Heyford Masterplan, Heyford Park, Oxfordshire

Ground Conditions Desk Study

Report for

March 2018

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1	October 2017	Original issue.
2	March 2018	Update Parcel numbers.

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Appendices

Executive Summary and Conceptual Site Model

SITE INFORMATION AND SETTING	
Report Purpose	Phase 1 desk study and preliminary risk assessment.
Client	Dorchester Living.
Site Name and Location	Heyford Masterplan, Heyford Park. The site is located in the former RAF Upper Heyford base, with parcels located either side of Camp Road, Heyford Park. The grid reference for the approximate centre of the site is 451390E, 226434N.
Proposed Development	The proposed development is to comprise residential and commercial buildings and commercial and recreational areas. An area in the south of the main site will be used for car processing.
PHASE 1 (DESK STUDY + WALK-OVER)	
Current Land Use and Description	The site is in the former RAF Upper Heyford airbase. The site is 455.4 ha and comprises many different parcels for development. The southernmost areas are agricultural fields. The southern/central areas are currently developed with warehouses, tanks and other buildings. The northern area is the air field. Several former aircraft shelters and bunkers surround the air field. Cars are stored on the hardstanding to the south of the air field.
Site History	The airbase was first constructed in 1915 for the RAF. It was leased to the United States Air Force from the 1950s to 1994. Due to the military use, the historical maps show limited information. A sewage works was constructed in the south of parcel 17 between the 1950s and the 1970s.
Unexploded Ordnance	In general accordance with CIRIA Report C681 (Stone et al 2009) non-specialist UXO screening exercise has been carried out for the site. Screening against the Zetica regional bomb risk map (Oxfordshire) indicates the site to be in an area where the bomb risk is low. As the site was in military use a full UXO desk top study is recommended.
Geology	The available geological sources indicate the site to be underlain by the White Limestone Formation. The Horsehay Sand Formation may outcrop at the western edge of the site. Head may be present in the far east of the site. Made Ground is anticipated due to the current and former development of the site.
Ground Stability	A fault is shown on the geological mapping approximately 35m east of the site, and it appears that this fault has caused the outcropping of the Rutland Formation (an older geology) in the White Limestone Formation 70m east of the site. However, this fault is not mapped on to the site and it is unlikely that it will cause any stability issues on site.
Hydrogeology	The White Limestone Formation is classified by the Environment Agency as a Principal aquifer. The site is not within a groundwater Source Protection Zone.
Hydrology	The nearest surface water feature is Gallos Brook, which runs along the boundary between parcel 16 and 18. Several other unnamed streams run from the east, northeast and west of the site. The River Cherwell and Oxford Canal flow north to south 600m west of the site.
Flood Risk	The site is in Flood Zone 1. No further consideration of flood risk is undertaken in this report.
Previous Site Data	A report confirming the completion of the removal of the Petroleum Oil and Lubrication system at RAF Upper Heyford was issued in 2012. A ground investigation, hydrogeological characterisation assessment, Controlled Waters DQRA and remediation strategy was undertaken by Waterman Energy, Environment & Design Ltd in 2012 for the Flying Field and 'New Settlement Area' of Heyford Park which includes parcels 11, 19 and 20. A ground investigation and remediation strategy was undertaken by Hydrock in 2017 for parcels 10, 16 and 18.

Radon	No radon protective measures are necessary according to current guidance but the site is in a Radon Affected Area (1-3%) and consideration should be given to fitting basic measures. A site specific radon report is recommended.	
Natural Soil Chemistry	Indicative natural concentration (estimated values) (mg/kg): Arsenic 15-25; Cadmium <1.8; Chromium 60-90; Lead <100; Ni 15-30.	
Geotechnical Hazards from Desk Study	• Uncontrolled Made Ground – excessive settlement (creep and inundation settlement or differential settlement of foundations, roads and infrastructure elements). • Attack of buried concrete by aggressive ground conditions – the development site may contain unknown Made Ground. • Shrink/swell of clay – settlement/heave of foundations when located within the influence of trees and vegetation.	
Possible Contaminant Linkages of Moderate or Greater Risk Level - From Desk Study	The possible pollutant linkages on un-remediated areas of the determined by desk study are summarised below for risk levels of moderate or greater.	
	Source(s)	◄ potential Impact on ► Receptor(s)
	Metals and other in-organics within Made Ground.	Site end users Neighbours Groundwater
	Asbestos fibres and ACM from Made Ground.	Site end users Neighbours
	Petroleum hydrocarbons from tanks and Made Ground.	Site end users Plant life Groundwater Surface water
	PCBs from former transformers	Site end users
	Ground gases from Made Ground, quarry backfill and nearby landfills	Site end users Neighbours Buildings (methane only)
	Radon	Site end users
ASSESSMENT AND CONCLUSIONS		
Conclusions	Based on historic land uses and its current operational use, the overall risk from land contamination at the site is considered to be low for the current development. For areas previously investigated and remediated the risk is considered to be low. However, areas of the site not previously investigated and remediated may be considered a moderate risk, prior to confirmation by investigation, and remediation if required. It is considered that it is unlikely that the site would be classified as Contaminated Land under Part 2A of the EPA 1990.	
FUTURE CONSIDERATIONS		
Uncertainties and Limitations	Further assessment of the data from previous investigations, investigation of the areas of the site not previously investigated, and confirmation that remediation has been undertaken is recommended in line with the proposed end use for each parcel.	
Further Work	In order to confirm the actual risks to receptors and confirm the ground conditions with respect to potential geotechnical and geo-environmental risks, an appropriate intrusive investigation for areas not	

	previously investigated will need to be undertaken. Based on the current data, this site investigation is proposed to comprise: • obtain site-specific radon report; • obtain a full UXO desk top study; • the excavation of trial pits to allow collection of samples for geotechnical and chemical analysis, to assess trench stability, over break potential and "diggability" and allow soil infiltration rate testing to be undertaken; • the undertaking of soil infiltration rate testing; • rotary cored boreholes to allow collection of samples for geotechnical and chemical analysis of deeper soils and allow in-situ testing (SPTs) to be undertaken to assess density of the natural rock strata to allow foundation design, and allow the installation of gas and groundwater monitoring wells; • gas and groundwater monitoring installations to allow gas concentrations and groundwater levels to be monitored; • gas concentration and groundwater level monitoring; • geotechnical testing of soils and rock; and • contamination analyses of soil and groundwater. In addition, areas where investigation and remediation has been undertaken, remediation verification should be sought and confirmed that the proposed end use has not changed. Where the proposed end use has changed, further assessment of the investigation and/or verification data should be carried out to confirm the risk to end users will continue to be low.

This Executive Summary forms part of Hydrock Consultants Limited report number HEY-HYD-XX-DS-RP-GE-1000-S2-P1.2 and should not be used as a separate document.

1.0 INTRODUCTION

1.1 Terms of Reference

In January 2017, Hydrock Consultants Limited (Hydrock) was commissioned by Pegasus Group on behalf of Dorchester Living to undertake a desk study for the Heyford Masterplan, Heyford Park, Oxfordshire.

The site covers approximately 455.4 ha and is comprises the former RAF Upper Heyford and currently developed area of Heyford Park.

The proposed development is to comprise residential and commercial buildings and commercial and recreational areas. An area in the south of the main site will be used for car processing.

A Composite Parameter Plan indicating proposed development areas is presented in Appendix A.

1.2 Objectives

The objectives of this investigation are to assess the readily available information on the likely ground conditions at the site and to provide information to support the planning application for the Heyford Masterplan.

1.3 Scope

The scope of work for this commission comprises:

- a desk study to determine the nature of the site and its surroundings including current and former land uses, geology, hydrogeology, hydrology and geo-environmental data. A summary of previous investigations carried out at the site is also included; and
- reporting on findings.

See Appendix D for detailed reporting methodology.

1.4 Provided Information

The following has been used by Hydrock in the preparation of this report:

- Pegasus Design. 25th August 2017. 'Heyford Park – Application Boundary'. Dwg no. P16-0631_33 Rev. F.
- Pegasus Design. 2nd February 2018. 'Heyford Park – Composite Parameter Plan'. Drwg no. P16-0631_08 Rev X.
- Hydrock. February 2017. 'Hydrock Park – Western Development, Phase 9, 10, 16 and 16A, Desk Study and Ground Investigation Report'. Report no. HPW-HYD-MS-ZZ-RP-G-0001-S2-P1.
- Hydrock. April 2017. 'Hydrock Park – Western Development, Phase 9, 10, 16 and 16A, Remediation Method Statement'. Report no. HPW-HYD-MS-ZZ-RP-G-3000-S2-P1.

- Waterman. May 2012. 'Preliminary Ground Investigation, New Settlement Area, Heyford Park'. Document ref. EED10658-13.2.2_FA.
- Vertase F.L.I. Limited. February 2012. Contract Completion Report – POL System – Clean and Make Safe. Report ref. 1246DOR.
- Waterman Energy, Environment and Design Ltd. September 2012. 'Remediation Strategy at New Settlement Area, Upper Heyford'. Ref. EED10658-109_S_12.2.2_FA.
- Waterman Energy, Environment & Design Ltd. September 2012. Controlled Water Detailed Quantitative Risk Assessment. Report ref. EED10658-14.1.7_FA.
- Waterman Energy, Environment & Design Ltd. March 2012. Hydrogeological Characterisation and Groundwater Quality Assessment. Report ref. EED10658-109_R_9.3.1_FA.

1.5 Approach

The work has been carried out in general accordance with recognised best practice as detailed in guidance documents such as the CLR 11 *Model Procedures* (Environment Agency 2004). The technical details of the approach and the methodologies adopted are given in Appendix D.

A recognised phased approach has been followed and this Phase 1 desk study and walk-over provides a preliminary assessment of the site conditions and the important factors that may require further investigation to reduce uncertainty. Recommendations for further work are listed at the end.

2.0 PRELIMINARY INVESTIGATION (PHASE 1 STUDY)

A number of desk study sources have been used to assemble the following information, including a proprietary environmental data report which has been obtained for the site (dated 4th September 2017) and is presented in Appendix C.

2.1 Site Referencing

The site is referenced in Table 2.1.

Table 2.1: Site Referencing Information

Item	Brief Description
Site name	Heyford Masterplan, Heyford Park.
Site location and grid reference	The site is located in the former RAF Upper Heyford base, with parcels located either side of Camp Road, Heyford Park. The grid reference for the approximate centre of the site is 451390E, 226434N.

2.2 Site Description

A basic site description is presented in Table 2.2.

Table 2.2: Site Description

Item	Brief Description
Site access	Via Camp Road.
Site area	Approximately 455.4 ha.
Elevation, topography and any geomorphic features	The site generally slopes upwards from the south to the north, at approximate levels between 125m and 135m AOD. To the west of the site, the topography slopes down towards the River Cherwell and Oxford Canal approximately 600m west of the site.
Present land use	The site is the former RAF Upper Heyford and can be split into several different development parcels as indicated on the Composite Parameter Plan in Appendix A. These parcels are numbered 10 through to 13 and 15 through to 38. Areas between these parcels are not numbered and are not being developed. In the south, Parcels 18, 34 and 18 and 17 are generally arable fields. Parcel 36 comprises the sewage treatment works to the south of Parcel 17. Parcel 32 West is a sports field with a football pitch and tennis/netball courts. In the southwest of the site, Parcel 10 is currently open ground and includes three large above ground fuel tanks, known as POL 21. Parcel 20 comprises three buildings. Parcel 32 East comprises the Heyford Park Free School. Parcel 38 lies just south of Camp Road and is currently an open space used for construction storage. Parcel 35 is in two areas; the western area is hardstanding used for storage and the eastern area is a small building and hardstanding. Parcel 19 is currently a warehouse with external hardstanding and landscaping. Parcel 13 is a thin area of open, grassed land and hardstanding.

Item	Brief Description
	Parcel 15 is a grassed area on the central east of the site. Parcel 33 is Chilgrove Drive running up the east of the site. Parcel 11 currently houses four thin, long buildings. The rest of the parcel is concrete hardstanding and landscaped areas. In the centre of the site, Parcels 12, 21, 22 and 23 are currently used for car storage. Parcel 22 houses six former RAF aircraft shelters and several former RAF buildings. Parcel 24 comprises many former RAF bunkers. Parcels 25, 31, 37 and 29 comprise car storage and several former RAF warehouses. Parcels 30, 28 and the Parcel 27 East are part of the former Flying Field. Parcel 27 West currently houses nine former RAF aircraft shelters. Parcel 26 is eight former RAF aircraft shelters across the north of the site. The rest of the site is the Flying Field, with various former RAF buildings, aircraft shelters and storage.
General site sensitivity	The site is within the rural area of north Oxfordshire. Upper Heyford village is approximately 250m west of the site. There are two Sites of Special Scientific Interest in the vicinity of the site, Ardley Cutting and Quarry, the cutting running southeast to northwest 120m northeast of the site and the quarry 230m northeast of the site, and Ardley Trackways approximately 1km southeast of the site. An Environmentally Sensitive Area is from 350m west of the site and comprises the River Cherwell, part of the Upper Thames Tributaries and the area around it.
Site boundaries and surrounding land	The site area is generally bound by agricultural fields. The current Heyford Park development, of residential and commercial use, are along the southern boundary of the site area and to the east of Parcels 16 and 32, and to the north and west of Parcel 17.

2.3 Site History

A study of historical Ordnance Survey maps (Appendix B) has been undertaken to identify any former land uses at the site and surrounding areas which may have geotechnical or geo-environmental implications for the proposed development and is summarised in Table 2.3.

Note that it is common for military sites not to be shown on Ordnance Survey maps and so details of sites with military or security significance may not be picked up in this review.

Table 2.3: Key Features from Historical Mapping

Map Edition and Scale	Key Features on Site	Key Features off Site
1875-1881 1:2,500 1875-1880 1:10,560	A drain/stream runs north-south through parcel 32 and along the boundary between parcels 18 and 16. Parcel 17 is an open field. Parcel 11 is covered with gorse. Ballard's copse is in parcel 27. A building named Halls Barn is also in parcel 27.	A quarry is on the southern boundary of parcel 18. The River Cherwell and Oxford Canal are approximately 600m west of the site.
1900 1:2,500 1898 1:10,560	A track is shown through parcel 18. A Roman Road runs north-south through the western end of the site.	Springs are noted 500m west of the site.
1922 1:2,500	No significant change.	The quarry has been extended south of parcel 18.

Map Edition and Scale	Key Features on Site	Key Features off Site
1818-1923 1:10,560		A railway line has been constructed 150m northeast of the site. Another spring is noted 450m west of the site.
1954	The site has been left blank and is labelled Airfield.	
1973-1975 1:2,500	Tanks are shown on the northern boundary of parcels 18 and 16. The drain now starts from these tanks south along the boundary between 18 and 16. A running track has been constructed around parcel 32. A sewage works with filter beds has been constructed in the southern end of parcel 17. Infrastructure associated with the airbase has been constructed across the rest of the site.	Upper Heyford American High School has been constructed 50m north of parcel 18 and 50m west of parcel 32. Residential housing and other associated buildings have been constructed to the south of the main site area. The quarry to the south of parcel 18 has been backfilled.
1982 1:2,500 1979-1981 1:10,000	A baseball pitch, tennis courts, a tank and a substation have been constructed in parcel 32. Ballard's Copse and Halls Barn are no longer in parcel 27.	There is only one spring 500m west of the site. A water works has been constructed 600m west. A sewage works has been constructed 750m southwest.
1994 1:2,500	No significant change.	No significant change.
2002-2014 1:10,000	No significant change.	Water works have been demolished 600m west.

Online sources indicate the airbase was constructed in 1915 and was used by the RAF. Following World War 2 the United States Air Force leased the site until 1994, when the site was returned to the Military of Defence and closed.

2.4 Unexploded Ordnance/Bombs

In general accordance with CIRIA Report C681 (Stone *et al* 2009) non-specialist UXO screening exercise has been carried out for the site. Screening against the Zetica regional bomb risk map (Oxfordshire) indicates the site to be in an area where the bomb risk is low. A copy of the map is presented in Appendix C. However, the site was in military use between 1915 and 1994 and a specialist Desk Top Study is recommended for the site.

2.5 Geology

The general geology of the site area is shown on the 1:50,000 geological map of Chipping Norton (Sheet 218) and is summarised in Table 2.4.

Table 2.4: Geology

Location	Age	Stratigraphic Name	Description
In the far eastern corner of site	Quaternary	Head	Essentially comprises sand and gravel, with lenses of clay and silt depending on upslope source and distance from source.
On site	Jurassic	White Limestone Formation (Great Oolite Group)	A pale grey to off-white or yellowish limestone, some recrystallised limestone, with rare sandy limestone, argillaceous limestone, marl and mudstone or clay.
At western edge of site	Jurassic	Horsehay Sand Formation (Great Oolite Group)	Pale grey and brown to off-white, medium- to fine-grained, quartzose sand, locally cemented into calcareous or weakly ferruginous sandstone with thin dark grey mudstone and siltstone beds in places.

The majority of the site is noted as being 'landscaped' on the geological map.

An inferred fault is noted in the environmental data report, starting 35m east of the site running towards the east. An outcrop of the Rutland Formation 70m east and Head Deposits on site are associated with this fault line.

2.6 Mining or Mineral Extraction

Several limestone quarries/pits are noted on the historical map on site or on the boundaries of the site. However, these appear to be small in nature and are likely to have been backfilled.

2.7 Ground Stability

The site is not directly underlain by soluble deposits, and the only extraction activities in the area were surface excavations.

A fault is shown on the geological mapping approximately. 35m east of the site, and it appears that this fault has caused the outcropping of the Rutland Formation (an older geology) in the White Limestone Formation 70m east of the site. However, this fault is not mapped on to the site and it is unlikely that it will cause any stability issues on site.

2.8 Hydrogeology

The aquifer designations given in Table 2.5 are based on the Environment Agency interactive aquifer designation map. Additional information on the hydraulic characteristics of the geological units has been abstracted from Allen *et al* (1997).

Table 2.5: Hydraulic Characteristics of Strata

Stratum	Aquifer Designation	Hydraulic Characteristics
Head	Secondary (undifferentiated) Aquifer	Variable characteristics depending on composition of deposits.
White Limestone Formation	Principal Aquifer	Hydraulic conductivity and water storage is high due to the fractured and fissured nature of the limestone. Hydraulic conductivity is linked to porosity, and where marls, mudstones, and clays are present porosity is lower and hence lowers the hydraulic conductivity.

Stratum	Aquifer Designation	Hydraulic Characteristics
		However, the thickness of the marls etc. are not so great to affect the overall conductivity of the aquifer in this area.
Horsehay Sand Formation	Secondary (A) Aquifer	Where this outcrops it is likely to be in hydraulic continuity with the White Limestone Formation, however, will have lower porosity but similar hydraulic continuity values.

Reference to the Environment Agency web site shows the following groundwater bodies beneath the site and their current status (Table 2.6).

Table 2.6: Groundwater Bodies

Category	Main site area	Western edge of site
Waterbody ID	GB40601G603100	GB40602G600200
Waterbody name	Tackley Jurassic	Banbury Jurassic
River basin district	Oxon Ray	Cherwell
Current quantitative quality	Good	Good
Current chemical quality	Good	Poor
Objectives	N/A	Good by 2027
Protected area	Yes (Drinking Water Protected Area and Nitrates Directive)	Yes (Drinking Water Protected Area and Nitrates Directive)

The site is not within a within a groundwater Source Protection Zone (SPZ). There is one active licensed groundwater abstraction within 1km of the site. It is 650m southeast of the site, from the Thames Groundwater at Manor Farm, Middleton Stoney.

The majority of the site is covered by soils of high leaching potential.

2.9 Hydrology and Flooding

The surface water features in the vicinity of the site are listed in Table 2.7.

Table 2.7: Surface Water Features

Feature	Location Relative to Site
Gallos Brook	Starts at the northern boundary between parcels 16 and 18 and flows south along the boundary.
Unnamed stream	Starts at the southern boundary of parcel 22 and flows south past the southeastern boundary of parcel 17. This joins Gallos Brook approximately 4km south of the site.
Unnamed stream	Starts at the northeastern boundary of parcel 27 and flows northeast.

Feature	Location Relative to Site
Unnamed streams	Two streams start within 500m southeast of the site and flow southeast to join a larger stream. Seven streams spring in a line between 1km and 500m west of the site and flow into the River Cherwell.
River Cherwell and Oxford Canal	Approximately 600m west of the site, flowing generally north to south. This joins the River Thames at Oxford, approximately 25km south of the site.

There are no surface water abstractions within 1km of the site.

The desk study information indicates the proposed development is in Flood Zone 1 (with low probability of flooding) and the area is greater than 1 ha so consultation with the Environment Agency is required with a Flood Risk Assessment (FRA).

The environmental data report indicates a potential for surface groundwater flooding.

No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regards to drainage and flooding.

2.10 Waste Management and Hazardous Substances

There is one waste management site recorded within 250m of the site. It is a historical landfill at Ardley Wood, Cherwell, approximately 180m northeast of the site. It was licensed between 1977 and 1985 for inert, industrial, commercial and household waste and was operated by Oxfordshire County Council.

There are records relating to the storage of radioactive materials on site by Oxford Bio-innovation Ltd between 2006 and 2015. However, as long as these have been stored and operated in accordance with any applicable licence, no impact on the site is envisaged.

There are no records of prosecutions relating to authorised processes in the vicinity of the site.

There is no Local Authority Pollution Prevention and Controls, NIHHS sites or Planning Hazardous Substance consents or enforcements within 500m of the site.

The Southern Bomb Store between Parcels 11 and 35 is a current Upper Tier Control of Major Accidents Hazards (COMAH) Regulations 2015 site. COMAH sites are subject to Regulations because certain dangerous substances are present at these sites and all activities must be managed to reduce the risk from to workers and the public. The Southern Bomb Store is used for general manufacture and/or storage and/or distribution of energetic materials that could potentially cause fire/explosion. It is assumed that the Southern Bomb Store operates all activities to the Regulations.

Depending on the sensitivity of the development, the HSE will advise against granting planning permission for developments within particular zones of a COMAH site. This advice is only provided to Local Planning Authorities (LPA) via the PADHI+ software decision support tool (planning advice for developments near hazardous installations). PADHI can be used to obtain HSE's advice on pre-planning enquiries (PPEs) in a similar way as formal consultation on planning

applications, provided sufficient information is available. Hydrock recommends the LPA is contacted at the earliest opportunity.

