they failed to initiate and fell in water, on soft vegetated ground, or bombed rubble, they could easily go unnoticed.
Large Incendiary bombs (IB)	These were not as common as the 1kg IBs, although they were more frequently deployed than PMs and AP bomblets.	If large IBs did penetrate the ground, complete combustion did not always occur and in such cases they could remain a risk to intrusive works.
Aerial or Parachute mines (PM)	There were deployed less frequently than HE and IBs due to size, cost and the difficulty of deployment.	If functioning correctly, PMs generally would have had a slow rate of descent and were very unlikely to have penetrated the ground. Where the parachute failed, mines would have simply shattered on impact if the main charge failed to explode. There have been extreme cases when these items have been found unexploded. However, in these scenarios, the ground was either extremely soft or the munition fell into water.
Anti-personnel (AP) bomblets	These were not commonly used and are generally considered to pose a low risk to most works in the UK.	SD2 bomblets were packed into containers holding between 6 and 108 submunitions. They had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.

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10.3. Failure Rate of German Aerial Delivered Ordnance

It has been estimated that 10% of WWII German aerial delivered HE bombs failed to explode as designed. Reasons for why such weapons might have failed to function as designed include:

- Malfunction of the fuze or gain mechanism (manufacturing fault, sabotage by forced labour or faulty installation).
- Many were fitted with a clockwork mechanism that could become immobilised on impact.
- Failure of the bomber aircraft to arm the bombs due to human error or an equipment defect.
- Jettisoning the bomb before it was armed or from a very low altitude. This most likely occurred if the bomber aircraft was under attack or crashing.

From 1940 to 1945 bomb disposal teams reportedly dealt with a total of 50,000 explosive items of 50kg and over, 7,000 anti-aircraft projectiles and 300,000 beach mines. Unexploded ordnance is still regularly encountered across the UK, see press articles in **Annex G**.

10.4. UXB Ground Penetration

An important consideration when assessing the risk from a UXB is the likely maximum depth of burial. There are several factors which determine the depth that an unexploded bomb will penetrate:

- Mass and shape of bomb.
- Height of release.
- Velocity and angle of bomb.
- Nature of the ground cover.
- Underlying geology.

Geology is perhaps the most important variable. If the ground is soft, there is a greater potential of deeper penetration. For example, peat and alluvium are easier to penetrate than gravel and sand, whereas layers of hard strata will significantly retard and may stop the trajectory of a UXB.

10.4.1. The J-Curve Effect

J-curve is the term used to describe the characteristic curve commonly followed by an aerial delivered bomb dropped from height after it penetrates the ground. Typically, as the bomb is slowed by its passage through underlying soils, its trajectory curves towards the surface. Many UXBs are found with their nose cone pointing upwards as a result of this effect. More importantly however is the resulting horizontal offset from the point of entry. This is typically a distance of about one third of the bomb's penetration depth, but can be higher in certain conditions (see **Annex F**).

10.4.2. WWII UXB Ground Penetration Studies

During WWII the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by bomb disposal (BD) teams. Conclusions were made as to the likely average and maximum depths of penetration of different sized bombs in different geological strata.

For example, the largest common German bomb (500kg) had a likely concluded penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1,000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

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10.4.3. Site Specific Bomb Penetration Considerations

When considering an assessment of the bomb penetration at the site of proposed works the following parameters have been used:

- WWII geology – Gunthorpe Member and Branscombe Mudstone Formation.
- Impact angle and velocity – 10-15° from vertical and 270 metres per second.
- Bomb mass and configuration – The 500kg SC HE bomb, without retarder units or armour piercing nose (this was the largest of the common bombs used against Britain).

It has not been possible to determine maximum bomb penetration capabilities at this stage due to the lack of site specific geotechnical information available. An assessment can be made once such information becomes available or by an UXO Specialist on-site.

10.5. V-Weapons

Hitler's 'V-weapon' campaign began from mid-1944. It used newly developed unmanned cruise missiles and rockets. The V-1 known as the *flying bomb* or *pilotless aircraft* and the V-2, a long range rocket, were launched from bases in Germany and occupied Europe. A total of 9,251 V-1s and 1,115 V-2s were recorded in the United Kingdom.

Although these weapons caused considerable damage, their range was limited by their position of deployment across Europe and as a result the vast majority of V-weapon strikes were directed against targets in the south-east of England, predominantly in the London Boroughs and Home Counties. This limitation of capability meant targets in Derbyshire were generally too far to be considered for V-weapon strikes by the Luftwaffe.

The risk from V-weapons is therefore considered negligible and will not be further addressed in this report.

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11. The Likelihood of Contamination from German Aerial Delivered UXBs

11.1. World War I

During WWI Britain was targeted and bombed by Zeppelin Airships as well as Gotha and Giant fixed-wing aircraft. A WWI map of air raids and naval bombardments across England is presented in **Annex H**. This source does not record any WWI bombing incidents to have affected the site, although the city of Derby was affected by Zeppelin bombing.

WWI bombs were generally smaller and dropped from a lower altitude than those used in WWII. This resulted in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress. For these reasons there is a limited risk that UXBs passed undiscovered in the urban environment. When combined with the relative infrequency of attacks and an overall low bombing density the risk from WWI UXBs is considered low and will not be further addressed in this report.

11.2. World War II Bombing of Southern Derbyshire

The Luftwaffe's main objective for the attacks on Britain was to inhibit the country's economic and military capability. To achieve this they targeted airfields, depots, docks, warehouses, wharves, railway lines, factories, and power stations. Attacks on Derbyshire were largely directed toward the extensive railway networks and industrial estates situated within the city of Derby, perhaps most notoriously on the Rolls-Royce works, which produced Merlin engines for the aircraft employed by the RAF.

In comparison to the devastation experienced by the cities such as Nottingham and Coventry, Derby fared fairly lightly. As fear grew as to whether Derby and the surrounding areas would be targeted by the 'Baedeker Raids', a series of raids aimed towards historic towns such as Bath, Exeter and York in 1942, this soon subsided; Jill Armitage argues in *Derby: A History* that the Germans saw the area as "too small and unimportant to concentrate on."[2]

As represented by the boundary map presented in **Annex I**, the site was situated across the Repton and Shardlow Rural Districts (R.D.) of southern Derbyshire during WWII. The western site area was situated within the civil parish of Twyford and Stenson within the Repton R.D., as was a western section of the central site area was also situated in this parish and rural district. Home Office bombing statistics indicate that the Repton R.D. sustained a low density of bombing, with any bombing likely aimed toward the Crewe-Derby railway line that traversed the district, as well as the various airfields found across Repton, including RAF Burnaston and RAF Church Broughton.

The site extended eastwards, crossing over into the Shardlow R.D., and traverses the civil parishes of Sinfin and Arleston, Barrow upon Trent and Sinfin Moor. As with the Repton R.D., Shardlow is indicated by Home Office statistics to have sustained a low density of bombing during the war. Whilst Shardlow did not encompass the wealth of RAF airfields situated across the Repton R.D., a large number of decoy sites were developed to divert attention away from the industrial centre of Derby, as well as airfields in the general vicinity such as RAF Castle Donnington. One of these decoy sites would actually develop to the east of the site at a distance of approximately 1km. As a result, despite no significant industrial or military targets situated within the boundaries of the Shardlow R.D., attention was drawn by the decoys to divert attention away from the industrial hub of Derby and the airfields in the vicinity.

Records of bombing incidents in the civilian areas of Derbyshire were typically collected by Air Raid Precautions (ARP) wardens and collated by Civil Defence personnel. Records would be in the form of typed or hand written incident notes, maps and statistics. Records of bombing incidents for the districts are presented in the following sections.

[2] Jill Armitage, *Derby: A History,* Amberley Publishing (2014) p.113

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11.3. WWII Home Office Bombing Statistics

The following table summarises the quantity of German aerial delivered bombs (excluding 1kg incendiaries and anti-personnel bombs) dropped on the Repton and Shardlow Rural Districts between 1940 and 1945.

Record of German Ordnance Dropped on the Repton Rural District		
Area Acreage		**65,653**
Weapons	High Explosive bombs (all types)	139
	Parachute mines	1
	Oil bombs	0
	Phosphorus bombs	0
	Fire pots	0
	Pilotless aircraft (V-1)	0
	Long range rocket bombs (V-2)	0
Total		**140**
Number of Items per 1,000 acres		**2.1**

Record of German Ordnance Dropped on the Shardlow Rural District		
Area Acreage		**44,204**
Weapons	High Explosive bombs (all types)	284
	Parachute mines	0
	Oil bombs	2
	Phosphorus bombs	0
	Fire pots	0
	Pilotless aircraft (V-1)	0
	Long range rocket bombs (V-2)	0
Total		**286**
Number of Items per 1,000 acres		**6.5**

Source: Home Office Statistics
These tables do not include UXO found during or after WWII.

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. Although the risk relating to IBs is lesser than that relating to larger HE bombs, they were similarly designed to inflict damage and injury. Anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. Although Home Office statistics were not recorded, both types of item should not be overlooked when assessing the general risk to personnel and equipment.

11.4. Bombing Records for the Repton Rural District

It is understood that the composition of ARP warden networks and posts were seldom as regimented and organised as those concentrated on cities, larger county boroughs and urban districts with a particular industrial importance. The Home Office issued instructions that Rural District Councils would be expected to make their own individual arrangements for ARP, and it was often possible for local County Boroughs to assume responsibility as a sub-centre for surrounding parishes. As a result, it is considered possible that ARP personnel active in the Repton R.D. would have reported to Derby.

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While the Derbyshire Record Office was contacted in order to acquire bomb census documentation and/or ARP incident records with the purpose of understanding the potential locations of bombing incidents that may have affected the Repton R.D. and the site area. This record office did not indicate any record sets of clear relevance or usefulness in informing the conclusions reached in this report.

The Derbyshire Record Office did hold council minutes for the Repton R.D, which were organised into the committees represented through the minutes, including war-related topics such as Civil Defence, Evacuation and Welfare, Fire Guard and County War Agricultural. However, whilst it is possible for bombing incidents to be referenced, information within this type of record is often cursory with information such as the locations of bombing incidents, the type of damage caused and any resulting actions taken not provided. Generally bomb incidents are not given any further reference past simple acknowledgement that a bombing raid occurred on a set date.

Resultantly, the minutes have not proven relevant on this occasion to inform an understanding as to the density of bombing sustained across the site area, nor were any details ascertained regarding the locations of any potential incidents in relation to the site.

11.5. Bombing Records for the Shardlow Rural District

As with the Repton R.D., the Derbyshire Record Office was also contacted to obtain any relevant bomb census information regarding the Shardlow R.D. As with the Repton R.D. the record office indicated council minutes were available, although the documents were not organised and simply covered a period between general 1937 and 1951. It was not indicated whether these minutes concerned matters related to the war or general district council. Further records held were indicated to be minutes for meetings of general purpose committees between 1939 and 1951, and civil defence, housing, finance and cultural committee minutes between 1951 and 1954. As with Repton, the minutes have not proven relevant fur the purpose of this report on this occasion.

11.6. Civil Defence Region 3 Air Raid Summary Files

As discussed in **Section 11.4**, it is understood that County Boroughs could often act as sub-centres for surrounding parishes that lacked in sophisticated networks of ARP personnel given their brevity and scattered local populations. As a result, it is considered possible that ARP personnel situated across the Repton and Shardlow R.D.s would have reported to the County Borough of Derby.

This consideration is evidenced through consultation of Air Raid Summary files compiled and produced by Civil Defence Region 3, which covered Derbyshire, that were obtained from The National Archives. Entries within the record set were drawn from Derby, as well as its surrounding area, which included the civil parishes of West Hallam and Littleover of the Shardlow R.D. and Mickleover from within the Repton R.D. As well as this, reports were received from as far regions of Derbyshire as Pinxton, within the Chesterfield R.D.

No references were made to the civil parishes or Twyford and Stenson, Sinfin and Arleston, Barrow-upon-Trent and Sinfin Moor, of which the site traversed. Whilst this would possibly suggest the parishes were not affected by bombing, it must be noted that record set does not mitigate every single incident represented by Home Office bombing statistics (see **Section 11.3**) and thus cannot be considered complete. It is possible that, should a bomb have fallen across the site area, the records may have been lost before this record set was compiled and consolidated, or the incidents were not recorded to begin with.

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11.7. WWII-Era Aerial Photography

A high-resolution scan of WWII-era aerial photography for the site area was obtained from the National Monuments Record Office (Historic England). This photograph provides a record of the potential composition of the site during the war, as well as its condition immediately following the war (**see Annex J**).

WWII-Era Aerial Photography – Annex J	
Date	**Description**
2nd August 1945 (Western Area)	The image depicted in **Annex J1** shows the western site area, from which no major structural features are discernible. Track signs are visible within the fields across the site area, indicating agricultural works was carried out in these areas. The fields across the remainder of the site area appear otherwise well maintained.
1st March 1950 (Central Area)	The photography presented in **Annex J2** shows the central site area in March 1950. No structural features or installations are visible across the site area. Further to this, no features indicative of bomb damage, such as circular depressions or cratering, is visible in this image. As with the previous image, the fields appear to be generally well maintained, although it must be noted that the image quality is of a comparatively poorer quality.
1st March 1950 (Eastern Area)	The aerial photography presented in **Annex J3** shows the conditions present across the eastern site area immediately following WWII. This site area can be seen to encompass numerous fields through which several roadways traverse. No structural features or installations of note occupy this site area. The surrounding structures, such as those that constitute Arleston Farm across the southern perimeter of the western half of this site area, do not display any features that can commonly be ascribed to bomb damage, such as areas of structural damage or clearance. The fields generally appear to be well maintained, save for several rises and evidence of irrigation that is known to have affected the area from Hell Brook, Twyford Brook and Doles Brook. No evidence of bombing damage, such as circular depressions or cratering, can be seen across the site area.

11.8. Introduction to WWII-era Bombing Decoy Sites

The decoy principal – drawing German bombers away from their designated targets onto dummy sites five or six miles away – began in WWI to protect RAF stations and areas of industrial or military importance. In 1939, a new department was set up to investigate and coordinate the concept of defence by deception. A whole range of decoy sites were developed – some of them became very elaborate and covered large areas.

Common WWII Decoy Site Variants	
Decoy Type	**Description**
K-site	Daytime dummy airfield. Dummy aircraft and infrastructure.
Q-site	Night time dummy airfield. Intended to represent the working lights of an airfield after dark.
QL	Night time dummy infrastructure. Replicating the lights and workings of marshalling yards, naval installations, armament factories etc.

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QF	Fire based decoy. Initially for aircraft factories, RAF maintenance units and ordnance works to simulate them on fire following bombing.
Oil QF	Simulation of burning oil tanks.
Starfish	Replicating a city under incendiary attack.

By June 1944, decoy sites had been attacked on 730 occasions. Attacks ranged from a single night-time bomber dropping its load onto a "Q" site, to the mass attacks on Starfish sites. In misleading air attacks away from intended targets they were responsible for protecting cities, key Allied installations and saved the lives of thousands of people.

As WWII decoys were specifically designed to be bombed, proposed works planned in the vicinity of such installations can be at an elevated risk from German aerial delivered UXBs. It was not uncommon for evidence of UXBs at a decoy site to be overlooked following an air raid. Given that such installations were on open ground, sometimes agricultural fields, UXB entry holes were not always evident.

11.9. RAF Decoy Site Bomb Census Papers

It is understood that the site was situated a kilometre to the west of an RAF decoy site specified as SF4(c), located more specifically in the vicinity of Lea Farm. Decoy sites were developed to divert Luftwaffe attention away from key industrial and military installations and districts that, if damaged, could otherwise impede the capabilities of the Allied war effort. In this case, the decoy is understood to have been installed to divert attention away from the Rolls Royce works situated within Derby, whilst an extensive network of decoys situated further northwards and eastwards of the site were created to draw attention away from the airfields in the vicinity.

Bomb census papers compiled by personnel employed to maintain these decoy sites were obtained from The National Archives. The papers, presented across **Annex K**, indicate the decoy was targeted on the 10th January 1941 and 10th/11th January 1942 although analysis of the report for the former incident is considered to have been wrongly recorded. The details for this incident, in which an enemy plane approached the site and dropped a mine in the vicinity of the decoy site, match the details recorded for the incident in 1942. In both incidents, the searchlights are indicated to have been switched off. Whilst evidence of a raid within which the exact conditions occurred precisely one year apart in this area of Derbyshire would prove monumentally coincidental, it is considered more likely that the decoy site was targeted just once and the first incident report recorded 1941, not 1942, in error.

The 10th/11th January 1942 raid on the decoy site adjacent to the site was recorded with a supplementary map, which plots the precise location of the bomb that was dropped. This map is presented in **Annex K2**, upon which the east half of the eastern site area has been overlaid. On this map edition however, it can be seen that the bomb fell approximately 1.75km eastwards of the site and is not considered to have affected the site area. No further bomb incident files were found in the record set concerning SF4(c).