2.11 Previous Evidence of Known Contamination Events

The environmental data report indicates there was a Category 2 (significant impact) pollution incident on site in 2007, relating to the leakage of final effluent sewage materials into the water course on the southeastern edge of the site.

2.12 Natural Soil Chemistry

Information contained within the environmental data report (Appendix C) gives indicative natural concentration values (estimated) for the natural soils at the site for a selection of Contaminants of Potential Concern (CoPC). These have been reproduced in Table 2.8 below.

Table 2.8: Natural Soil Chemistry

Element	Arsenic	Cadmium	Chromium	Lead	Nickel
Concentration (mg/kg)	15 - 25	<1.8	60 - 90	<100	15 - 30

2.13 Radon

The radon risk has been reported in the environmental data report. This indicates that the site is in a Radon Affected Area where 1-3% of homes are above the action level and no radon protection measures are required for new buildings at this location in line with current guidance. However, consideration should be given to fitting basic protection measures on the “as low as reasonably practicable” principle in view of advice given to householders and the legal responsibilities of rental landlords and employers with commercial properties (see Appendix D for further details).

2.14 BGS Borehole Archive

A number of borehole logs from the BGS archive have been reviewed:

- SP52NW17 located on site.
- SP52NW116A, B and C, located on site.

These identified the following geology beneath the site:

- Topsoil to between 0.45m and 0.50m below ground level (bgl); over
- Silty sandy clay with limestone gravel (White Limestone Formation) to between 1.60m and 1.95m bgl; over
- Limestone interbedded with clay, shale, sandstone (White Limestone Formation) to 19.00m bgl; over
- Estuarine Series and Northampton Sand Formation to 30m bgl; over
- Upper Lias Clay (now Whitby Mudstone Formation) to 50m bgl; over

- Marlstone Rock Formation to 56m bgl; over
- Middle and Lower Lias Clay (now Dyrham Formation and Charmouth Mudstone Formation) to 75m bgl.

2.15 Previous Site Investigations or Other Reports

The following previous ground investigations and other associated works have been undertaken at the site and wider site area and the main findings are summarised in Table 2.9. Reference to these reports should be made if further information is required.

Table 2.9: Summary of Previous Reports

Findings
Vertase F.L.I. Limited. February 2012. Contract Completion Report – POL System – Clean and Make Safe. Report ref. 1246DOR. This report details and confirms the decommissioning of the Petroleum Oil and Lubrication (POL) system at the former RAF airbase at Upper Heyford. All waters from tanks were pumped directly to mobile waste water treatment plants. Monitoring and validation of groundwater and soils in the vicinity of the works confirmed the works did not impact on residual site conditions. Tanks were filled with PFA with 1.5% OPC and 27% water. 99 tanks were decommissioned, of which 19 were not filled with PFA/OPC grout. Above ground storage tanks were not filled. The POL pipeline was cleaned, foam filled and broken in places to prevent migration pathways.
Waterman Energy, Environment & Design Ltd. March 2012. Hydrogeological Characterisation and Groundwater Quality Assessment. Report ref. EED10658-109_R_9.3.1_FA. This report covers the Flying Field at Heyford Park. The works comprised 42 rotary cored boreholes, 5 rotary open hole boreholes and the installation of 46 monitoring wells. Ground conditions comprised: • Topsoil or Made Ground to a maximum proven depth of 1.1m bgl. • Natural Drift to a maximum depth of 2.8m bgl. • Interbedded limestone, siltstone, mudstone and sandstone to a maximum proven depth of 40.0m bgl. Groundwater was found to comprise a layered system, with a shallow groundwater body and a deeper groundwater body. Vertical migration of water and contaminants is occurring from the shallow to the deeper groundwater body. **Conclusions/Recommendations:** The shallow groundwater has been marginally impacted from historical site use. TPH concentrations were more elevated in the south of the Flying Field. Works including tanks and pipes being emptied and cleaned were being undertaken at the time of the investigation. Following these it was recommended a groundwater monitoring programme of sampling every quarter and testing for speciated TPH and a further review to determine if supplementary works in the most contaminated area of the site would be required.
Waterman Energy, Environment & Design Ltd. May 2012. Preliminary Generic Quantitative Environmental Risk Assessment. Report ref. EED10658-13.2.2_FA. This report covers the 'New Settlement Area' of Heyford Park, of which the Retained Commercial Area (RCA) covers an area around parcels 20, 19 and 11 of the site. Overall the works undertaken comprised 41 boreholes and 96 trial pits. Ground conditions encountered: • Made Ground to a maximum proven depth of 2.6m bgl.

- Weathered limestone becoming thickly bedded limestone to a maximum proven depth of 6.8m bgl.
- Interbedded siltstone and mudstone to a maximum proven depth of 10.0m bgl.

Groundwater at between 107.6mAOD and 123.82mAOD.

Conclusions/Recommendations:

The RCA area is considered suitable for continued use commercial use with regards to soil contamination.

Ground gas levels indicate the RCA area can be classified as Characteristic Situation 2 for Situation A development.

Barrier pipe is recommending for water supply pipes.

Tank removal and hydrocarbon contamination associated with the tank was recommended to improve the groundwater quality.

A DQRA was proposed to generate threshold values for the soils.

Waterman Energy, Environment & Design Ltd. September 2012. Controlled Water Detailed Quantitative Risk Assessment. Report ref. EED10658-14.1.7_FA.

A Controlled Waters DQRA was undertaken for the 'New Settlement Area' of Heyford, of which the Retained Commercial Area (RCA) covers an area around parcels 20, 19 and 11 of the site.

Site Specific Remediation targets were derived using the Environment Agency's Remedial Targets Methodology model. Two sets of target values were derived for a compliance point at the site boundary, depending on the distance of the tank clusters to the site boundary.

Residual environmental liabilities are anticipated to be of low risk after implementation of the remediation strategy (below) using the target values.

Waterman Energy, Environment & Design Ltd. September 2012. Remediation Strategy. Report ref. EED10658-109_S_12.2.2_FA.

As above, this report covers the 'New Settlement Area' of Heyford Park, of which the Retained Commercial Area (RCA) covers an area around parcels 20, 19 and 11 of the site.

The remediation activities include:

- Tank and impacted soil removal
- Backfill excavations with appropriate material
- Treatment and disposal of groundwater in excavations

The plan with the locations of underground tanks which were to be removed is not included, but the following tanks are noted on site or at the boundaries of this site; UGNSA 13-15, 22 and 23. The following tanks are near to or adjacent to site boundaries; UGNSA 26-30.

Hydrock. Desk Study and Ground Investigation Report. February 2017. Report ref. HPW-HYD-MS-ZZ-RP-G-0001.

This report covers Parcels 10, 16 and 18.

In parcel 10 the works comprised six cable percussion boreholes, nine trial pits and two soakaway tests. In parcel 16 the works comprised two cable percussion boreholes, 28 trial pits and three soakaway tests. In parcel 18 the works comprised two cable percussion boreholes and 28 trial pits.

Across the three parcels the ground conditions encountered comprised:

- Made Ground across parcel 10 to depths between 0.15m and 0.30m bgl; and
- Topsoil across parcels 16 and 18 to depths between 0.15m and 0.30m bgl; over
- Great Oolite Group (White Limestone Formation) below Made Ground or Topsoil to a maximum depth of 8.00m bgl.

Groundwater was encountered in one trial pit at 2.60m bgl in parcel 10 and in two trial pits at 1.80m and 3.00m bgl in parcel 18, close to Gallos Brook. Subsequent monitoring recorded levels generally between 2.00m and 3.50m bgl, although a reading of 1.00m bgl was recorded in parcel 10 and a reading of 1.00m bgl was recorded in parcel 16, adjacent to Gallos Brook.

Conclusions/Recommendations: **<u>Environmental – residential end use</u>** Pervasive PAH, TPH and VOCs in the Made Ground in parcel 10, when compared to residential end use GACs. However, likely to be elevated compared to commercial GACs. No risk identified to Controlled Waters (subject to regulatory approval). Parcel 10 can be classified as Characteristic Situation 2 for Situation A development with regards to ground gases. **<u>Geotechnical</u>** Strip/trench fill foundations can give an allowable net bearing pressure of 100kN/m2 on natural soils, and at least 250kN/m2 on natural rock quality strata. Ground bearing floor slabs. <2.5% CBR on Made Ground, 3% CBR on natural fine soils, 5% CBR on natural coarse soils. Soakaways may be possible. Further infiltration rate testing is required. Sulphate classification – DS-1, ACEC-1 and DC-1 for a 50-year design life.
Hydrock. Remediation Method Statement. April 2017. Report ref. HPW-HYD-MS-ZZ-RP-G-3000. This report covers Parcels 10, 16 and 18. The following remediation strategy was proposed: • Asbestos survey of former buildings • Asbestos removal • Controlled decommissioning, decontamination and demolition of site buildings and ancillary structures • Removal of slabs, tanks, existing drainage system and pipework • Excavation of hotspots around tanks etc. • Ex situ remediation of hydrocarbon impacted soils • Installation of barrier pipe for potable water supply • Installation of ground gas protection measures in parcel 10 • Installation of engineered cover system in parcel 10. • Validation and verification of above.

2.15.1 Evaluation of Previous Reports

Site investigation and remediation has been undertaken for several parcels of the site to date. From these works it can be concluded that the groundwater has been marginally impacted by petroleum hydrocarbons from the historical site use as a RAF/USAF airbase in the vicinity of former underground storage tanks. Site specific remedial targets were calculated and a strategy of betterment by removal of tanks and pipework and hydrocarbon impacted soils was recommended for the Flying Field and the central area of the site. Groundwater in the south of the site, away from underground storage tanks, had not been impacted. However, soils in the developed areas of the site may pose a risk to human health, depending on the proposed end use.

2.15.2 Suitability of Previous Data

Chemical Test Data

Chemical test data from the Waterman investigations should not be used in future assessments, due to the time scale since being undertaken. Chemical test data from Hydrock investigations can be used in future risk assessments, where appropriate.

Groundwater Data

Groundwater levels fluctuate seasonally and across the various parcels. Review of specific data should be undertaken for each plot to facilitate design.

Ground Gas Data

Ground gas data from both investigations can be used in future assessment. Review of specific data should be undertaken for each plot to facilitate design.

Geotechnical Data

All geotechnical data can be used in future assessment where appropriate.

3.0 PRELIMINARY CONCEPTUAL SITE MODEL

3.1 Physical Setting

The preliminary ground model of the site is the basis of the understanding of the ground conditions that will inform the geo-environmental exposure model and the geotechnical hazard assessment.

3.2 Geo-environmental Exposure Model

The preliminary exposure model is used for geo-environmental hazard identification and establishing potential contaminant linkages based on the contaminant-pathway-receptor approach.

3.2.1 Potential Contaminants

For the purpose of this assessment the potential contaminants have been separated according to whether they are likely to have originated from on-site or off-site sources.

Potential On-Site Sources of Contamination

- Made Ground possibly including metals, metalloids, asbestos, PAH and petroleum hydrocarbons.
- Hydrocarbon fuels associated with the former land use as an airfield and underground storage tanks.
- VOCs and SVOCs associated with former land use.
- PCBs associated with former transformers.
- Ground gases (gases carbon dioxide and methane) from organic materials present in the Made Ground.
- Ground gases (radon) from natural strata.

Potential Off-Site Sources of Contamination

- Hydrocarbon fuels associated with the former land use as an airfield and underground storage tanks.
- Quarry backfill adjacent to the southern boundary of Phase 16A possibly including metals, metalloids, asbestos, PAH and petroleum hydrocarbons.
- Ground gas (carbon dioxide and methane) from nearby landfills.

3.2.2 Potential Receptors

- Humans (site end users, neighbours).
- Development end use (buildings, utilities and landscaping).
- Groundwater: Principal Aquifer status of the White Limestone Formation.
- Surface water: Gallos Brook and other unnamed streams.

It should be noted that health and safety risks to site contractors and maintenance workers have not been assessed during these works and will need to be considered separately.

3.2.3 Potential Pathways

- Humans: ingestion, skin contact, inhalation of dust and outdoor air.
- Buildings: methane ingress via permeable soils and/or construction gaps.
- Plant life: root uptake.
- Plant uptake: methane ingress to the root zone.
- Underlying groundwater: migration of contaminant via leachate dispersion through the unsaturated zone in the White Limestone Formation.
- Underlying groundwater: migration of contaminant into the White Limestone Formation aquifer.
- Surface water: overland flow.
- Surface water: base flow from groundwater.

3.2.4 Summary of Potential Contaminant Linkages

Table 3.1 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in CLR 11 and additional risk assessment is required.

Linkages has been assessed in general accordance with guidance in CIRIA Report C552 (Rudland *et al* 2001) but with the addition of a 'no linkage' category. More details are given in Appendix D including descriptions of typical examples of probability and consequences.

It should be noted that whilst the risk assessment process undertaken in this report may identify potential risks to site demolition and redevelopment workers, consideration of occupational health and safety issues is beyond the scope of this report and need to be considered separately in the Construction Phase Health and Safety Plan.

Table 3.1: Exposure Model – Preliminary Risk Assessment of Source-Pathway-Receptor Contaminant Linkages

Source(s)	Possible Pathway(s)	Receptor(s)	Probability	Consequence	Risk Level	Comments
Metals, metalloids and PAH from Made Ground.	Ingestion, inhalation, direct contact.	Site end users.	Likely	Medium	Moderate	Made Ground is known to be present beneath parcels in previously developed areas of the site. Further investigation is required in areas where investigation has not been undertaken to assess the risk from Made Ground.
	Inhalation of fugitive dust.	Neighbours.	Low likelihood.	Medium.	Low/ moderate.	
	Root uptake.	Plant life.	Likely.	Minor.	Low.	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood.	Medium.	Low/ moderate.	A Controlled Waters Detailed Risk Assessment has been undertaken for the groundwater beneath the site, and metals, metalloids and PAH were not considered to pose a risk to Controlled Waters at the site.
	Surface run-off, base flow from contaminated groundwater.	Aquatic ecosystems. Surface water and possible abstractors.	Likely.	Mild.	Low.	Made Ground is known to be present beneath the developed areas of the site and it is possible contaminants will leach into run-off and into the streams flowing offsite.
Asbestos fibres from insulation or asbestos-containing materials in the Made Ground	Fugitive dust.	Site end users.	Likely.	Medium.	Moderate.	Made Ground is known to be present beneath the developed areas of the site and could contain asbestos containing materials. Further investigation is required in areas where investigation has not been undertaken to assess the risk from asbestos.
		Neighbours.	Low likelihood.	Medium.	Low/ moderate.	

Source(s)	Possible Pathway(s)	Receptor(s)	Probability	Consequence	Risk Level	Comments
Petroleum hydrocarbons, VOCs and SVOCs in Made Ground and from storage tanks.	Ingestion, inhalation, direct contact.	Site end users.	Likely.	Medium.	Moderate.	Petroleum hydrocarbons, VOCs and SVOCs have been identified across areas of the site previously. It is likely additional petroleum hydrocarbon contamination will be encountered on areas not previously investigated. The Remediation Strategy produced for Parcels 16, 18 and 10 (HPW-HYD-MS-ZZ-RP-G-3000) and for Parcels 11, 19 and 20 (EED10658-109_S_12.2.2_FA) should be reviewed and further investigation may be required to confirm if these remediation measures have been or should be undertaken on parcels not covered previously.
	Root uptake.	Plant life.	Likely.	Mild.	Low/ moderate.	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Likely.	Medium.	Moderate.	
	Surface run-off, base flow from contaminated groundwater.	Aquatic ecosystems. Surface water and possible abstractors.	Likely.	Mild.	Low/ moderate.	
PCBs from former transformers in electricity substations.	Ingestion, inhalation, direct contact.	Site end users.	Low likelihood.	Medium.	Low/ moderate.	Electricity substations are present on site and could contain PCBs from former transformers. The areas around these electricity substations should be investigated.
Carbon dioxide from Made Ground, backfill of quarry or nearby landfills.	Migration through soils or groundwater to indoor air.	End users of new buildings (asphyxiation).	Low likelihood.	Severe.	Moderate.	Previous investigations have determined that parcels 10, 11, 19 and 20 are classified as Characteristic Situation 2 (low to moderate risk) for ground gases. Investigation is required for areas not investigated to determine the risk from ground gases across the rest of the site.
		Users of off-site properties (asphyxiation).	Low likelihood.	Severe.	Moderate.	

Source(s)	Possible Pathway(s)	Receptor(s)	Probability	Consequence	Risk Level	Comments
Methane from Made Ground, backfill of quarry or nearby landfills.	Migration through soils or groundwater to indoor air.	End users of new buildings (asphyxiation or explosion).	Low likelihood.	Severe.	Moderate.	
		Users of off-site properties (asphyxiation or explosion).	Low likelihood.	Severe.	Moderate.	
		New buildings (damage by explosion).	Low likelihood.	Severe.	Moderate.	
		Neighbouring properties (damage by explosion).	Low likelihood.	Severe.	Moderate.	
Radon	Migration through soils or groundwater to indoor air.	End users of new buildings.	Low likelihood.	Medium.	Low/ moderate.	BR 211 (2007) radon advice indicates no radon protection measures are required, but considering the site is in a Radon Affected area (1-3%) consideration should be given to basic protection measures. A site specific radon report is recommended.

3.3 Geotechnical Hazard Identification

Potential geotechnical hazards based on the expected ground conditions are listed below.

- Uncontrolled Made Ground – excessive settlement (creep and inundation settlement or differential settlement of foundations, roads and infrastructure elements).
- Attack of buried concrete by aggressive ground conditions – the development site may contain unknown Made Ground.
- Shrink/swell of clay – settlement/heave of foundations when located within the influence of trees and vegetation.

4.0 DESK STUDY CONCLUSIONS

Table 3.1 is a summary of the geo-environmental risks identified and the overall risk associated with the site has been designated using qualitative judgement according to the risk categories given in Table 4.1.

Based on historic land uses and its current operational use, the overall risk from land contamination at the site is considered to be low for the current development. For areas previously investigated and remediated the risk is considered to be low. However, areas of the site not previously investigated and remediated may be considered a moderate risk, prior to confirmation by investigation, and remediation if required.

It is considered that it is unlikely that the site would be classified as Contaminated Land under Part 2A of the EPA 1990.

Table 4.1: Assessed Overall Risk Categories for the Site from Land Contamination

Risk Category	Definition
Very High Risk	A significant contaminant linkage, including actual evidence of significant harm or significant possibility and significant harm, is clearly identifiable at the site (e.g. from visual or documentary evidence) under current conditions, with potential for legal and/or financial consequences for the site owner or other Responsible Person. Remediation advisable based on acute impacts being likely. Immediate action should be considered.
High Risk	A contaminant linkage is identifiable at the site under current and future use conditions. Although likely, there is no obvious actual evidence of significant harm or significant possibility and significant harm under current conditions. Extent of risk is therefore subject to confirmation by investigation and risk assessment and most likely to be deemed significant. Realisation of the risk is likely to present a substantial liability to the site owner or other Responsible Person. Remediation required for redevelopment and may also be required under Part 2A for existing receptors.
Moderate Risk	A contaminant linkage is identifiable at the site under current and future use conditions. However, it is not likely to be a significant linkage under current conditions. It is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Actual extent of risk subject to confirmation by additional investigation and risk assessment and most likely to lie between no possibility of harm (under current conditions) and significant possibility of significant harm (under conditions created by new use). Remediation may be required for redevelopment.
Low Risk	Potential pathways and receptors exist but history of contaminative use or site conditions indicates that contamination is likely to be of limited extent and below the level of possibility of harm. It is unlikely that the site owner or other Responsible Person would face substantial liabilities from such a risk. Precautionary investigations and risk assessment advisable on change of use. Any subsequent remedial works are likely to be relatively limited.
Very Low Risk	No contaminant linkage likely to exist under current or future conditions, but this cannot be completely discounted. If harm is realised, it is likely at worst to be mild or minor. Site not capable of being determined under Part 2A where the Local Authority inspects the site. Precautionary investigations and risk assessment advisable on change of use. Otherwise no further action recommended.
No Risk	No contaminant linkage exists.

5.0 UNRESOLVED ISSUES, UNCERTAINTIES AND LIMITATIONS

5.1 Site-Specific Comments

Further assessment of the data from previous investigations, investigation of the areas of the site not previously investigated, and confirmation that remediation has been undertaken is recommended in line with the proposed end use for each parcel.

5.2 General Comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of Dorchester Living, under the terms of appointment for Hydrock. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by Hydrock in this connection without the explicit written agreement thereto by Hydrock. The report may be assigned by the Client by way of absolute legal agreement to a purchaser of all or part of the site to which the report refers ("The Site") without the consent of Hydrock being required and such assignment shall be effective upon written notice thereof being given to Hydrock. No further assignments shall be permitted, unless expressly agreed in writing by Hydrock. In the event of the Client entering into a legal joint venture to develop The Site, the report can be regarded as having been issued by Hydrock jointly in favour of the Client and the joint venture partner, and in respect of the report Hydrock would owe the joint venture partner the same duty of care that Hydrock owed to the Client when Hydrock was instructed to prepare the report subject to all the matters contained or referred to in the report.

This report details the findings of work carried out in October 2017. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness. It is assumed that previous reports provided have been assigned to the Client and can be relied upon. Should this not be the case Hydrock should be informed immediately as additional work may be required.

The work has been carried out in general accordance with recognised best practice. The various methodologies used are explained in Appendix D. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The preliminary risk assessment process may identify potential risks to site demolition and redevelopment workers. However, consideration of occupational health and safety issues is beyond the scope of this report.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds such as Japanese knotweed, this report does not constitute a formal survey of these potential hazards.

Any site boundary line depicted on plans does not imply legal ownership of land.

6.0 RECOMMENDATIONS FOR FURTHER WORK

In order to confirm the actual risks to receptors and confirm the ground conditions with respect to potential geotechnical and geo-environmental risks, appropriate intrusive investigation for areas not previously investigated will need to be undertaken. Based on the current data, this site investigation is proposed to comprise:

- obtain site-specific radon report;
- obtain a full UXO desk top study;
- the excavation of trial pits to allow collection of samples for geotechnical and chemical analysis, to assess trench stability, over break potential and “diggability” and allow soil infiltration rate testing to be undertaken;
- the undertaking of soil infiltration rate testing;
- rotary cored boreholes to allow collection of samples for geotechnical and chemical analysis of deeper soils and allow in-situ testing (SPTs) to be undertaken to assess density of the natural rock strata to allow foundation design, and allow the installation of gas and groundwater monitoring wells;
- gas and groundwater monitoring installations to allow gas concentrations and groundwater levels to be monitored;
- gas concentration and groundwater level monitoring;
- geotechnical testing of soils and rock; and
- contamination analyses of soil and groundwater.

In addition, areas where investigation and remediation has been undertaken, remediation verification should be sought and confirmed that the proposed end use has not changed. Where the proposed end use has changed, further assessment of the investigation and/or verification data should be carried out to confirm the risk to end users will continue to be low.

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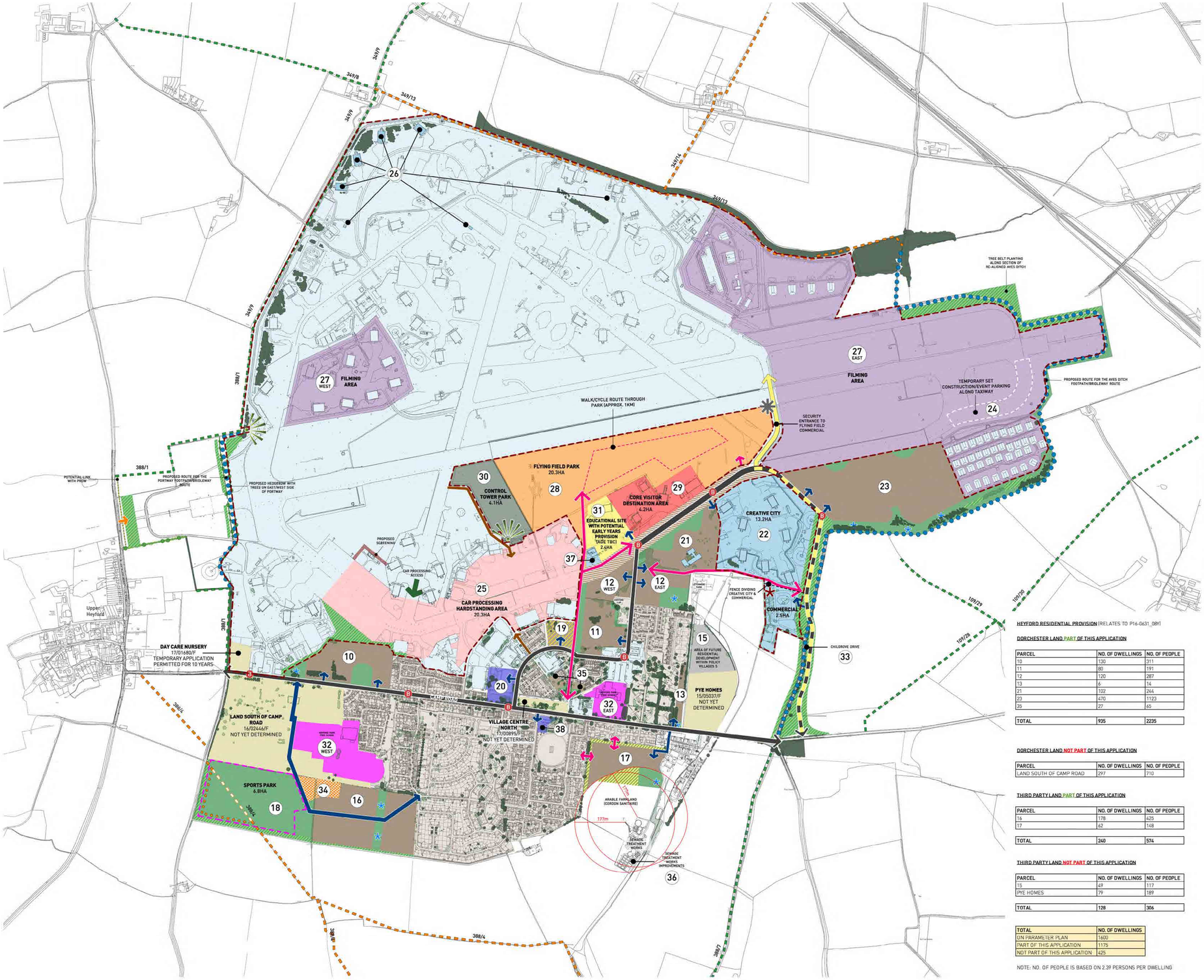
Appendix A

Drawings



PROPOSALS KEY

LAND USE

- EXISTING BUILT DEVELOPMENT/PROPOSALS
- EXISTING COMMERCIAL AREAS
- EXISTING APPLICATIONS WITHIN MASTERPLAN AREA
  LAND SOUTH OF CAMP ROAD, VILLAGE CENTRE NORTH, DAY NURSERY & PYE HOMES
- RESIDENTIAL
- CREATIVE CITY / COMMERCIAL
- CAR PROCESSING
- MIXED USE
- FLYING FIELD PARK
- CORE VISITOR DESTINATION AREA
- EDUCATIONAL SITE WITH POTENTIAL EARLY YEARS PROVISION
  AGE TBC
- ANCILLARY OPEN ACTIVITY SUCH AS PARKING
- FILMING ACTIVITY AREA
- HEYFORD FREE SCHOOL SITES
  TO BE EXTENDED/EXPANDED
- UP TO 60 EXTRA CARE DWELLINGS (CLASS C2/C3)
  0.9HA
- AREA FOR COMMUNITY USES
- CONTROL TOWER PARK
- GREEN INFRASTRUCTURE
  INCLUDING CHILDREN'S PLAY AREAS

GREEN INFRASTRUCTURE

- STRATEGIC LANDSCAPE BUFFER
- COMMUNITY ORCHARD / ALLOTMENTS
- SPORTS PARK
- APPROXIMATE LOCATION OF ATTENUATION AREAS
- PROPOSED SCREENING
- VIEWPOINT ACROSS SITE
- EXISTING VEGETATION
  SUBJECT TO DETAILED TREE SURVEY (CLASS 'C' HATCHED GREEN)

HEYFORD RESIDENTIAL PROVISION (RELATES TO P16-0631_08Y)

DORCHESTER LAND PART OF THIS APPLICATION

PARCEL	NO. OF DWELLINGS	NO. OF PEOPLE
10	130	311
11	80	191
12	120	287
13	6	14
21	102	244
23	470	1123
35	27	65
TOTAL	935	2235

DORCHESTER LAND NOT PART OF THIS APPLICATION

PARCEL	NO. OF DWELLINGS	NO. OF PEOPLE
LAND SOUTH OF CAMP ROAD	297	710

THIRD PARTY LAND PART OF THIS APPLICATION

PARCEL	NO. OF DWELLINGS	NO. OF PEOPLE
16	178	425
17	62	148
TOTAL	240	574

THIRD PARTY LAND NOT PART OF THIS APPLICATION

PARCEL	NO. OF DWELLINGS	NO. OF PEOPLE
15	49	117
PYE HOMES	79	189
TOTAL	128	306

TOTAL	NO. OF DWELLINGS
ON PARAMETER PLAN	1600
PART OF THIS APPLICATION	1175
NOT PART OF THIS APPLICATION	425

NOTE: NO. OF PEOPLE IS BASED ON 2.39 PERSONS PER DWELLING

ACCESS & MOVEMENT

- BUS ROUTE, VEHICLE ACCESS & FOOTWAYS
- PRIMARY VEHICULAR ACCESS
- PRIMARY HGV ACCESS
- MAINTENANCE ACCESS
- PRIMARY PEDESTRIAN / CYCLE ROUTES
  WHERE NOT IN ASSOCIATION WITH VEHICLE ACCESS
- PRIMARY CAR PROCESSING ACCESS
- SECONDARY COMMERCIAL ACCESS
- POTENTIAL BUS STOP LOCATIONS
- FOOTPATH/BRIDLEWAY ROUTE
- POTENTIAL LINK WITH PROW
- EXISTING FOOTPATHS
- CLOSURE OF EXISTING FOOTPATH
- DIVERTED FOOTPATH
- EXISTING BRIDLEWAY

OTHER

- SECURITY FENCE
- 10 PARCEL NUMBER
- OBSERVATION TOWER & ZIPWIRE
- CORDON SANITARE EXCLUSION ZONES
  177M RADIUS
- APPROXIMATE LOCATION OF ENERGY INFRASTRUCTURE / FACILITY

N W E S 0 50 150 250m

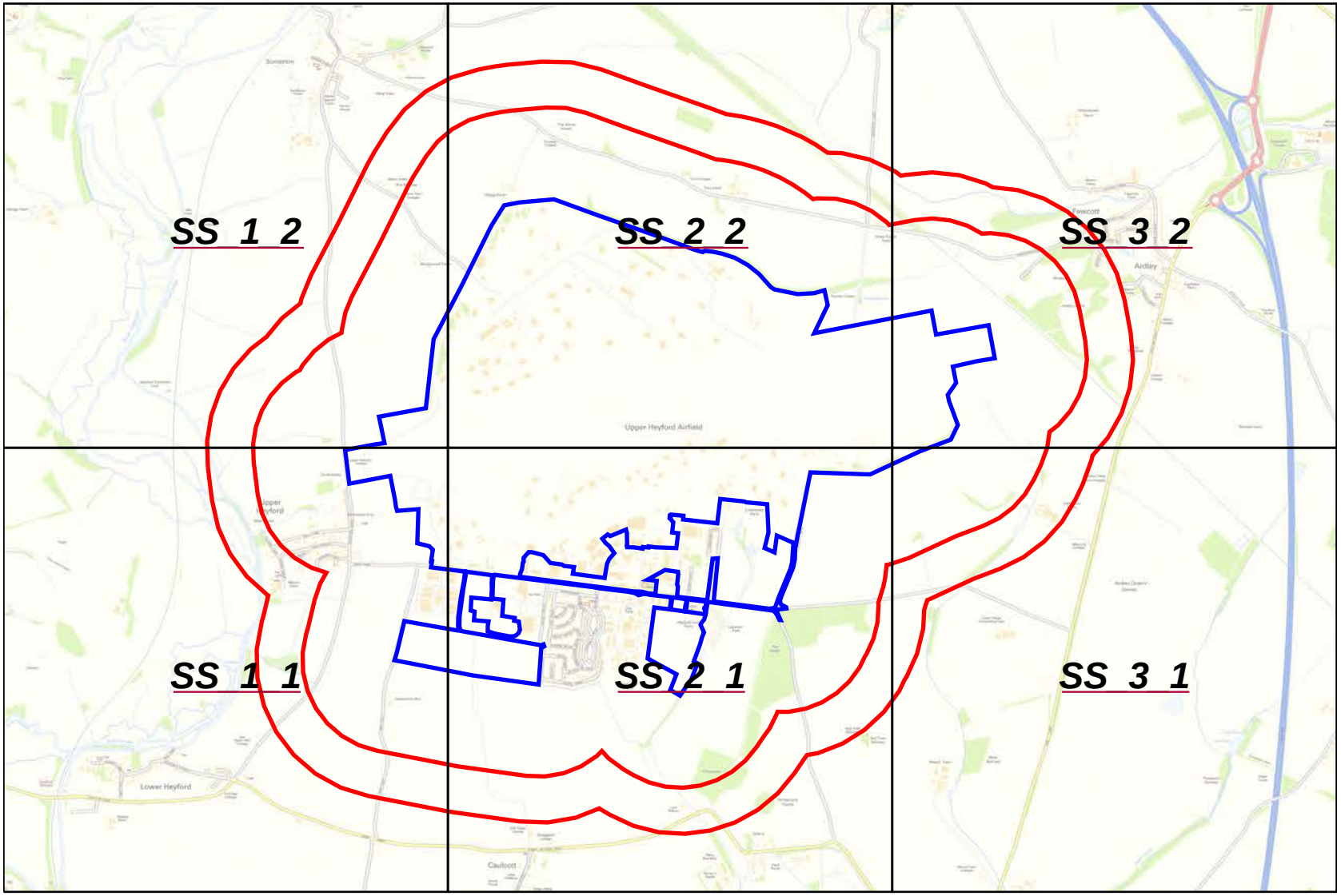
HEYFORD PARK - **COMPOSITE PARAMETER PLAN**

Pegasus Design

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS | WWW.PEGASUSPG.CO.UK | TEAM/DRAWN BY MCC/KM | APPROVED BY P.M: MCC | DATE: 11/04/2018 | SCALE: 1:5000 @ A0 | DRWG: P16-0631_08 SHEET NO: 01 REV: Y | CLIENT: DORCHESTER GROUP |

Appendix B

Historical Ordnance Survey Maps



Groundsure INSIGHTS

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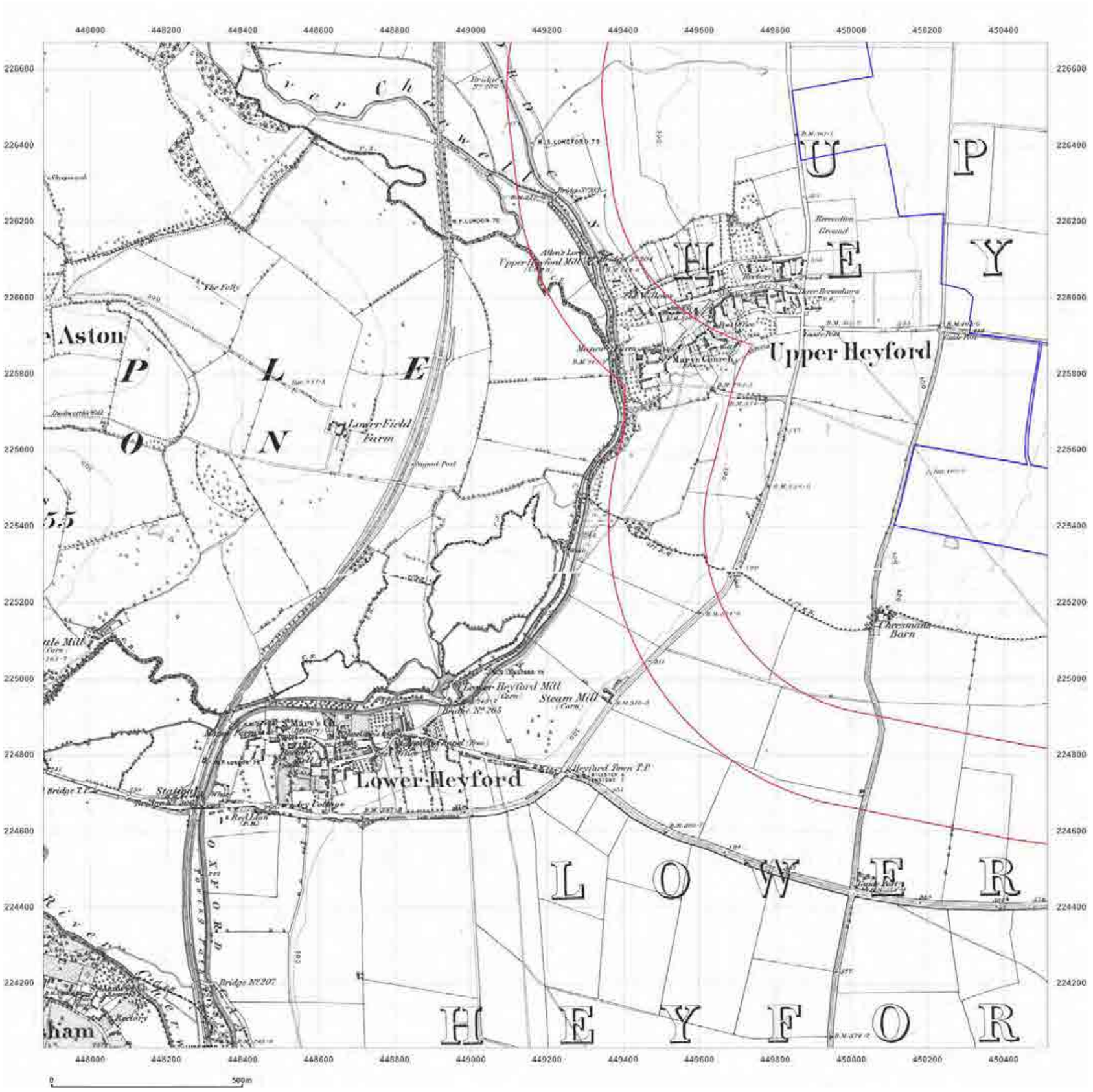
Small Scale Grid Index



Groundsure INSIGHTS

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HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

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Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

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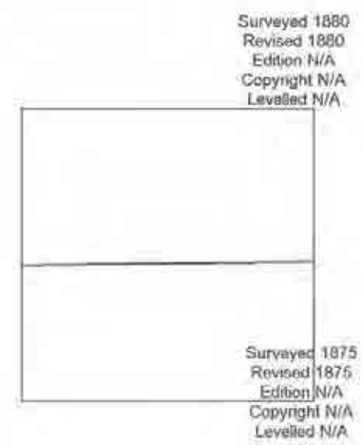

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E: info@groundsure.com
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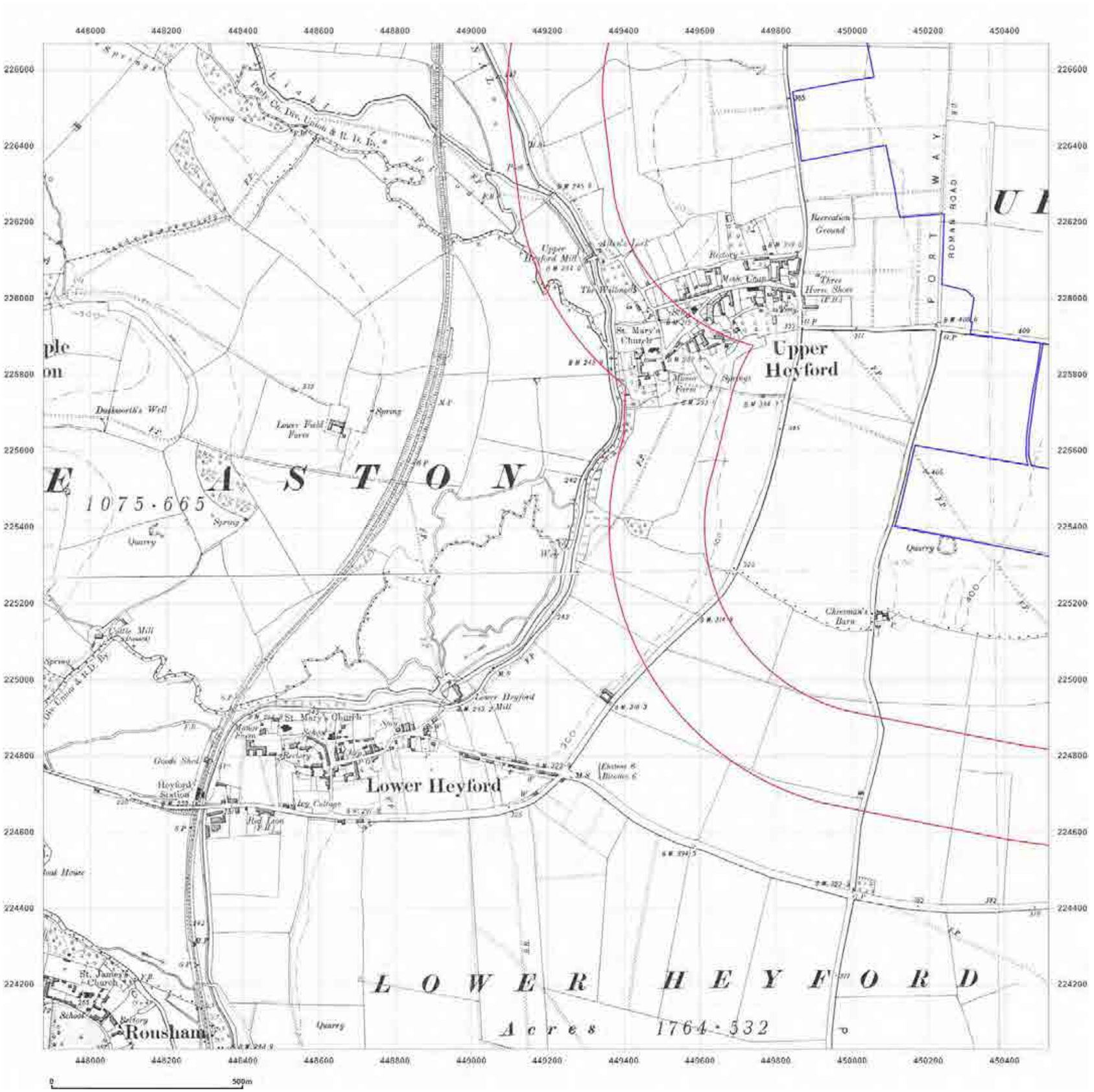

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UPPER HEYFORD, OX25 5HD

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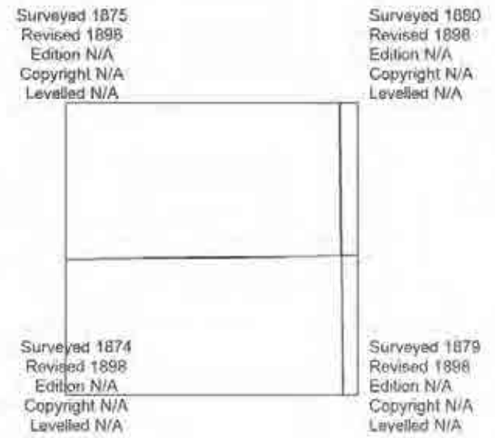