11.10. Abandoned Bombs

A post air-raid survey of buildings, facilities, and installations would have included a search for evidence of bomb entry holes. If evidence of an entry hole was encountered, Bomb Disposal Officer Teams would normally have been requested to attempt to locate, render safe, and dispose of the bomb. Occasionally, evidence of UXBs was discovered but due to a relatively benign position, access problems, or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an 'abandoned bomb'.

Given the inaccuracy of WWII records and the fact that these bombs were 'abandoned', their locations cannot be considered definitive or the lists exhaustive. The MoD states that 'action to make the

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devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that were never recorded.

Anecdotal evidence was found to suggest that a stick of bombs aimed towards the neighbouring decoy site at Lea Farm was dropped eastwards of the site and failed to explode. The source claims that the bombs still remain buried "deep in the soft clay of Sinfin Moor," although it cannot be verified whether this source has been updated since production.[3] As a result, abandoned bombs in the vicinity may still exist, although none are known to have fallen within the site area.

11.11. Bomb Disposal Tasks

In-house data indicates that an Explosive Ordnance Clearance (EOC) task was carried out approximately 400m southwards of the site at Arleston Farm, which uncovered four live items. No further information could be obtained as to the nature of these items of ordnance and it is not clear whether the items found were German air delivered bombs or Allied ordnance. However, in either case it is understood that the task covered a relatively small surface area of 2.5 hectares, indicating these items of ordnance were situated close together. It is possible that this area was known to have been contaminated, thus the small scale of this task could indicate it was part of a planned clearance of ordnance in a specific location. Should this be the case, then the presence of a task such as this does not significantly elevate the likelihood that the general site area is as contaminated as this small area of land within the confines of Arleston Farm.

Further information was sourced, although the information service from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (EOD) (now 29 Regt) is currently facing considerable delay. It has therefore not been possible to include any updated official information regarding bomb disposal/clearance tasks with regards to this site. If any relevant information is received at a later date, BWB Consulting Limited will be advised.

11.12. Evaluation of German Aerial Delivered UXO Records

Factors	Conclusion
Density of Bombing *It is important to consider the bombing density when assessing the possibility that UXBs remain in an area. High bombing density could allow for error in record keeping due to extreme damage caused to the area.*	The site area traversed the Repton and Shardlow Rural Districts, both of which are understood to have sustained low densities of bombing in accordance with Home Office bombing statistics. This constituted to an average of 2.1 items dropped per 1,000 acres in the Repton R.D. and 6.5 items per 1,000 acres in the Shardlow R.D. The Derbyshire Record Office was contacted to obtain bomb census information to ascertain the density of bombing across the Repton and Shardlow R.D. However, no relevant documents were indicated to be held. No entries concerning these districts were found within a record set covering Derbyshire that was obtained from The National Archives. Bomb census papers associated with an adjacent RAF decoy site indicates a bomb was dropped approximately 1.75km eastwards of the site whilst anecdotal evidence indicates a stick of abandoned bombs may still remain in Sinfin Moor, generally located 1.6km eastwards. Overall, it is understood that that the general area sustained sporadic episodes of bombing. No evidence could be found to indicate the planned site area sustained any incidents of bombing.
Damage *If buildings or structures on a site sustained bomb or fire damage any resulting rubble and debris could have*	Sources consulted to understand the composition of the site area during the war, such as WWII-era aerial photography and historical OS mapping, indicate that the proposed site boundary encompassed an area of fields within a large area of open land. Due to the lack of

[3] *https://www.sinfin.net/sinfin/sinfin.html*

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obscured the entry holes of unexploded bombs dropped during the same or later raids. Similarly, a high explosive bomb strike in an area of open agricultural land will have caused soil disturbance, increasing the risk that a UXB entry hole would be overlooked.	structures present on site and in the immediate vicinity, features usually indicative of bomb damage, such as areas of clearance and ruinous structures, are not indicated on consulted sources. Whilst it is often possible to view cratering or circular depressions across fields affected by bombing in WWII-era aerial photography, it is often not possible to clearly view evidence of UXO, the entry hole of which can be as little as 20cm in diameter (see **Annex F**). Further to this, it is possible for evidence of UXO to be obscured by subsequent agricultural activity carried out between the time of the strike and the date of the obtained photographs. Despite these factors, no obvious signs of bombing or bomb damage could be identified at the site location.
Access Frequency *UXO in locations where access was irregular would have a greater chance of passing unnoticed than at those that were regularly occupied. The importance of a site to the war effort is also an important consideration as such sites are likely to have been both frequently visited and subject to post-raid checks for evidence of UXO.*	WWII-era photography shows the grounds within the site area were well-maintained following the war, with evidence of agricultural farming in the vicinity indicated across the surrounding fields in the obtained photography. Whilst the site would have been subjected to general agricultural use to tend the grounds and sustain well-maintenance of the fields, the day-to-day access of the site area is considered to be irregular. Access is only considered to be frequent during times in which the fields were tended to by occupants. It is possible that the site was accessed during post-raid inspections of the fields following strikes in the vicinity aimed towards the nearby decoy site, although this too would be considered irregular and would have only resulted when strikes are known to have occurred.
Ground Cover *The nature of the ground cover present during WWII would have a substantial influence on any visual indication that may indicate UXO being present.*	The site area was generally typified by fields across an open area of agricultural land. Due to the soft underlying strata generally typical to grass fields, evidence of UXO can take the form of bomb entry holes measuring as little as 20cm in diameter and can often be missed or obscured by any natural features. However, this possibility is considered to be significantly reduced by the low bomb density of the region and the lack of recorded incidents in the site locality.
Bomb Failure Rate	There is no evidence to suggest that the bomb failure rate in the locality of the site would have been dissimilar to the 10% normally used.
Abandoned Bombs	It is understood that a stick of unexploded bombs fell at Sinfin Moor and remain buried beneath the soft clay. It cannot be confirmed if the source of this understanding has been updated or revised, or whether the information is factually correct. However, with no counter-evidence suggesting otherwise, evidence such as this cannot be ignored. Regardless, it is understood that, should these bombs have fallen, they did not fall within the bounds of the site area and thus pose no inherent risk to the site.
Bombing Decoy sites	It is understood that a decoy site was developed at Lea Farm, approximately a kilometre east of the site, which was specified as SF4(c). This decoy site was targeted on at least one occasion.
Bomb Disposal Tasks	It is understood an EOC task was carried out approximately 400m southwards of the eastern site area, uncovering four items of live ordnance over a specific area of 2.5 hectares. No further information regarding this discovery could be found.

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12. Introduction to Allied Explosive Ordnance

12.1. General

Many areas across the UK may be at risk from Allied UXO because of both wartime and peacetime military use. Typical military activities and uses that may have led to a legacy of military UXO at a site include former minefields, home guard positions, anti-aircraft emplacements, training and firing ranges, military camps, as well as weapons manufacture and storage areas.

Although land formerly used by the military were usually subject to clearance before they returned to civilian use, items of UXO are sometimes discovered and can present a potential risk to construction projects.

This section of the report discusses the generic types of Allied ordnance typically encountered on areas associated with former military activity.

12.2. Land Service Ammunition

Given the understanding that an EOC task uncovered four items of unspecified live ordnance was immediately southwards of the site, the possibility that the ordnance constituted items of Land Service Ammunition (LSA) cannot be discounted. The term LSA covers items of ordnance that are propelled, placed, or thrown during land warfare. These items may be filled or charged with explosives, smoke, incendiary, or pyrotechnics and can be divided into five main groups:

Land Service Ammunition	
Item	**Description**
Mortar Rounds	A mortar round is normally nosed-fused and fitted with its own propelling charge. Its flight is stabilised by the use of a fin. They are usually tear-drop shaped (though older variants are parallel sided), with a finned 'spigot tube' screwed or welded to the rear end of the body which houses the propellant charge. Mortars are either High Explosive or Carrier (i.e. smoke, incendiary, or pyrotechnic).
Grenades	A grenade is a short range weapon designed to kill or injure people. It can be hand thrown or fired from a rifle or a grenade launcher. Grenades either contain high explosive or smoke producing pyrotechnic compounds. The common variants have a classic 'pineapple' shape.
Projectiles	A projectile (or shell) is propelled by force, normally from a gun, and continues in motion using its kinetic energy. The gun a projectile is fired from usually determines its size. A projectile contains a fuzing mechanism and a filling. Projectiles can be high explosive, carrier or Shot (a solid projectile).
Rockets	Rockets were commonly designed to destroy heavily armoured military vehicles (anti-tank weapon). The device contains an explosive head (warhead) that can be accelerated using internal propellants to an intended target. Anti-aircraft rocket batteries were also utilised as part of air defence measures.
Landmines	A landmine is designed to be laid on or just below the ground to be exploded by the proximity, or contact of a person or vehicle. Landmines were often placed in defensive areas of the UK to obstruct potential invading adversaries.

In the UK unexploded or partially exploded mortars and grenades are the most common items of LSA encountered, as they could be transported and utilised anywhere. They are mostly encountered in areas used for military training and are often found discarded on or near historical military bases. Images of the most commonly found items of LSA are presented in **Annex L.**

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12.3. Small Arms Ammunition

It is also considered possible that the items uncovered during the EOC task carried out the south were items of Small Arms Ammunition (SAA). These are the most common type of ordnance encountered on land and refer to the complete round or cartridge designed to be discharged from varying sized hand-held weapons such as rifles, machine guns and pistols. SAA can include bullets, cartridge cases and primers/caps. Example imagery of SAA is presented in **Annex M**.

12.4. Home Guard

Personnel associated with local Home Guard battalions are known to have utilised vast agricultural areas of land for training purposes during the war, as to not disrupt or disturb activities in nearby urban districts and County Boroughs. Practice with items of explosive ordnance were best practiced in remote areas as opposed to built-up districts, thus fields surrounding towns were ideal for training purposes. Further to this, it is understood that farms were often requisitioned for storage and training purposes associated with the Home Guard.

It is possible that Arleston Farm was requisitioned by the Home Guard for these very purposes, thus accounting for the discovery of items of live ordnance during EOC tasks carried out in this area. Should this be the case, it is possible that the Home Guard would have used the surrounding fields to the farm, which may have included the site area. However, documents recording Home Guard activities are difficult to obtain and are often not consolidated sources. Many of the training operations were not recorded or have since been lost, thus this possibility cannot be confirmed nor denied.

Information regarding common items of ordnance associated with the Home Guard are presented in **Annex N**.

12.5. Defending the UK From Aerial Attack

During WWII the War Office employed a number of defence tactics against the Luftwaffe from bombing major towns, cities, manufacturing areas, ports and airfields. These can be divided into passive and active defences (examples are provided in the table below).

Active Defences	Passive Defences
• Anti-aircraft gun emplacements to engage enemy aircraft. • Fighter aircraft to act as interceptors. • Rockets and missiles were used later during WWII.	• Blackouts and camouflaging to hinder the identification of Luftwaffe targets. • Decoy sites were located away from targets and used dummy buildings and lighting to replicate urban, military, or industrial areas. • Barrage balloons forced enemy aircraft to greater altitudes. • Searchlights were often used to track and divert adversary bomber crews during night raids.

Active defences such as anti-aircraft artillery present a greater risk of UXO contamination than passive defences. Unexploded ordnance resulting from dogfights and fighter interceptors is rarely encountered and difficult to accurately qualify.

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12.5.1. Anti-Aircraft Artillery (AAA)

During WWII three main types of gun sites existed: heavy anti-aircraft (HAA), light anti-aircraft (LAA) and 'Z' batteries (ZAA). If the projectiles and rockets fired from these guns failed to explode or strike an aircraft they would descend back to land. The table below provides further information on the operation and ordnance associated with these type of weapons.

Anti-Aircraft Artillery				
Item	**Description**			
HAA	These large calibre guns such as the 3.7" QF (Quick Firing) were used to engage high flying enemy bombers, They often fired large HE projectiles, which were usually initiated by integral fuzes triggered by impact, area, time delay or a combination of aforementioned mechanisms.			
LAA	These mobile guns were intended to engage fast, low flying aircraft. They were typically rotated between locations on the perimeters of towns and strategically important industrial works. As they could be moved to new positions with relative ease when required, records of their locations are limited. The most numerous of these were the 40mm Bofors gun which could fire up to 120 x 40mm HE projectiles per minute to over 1,800m.			
Variations in HAA and LSA Ammunition	**Gun type**	**Calibre**	**Shell Weight**	**Shell Dimensions**
	3.0 Inch	76mm	7.3kg	76mm x 356mm
	3.7 Inch	94mm	12.7kg	94mm x 438mm
	4.5 Inch	114mm	24.7kg	114mm x 578mm
	40mm	40mm	0.9kg	40mm x 311mm
Z-AA	The three inch unrotated rocket/projectile known as the UP-3 had initially been developed for the Royal Navy. The UP-3 was also used in ground-based single and 128-round launchers known as ''Z'' batteries. The rocket, containing a high explosive warhead was often propelled by cordite.			

The closest recorded HAA to the site was located approximately 600m east of the site, however the range of a projectile can be up to 15km. The site would also have been in range of mobile light anti-aircraft guns.

The conditions in which anti-aircraft projectiles may have fallen unnoticed within a site area are analogous to those regarding aerial delivered ordnance. Unexploded anti-aircraft projectiles could essentially have fallen indiscriminately anywhere within range of the guns. The chance of such items being observed, reported and removed during the war depends on factors such as land use, ground cover, damage and frequency of access – the same factors that govern whether evidence of a UXB is likely to have been noted. More information about these factors with regards to this particular site can be found in the German Aerial Delivered Ordnance section of this report.

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at **Annex O**.

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13. The Likelihood of Contamination from Allied Ordnance

13.1. Introduction

When undertaking construction work within or immediately adjacent to a site with previous and/or current military use, it is often considered likely to contain an elevated risk of contamination from Allied UXO. This assumption of risk is based on the following reasoning:

- The clearance of ordnance from military camps, depots, storage facilities, ranges and training areas were not always effectively managed, or undertaken to equivalent degrees of certainty. In addition, search and detection equipment used over seventy years ago following WWII has proved ineffective both for certain types of UXO and at depths beyond capability.
- In the vast majority of cases, explosive ordnance would have been stored and available for use at military installations. Ordnance ranged from small arms and land service ammunition to weapons components and larger, aerial delivered items. During periods of heightened activity, ordnance was also frequently lost in transit, particularly between stores and assigned training locations.
- The military generally did not anticipate that their land would be later sold for civilian development, and consequently appropriate ordnance disposal procedure was not always adhered to. It was not uncommon for excess or unwanted ordnance to be buried or burnt within the perimeters of a military establishment as a means of disposal. Records of such practice were rarely kept.

There are several factors that may serve to either affirm, increase, or decrease the level of risk within a site with a history of military usage. Such factors are typically dependent upon the proximity of the proposed area of works to training activities, munition productions and storage, as well as its function across the years.

This section will examine the history of the proposed site and assess to what degree, if any, the site could have become contaminated as a result of the military use of the surrounding area.

13.2. Evaluation of Contamination Risk from Allied UXO

1st Line Defence has considered the following potential sources of Allied ordnance contamination:

Sources of Allied UXO Contamination	Conclusion
Military Camps *Military camps present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training.*	1st Line Defence could find no evidence of a military camp within the site.
Anti-Aircraft Defences *Anti-Aircraft defences were employed across the country. Proximity to anti-aircraft defences increases the chance of encountering AA projectiles.*	The closest HAA was located approximately 600m east of the site. It is considered possible that shells associated with this particular HAA battery may have been stored in the various agricultural structures in the vicinity of the site, including *Barrow Old Elm* and *Porter's Barn* that are visible on historical OS map editions presented across **Annexes D5 and D6**. Furthermore, this may account for the discovery of ordnance at Arleston Farm. Given that the closest HAA was located approximately 600m east of the site, it should be noted that the range of a projectile can be up to 15km. The conditions in which HAA or LAA projectiles may have fallen unnoticed within a site footprint are analogous to those regarding German aerial delivered ordnance.

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Home Guard Activity *The Home Guard regularly undertook training and ordnance practice in open areas, as well as burying ordnance as part of anti-invasion defences.*	1st Line Defence has no evidence of any Home Guard activities on the site.
Defensive Positions *Defensive positions suggest the presence of military activity, which is often indicative of ordnance storage, usage or disposal.*	There is no evidence of any defensive features formerly located on or bordering the site footprint.
Training or firing ranges *Areas of ordnance training saw historical ordnance usage in large numbers, often with inadequate disposal of expended and live items. The presence of these ranges significantly impact on the risk of encountering items of ordnance in their vicinity.*	There is no evidence of such features affecting the site.
Defensive Minefields *Minefields were placed in strategic areas to defend the country in the event of a German invasion. Minefields were not always cleared with an appropriate level of vigilance.*	There is no evidence of defensive minefields affecting the site.
Ordnance Manufacture *Ordnance manufacture indicates an increased chance that items of ordnance were stored, or disposed of, within a location.*	No information of ordnance being stored, produced, or disposed of within the proposed site could be found.
Military Related Airfields *Military airfields present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training or bombing practice.*	The site was not situated within the perimeters or vicinity of a military airfield.

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14. The Likelihood of UXO Contamination Summary

The following table assesses the likelihood that the site was contaminated by items of German aerial delivered and Allied ordnance. Factors such as the risk of UXO initiation, remaining, and encountering will be discussed later in the report.

UXO Contamination Summary	
Quality of the Historical Record	The research has evaluated a range of visual sources, including pre- and post-WWII Ordnance Survey maps and historical aerial photography of the site area and environs. As well as this, incident reports associated with the adjacent decoy site at Lea Farm have been consulted. A range of secondary historical sources and anecdotal evidence have also been consulted. Despite this, the available record set was found to be somewhat limited. The Derbyshire Record Office did not indicate any explicit bomb census data is held by the record office, nor were any entries found within Air Raid Files covering Derbyshire to indicate that the areas of the Repton and Shardlow Rural Districts occupied by the site area were affected by bombing. Whilst visual sources have allowed for an analysis of the physical conditions across the site, the usage of the site cannot be ascertained. It is known that an EOC task uncovered four live items of unspecified ordnance to the south of the site, yet no further information regarding the nature of this ordnance could be found. As a result, it cannot be confirmed nor denied whether these items constituted German aerial-delivered ordnance, LSA, SAA or items associated with Home Guard activity.
German Aerial Delivered Ordnance	• The site area traversed the Repton and Shardlow Rural Districts, both of which are understood to have sustained low densities of bombing, in accordance with Home Office bombing statistics, likely due to their rural composition and distance from any significant targets within the city of Derby. This constituted to an average of 2.1 items dropped per 1,000 acres in the Repton R.D. and 6.5 items per 1,000 acres in the Shardlow R.D. • The site area encompassed numerous fields that traversed the civil parishes of Twyford and Stenson, Sinfin and Arleston, Barrow-upon-Trent and Sinfin Moor. Available bomb census data recorded in the air raid files, compiled by Civil Defence Region 3 and discussed in **Section 11.6**, does not indicate any bombs to have fallen across these areas of the Repton and Shardlow Rural District. However, it must be noted that this record set is not considered comprehensive. • To gain a greater understanding of the density of bombing sustained by the Repton and Shardlow Rural Districts, the Derbyshire Record Office was contacted. However, as discussed in **Sections 11.4 and 11.5**, no relevant records were found. As a result, the absence of this record set perhaps indicates that personnel reported to Derby, although no reference was found to the areas surrounding the site area in consulted Derby record sets. • The closest confirmed strike to the site area is understood to have fallen in the vicinity of an RAF decoy site specified as SF4(c), situated at Lea Farm approximately a kilometre east of the site. Bomb census papers, presented across **Annex K**, includes a supplementary map plotting the approximate location of the bomb strike, which is understood to have fallen 1.75km eastwards of the site, during an isolated raid in January 1942. No reference to any other raids could be found on this decoy. • OS mapping presented in **Annex D** indicates that the site occupied a portion of an open area of agricultural land. Due to the soft underlying strata generally typical to grass fields, evidence of UXO can take the form of bomb entry holes measuring as little as 20cm in diameter and can be missed or obscured by any natural features. However, this possibility is considered to be significantly reduced by the low bomb density of the region and the lack of recorded incidents in the site locality.

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	• WWII-era photography presented in **Annexes J** show the grounds within the site area were well-maintained following the war, with evidence of agricultural farming in the vicinity indicated across the surrounding fields in the obtained photography. The site would therefore have been subjected to general agricultural use to tend the grounds and maintenance of the fields. Discovery of evidence of bombing would rely on the vigilance of local inhabitants and those tending the fields, although access across this general area is considered to have been largely infrequent during the war. • Despite these conditions, due to the relatively low number of raids and incidents within the site locality the risk from UXO is not considered significant enough to warrant proactive risk mitigation measures. However, due to the references found to sporadic bomb strikes in the site locality and the discovery of live ordnance at Arleston Farm, approximately 400m south of the site, in 1985, the risk from UXO contamination cannot be discounted entirely. It is therefore recommended that UXO awareness briefings are provided to all personal carrying out intrusive works as a minimum precaution.
Allied Ordnance	• Of concern is the understanding that an Explosive Ordnance Clearance (EOC) task was carried out across the southern perimeter of the eastern site area at Arleston Farm, in 1985. The task uncovered four live items of ordnance, although no further information was made available regarding the nature of the ordnance. It has therefore, not been possible to determine whether these items were historic Allied ordnance or German air delivered bombs, although the former is considered more likely. • It must be noted that it is understood that the EOC the task covered a relatively small surface area of 2.5 hectares, indicating these items of ordnance were situated close together. It is possible that this area was known to have been contaminated, thus the small scale of this task could indicate it was part of a planned clearance of ordnance in a specific location. Should this be the case, then the presence of a task such as this does not significantly elevate the likelihood that the general site area is as contaminated as this small area of land within the confines of Arleston Farm. • Personnel associated with local Home Guard battalions are known to have utilised vast agricultural areas of land, such as the site area, for training purposes during the war. It is possible that Arleston Farm was requisitioned by the Home Guard for these very purposes, thus accounting for the discovery of items of live ordnance during EOC tasks carried out in this area. Should this be the case, it is possible that the Home Guard would have used the surrounding fields to the farm, which may have included the site area. However, no evidence could be found to suggest this was the case, although the possibility cannot be discounted given a known discovery of ordnance in the vicinity.

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15. The Likelihood that UXO Remains

15.1. Introduction

It is important to consider the extent to which any explosive ordnance clearance (EOC) activities or extensive ground works have occurred on site. This may indicate previous ordnance contamination or reduce the risk that ordnance remains undiscovered.

15.2. UXO Clearance

Whilst it is understood that an EOC task was carried out southwards of the site, it must be noted that UXO is sometimes still discovered even on sites where clearance operations are known to have been undertaken. The detail and level of survey and targeted investigation undertaken by the military will depend on the former use of the site and purpose of the clearance (i.e. disposal, redevelopment, return to agriculture, etc.).[4] The level of clearance will also depend on the available technology, resources and practices of the day.

It therefore cannot be assumed that the risk of UXO remaining has been completely mitigated, even though EOC tasks have been undertaken at a former military site.

15.3. Post-war Redevelopment

Following the war, the site has generally retained the conditions present during WWII, save for the development of Ashlea Farm across the eastern perimeter of Deep Dale Lane. Across the locality of the site, several drains have been laid beneath surface level to assist with flooding across the fields. Most notably, the field now borders Stenson Fields, a large housing development started in the 1970s that now defines the northern perimeter of the site boundary. Across the southern perimeter of the site, the A50 has been laid.

In areas of development, the risk from deep-buried unexploded bombs is only considered mitigated at locations where post war piling or deep foundations have taken place, although it must be noted that the majority of the site has remained undeveloped since wartime.

[4] *CIRIA C681*

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16. The Likelihood of UXO Encounter

16.1. Introduction

For UXO to pose a risk at a site, there should be a means by which any potential UXO might be encountered on that site.

The likelihood of encountering UXO on the site of proposed would depend on various factors, such as the type of UXO that might be present and the intrusive works planned on site. In most cases, UXO is more likely to be present below surface (buried) than on surface.

In general, the greater the extent and depth of intrusive works, the greater the risk of encountering. The most likely scenarios under which items of UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

16.2. Encountering Aerial Delivered Ordnance

Since an aerial delivered bomb may come to rest at any depth between just below ground level and its maximum penetration depth, there is a chance that such an item (if present) could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level as well as at depth.

16.3. Land Service/Small Arms Ammunition Encounter

Items of LSA and SAA are mostly encountered in areas previously used for military training. Such items could have been lost, burnt, buried or discarded during being in use by the military. Due to this, LSA are most likely to be encountered at relatively shallow depths – generally in the top 1m below ground level. Therefore, such items are most likely to be encountered during open excavation works. In some cases, there is the potential that LSA or SAA may be present on the surface of the ground – especially in areas with active military use or were recently in use by the MoD.

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17. The Likelihood of UXO Initiation

17.1. Introduction

UXO does not spontaneously explode. Older UXO devices will require an external event/energy to create the conditions for detonation to occur. The likelihood that a device will function can depend on a number of factors including the type of weaponry, its age and the amount of energy it is struck with.

17.2. Initiating Aerial Delivered Ordnance

Unexploded bombs do not spontaneously explode. All high explosive filling requires significant energy to create the conditions for detonation to occur.

In recent decades, there have been a number of incidents in Europe where Allied UXBs have detonated, and incidents where fatalities have resulted (some examples are presented in **Annex G**). There have been several hypotheses as to the reason why the issue is more prevalent in mainland Europe – reasons could include the significantly greater number of bombs dropped by the Allied forces on occupied Europe, the preferred use by the Allies of mechanical rather than electrical fuzes, and perhaps just good fortune. The risk from UXO in the UK is also being treated very seriously in many sectors of the construction industry, and proactive risk mitigation efforts will also have affected the lack of detonations in the UK.

There are certain construction activities which make initiation more likely, and several potential initiation mechanisms must be considered:

UXB Initiation	
Direct Impact	Unless the fuze or fuze pocket is struck, there needs to be a significant impact e.g. from piling or large and violent mechanical excavation, onto the main body of the weapon to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
Re- starting the Clock	A small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion would have taken place within the fuze mechanism over the last 70+ years that would prevent clockwork mechanisms from functioning. Nevertheless, it was reported that the clockwork fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-start.
Friction Impact	The most likely scenario resulting in the detonation of a UXB is friction impact initiating the shock-sensitive fuze explosive. The combined effects of seasonal changes in temperature and general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive which could detonate the main charge.

17.3. Land Service /Small Arms Ammunition Initiation

Items of LSA generally do not become inert or lose their effectiveness with age. Time can cause items to become more sensitive and less stable. This applies equally to items submerged in water or embedded in silts, clays, or similar materials. The greatest risk occurs when an item of ordnance is struck or interfered with. This is likely to occur when mechanical equipment is used or when unqualified personnel pick up munitions.

If left alone, an item of LSA will pose little/no risk of initiation. Therefore, if it is not planned to undertake construction/intrusive works at the site, the risk of initiation of any LSA that may be present would be negligible. Similarly, those accessing a contaminated area would be at minimal risk if they do not interfere with any UXO present on the ground. Clearly for many end uses however, the

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presence of UXO anywhere on a site would not be acceptable as it could not be guaranteed that the items will not be handled, struck or otherwise affected, increasing the likelihood of initiation.

Items of SAA are much less likely to detonate than LSA or UXBs, but can be accidentally initiated by striking the casing, coming into contact with fire, or being tampered with/dismantled. It is likely that the detonation of an item of SAA would result in a small explosion, as the pressure would not be contained within a barrel. Detonation would only result in local overpressure and very minor fragmentation from the cartridge case.

18. Consequences of Initiation/Encounter

18.1. Introduction

The repercussions of the inadvertent detonation of UXO during intrusive ground works, or if an item or ordnance is interfered with or disturbed, are potentially profound, both in terms of human and financial cost. A serious risk to life and limb, damage to plant and total site shutdown during follow-up investigations are potential outcomes. However, if appropriate risk mitigation measures are put in place, the chances of initiating an item of UXO during ground works is comparatively low.

The consequences of encountering UXO can be particularly notable in the case of high-profile sites (such as airports and train stations) where it is necessary to evacuate the public from the surrounding area. A site may be closed for anything from a few hours to a week with potentially significant cost in lost time. It should be noted that even the discovery of suspected or possible item of UXO during intrusive works (if handled solely through the authorities), may also involve significant loss of production

18.2. Consequences of Detonation

When considering the potential consequences of a detonation, it is necessary to identify the significant receptors that may be affected. The receptors that may potentially be at risk from a UXO detonation on a construction site will vary depending on the site specific conditions but can be summarised as follows:

- People – site workers, local residents and general public.
- Plant and equipment – construction plant on site.
- Services – subsurface gas, electricity, telecommunications.
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and the weakening of support structures.
- Environment – introduction of potentially contaminating materials.

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19. 1st Line Defence Risk Assessment

19.1. Risk Assessment Stages

Taking into account the quality of the historical evidence, the assessment of the overall risk from unexploded ordnance is based on the following five considerations:

1. That the site was contaminated with unexploded ordnance.
2. That unexploded ordnance remains on site.
3. That such items will be encountered during the proposed works.
4. That ordnance may be initiated by the works operations.
5. The consequences of encountering or initiating ordnance.

19.2. Assessed Risk Level

No evidence could be found to suggest that the site was ever subject to bombing. However, given the large surface area, recorded bomb strikes in the locality and known ordnance clearance tasks in the vicinity of the site, 1st Line Defence has assessed that there is an overall **Low-Medium Risk** from German and anti-aircraft unexploded ordnance at the site of proposed works. There is also an assessed **Low-Medium Risk** from Allied ordnance.

Ordnance Type	Risk Level			
	Negligible	Low	Medium	High
German Unexploded HE Bombs		✓		
German 1kg Incendiary Bombs		✓		
Allied Anti-Aircraft Artillery Projectiles		✓		
Allied Land Service and Small Arms Ammunition		✓		

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20. Proposed Risk Mitigation Methodology

20.1. General

The following risk mitigation measures are recommended to support the proposed works at Wragley Way Park:

Type of Work	Recommended Mitigation Measure
All Works	• **UXO Risk Management Plan** It is recommended that a site-specific plan for the management of UXO risk be written for this site. This plan should be kept on site and be referred to in the event that a suspect item of UXO is encountered at any stage of the project. It should detail the steps to be taken in the event of such a discovery, considering elements such as communication, raising the alarm, nominated responsible persons etc. Contact 1st Line Defence for help/more information. • **Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.** As a minimum precaution, all personnel working on the site should be briefed on the basic identification of UXO and what to do in the event of encountering a suspect item. This should in the first instance be undertaken by a UXO Specialist. Posters and information on the risk of UXO can be held in the site office for reference. • **Site Specific Safety Package (SSSP)** As part of the site safety induction all personnel involved in intrusive ground works should attend a UXO Awareness Briefing before starting work. In the first instance the briefings should be delivered by a fully qualified Unexploded Ordnance (UXO) Specialist however for longer term projects, where it may not be a requirement for an UXO Specialist to be present on site all times, the UXO SSSP's can be commissioned to allow a contractors representative to deliver the briefings.

In making this assessment and recommending these risk mitigation measures, if known, the works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

1st Line Defence Limited **15th May 2019**

This Report has been produced in compliance with the Construction Industry Research and Information Association (CIRIA) C681 guidelines for the writing of Detailed UXO Risk Assessments.