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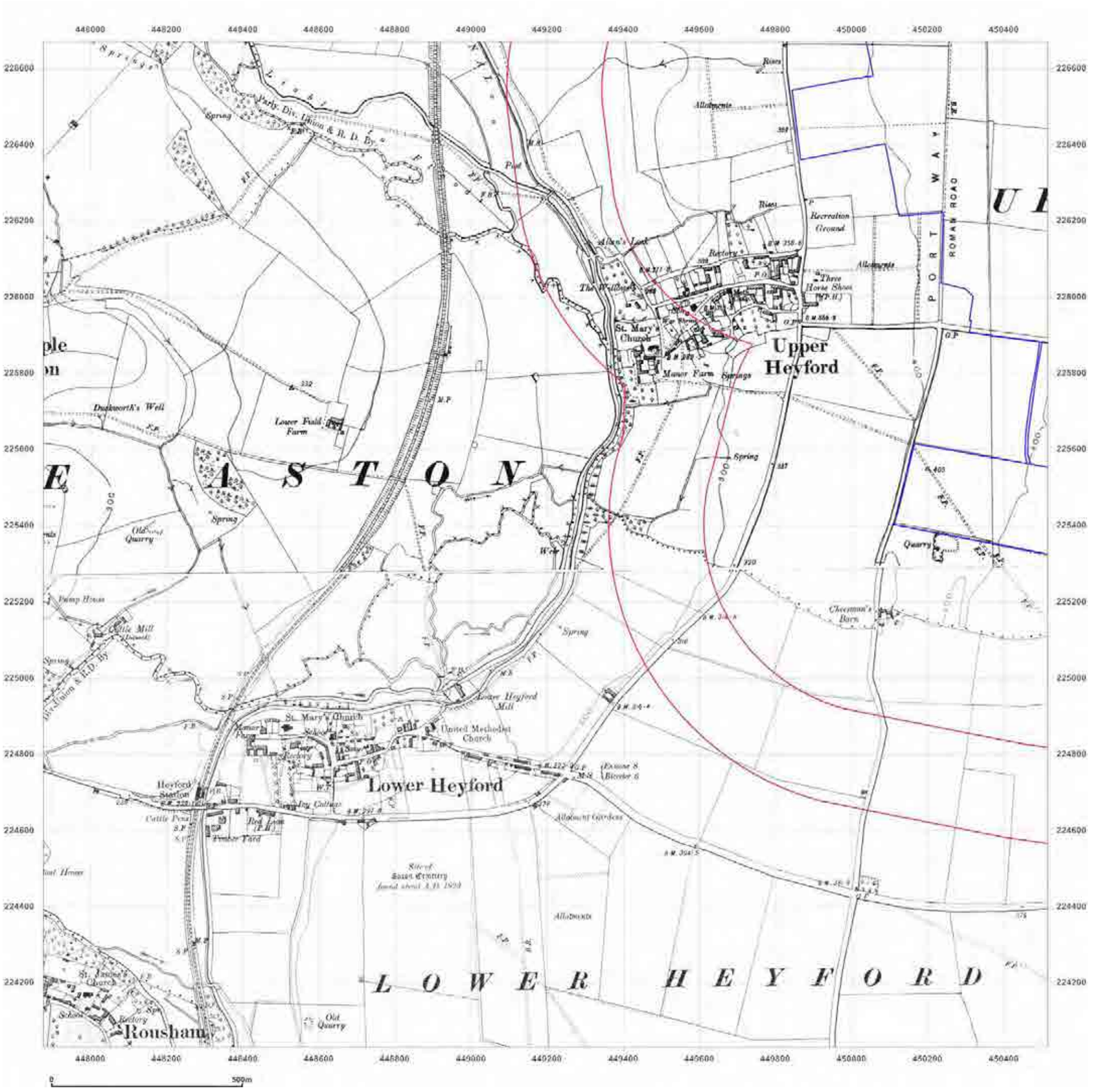

Groundsure INSIGHTS

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UPPER HEYFORD, OX25 5HD

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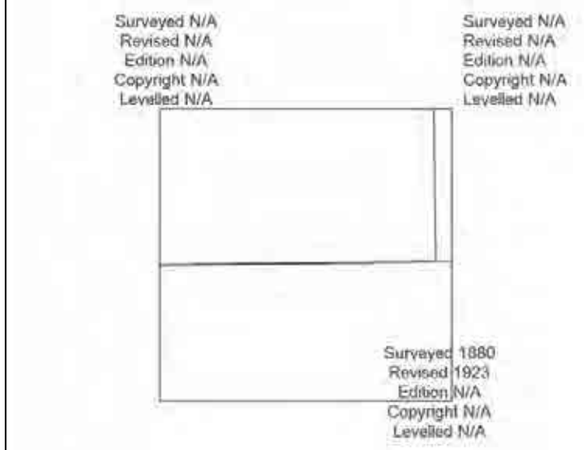

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Production date: 04 September 2017

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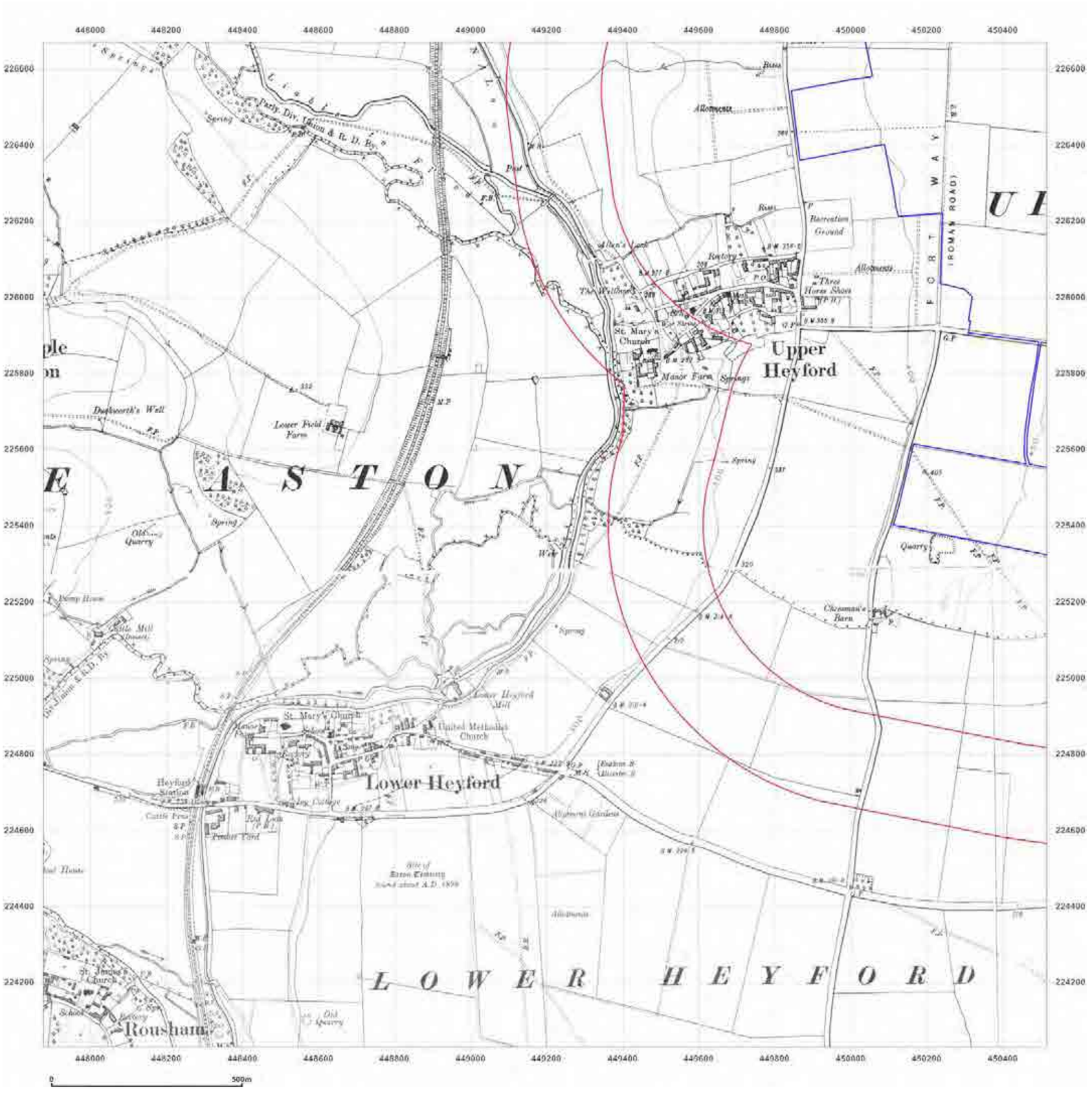

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

Map Name: County Series

Map date: **1919-1923**

Scale: 1:10,560

Printed at: 1:10,560

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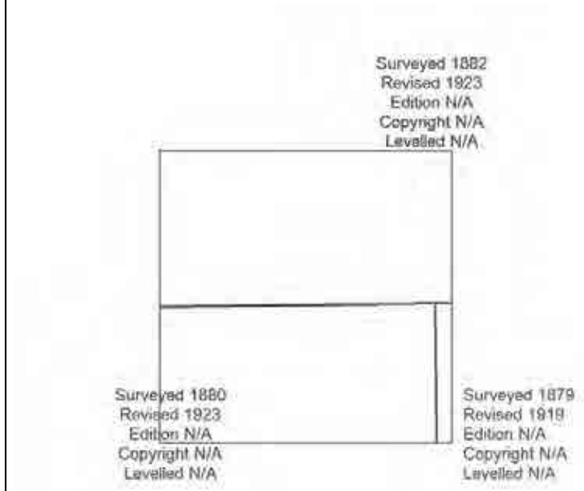

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Production date: 04 September 2017

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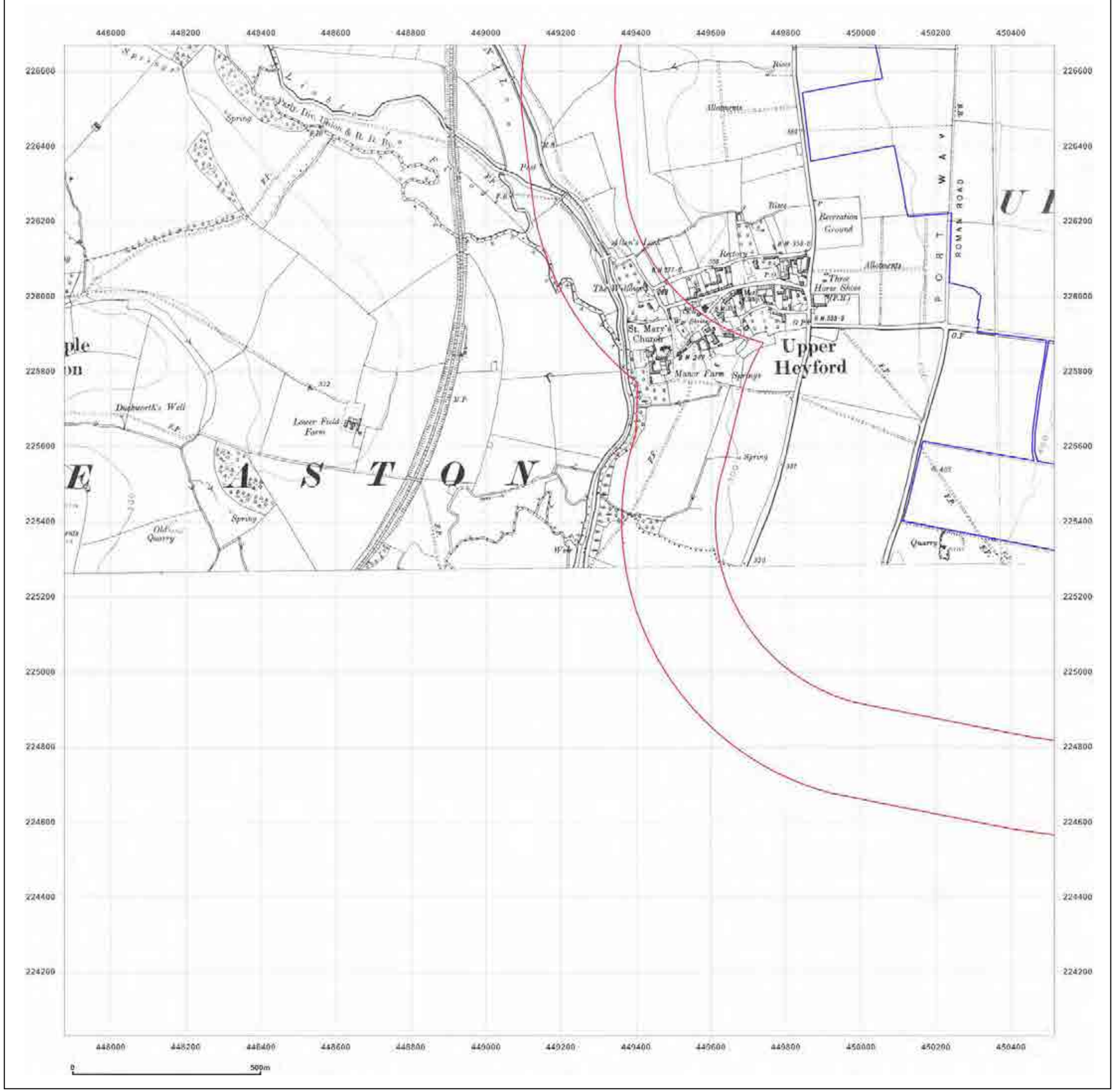

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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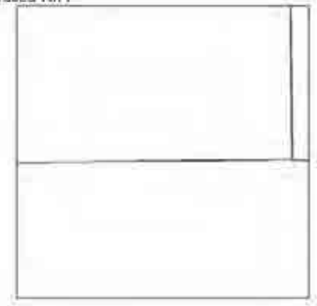
Surveyed 1880
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1880
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

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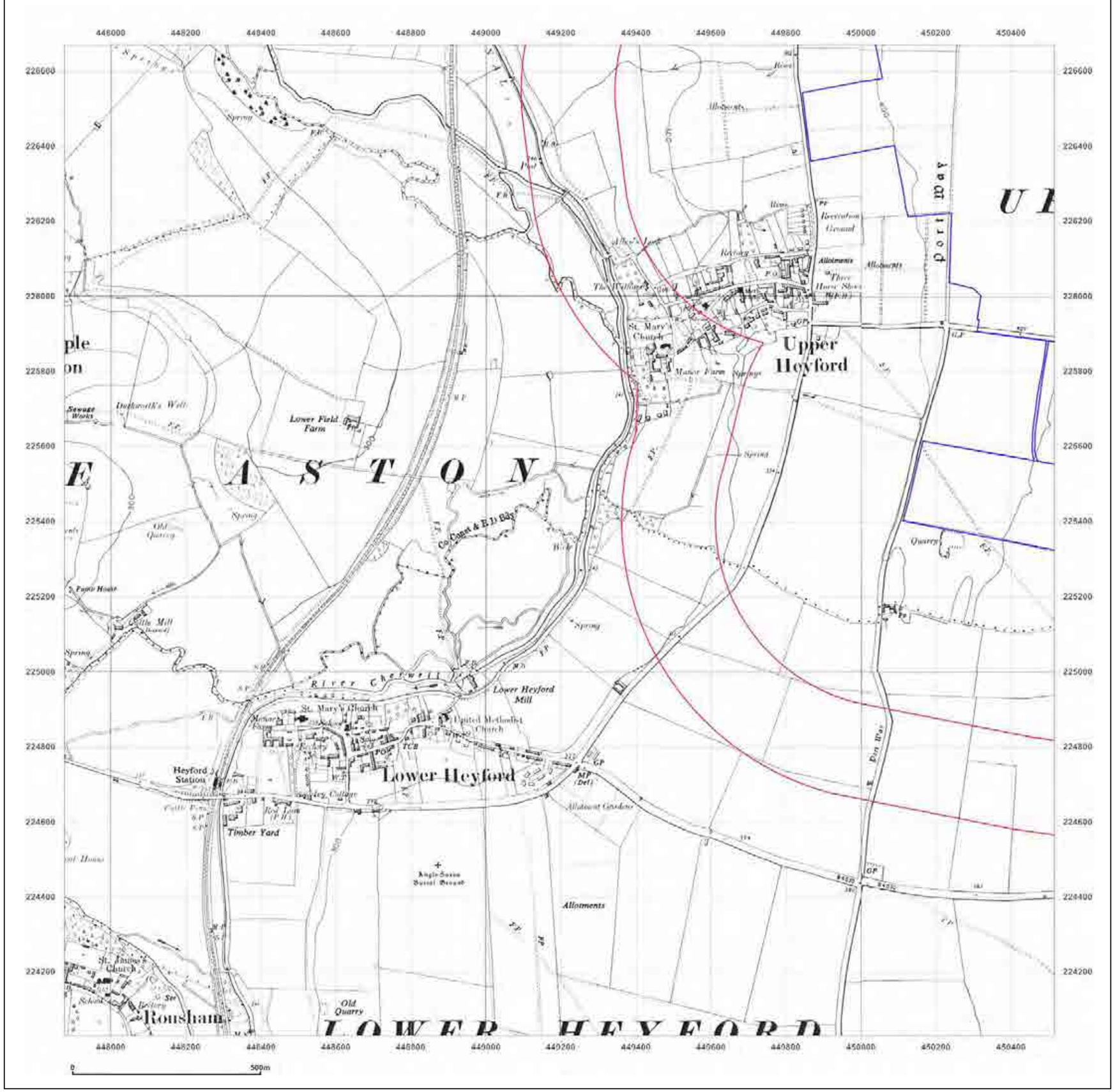
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

Map Name: Provisional
Map date: **1950-1954**
Scale: 1:10,560
Printed at: 1:10,560

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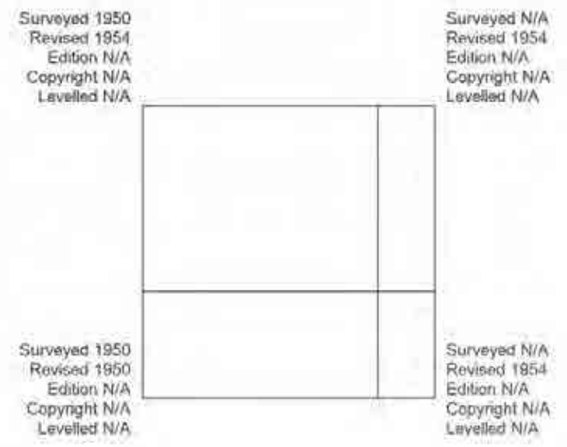

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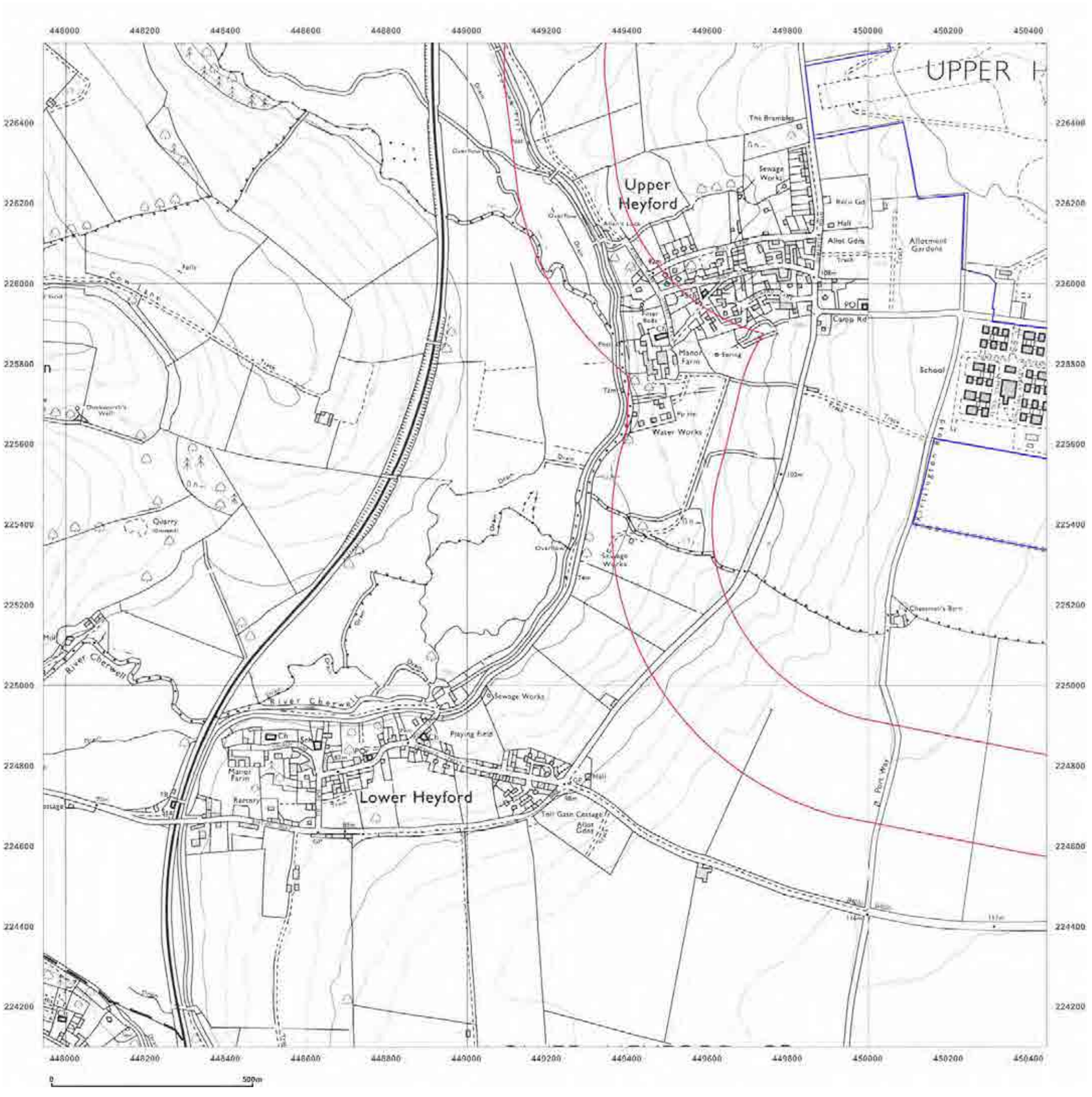
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

Map Name: National Grid

Map date: **1979-1981**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1973
Revised 1979
Edition N/A
Copyright 1979
Levelled 1973

Surveyed 1975
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1974
Revised 1980
Edition N/A
Copyright 1980
Levelled 1973

Surveyed 1977
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

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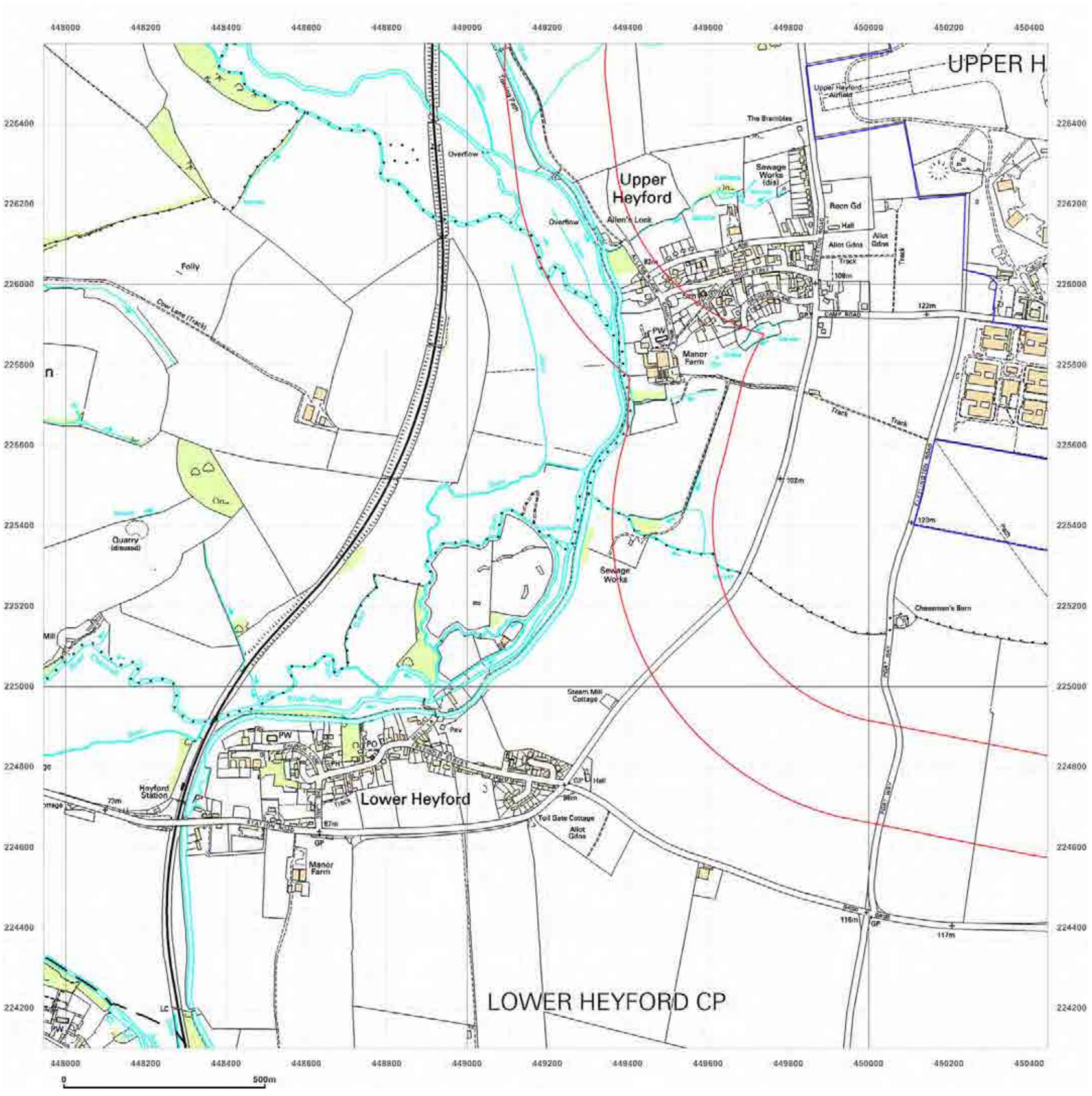
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

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

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Production date: 04 September 2017

To view map legend click here *Legend*

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

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

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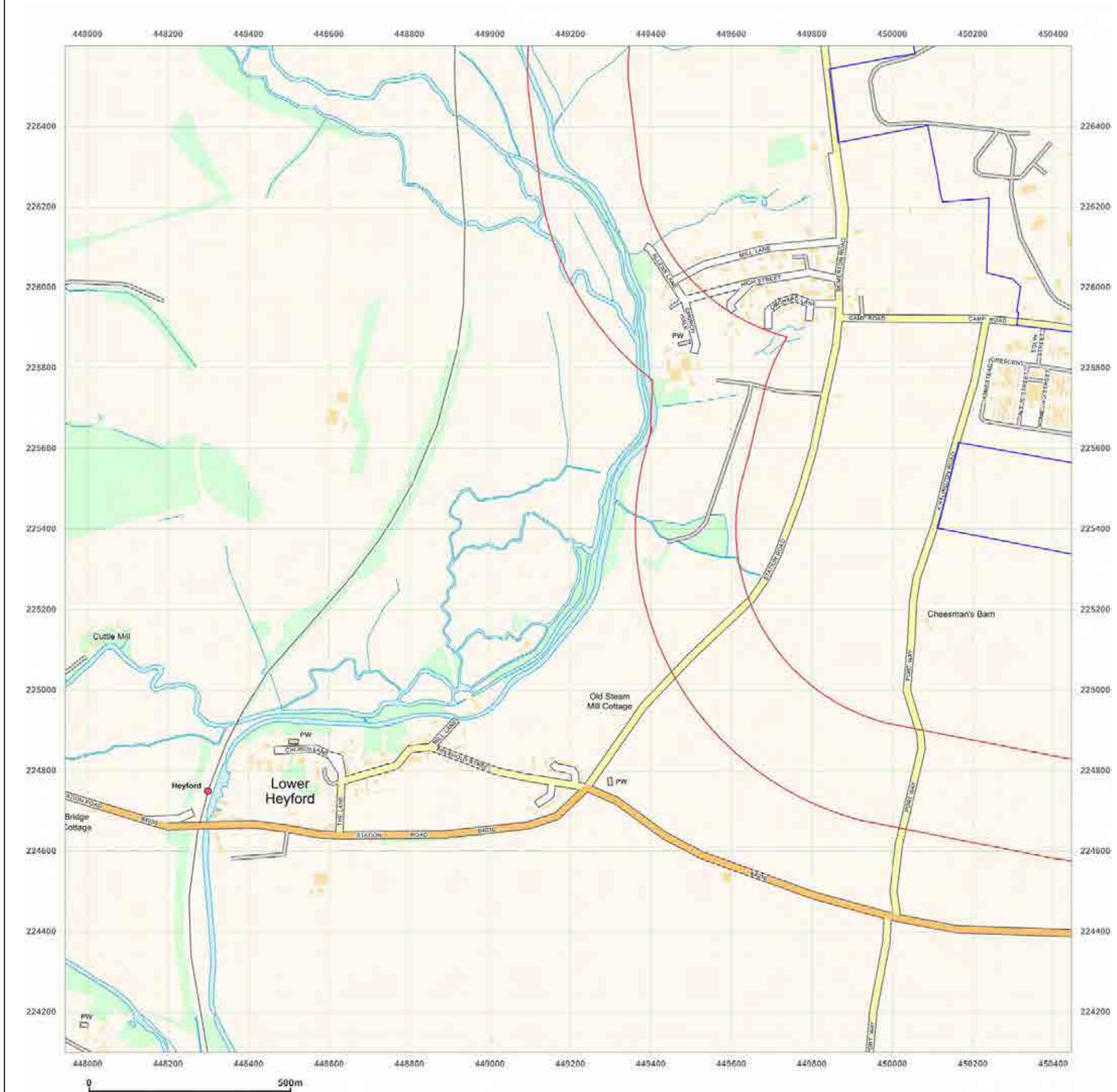
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_1
Grid Ref: 449195, 225350

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

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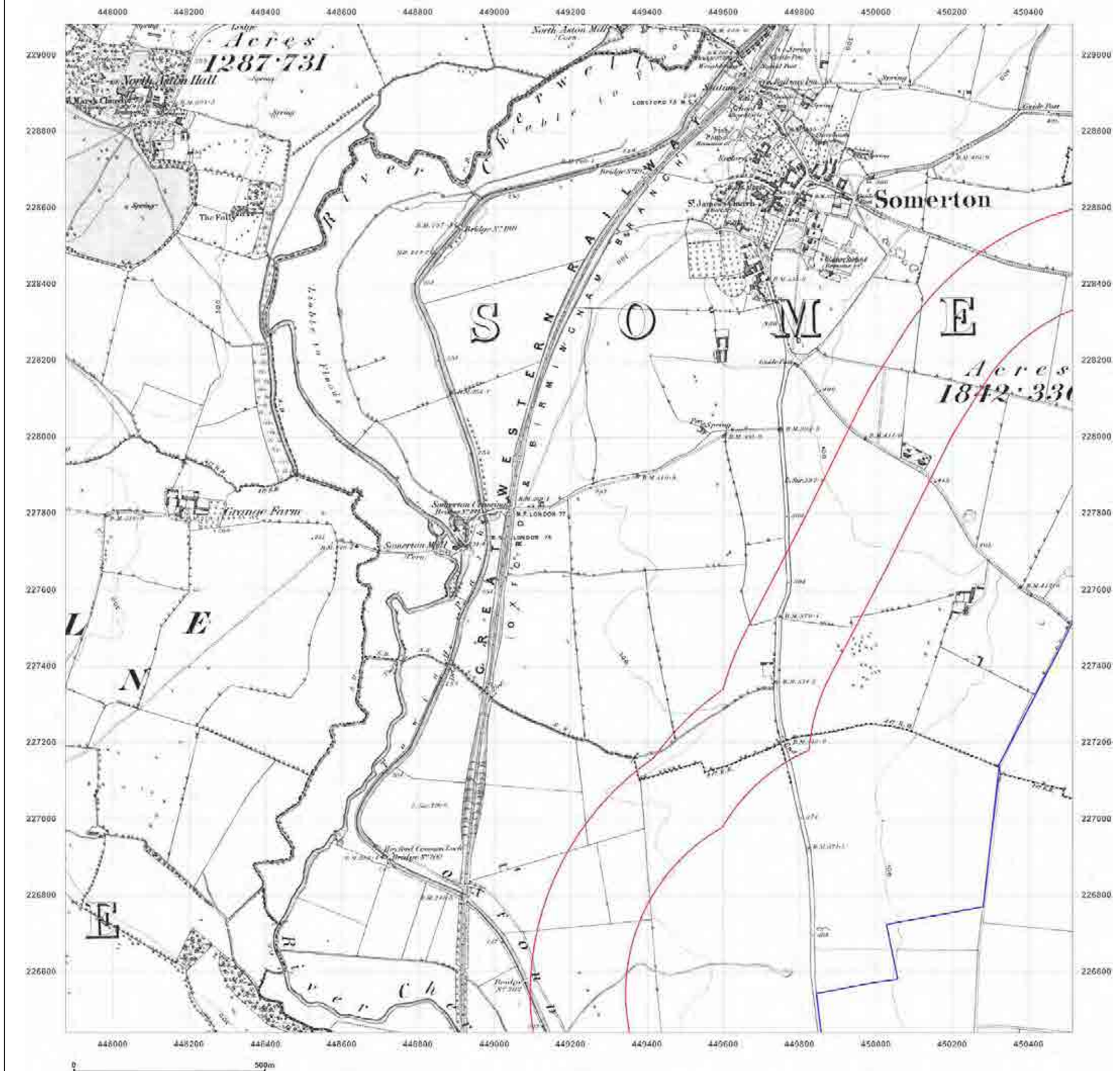
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: County Series

Map date: **1880**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

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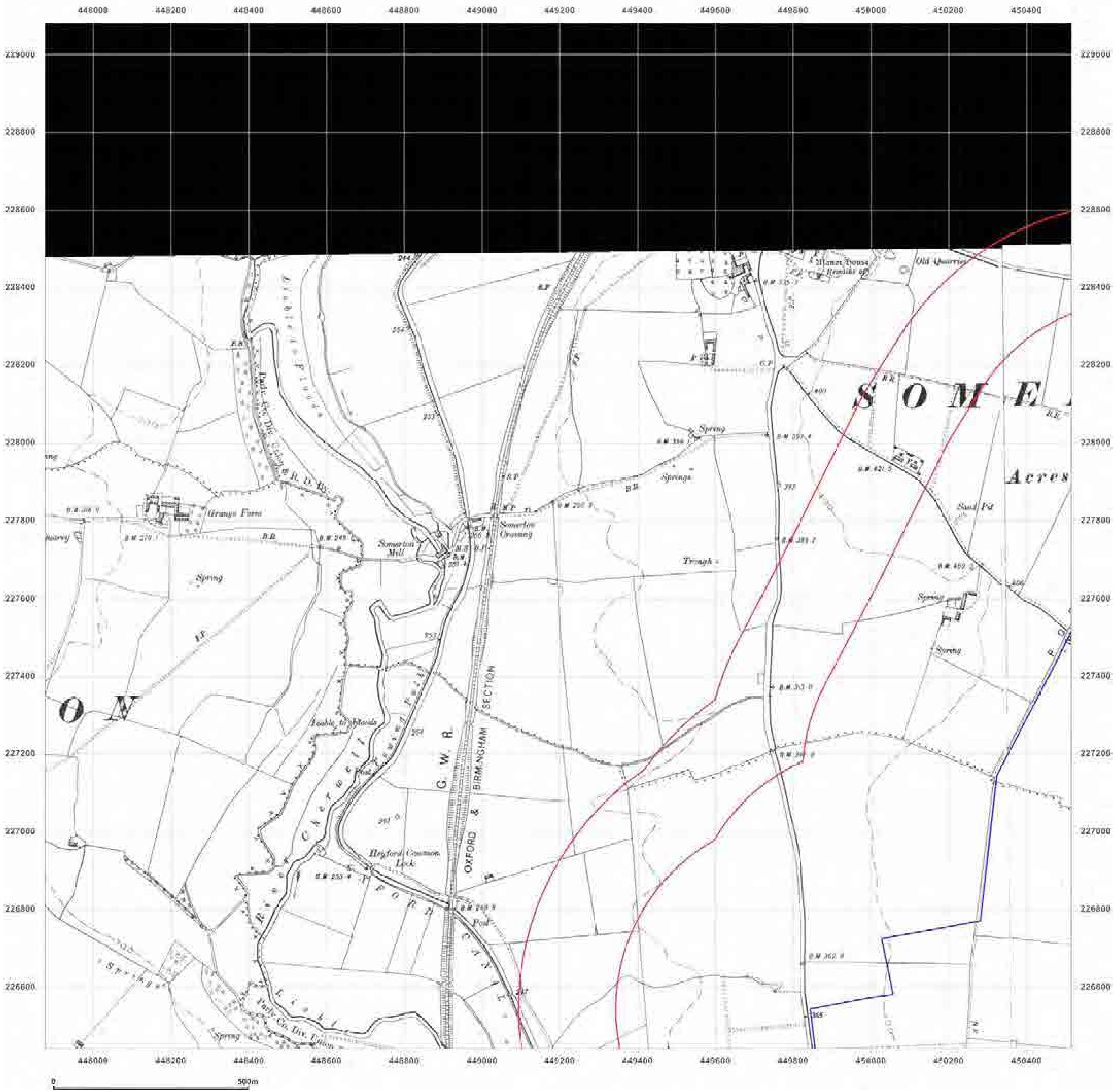
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: County Series

Map date: **1898-1900**

Scale: 1:10,560

Printed at: 1:10,560

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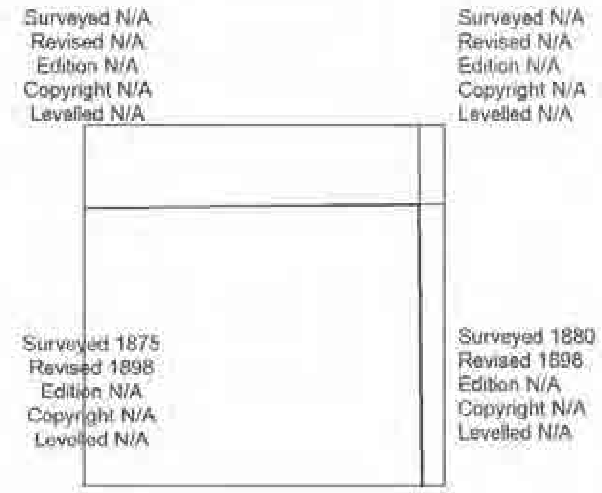

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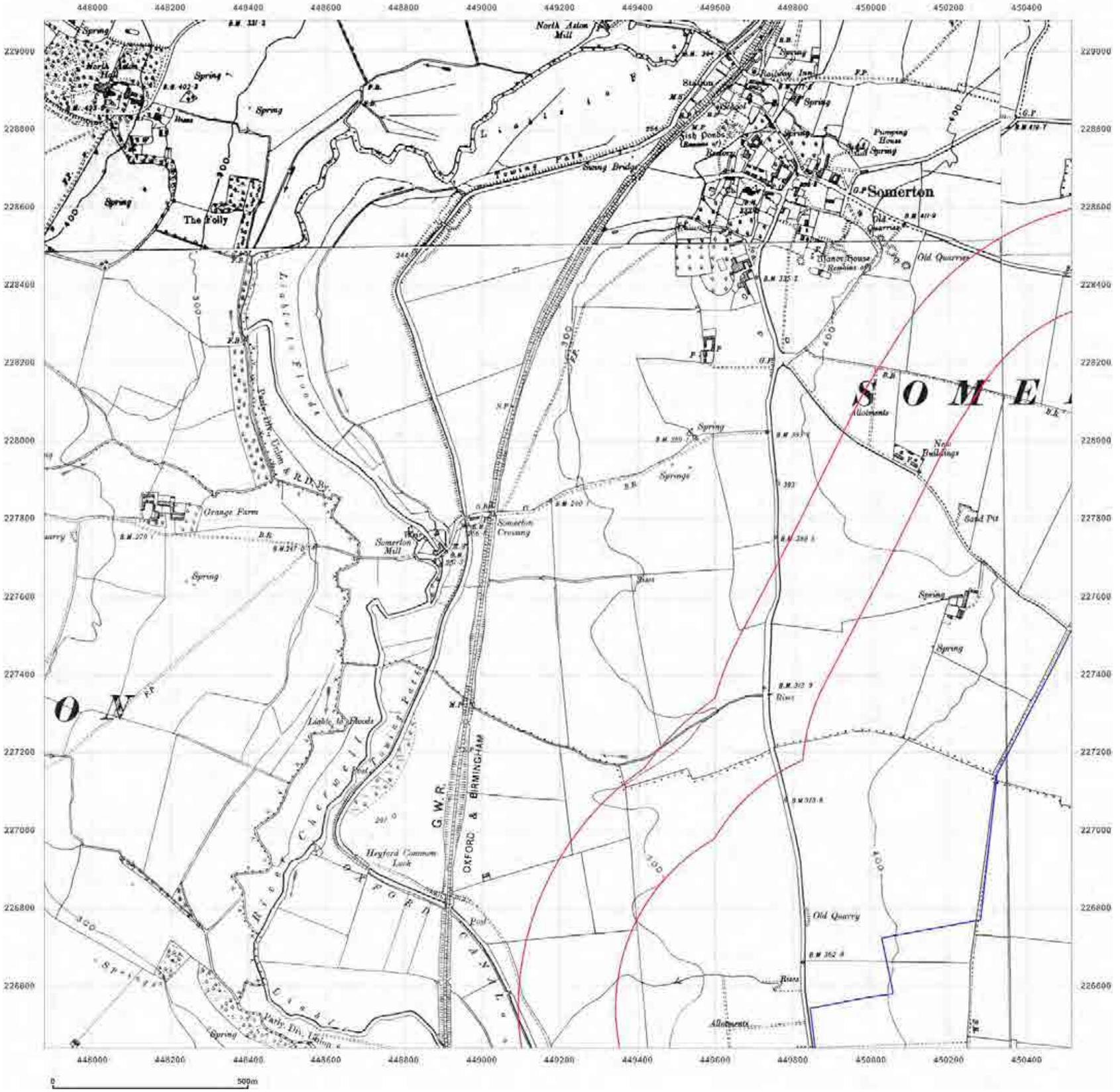
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: County Series

Map date: **1919**

Scale: 1:10,560

Printed at: 1:10,560

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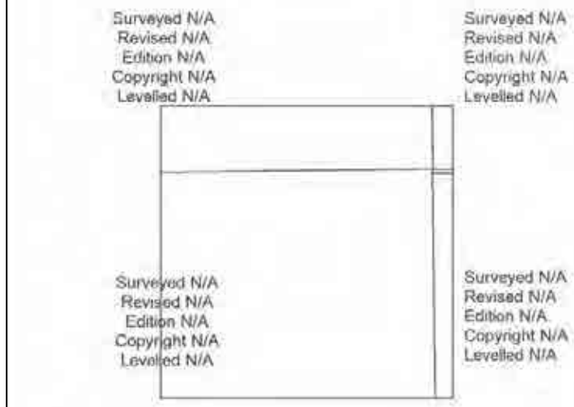