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Site Location Maps

Annex: **A**

Western half



Eastern half



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Tel: +44 (0)1992 245 020

Client: **BWB Consulting Limited**

Approximate site boundary

N

Project: **Wragley Way Park, Derby**

Ref: **DA8642-00**

Source: Google Maps

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Recent Aerial Photography

Annex: **B**





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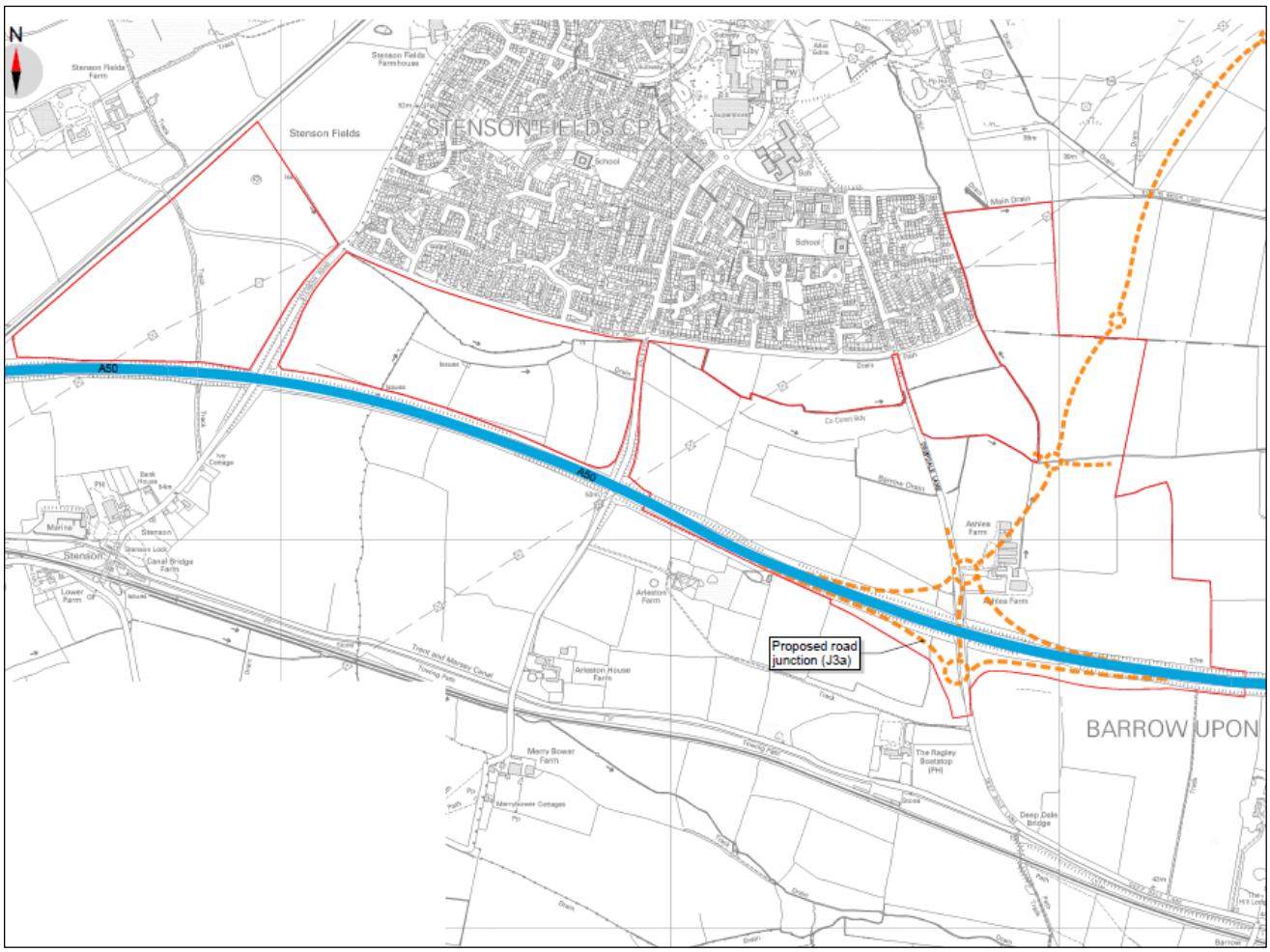
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Client Provided Site Plan

Annex: **C**



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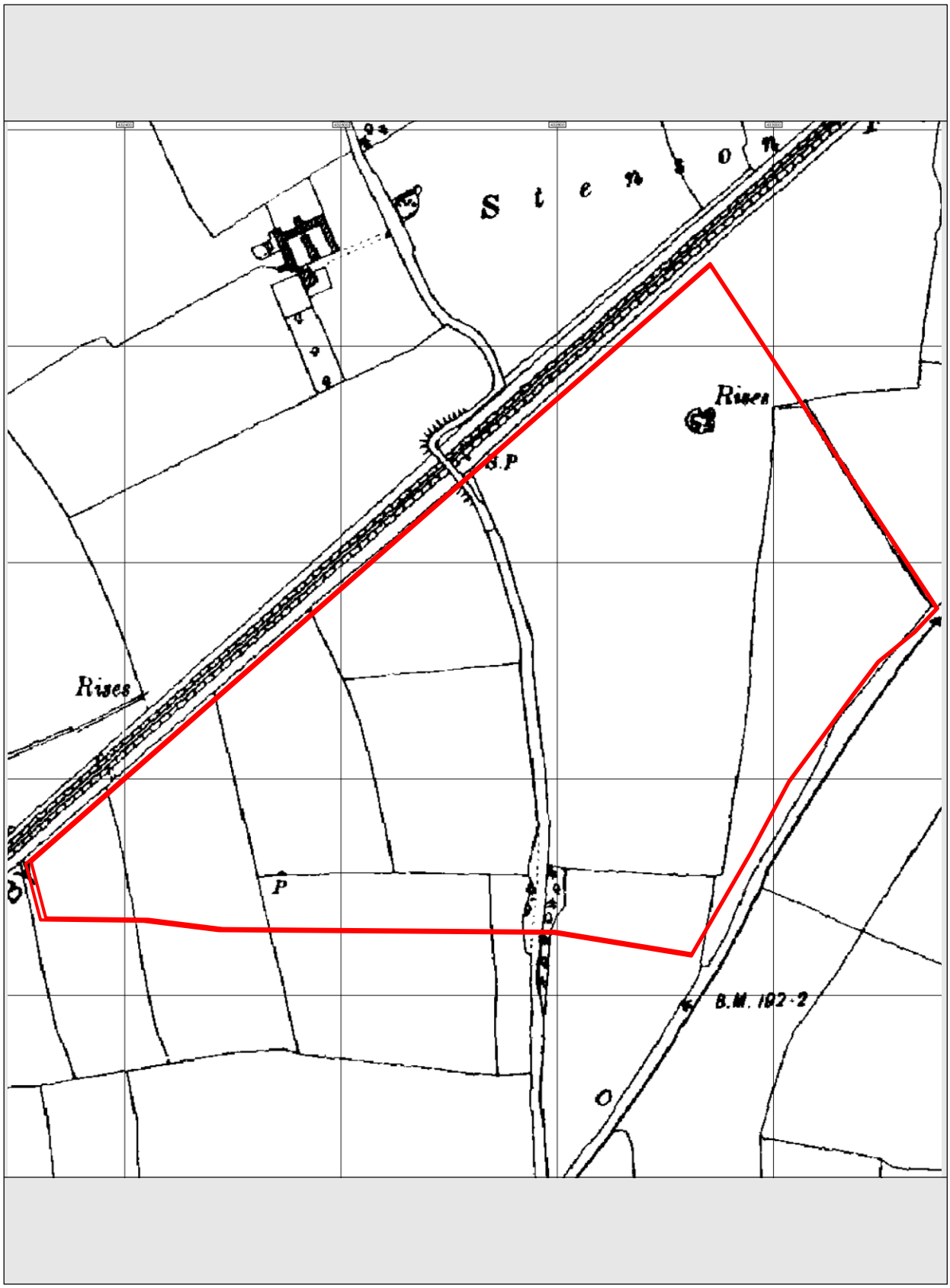
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1923 Historical Map – Western Site Area

Annex: D1



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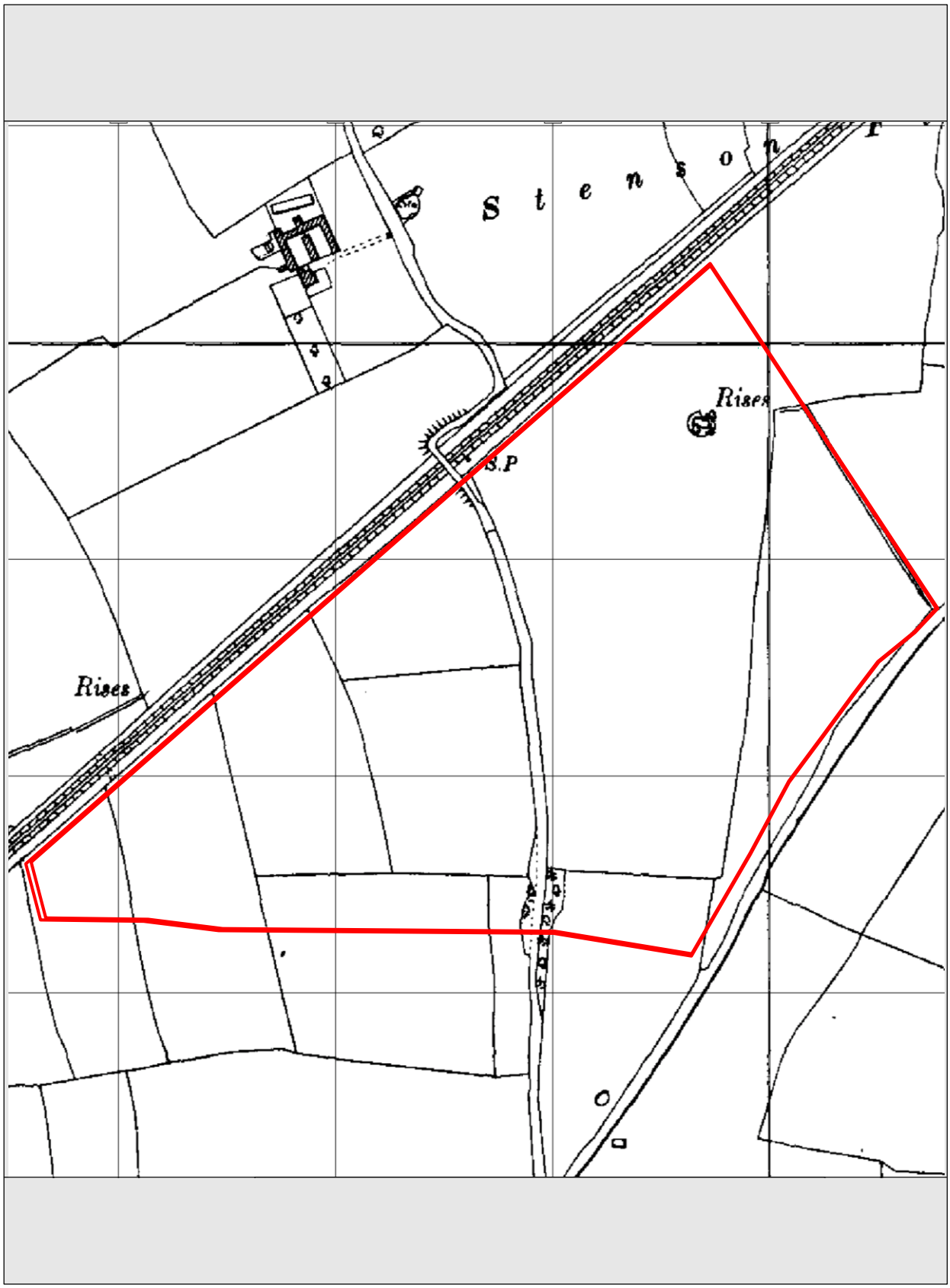
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1955 Historical Map – Western Site Area

Annex: D2



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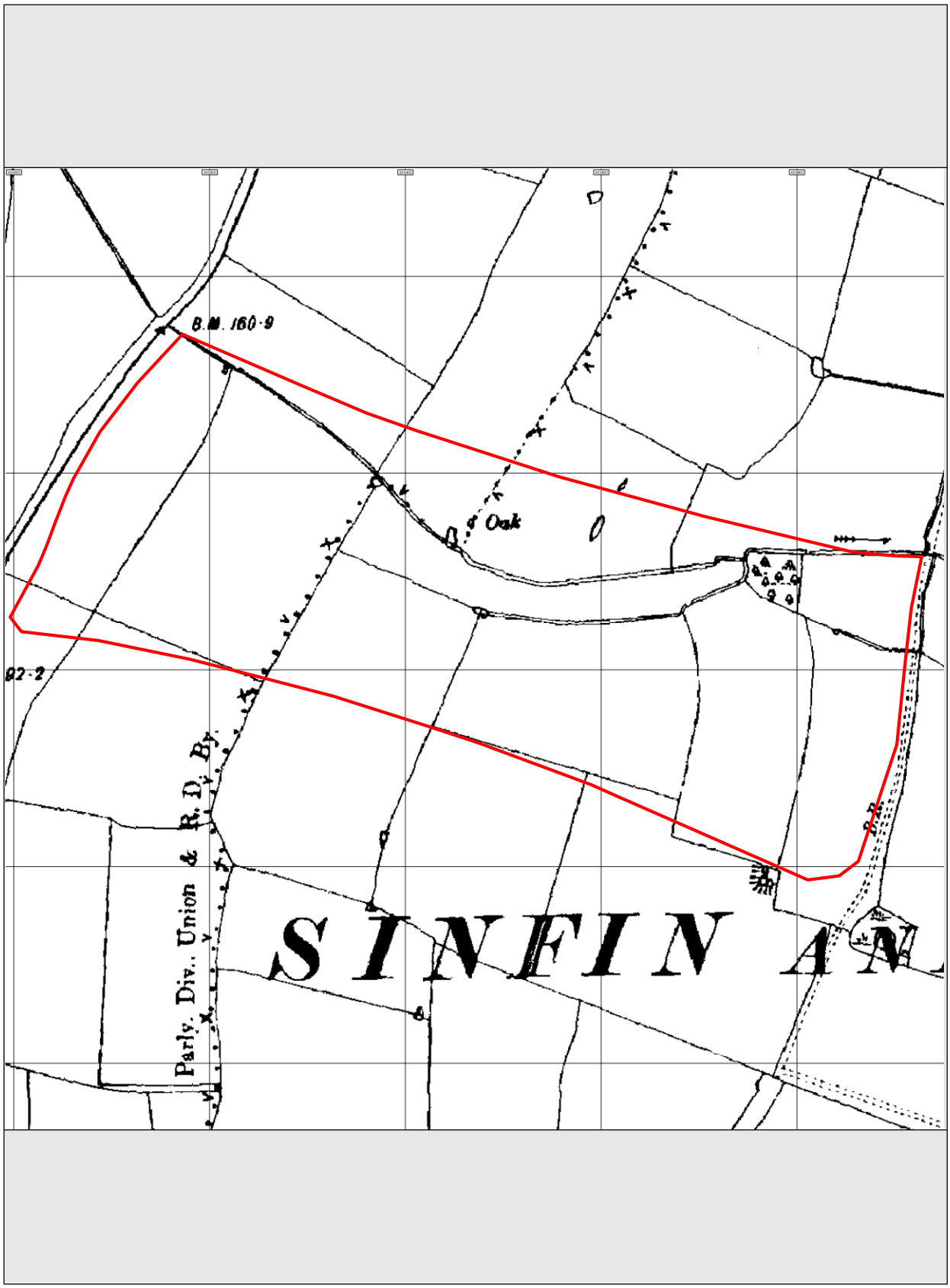
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1923 Historical Map – Central Site Area

Annex: D3



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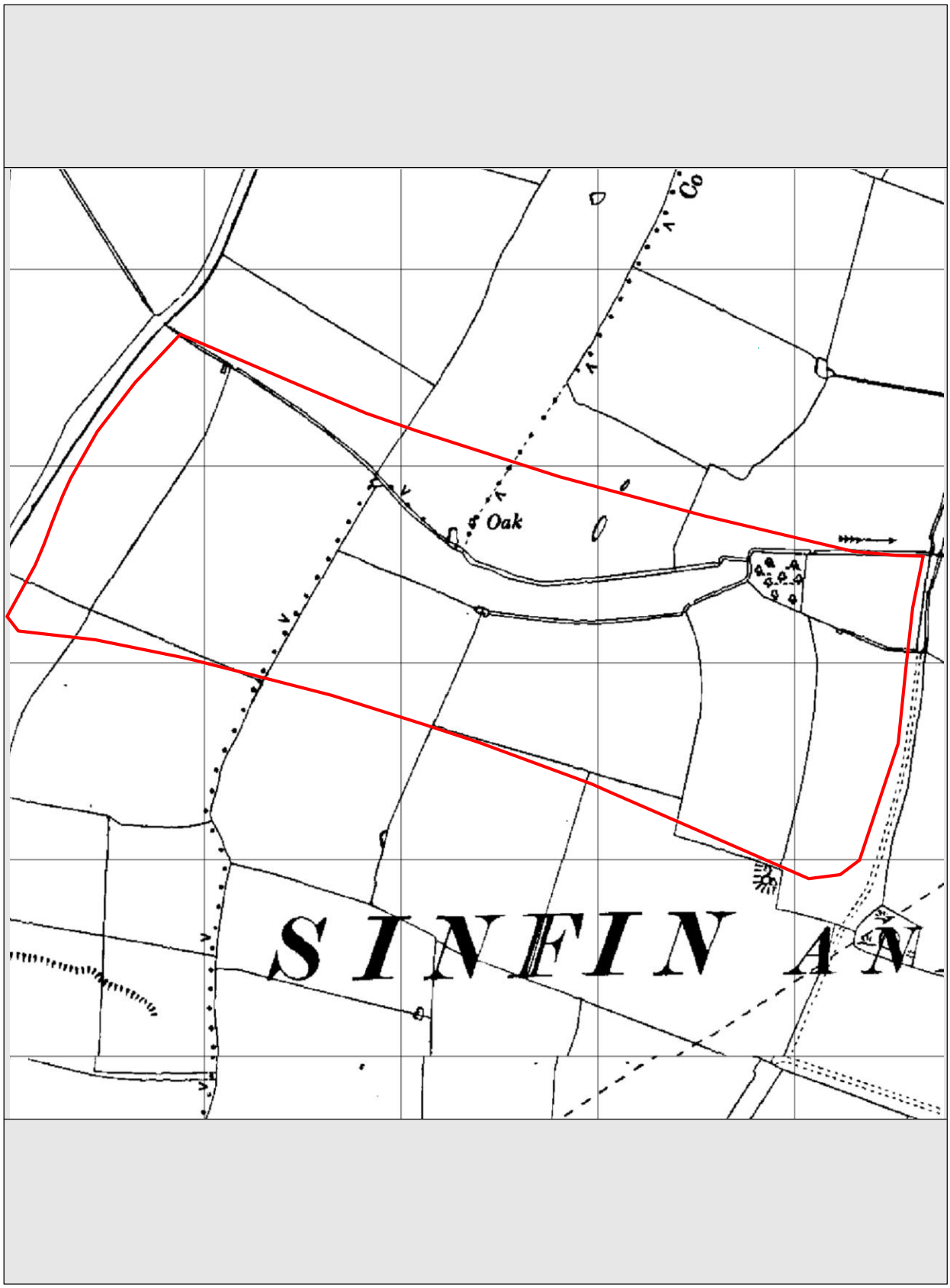
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1955 Historical Map – Central Site Area