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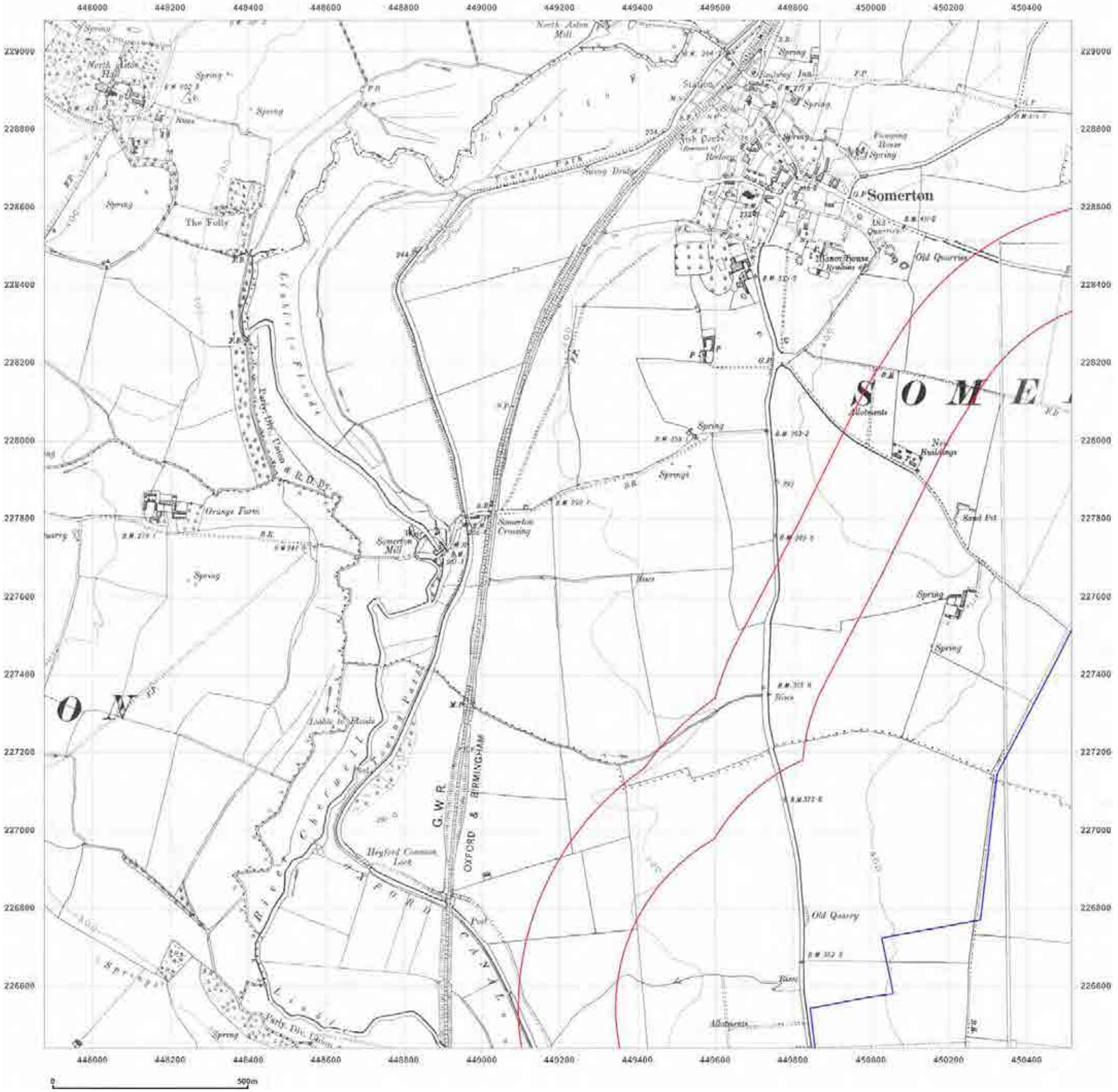
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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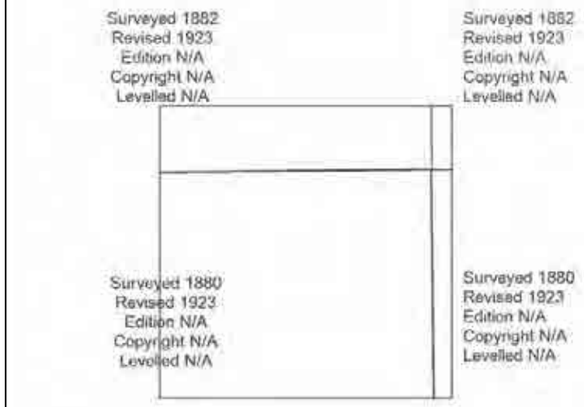

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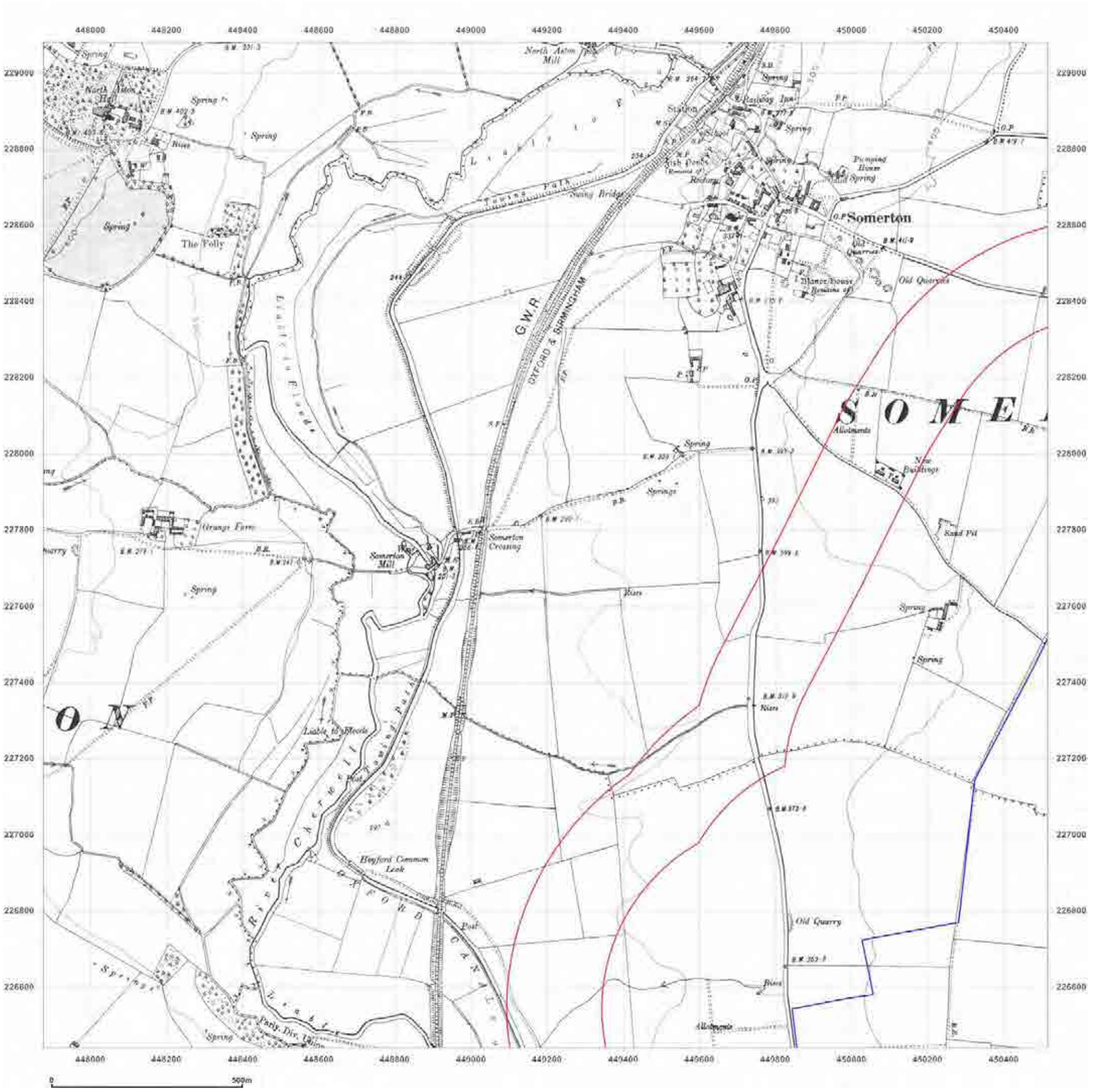
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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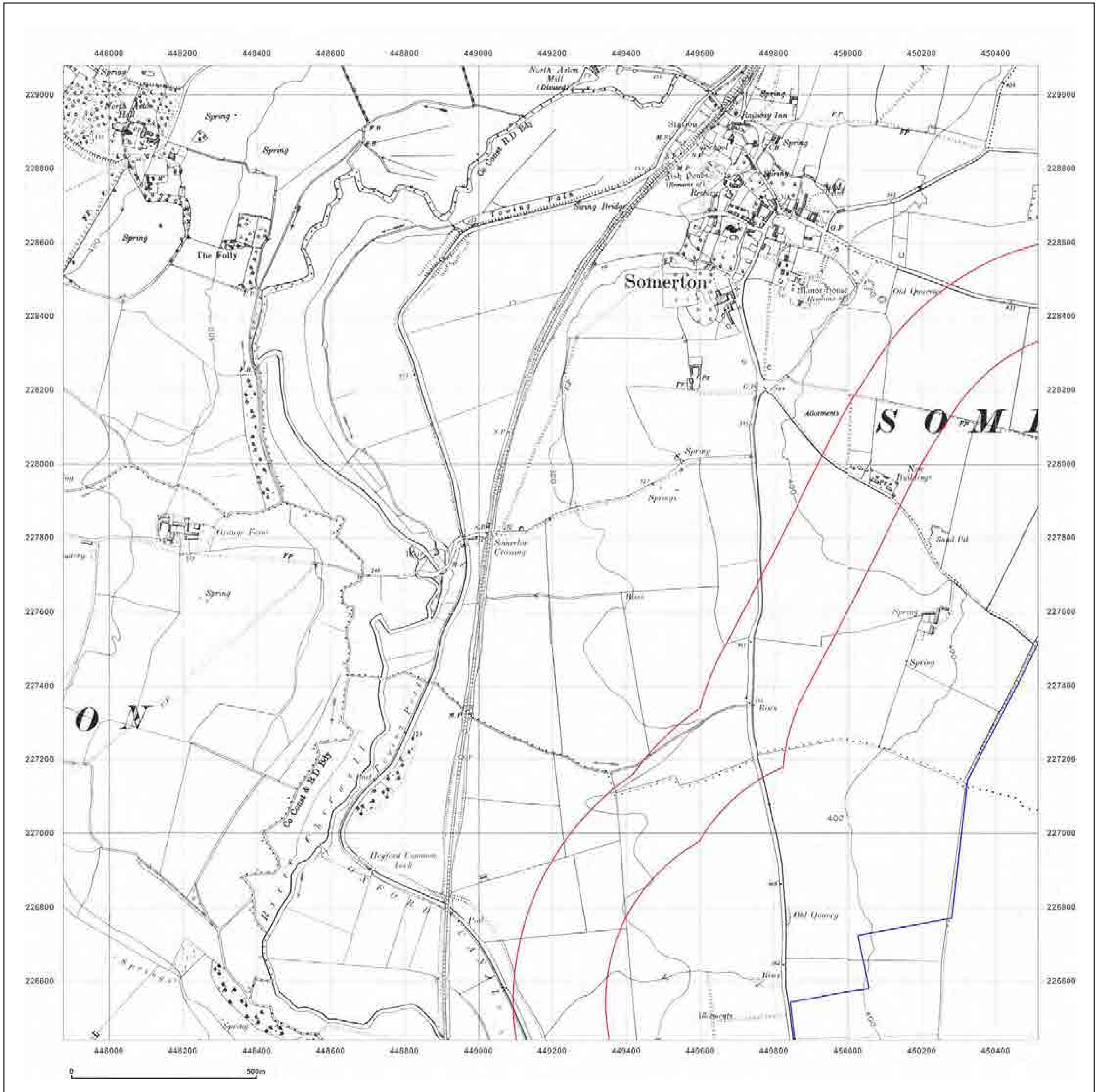
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



![Groundsure Insights logo]

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: Provisional

Map date: **1954**

Scale: 1:10,560

Printed at: 1:10,560

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

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

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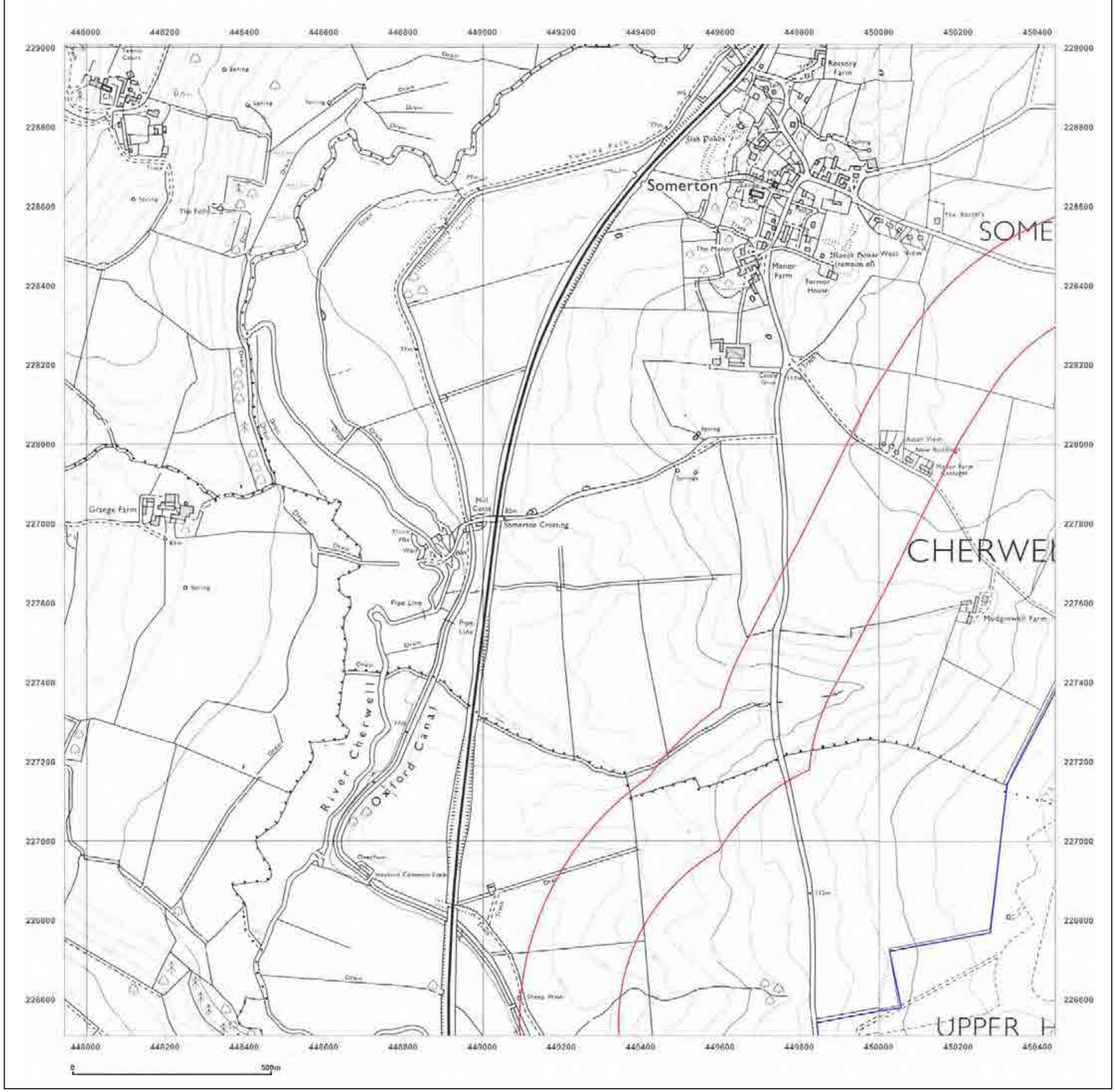
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: National Grid

Map date: **1979-1980**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 04 September 2017

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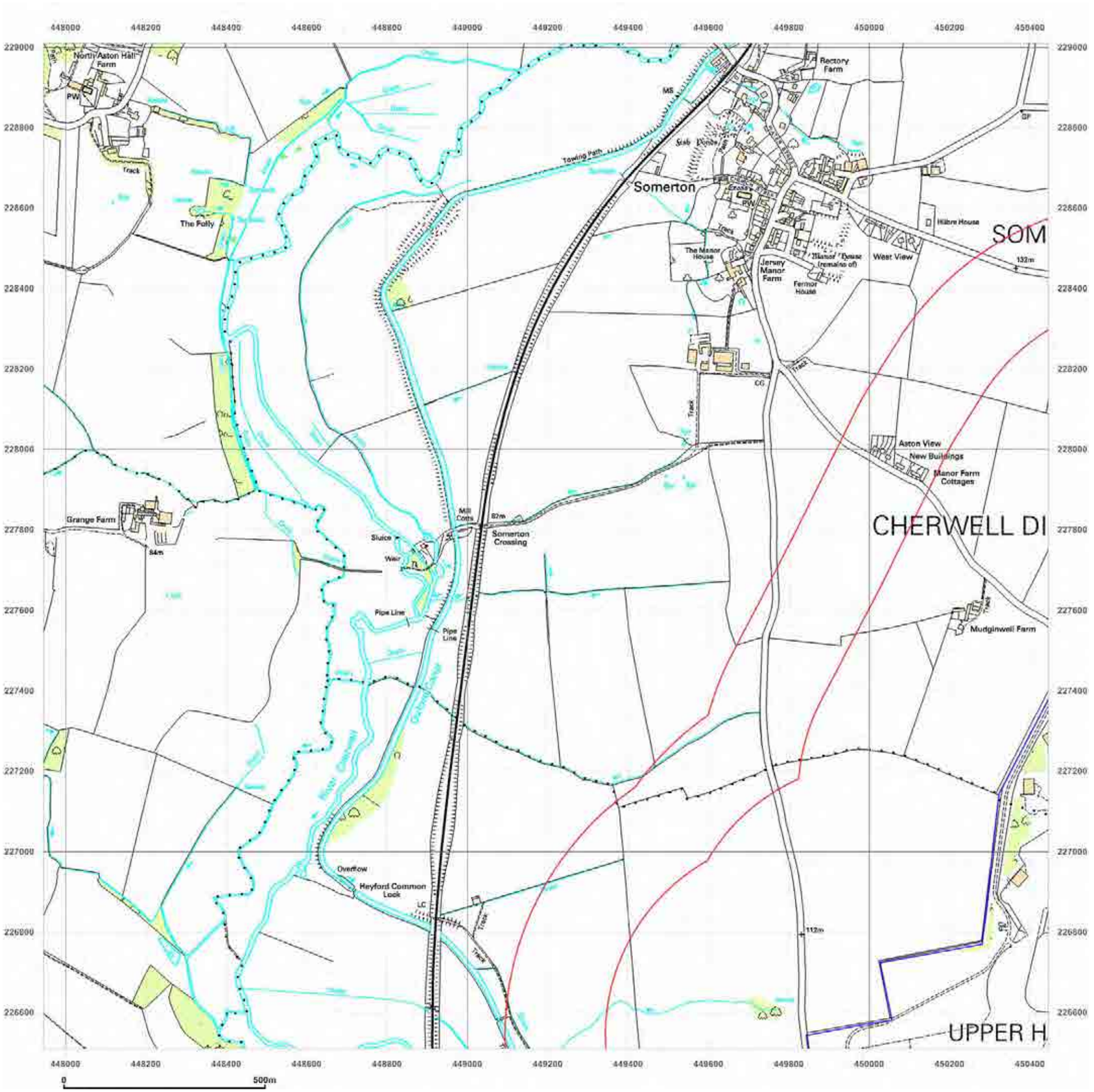

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

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

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W: www.groundsure.com

Production date: 04 September 2017

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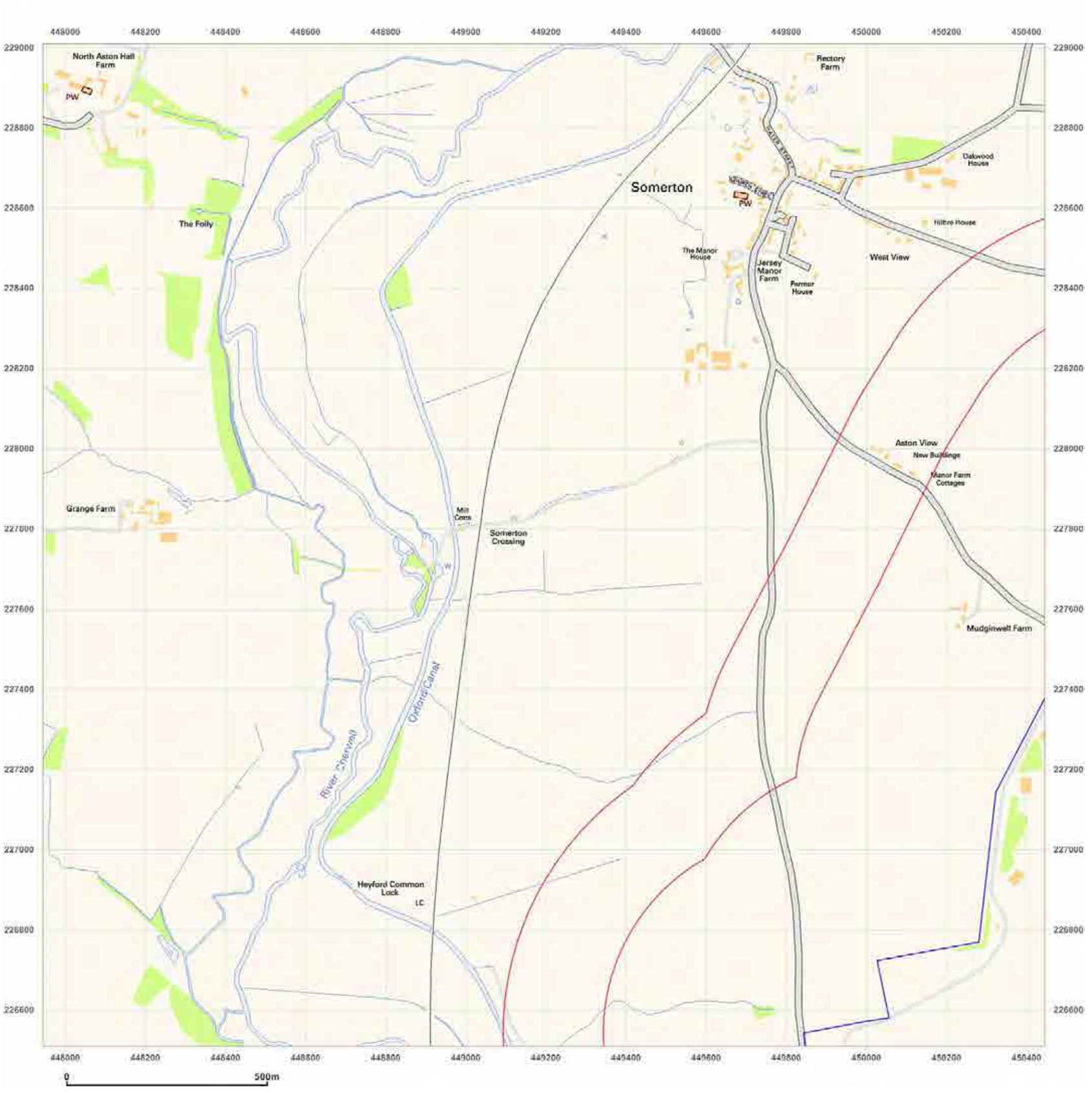