Annex: **D4**



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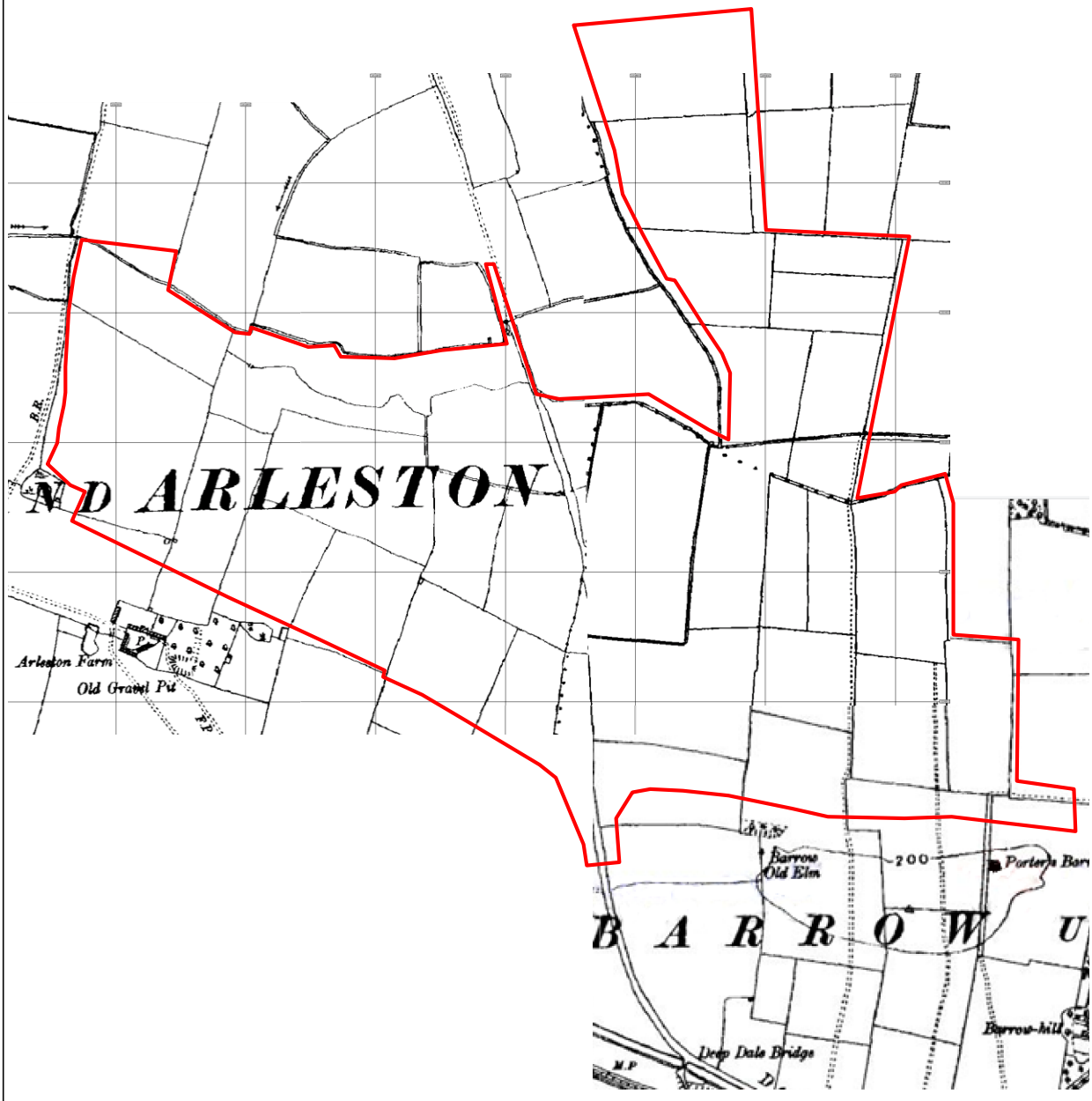
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1923 Historical Map – Eastern Site Area

Annex: D5



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1955 Historical Map – Eastern Site Area

Annex: D6



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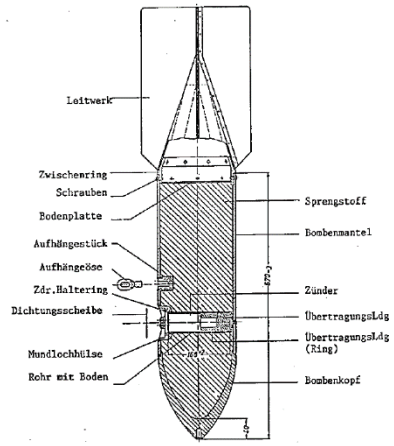
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Examples of German Air-Delivered Ordnance

SC 50kg High Explosive Bomb

Bomb Weight	40-54kg (88-119lb)
Explosive Weight	25kg (55lb)
Fuze Type	Impact fuze/electro-mechanical time delay fuze
Bomb Dimensions	1,090 x 280mm (42.9 x 11.0in)
Body Diameter	200mm (7.87in)
Use	Against lightly damageable materials, hangars, railway rolling stock, ammunition depots, light bridges and buildings up to three stories.
Remarks	The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.

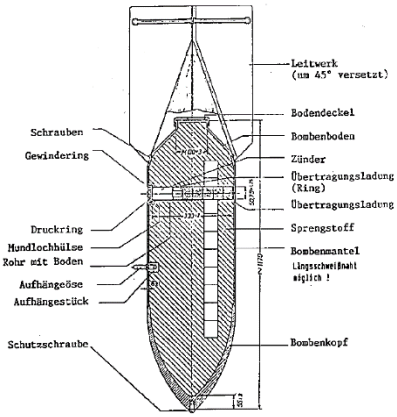






SC 250kg High Explosive Bomb

Bomb Weight	245-256kg (540-564lb)
Explosive Weight	125-130kg (276-287lb)
Fuze Type	Electrical impact/mechanical time delay fuze.
Bomb Dimensions	1640 x 512mm (64.57 x 20.16in)
Body Diameter	368mm (14.5in)
Use	Against railway installations, embankments, flyovers, underpasses, large buildings and below-ground installations.
Remarks	It could be carried by almost all German bomber aircraft, and was used to notable effect by the Junkers Ju-87 Stuka (Sturzkampfflugzeug or dive-bomber).



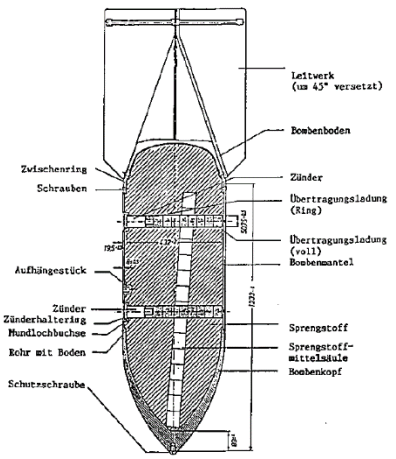


SC250 bomb being loaded onto German bomber

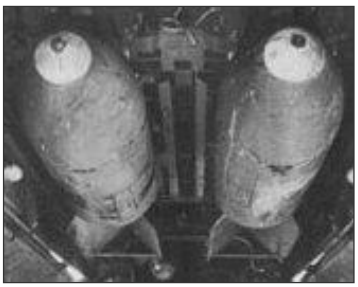


SC 500kg High Explosive Bomb

Bomb Weight	480-520kg (1,058-1,146lb)
Explosive Weight	250-260kg (551-573lb)
Fuze Type	Electrical impact/mechanical time delay fuze.
Bomb Dimensions	1957 x 640mm (77 x 25.2in)
Body Diameter	470mm (18.5in)
Use	Against fixed airfield installations, hangars, assembly halls, flyovers, underpasses, high-rise buildings and below-ground installations.
Remarks	40/60 or 50/50 Amatol TNT, trialene. Bombs recovered with Trialen filling have cylindrical paper wrapped pellets 1-15/16 in. in length and diameter forming







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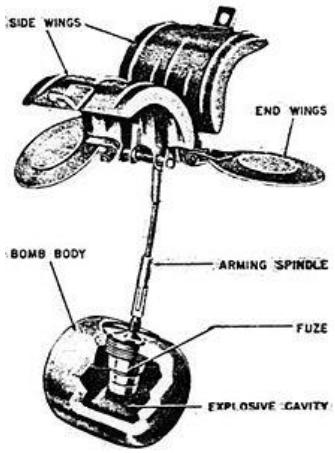
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Examples of German Air-Delivered Ordnance

SD2 Anti-Personnel 'Butterfly Bomb'

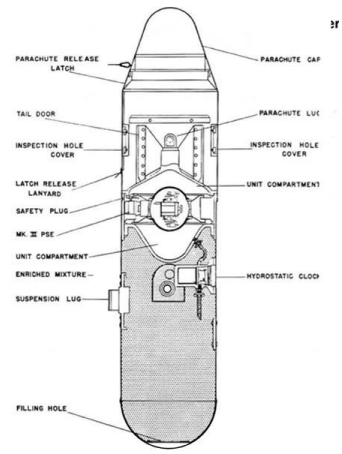
Bomb Weight	Approx. 2kg (4.41lb)
Explosive Weight	Approx. 7.5oz (225 grams) of Amatol surrounded by a layer of bituminous composition.
Fuze Type	41 fuze (time) , 67 fuze (clockwork time delay) or 70 fuze (anti-handling device)
Body Diameter	3in (7.62 cm) diameter, 3.1in (7.874) long
Use	Designed as an anti-personnel/ fragmentation weapon. They were delivered by air, being dropped in containers of 23-144 sub-munitions that opened at a predetermined height, thus scattering the bombs.
Remarks	Very rare. First used against Ipswich in 1940, but were also dropped on Kingston upon Hull, Grimsby and Cleethorpes in June 1943, amongst various other targets in UK. As the bombs fell the outer case flicked open by springs which caused four light metal drogues with a protruding 5 inch steel cable to deploy in the form of a parachute & wind vane which armed the device as it span.





Parachute Mine (Luftmine B / LMB)

Bomb Weight	Approx. 990kg (2176lb)
Explosive Weight	Approx. 705kg (1,554lb)
Fuze Type	Impact/ Time delay / hydrostatic pressure fuze
Dimensions	2.64m x 0.64m (3.04m with parachute housing)
Use	Against civilian, military and industrial targets. Used as blast bombs and designed to detonate above ground level to maximise damage to a wider area.
Remarks	Deployed a parachute when dropped in order to control its descent. Had the potential to cause extensive damage in a 100m radius.



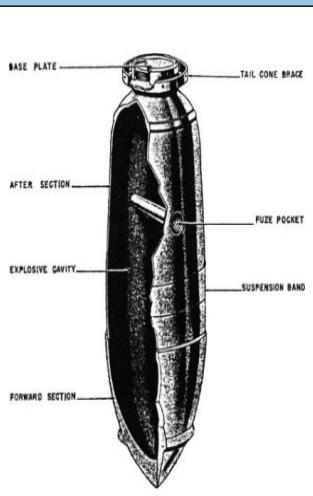


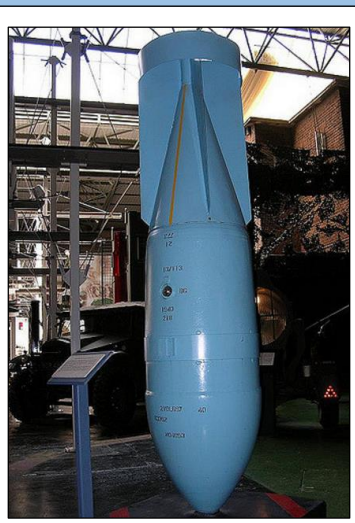




SC 1000kg

Bomb Weight	Approx. 993-1027kg (2,189-2,264lb)
Explosive Weight	Approx. 530-620kg (1168-1367lb)
Fuze Type	Electrical impact/mechanical time delay fuze.
Filling	Mixture of 40% amatol and 60% TNT, but when used as an anti-shipping bomb it was filled with Trialen 105, a mixture of 15% RDX, 70% TNT and 15% aluminium powder.
Bomb Dimensions	2800 x 654mm (110 x 25.8in)
Body Diameter	654mm (18.5in)
Use	SC type bombs are General Purpose Bombs used primarily for general demolition work. Constructed of parallel walls with comparatively heavy noses. They are usually of three piece welded construction





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Client: **BWB Consulting Limited**

Project: **Wragley Way Park, Derby**

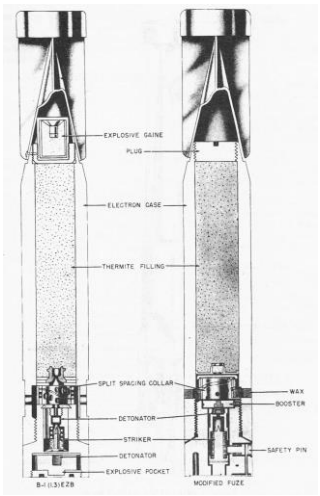
Ref: **DA8642-00**

Source: Various sources

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1kg Incendiary Bomb

Bomb Weight	Approx. 1.0 - 1.3kg (2.2 and 2.9lb)
Explosive Weight	Approx. 680g (1.5lb) Thermite 8-15gm Explosive Nitropenta
Fuze Type	Impact fuze
Bomb Dimensions	350 x 50mm (13.8 x 1.97in)
Body Diameter	50mm (1.97in)
Use	As incendiary – dropped in clusters on towns and industrial complexes
Remarks	Magnesium alloy case. Sometimes fitted with high explosive charge. The body is a cylindrical alloy casting threaded internally at the nose to receive the fuze holder and fuze.

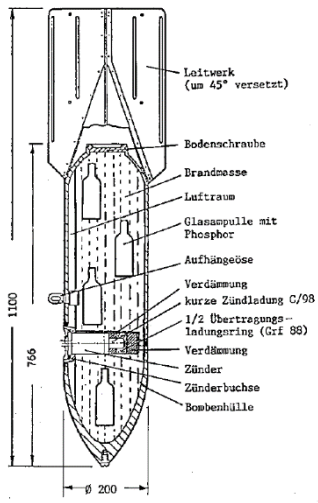


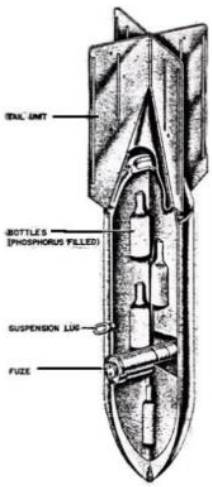




C50 A Incendiary Bomb

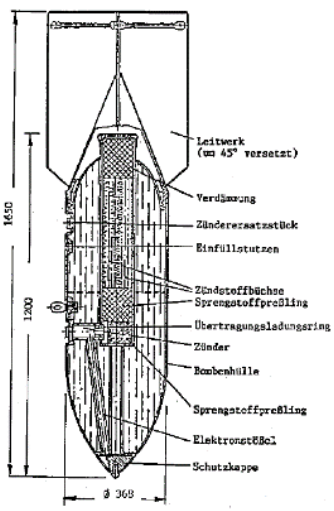
Bomb Weight	Approx. 41kg (90.4lb)
Explosive Weight	Approx. 0.03kg (0.066lb)
Incendiary Filling	12kg (25.5lb) liquid filling with phosphor igniters in glass phials. Benzine 85%; Phosphorus 4%; Pure Rubber 10%
Fuze Type	Electrical impact fuze
Bomb Dimensions	1,100 x 280mm (43.2 x 8in)
Use	Against any targets where an incendiary effect is required
Remarks	Early fill was a phosphorous/carbon disulphide incendiary mixture





Flam C-250 Oil Bomb

Bomb Weight	Approx. 125kg (276lb)
Explosive Weight	Approx. 1kg (2.2lb)
Fuze Type	Super-fast electrical impact fuze
Filling	Mixture of 30% petrol and 70% crude oil
Bomb Dimensions	1,650 x 512.2mm (65 x 20.2in)
Body Diameter	368mm (14.5in)
Use	Often used for surprise attacks on ground troops, against troop barracks and industrial installations. Thin casing – not designed for ground penetration





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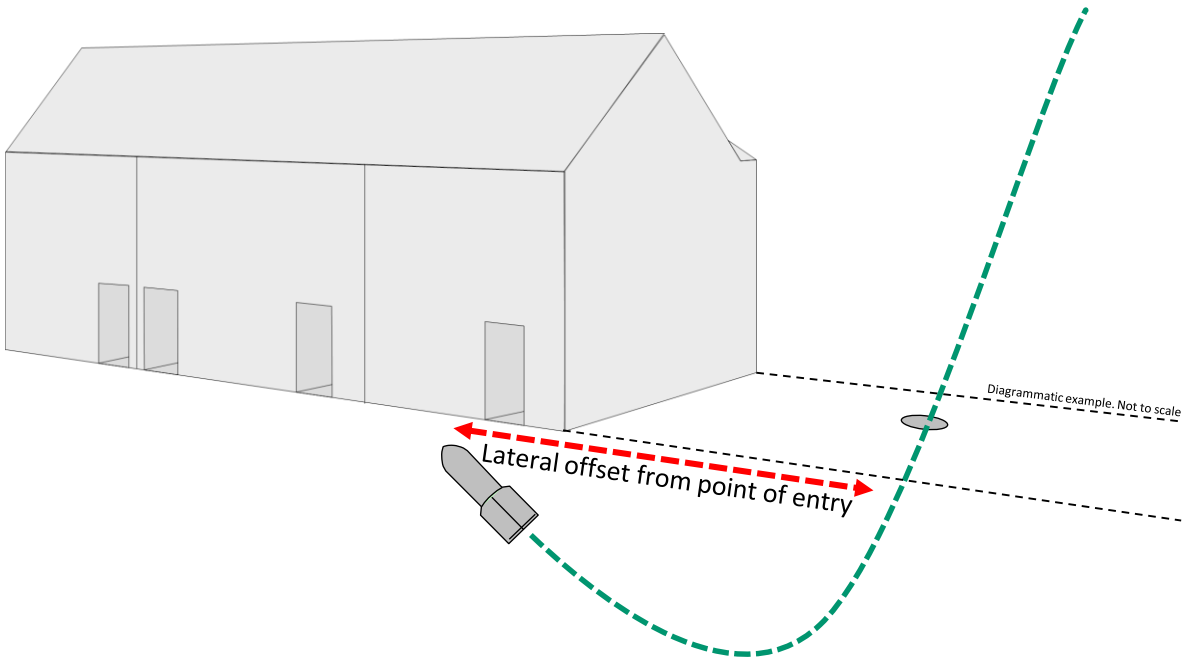
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The 'J-Curve' Effect









Top: J-curve Effect - Due to angle of entry, unexploded bombs would often end their trajectory at a lateral offset from point of entry, often ending up beneath adjacent extant structures/sites. The photograph above shows 250kg bomb found in Bermondsey pointing upwards, demonstrating 'J-curve'

One of the most common scenarios for UXO going unnoticed was when a UXB fell into a 'bomb site' (such as the area shown **Top Left**), the entry hole of the bomb obscured by any debris and rubble present. Note that the entry hole of a 50kg UXB could be as little as 20cm in diameter (**Left**).

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BBC NEWS

Bermondsey bomb: World War Two device safely removed



An unexploded World War Two bomb found in south London has been driven away safely under police and Army escort.

The 500lb (250kg) device was found on a building site in Grange Walk, Bermondsey on Monday.

March 2015

BBC NEWS

Bethnal Green WW2 bomb: Experts remove unexploded device



An unexploded World War Two bomb that prompted the evacuation of 700 people in east London has been made safe and removed by the military.

Families spent the night in a school hall after the 500lb bomb was found in the basement of a building site on Temple Street, in Bethnal Green, on Monday afternoon.

A 200m (650ft) exclusion zone was set up around the device.

August 2016

BBC NEWS

Bath WW2 bomb scare: Device defused, police say



A 500lb World War Two bomb found on the site of a former school in Bath has been defused and made safe.

The discovery of the bomb on Thursday **led to the evacuation of hundreds of homes** and many road closures in the Lansdown area of the city.

A cordon around the site was lifted on Friday evening, more than 24 hours after residents were asked to leave their homes.

May 2016

BBC NEWS

London City Airport reopens after WW2 bomb moved



London City Airport has reopened after an unexploded 500kg World War Two bomb was safely moved from the area.

The device was discovered at the King George V Dock on Sunday during planned work at the east London airport.

All flights were cancelled on Monday after an exclusion zone was put in place, **with the closure affecting up to 16,000 passengers and nearby residents being evacuated from their homes.**

May 2015

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Examples of Unexpected Detonation of WWII Bombs

Annex: **G2**

BASF has confirmed that an explosive device, most likely a World War II-era bomb, caused the blast that left one person injured Tuesday at a plant construction site in Germany.

The explosion was reported at BASF's Ludwigshafen toluene diisocyanate (TDI) plant, which recently broke ground for a 300,000 metric tons per year TDI production plant and other construction to expand its facilities.



BASF Provides Some Details

Responding to a request from *PaintSquare News* for more information on Wednesday (Feb. 27), BASF's manager of media relations and corporate communications Europe, Ursula von Stetten, wrote in an email, "So here [are] the facts: The detonation took place at 10:00 a.m. One person was injured; the injury is not serious. He will be kept in the hospital for some days.

"Cause of the detonation was an explosive device, presumably a bomb deriving from the Second World War. The device detonated when grounding work was done. No details on [a] delay [are] available. At the moment, the exact circumstances of the incident are [being] evaluated."

1st March 2013

SPIEGEL ONLINE

Blast Kills One

World War II Bomb Explodes on German Motorway

A highway construction worker in Germany accidentally struck an unexploded World War II bomb, causing an explosion which killed him and wrecked several passing cars.



A World War II bomb has exploded during construction work on a German highway, killing one worker and injuring several motorists who were driving past, police said.

The worker had been cutting through the road surface near the south-western town of Aschaffenburg when his machine struck the bomb and triggered it. Police said they weren't sure yet what type of bomb it was. "The explosion seems to have been too small for it to have been an aircraft bomb," a police spokesman said.

23rd October 2006

WWII bomb injures 17 at Hattingen construction site



Seventeen people were injured on Friday when a construction crew unwittingly detonated a buried World War II-era bomb in Hattingen.

An excavator apparently drove over a 250-kilogramme (550 pound) American bomb, damaging surrounding buildings. Most of the injured suffered auditory trauma from the blast, and the excavator operator suffered injuries to his hands, police in the German state of North Rhine-Westphalia said.

"The hole was astoundingly small for such a large bomb full of so many explosives," Armin Gebhard, head of the Arnsberg department for military ordnance removal, told The Local. "But of course it damaged all the surrounding buildings too. We are really happy it wasn't worse."

19th September 2013

BBC NEWS

World War II bomb kills three in Germany



A special commission is investigating the causes of the explosion, while prosecutors are considering whether the team leader should face charges of manslaughter through culpable negligence, the BBC's Oana Lungescu reports from Berlin.

The blast happened an hour before the defusing operation was due to start.

Officials said the three men who died were experienced sappers, or combat engineers, who over 20 years had defused up to 700 bombs.

More than 7,000 people were immediately evacuated when the 500kg bomb was found. Several schools, a kindergarten and local companies remain closed.

2nd June 2010



June 2006

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Source: Various news sources

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Examples of Land Service Ammunition finds in the UK

Unexploded Second World War bomb discovered under Somerset footpath

By Western Daily Press | Posted: January 21, 2014



The unexploded bomb was found in Somerset

Comments (0)

An unexploded bomb dropped in Britain during the Second World War has finally been discovered – underneath a popular footpath in Somerset.

Unexploded WW2 bomb found at Kenfig Pool, Bridgend

23 August 2014 Last updated at 15:01



Dean Smith believes the shell was made in Germany

Bomb experts have been called to a south Wales nature reserve after an unexploded World War Two shell was discovered by a walker in Bridgend.

Dean Smith, 38, of Pyle, was walking near Kenfig Pool on Saturday when he saw a fin sticking out of the sand.

He reached down to pick it up, but ending up falling and landed with the 2ft-long (0.6m) bomb on top of him.

The site has been cordoned off by police and the Royal Logistics Corps will carry out a controlled explosion.

Related Stories

'Panic' as dog nearly thrown grenade

WW2 bomb found at wind farm exploded

WWII bomb found in kitchen cupboard

Mortar thought to be from WWII found on Oshawa's Camp-X grounds

August 24, 2016 | 5:42 am



What is believed to be a World War II mortar has been discovered in south Oshawa. A man out in Intrepid Park, the site of the Camp-X Second World War training grounds, discovered the round with his metal detector on Tuesday evening. Durham police are held the scene overnight awaiting military officials from Trenton to come and properly detonate the mortar.

Unexploded bomb found in farmer's field

17 May 2010



A live Second World War mortar shell was blown up by Army experts after a farmer found it in his field.

The discovery was made in the field alongside the A20 between Folkestone and Dover.

The mortar shell, which was around a foot long and 3in in diameter, was around 50ft from the main road.

The farmer alerted police and PC Trevor Moody and PCSO Michelle Brady went to the field.

PC Moody contacted the Army who sent in a bomb disposal unit.

An Army officer confirmed the live shell was from the Second World War and was packed with high explosives.

They moved it a safe distance away from the A20 and carried out a controlled explosion.

PC Moody said: "Given that we live in an area that saw much action during the Second World War, it is not uncommon for us to be alerted about unexploded bombs."

The incident was on Thursday.

Click here for more news from Kent.

Royal Navy bomb disposal experts remove a World War Two shell discovered in a nature reserve

- A World War Two bomb was discovered in a Plymouth nature reserve
- Amateur metal detector found the shell and partially dug it up
- Royal Navy experts carried the explosive away before disposing of it

By VALERIE EDWARDS FOR MAILONLINE
PUBLISHED: 01:29, 13 January 2016 | **UPDATED:** 09:51, 13 January 2016

Share 338 shares 10 View comments

A World War Two bomb was reportedly found at Efford Nature Reserve in Plymouth after a member of the public was metal detecting and partially dug it up.

The Royal Navy Bomb Disposal team was called in to remove the bomb and police have closed off Military Lane, with the possibility of Military Road also being closed.

Police were called at around 1.30pm yesterday after what appeared to be a shell was discovered and partially dug up near Military Lane, Efford.



Holiday beach cordoned off after landslip sends more than a THOUSAND Second World War bombs and rockets tumbling onto the sands

- Bad weather led to ground movement which exposed the huge arsenal at Mappleton, East Riding
- A dog walker stumbled across the deadly find on Saturday and 15 controlled explosions were carried out
- Rockets, mortar bombs and 25-pounder bombs were recovered after they were fired into the cliffs by RAF aircraft during the war
- Most of the devices were dummy rounds used for bombing practice but contain enough explosives to cause terrible injuries



© Jonathan Pow

Bomb Beach Alley: Rockets were found after a landslide on Mappleton beach in 2012

Army bomb disposal team called to Blacksole Bridge in Herne Bay

by Aidan Barlow abarlow@thekmgroup.co.uk 08 July 2015

It was like a scene from Dad's Army when Army bomb disposal experts found wartime explosives made by the Home Guard in makeshift bottles.

A team was called to the Blacksole Bridge in Herne Bay after the wartime bombs were found.

The team from the Royal Logistics Corps set up a 30 metre exclusion zone for pedestrians around the railway embankment after the suspected homemade phosphorous bombs were found.



The scene at Blacksole Bridge after wartime explosives were found in the railway cutting



Tweet

Published by Huw Oxburgh

Posted: 03/06/14

Updated: 03/06/14

Unexploded bomb found in Axminster

Update: The bomb disposal unit has made the device safe and the road has re-opened.

Six homes have been evacuated today after the discovery of an unexploded device in Axminster.

A Royal Navy bomb disposal team have been called to the scene after a 'historic German device' was discovered in a garden.

Police have set up a 20m cordon around the garden in Alexandra Road and evacuated homes in the surrounding area as a precaution.

Storms and floods unearth unexploded wartime bombs

By Claire Marshall
BBC environment correspondent

There has been a dramatic increase in the number of wartime bombs unearthed because of the winter storms and flooding.

Bomb disposal teams in the South West have dealt with double the number of unexploded ordnance than in the same period last year.

Since mid December, the Royal Navy's Southern Dive Unit has recovered or disposed of 244 items of ordnance.

During the same period last year, they dealt with just 108 items.



The storms have uncovered a lethal past

Almost 70 years after the end of WWII, one legacy of that conflict continues to turn up on beaches and harbours around Britain.

Unexploded shells, bombs and mines continue to be discovered every year, and the Royal Navy's Southern Dive Unit is tasked with making these devices safe.

Its area of responsibility stretches for some 2,250km (1,400 miles). It begins from the highwater mark in Hull and proceeds seaward to the territorial limit, and then runs clockwise around the British Isles - including the Isle of Wight, Channel Islands, and Isles of Scilly - to finish in Liverpool.

Related Stories

Ancient trees revealed by storms

Land Service Ammunition (LSA) resulting from historic military activity is commonly encountered across the UK by the public and construction industry alike. Such finds are much more common in rural areas than in urban environments, and can often be anticipated in areas such as former RAF stations or ranges. However, many such items are encountered entirely by surprise where the landowner or developer has no knowledge of any previous military use of the land.

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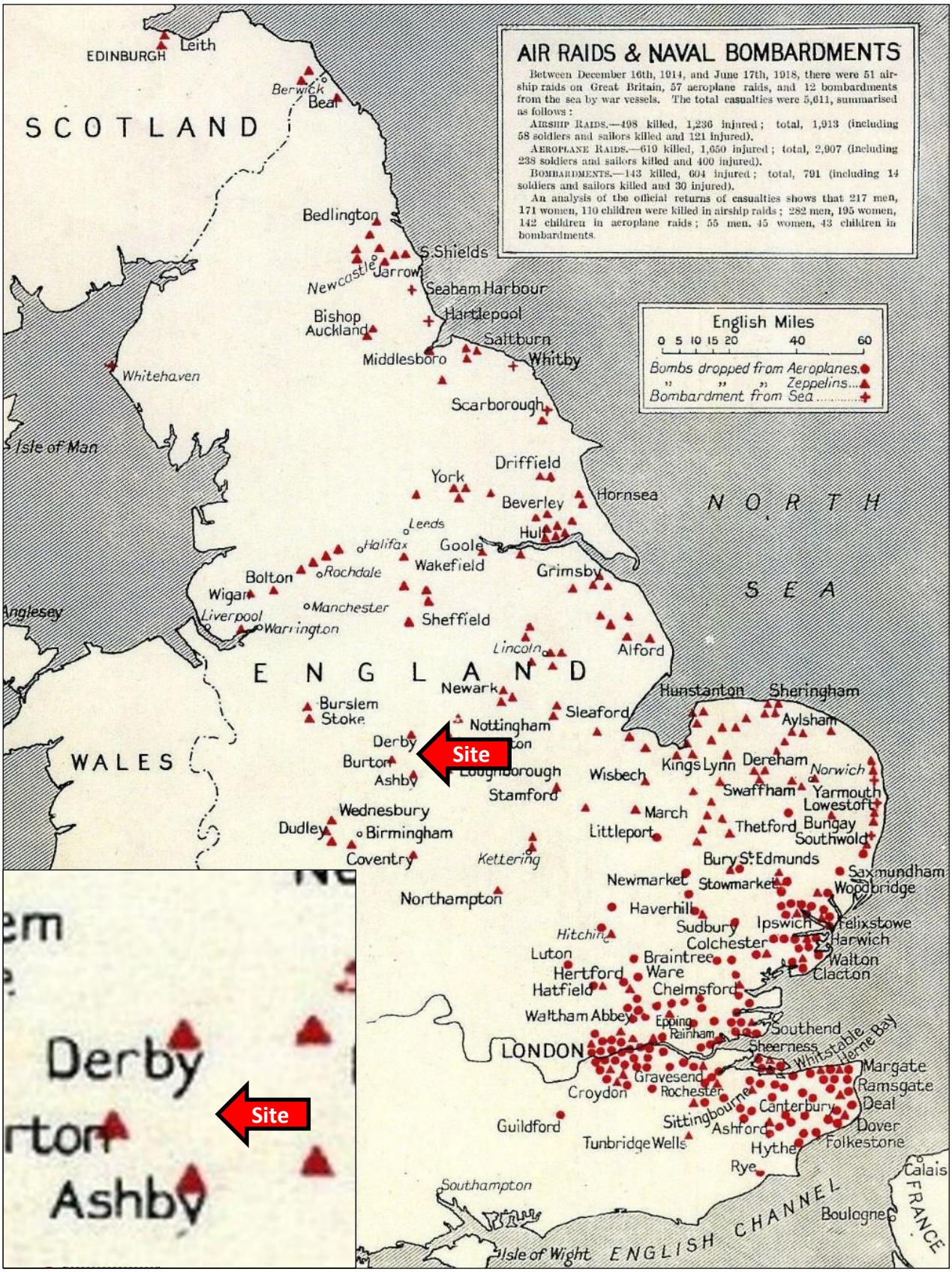
Ref: **DA8642-00**