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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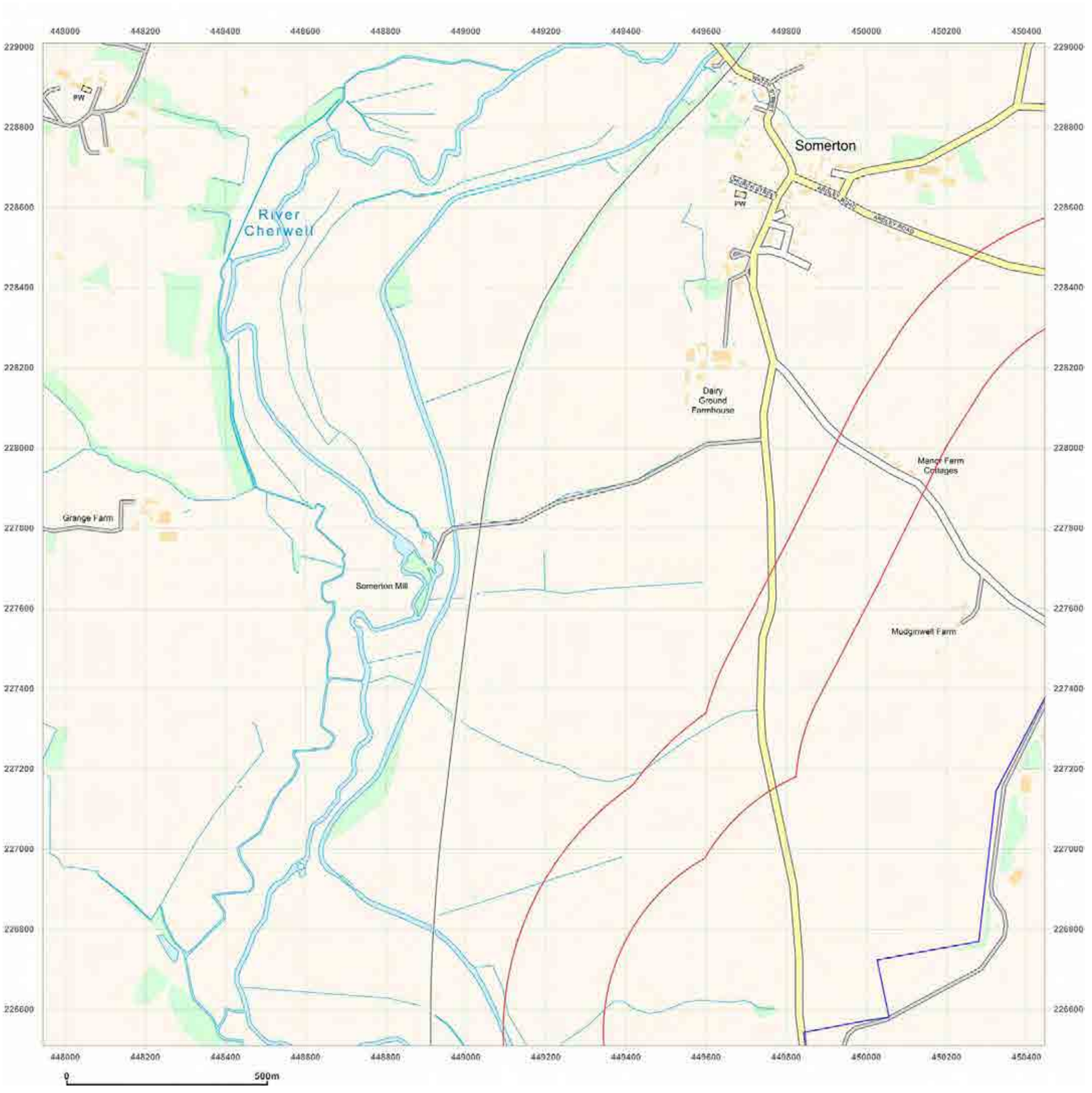
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_1_2
Grid Ref: 449195, 227760

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

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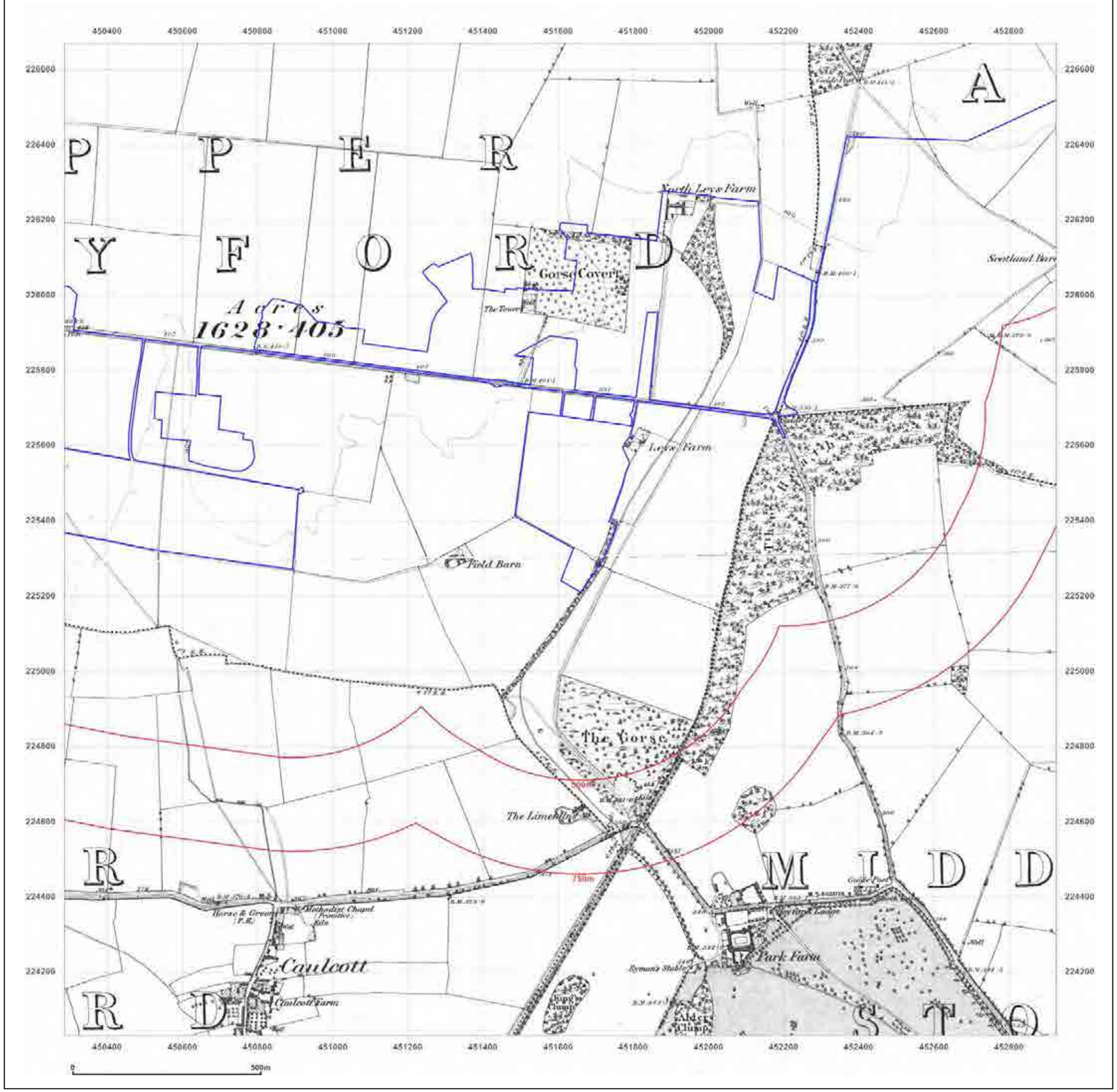
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: County Series

Map date: **1875-1880**

Scale: 1:10,560

Printed at: 1:10,560

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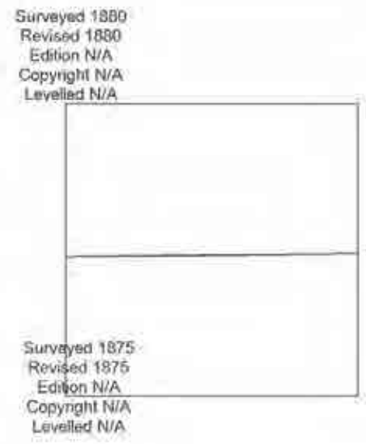

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Produced by
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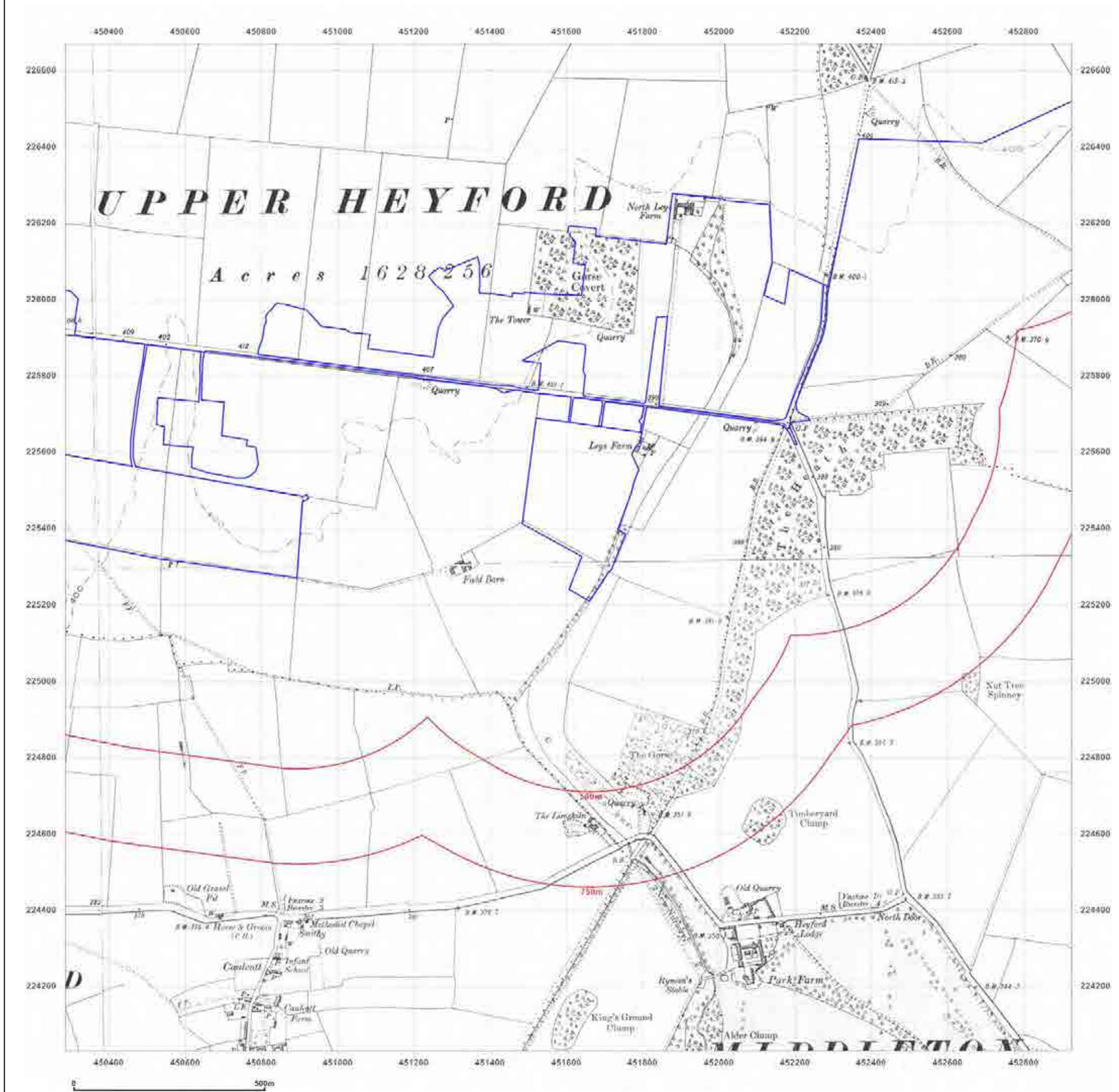
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

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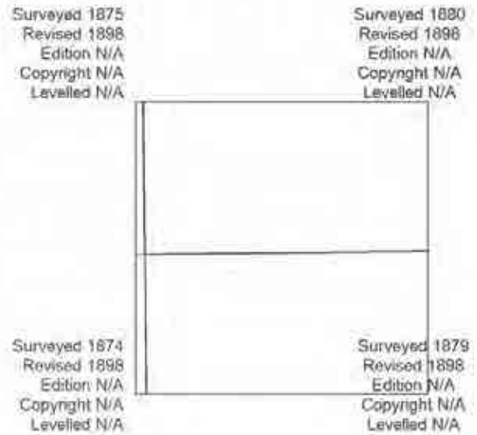

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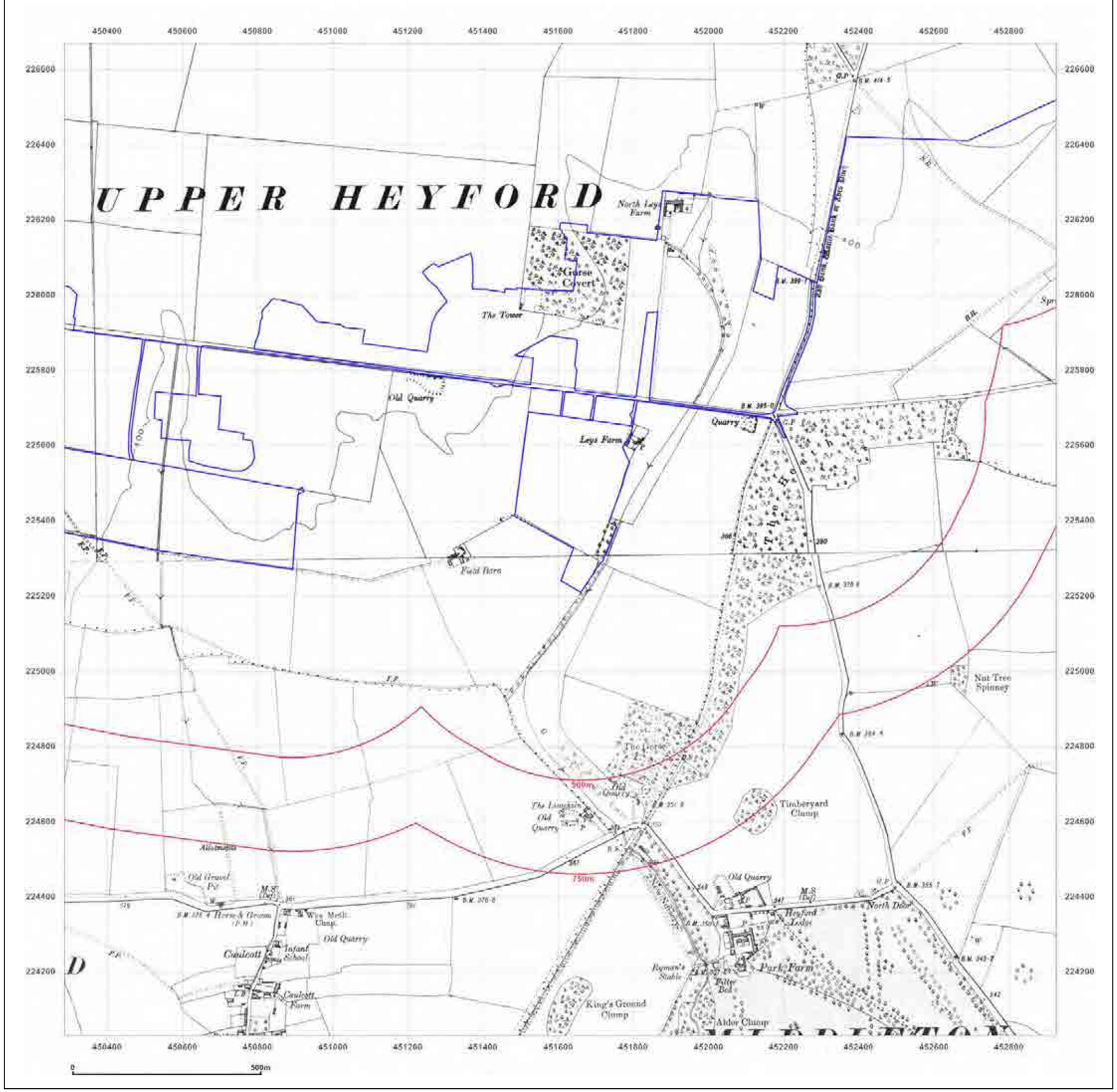
Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: County Series
Map date: **1919-1923**
Scale: 1:10,560
Printed at: 1:10,560

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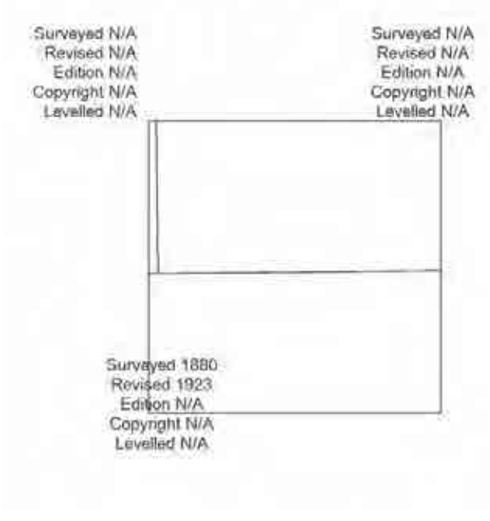

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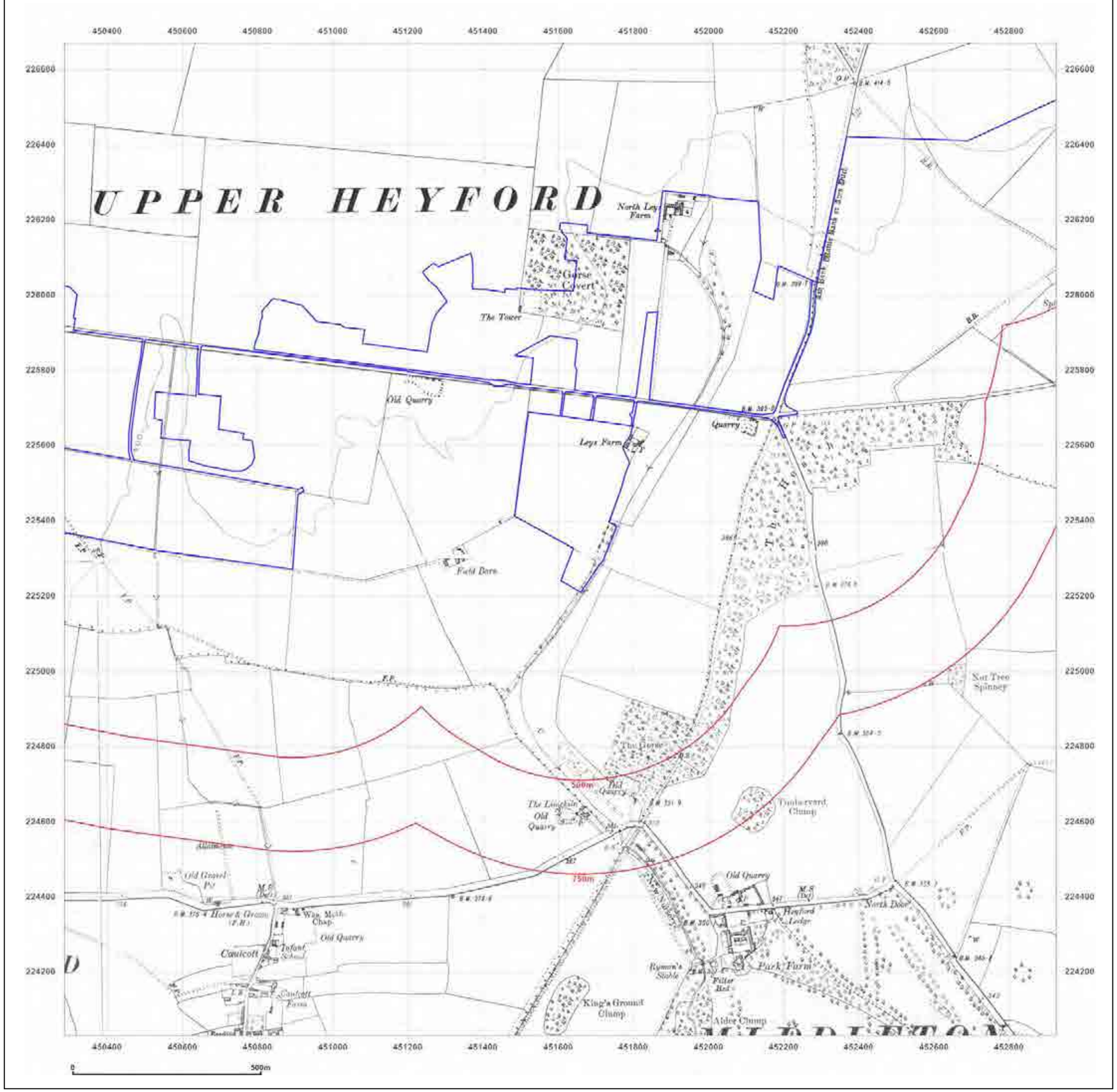
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: County Series
Map date: **1919-1923**
Scale: 1:10,560
Printed at: 1:10,560