Source: Various news sources

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WWI Map of Air Raids and Naval Bombardments

Annex: H



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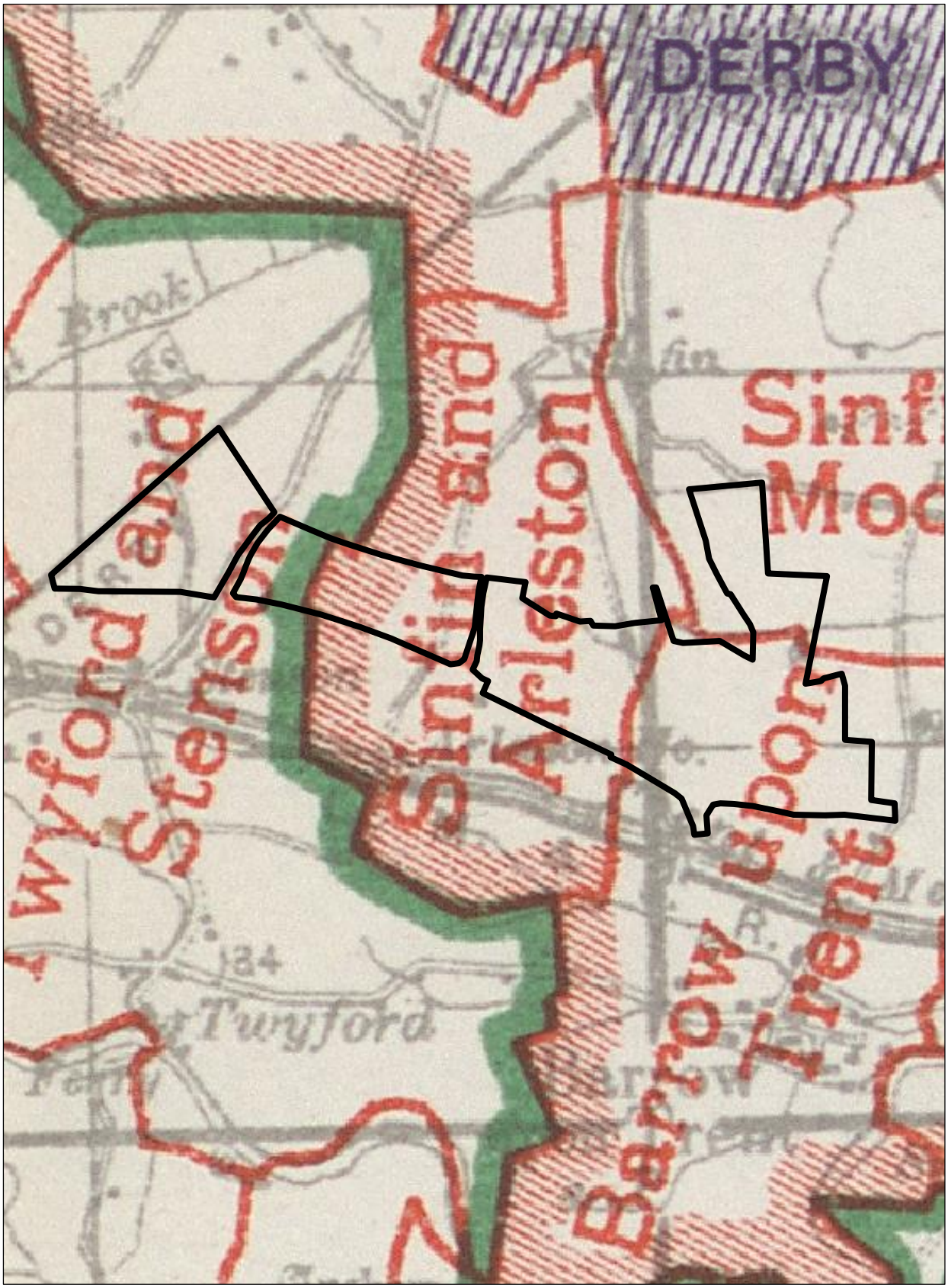
Source: J. Morris, *German Air Raids on Britain*

N

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WWII-era Boundary Map of Derbyshire

Annex: I



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Source: Vision of Britain

— **Approximate site boundary**

N

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RAF Aerial Photography 1st March 1950 – Western Site Area

Annex: J1



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Approximate site boundary

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Source: National Monuments Record Office (Historic England)

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RAF Aerial Photography 1st March 1950 – Central Site Area

Annex: J2



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Approximate site boundary

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Project: **Wragley Way Park, Derby**

Ref: **DA8642-00**

Source: National Monuments Record Office (Historic England)

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RAF Aerial Photography 2nd August 1945 – Eastern Site Area

Annex: **J3**



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Approximate site boundary

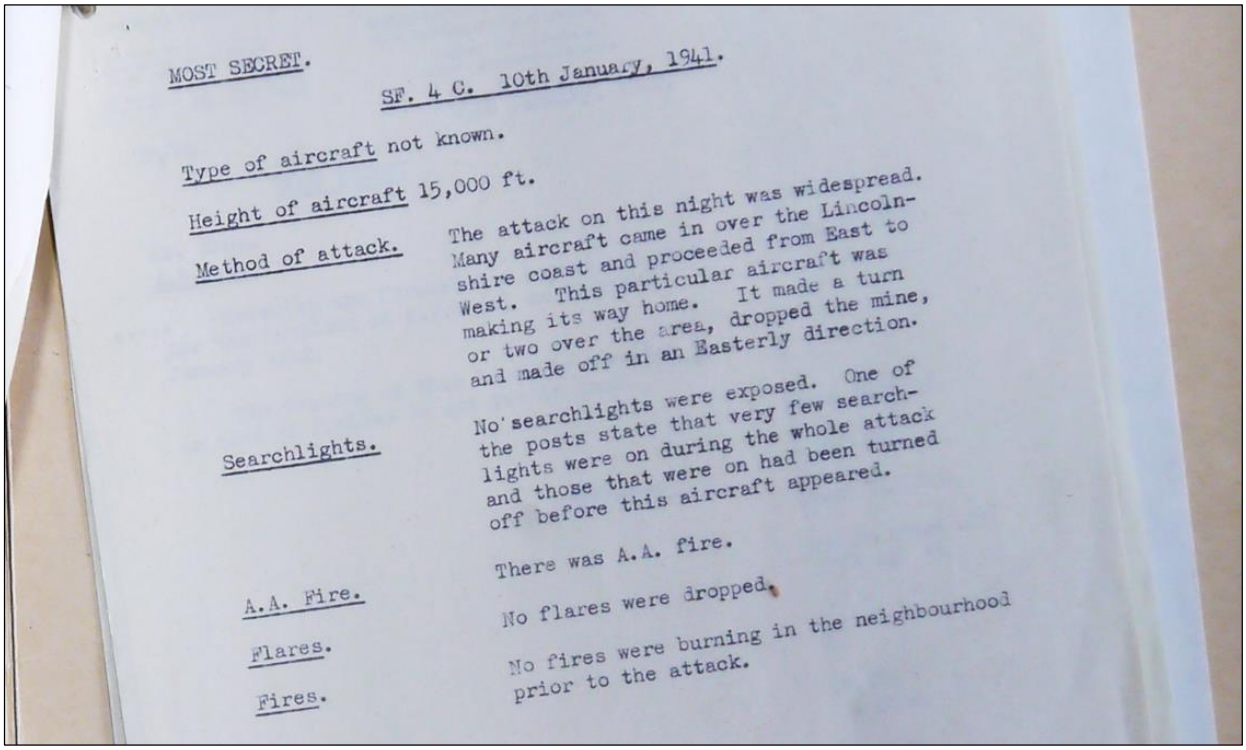
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Ref: **DA8642-00**

Source: National Monuments Record Office (Historic England)

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MOST SECRET.

SF. 4 C. 10th January, 1941.

Type of aircraft not known.

Height of aircraft 15,000 ft.

Method of attack. The attack on this night was widespread. Many aircraft came in over the Lincolnshire coast and proceeded from East to West. This particular aircraft was making its way home. It made a turn or two over the area, dropped the mine, and made off in an Easterly direction.

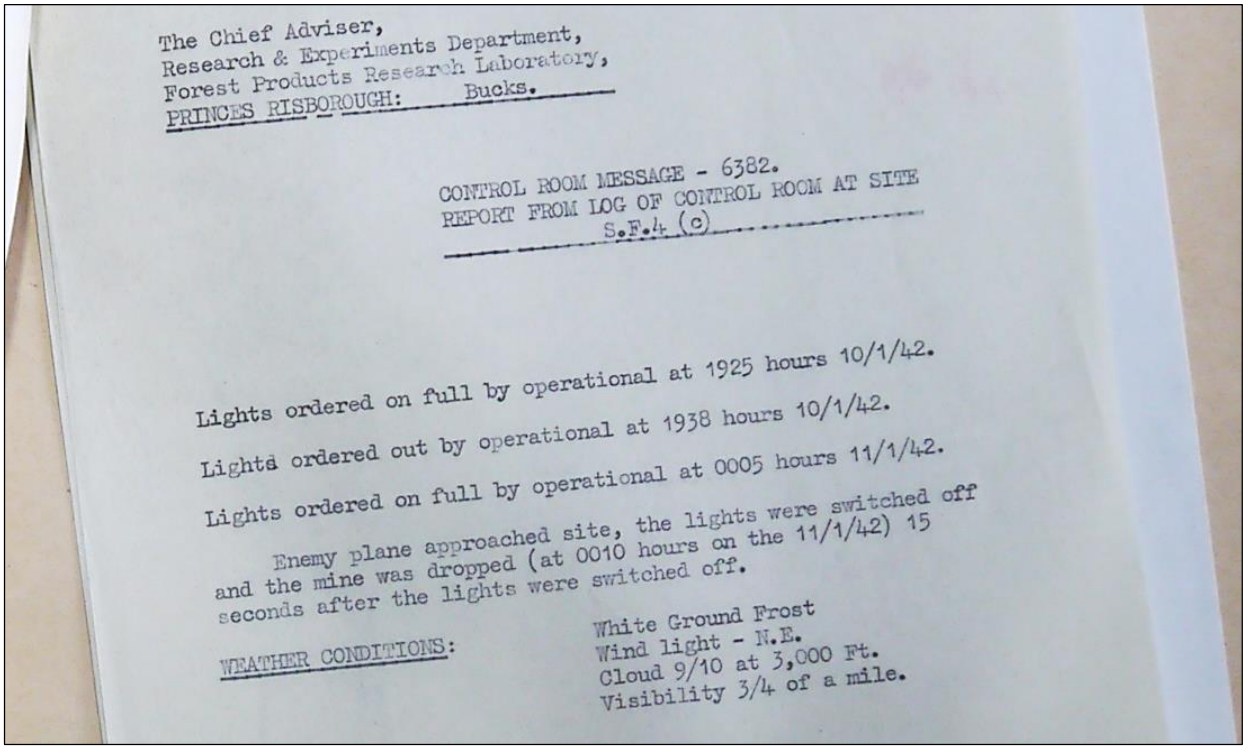
Searchlights. No searchlights were exposed. One of the posts state that very few searchlights were on during the whole attack and those that were on had been turned off before this aircraft appeared.

A.A. Fire. There was A.A. fire.

Flares. No flares were dropped.

Fires. No fires were burning in the neighbourhood prior to the attack.

Bombing reported near SF4(c) on 10th January 1941, although this may have been subject to a recording error.



The Chief Adviser,
Research & Experiments Department,
Forest Products Research Laboratory,
PRINCES RISBOROUGH: Bucks.

CONTROL ROOM MESSAGE - 6382.
REPORT FROM LOG OF CONTROL ROOM AT SITE S.F.4 (c)

Lights ordered on full by operational at 1925 hours 10/1/42.

Lights ordered out by operational at 1938 hours 10/1/42.

Lights ordered on full by operational at 0005 hours 11/1/42.

Enemy plane approached site, the lights were switched off and the mine was dropped (at 0010 hours on the 11/1/42) 15 seconds after the lights were switched off.

WEATHER CONDITIONS: White Ground Frost
Wind light - N.E.
Cloud 9/10 at 3,000 Ft.
Visibility 3/4 of a mile.

Excerpt from the log of the control room associated with the decoy site SF4(c) recording the details of the attack by the enemy on the decoy site on 10th/11th January 1942.

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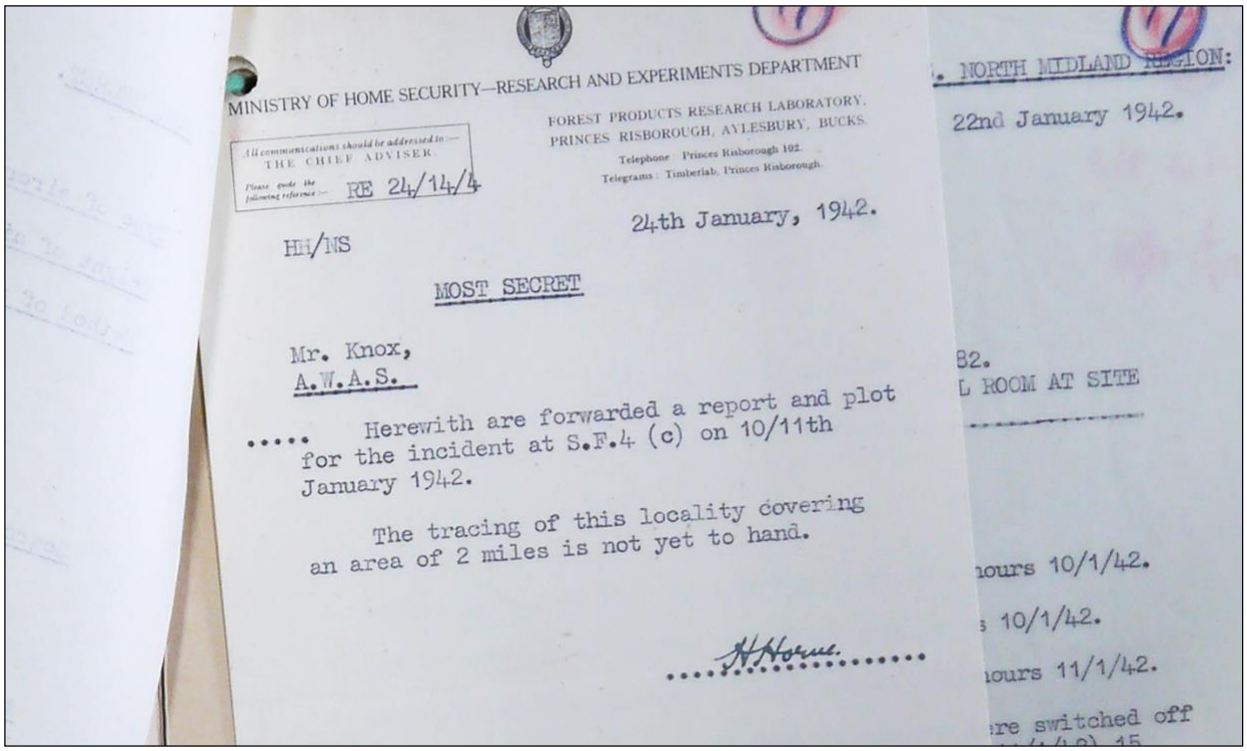
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Source: The National Archives, Kew

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MINISTRY OF HOME SECURITY—RESEARCH AND EXPERIMENTS DEPARTMENT

FOREST PRODUCTS RESEARCH LABORATORY,
PRINCES RISBOROUGH, AYLESBURY, BUCKS.
Telephone: Princes Risborough 102.
Telegrams: Timberlab, Princes Risborough.

All communications should be addressed to—
THE CHIEF ADVISER.
Please quote the following reference—
RE 24/14/4

24th January, 1942.

HH/NS

MOST SECRET

Mr. Knox,
A.W.A.S.

Herewith are forwarded a report and plot for the incident at S.F.4 (c) on 10/11th January 1942.

The tracing of this locality covering an area of 2 miles is not yet to hand.

H Horne.

. NORTH MIDLAND REGION:

22nd January 1942.

82.
L ROOM AT SITE

hours 10/1/42.
10/1/42.
hours 11/1/42.
re switched off

Report referring to the map below indicating an incident at SF4(c) on 10th/11th January 1942.



The supplementary map to the entry above plotting an incident aimed toward a decoy site to the east that fell approximately 1.75km eastwards of the perimeters of the site area.

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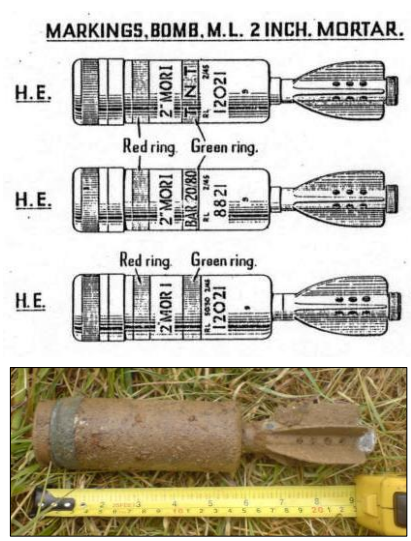
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Examples of Land Service Ammunition – Mortars

Annex: L1

2 inch Mortar High Explosive

Weight	Approx. 1.02kg (2.25lb)
Maximum Range	460m (500yards)
Filling	200g RDX/TNT
Dimensions	51 x 290mm (2in x 11.4 in)
Fuze Type	An impact fuze which detonates the fuze booster charge and in turn the high explosive charge.
Use	It had greater range and firepower over hand and rifle grenades, and was used to attack targets behind cover with high explosive rounds.
Identification	HE has a rounded edge to a flat back. Can either be a black body colour with red and yellow band or dark green with yellow band. Brass cap on top. Practice will have hole all the way through the top.





2 inch Mortar Smoke

Weight	Approx. 910g (2lb)
Maximum Range	460m (500yards)
Filling	White phosphorus and smoke fill
Dimensions	51 x 290mm (2in x 11.4 in)
Fuze Type	An impact fuze which initiates a bursting charge. This ruptures the mortar bomb's body and disperses the phosphorus filler
Identification	Smoke mortars have a recess and emission holes. May still see light green body paint. Look for stained ground around munition.
Use	As a screening devices for unit movement or to impair enemy field of vision.

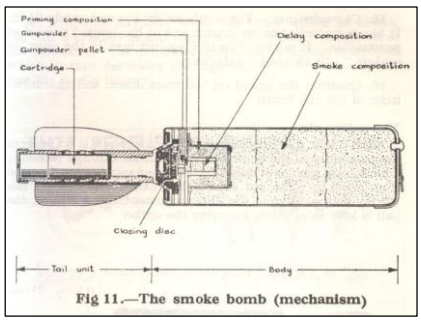
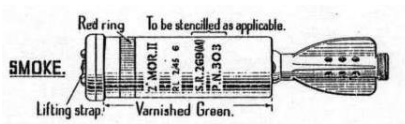


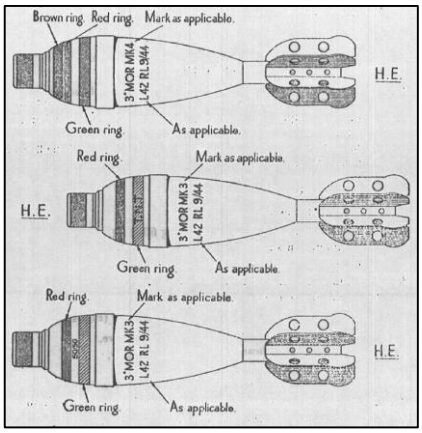
Fig 11.—The smoke bomb (mechanism)



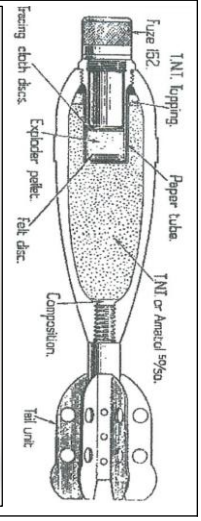


3 inch Mortar High Explosive

Weight	Approx. 4.5kg (10lb)
Maximum Range	1,460 (Mk1) – 2,560m (Mk2) (1,600 – 2,800yds)
Dimensions	81mm (3in)
Filling	Amatol
Firing Mechanism	Drop, fixed striker
Remarks	Fin-stabilised bomb fired by means of a charge consisting of a primary cartridge in the tail and four secondary cartridges
Identification	An old style mortar. No way of telling if HE or practice so treat as HE







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Project: **Wragley Way Park, Derby**

Ref: **DA8642-00**

Source: Various sources

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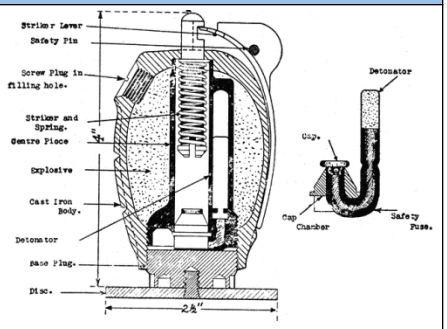
Examples of Land Service Ammunition – Grenades

Annex: L2

No. 36 'Mills' Grenade

Weight	Approx. 765g filled (1lb 11.25oz)
Explosive Weight	71g (2oz) filling.
Fuze Type	4-7 second delay hand-throwing fuze. No. 6 Detonator
Dimensions	95 x 61mm (4 x 2.4in)
Use	Fragmentation explosive at approx. 30m range 100m range of damage.
Remarks	First introduced in 1915 its classic grooved, cast-iron 'pineapple' design was designed to provide uniform fragmentation. The detonator is inserted before use after removing the base plug.





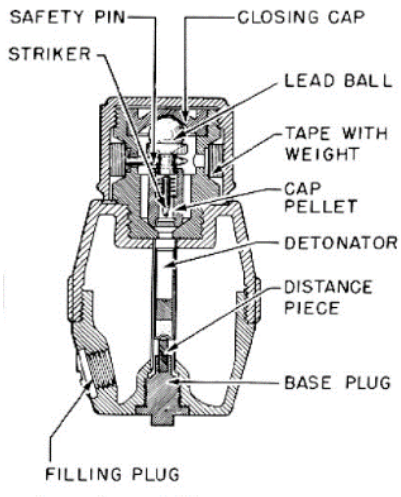


Left: baseplate and detonator removed

No. 69 Grenade

Weight	Approx. 383g (13.5oz)
Fill Weight	93g (3.25 oz) of either Amatol, Baratol or Lyddite
Fuze Type	'All-ways' Fuze. Compromised of a safety cap, a weighted streamer attached to a steel ball bearing and a safety bolt designed to detonate from any point of impact.
Dimensions	115 x 60mm (4.5 x 2 .4 in)
Use	A blast grenade for use as an offensive weapon. Detonator was inserted before use.
Remarks	Introduced December 1940 and made from the plastic Bakelite as opposed to conventional metals. Detection is difficult due to this low metal content.

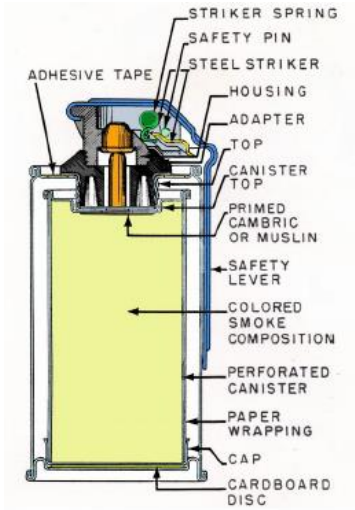




No. 83 Smoke Grenade

Weight	Approx. 680g (1.5lb)
Explosive Weight	Approx. 170-200g. (6-7 oz)
Fuze Type	Originally used a friction system using a match head composition. Later developed to a striker lever ignition system.
Dimensions	Approx. 62 x 140mm (2.44 x 5.5 in)
Use	Use as a target or landing zone marking device and as a screening method for troop / unit movement.
Remarks	This basic design stayed relatively unchanged up to the 1980's. The letters CCC were often etched into the body of the grenade in the colour of the smoke.





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Examples of Small Arms Ammunition

Examples of British Small Arms Ammunition

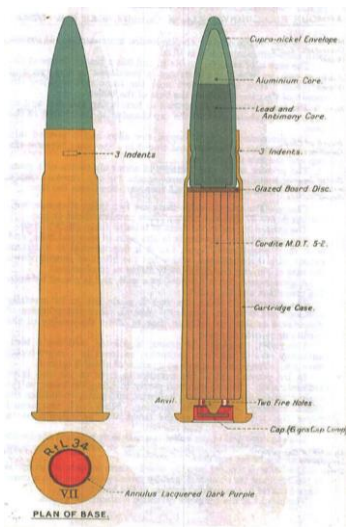


.303 Rifle

Bullet Diameter	7.92mm
Case length	56.44mm
Overall length	78.11mm
Type	Rifle Ammunition
Propellant	Originally black powder. Later Cordite followed by Nitrocellulose
Remarks	First produced in 1889 and still in use today, the .303inch cartridge has progressed through ten 'marks' which eventually extended to a total of around 26 variations.

Bullet Type	Colour of tip	Colour of Annulus
Armour Piercing	Green	Green
Ball	None	Purple
Incendiary	Blue	Blue
Observing	Black	Black
Proof	None	Yellow
Tracer Short Range	White	Red
Tracer Dark Ignition	Grey	Red





Buried and Decayed Ammunition





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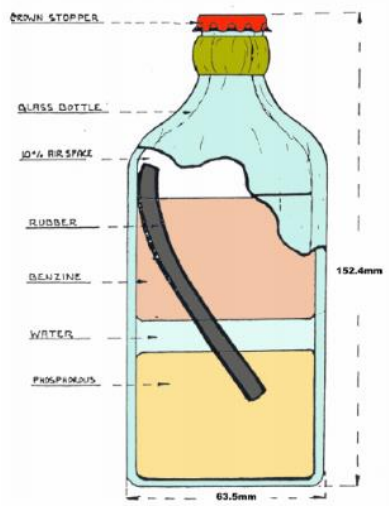
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No. 76 Self Igniting Phosphorous (SIP) Grenade

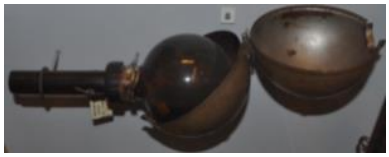
Weight	Approx. 1lb 3oz
Filling	White Phosphorous and Benzene
Design	The filling was contained in a ½ pint sized glass bottle with water and a strip of rubber. Over time the rubber dissolved to create a sticky which would self ignite when the bottle broke.
Use	Originally intended as an anti-tank incendiary weapon deployed by hand. Designed to be produced cheaply without consuming materials needed to produce armaments on the front line.
Remarks	The Home Guard hid caches of these grenades during the war. Not all locations were officially recorded and some caches were lost and encountered post-war. In all cases, the grenades are still found to be dangerous.



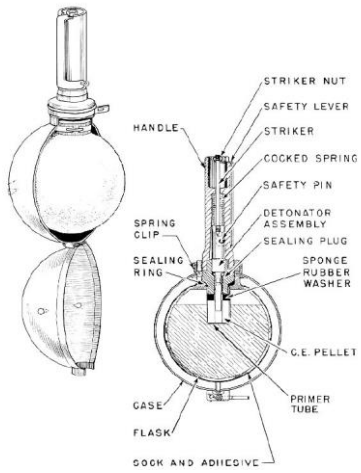


No. 74 Grenade ("Sticky Bomb") Mk1

Weight	Approx. 1.1kg (2.25lb)
Filling	Approx. 600g Nobel's No.283 (Nitro-glycerine) (1.33lb)
Design	A glass ball on the end of a Bakelite (plastic) handle. The inside of the ball would contain the explosive filling and the outside a very sticky adhesive coating.
Use	An anti-tank grenade primarily issued to the home guard. It required the user to come in very close proximity with the target and smash the glass explosive container against it.
Remarks	Timer fuze was located in the handle. This would explode after 3-6 secs. 9.5in Long 4.5in Diameter







Flame Fougasse Bomb

Weight	Various
Filling	Initially a mixture of 40% petrol and 60% gas. Ammonal provided the propellant charge.
Design	Usually constructed from a 40-gallon drum dug into a roadside and camouflaged.
Use	As an improvised anti-tank bomb. When triggered the Fougasse could project a beam of burning sticky fuel in a fixed direction from up to 3m (10ft) wide and 27m (30yards) long.
Remarks	A highly unorthodox weapon designed by the Petroleum Warfare Department to address a critical lack of weapons in 1940. 50,000 are estimated to have been distributed around the UK.





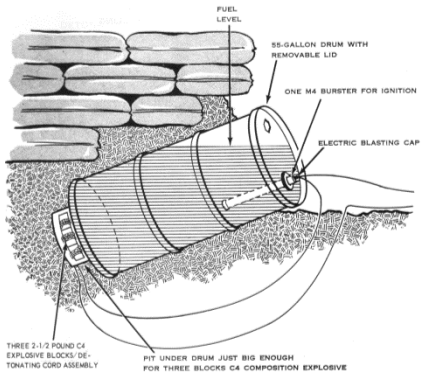


Figure 22. Flame fougasse (55-gallon drum).

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Examples of Anti-Aircraft Projectiles

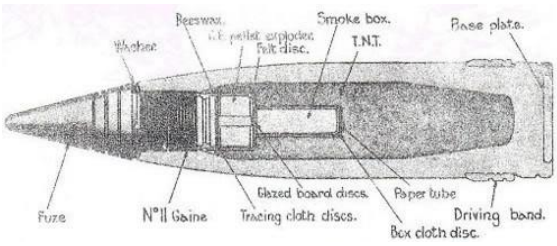
Annex: O

3.7 Inch QF Anti-Aircraft Projectile

Projectile Weight	28lb (12.6 kg)
Explosive Weight	2.52lbs
Fuze Type	Mechanical Time Fuze
Dimensions	3.7in x 14.7in (94mm x 360mm)
Rate of Fire	10 to 20 rounds per minute
Use	The 3.7in AA Mks 1-3 were the standard Heavy Anti-Aircraft guns of the British Army.
Ceiling	30,000ft to 59,000ft





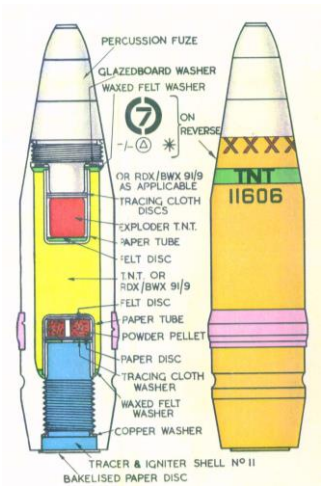


40mm Bofors Projectile

Projectile Weight	1.96lb (0.86kg)
Explosive Weight	300g (0.6lb)
Fuze Type	Impact Fuze
Rate of Fire	120 rounds per minute
Projectile Dimensions	40 x 180mm
Ceiling	23,000ft (7000m)
Remarks	Light quick fire high explosive anti-aircraft projectile. Each projectile fitted with small tracer element. If no target hit, shell would explode when tracer burnt out. Designed to engage aircraft flying below 2,000ft



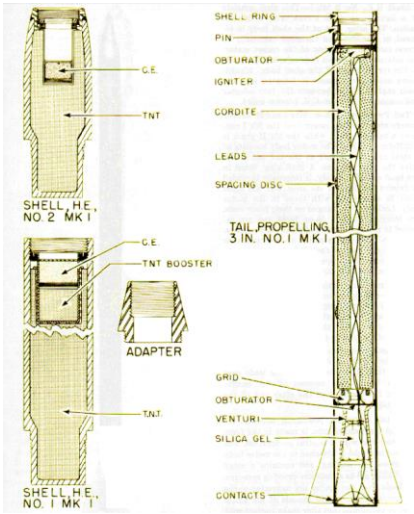




3in Unrotated Projectile (UP) Anti-Aircraft Rocket ("Z" Battery)

HE Projectile Weight	3.4kg (7.6lb)
Explosive Weight	0.96kg (2.13lb)
Filling	High Explosive – TNT. Fitted with aerial burst fuzing
Dimensions of projectile	236 x 83mm (9.29 x 3.25in)
Remarks	As a short range rocket-firing anti-aircraft weapon developed for the Royal Navy. It was used extensively by British ships during the early days of World War II. The UP was also used in ground-based single and 128-round launchers known as Z Batteries. Shell consists of a steel cylinder reduced in diameter at the base and threaded externally to screw into the shell ring of the rocket motor





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