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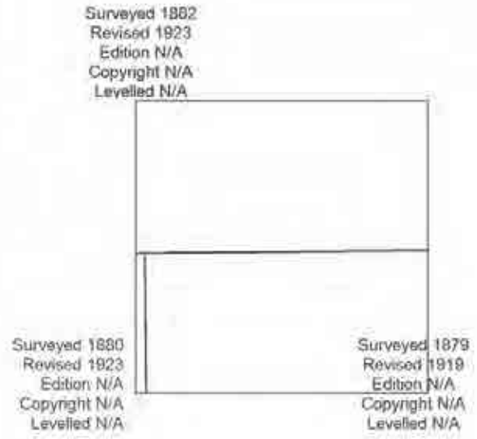

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Production date: 04 September 2017

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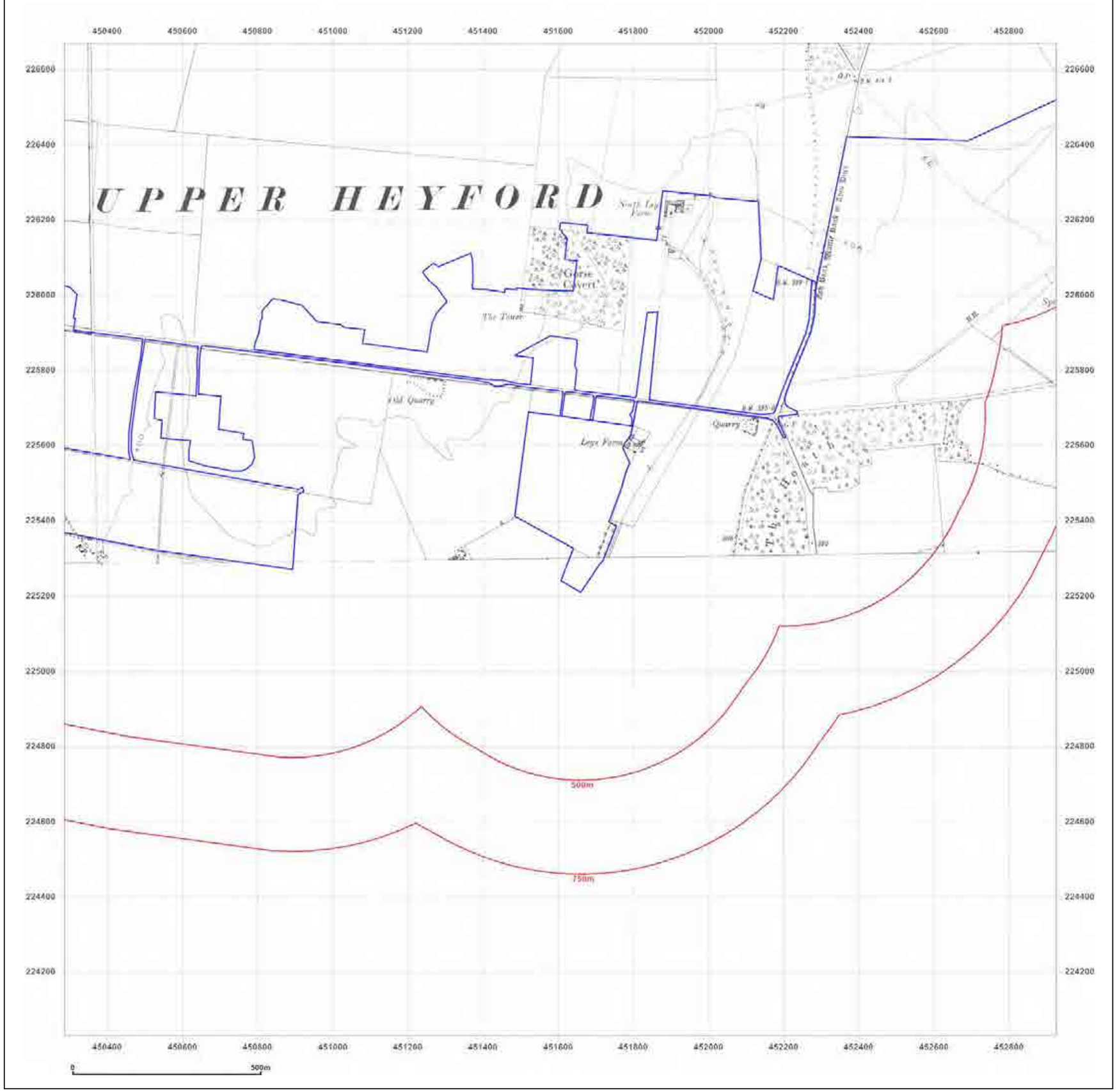

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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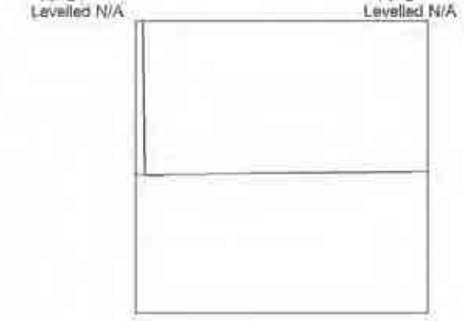

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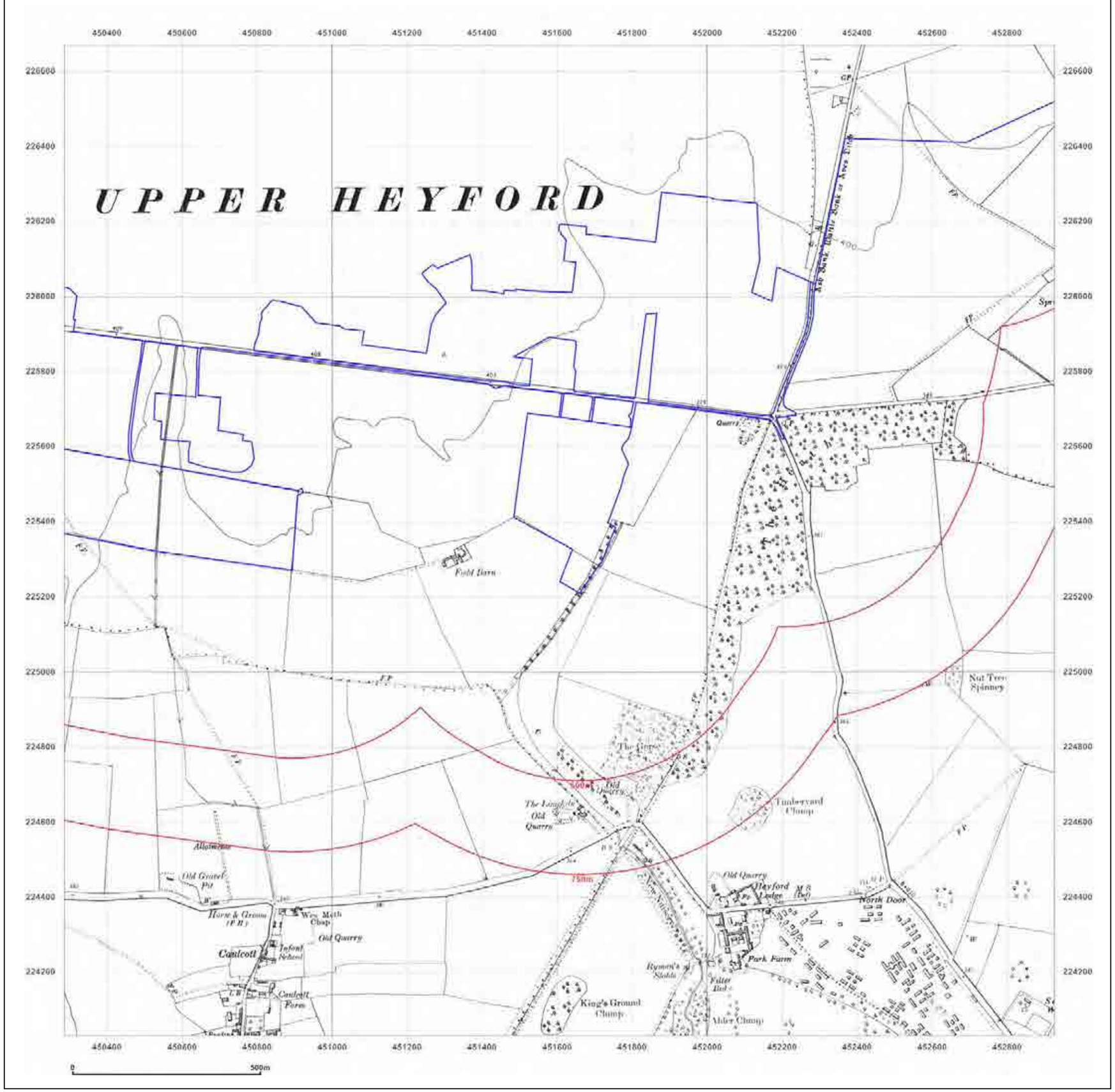

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

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

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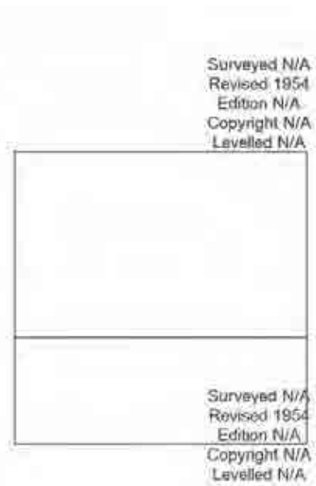

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Production date: 04 September 2017

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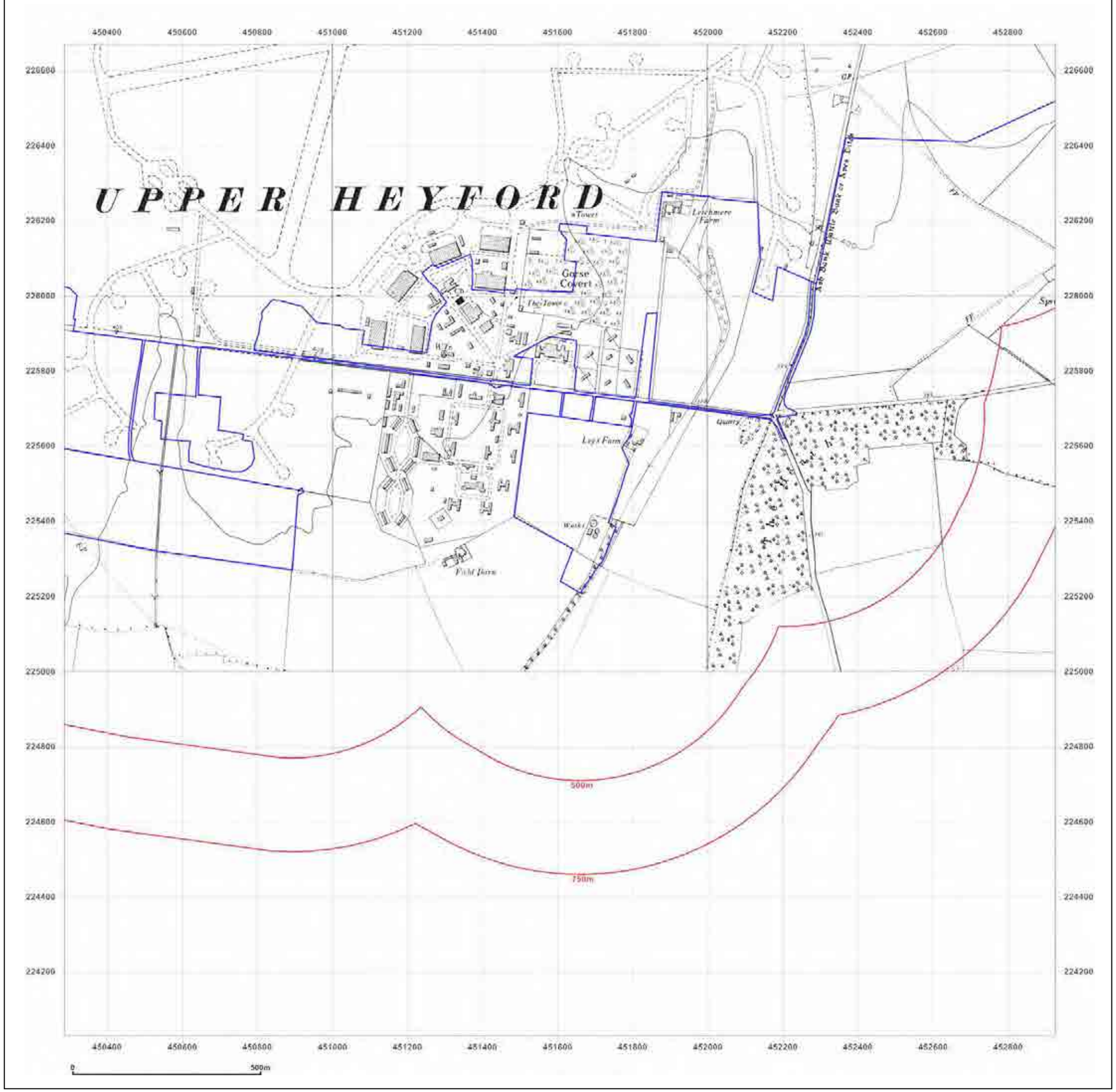

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: Provisional

Map date: **1965**

Scale: 1:10,560

Printed at: 1:10,560

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Production date: 04 September 2017

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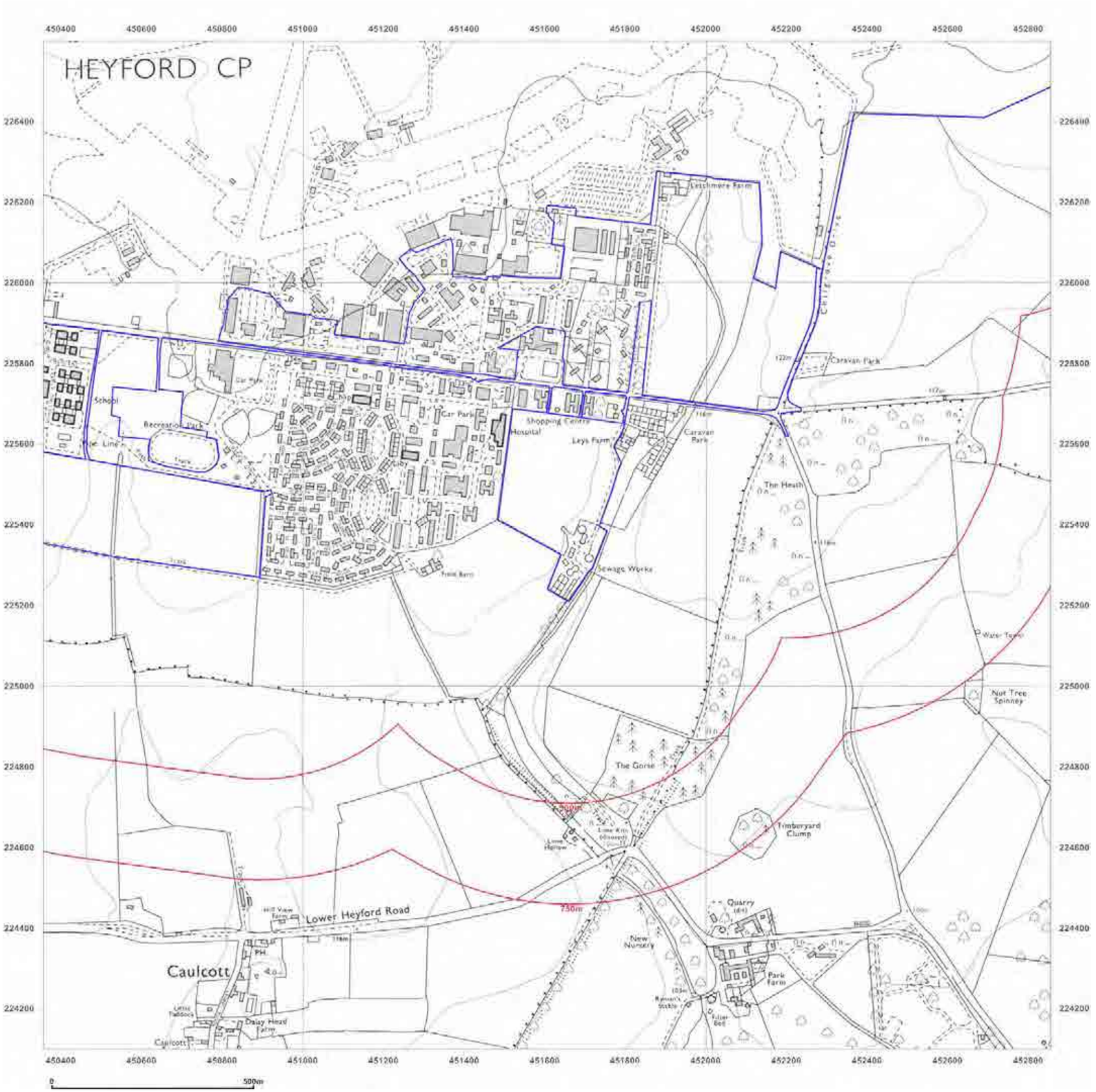

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: National Grid

Map date: **1980-1981**

Scale: 1:10,000

Printed at: 1:10,000

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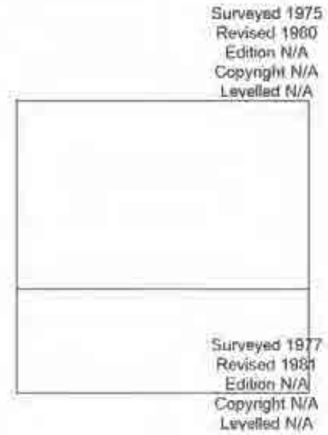

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Production date: 04 September 2017

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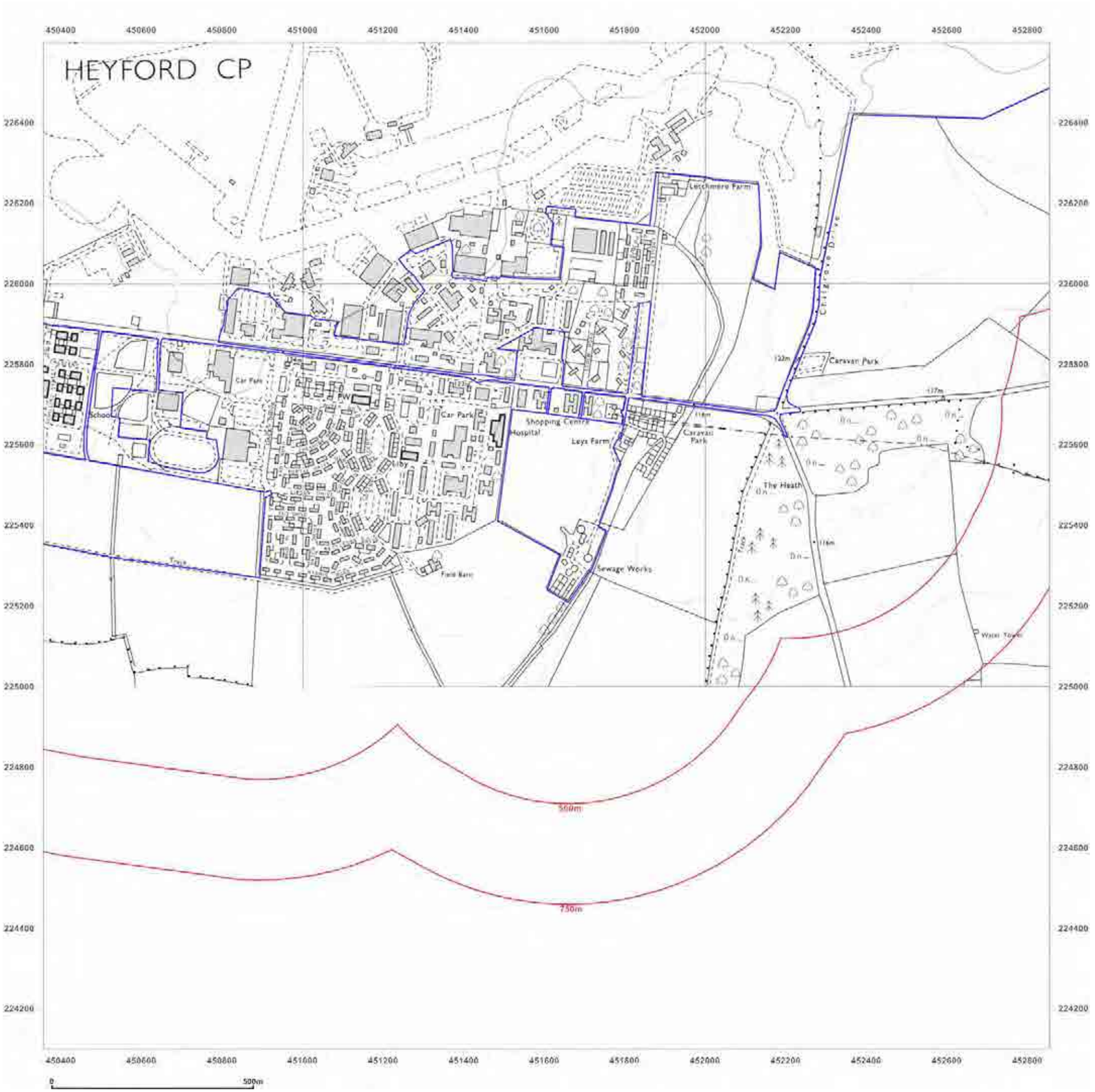

Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: National Grid

Map date: **1992**

Scale: 1:10,000

Printed at: 1:10,000

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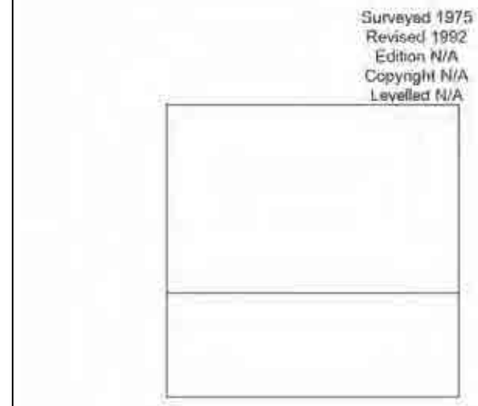

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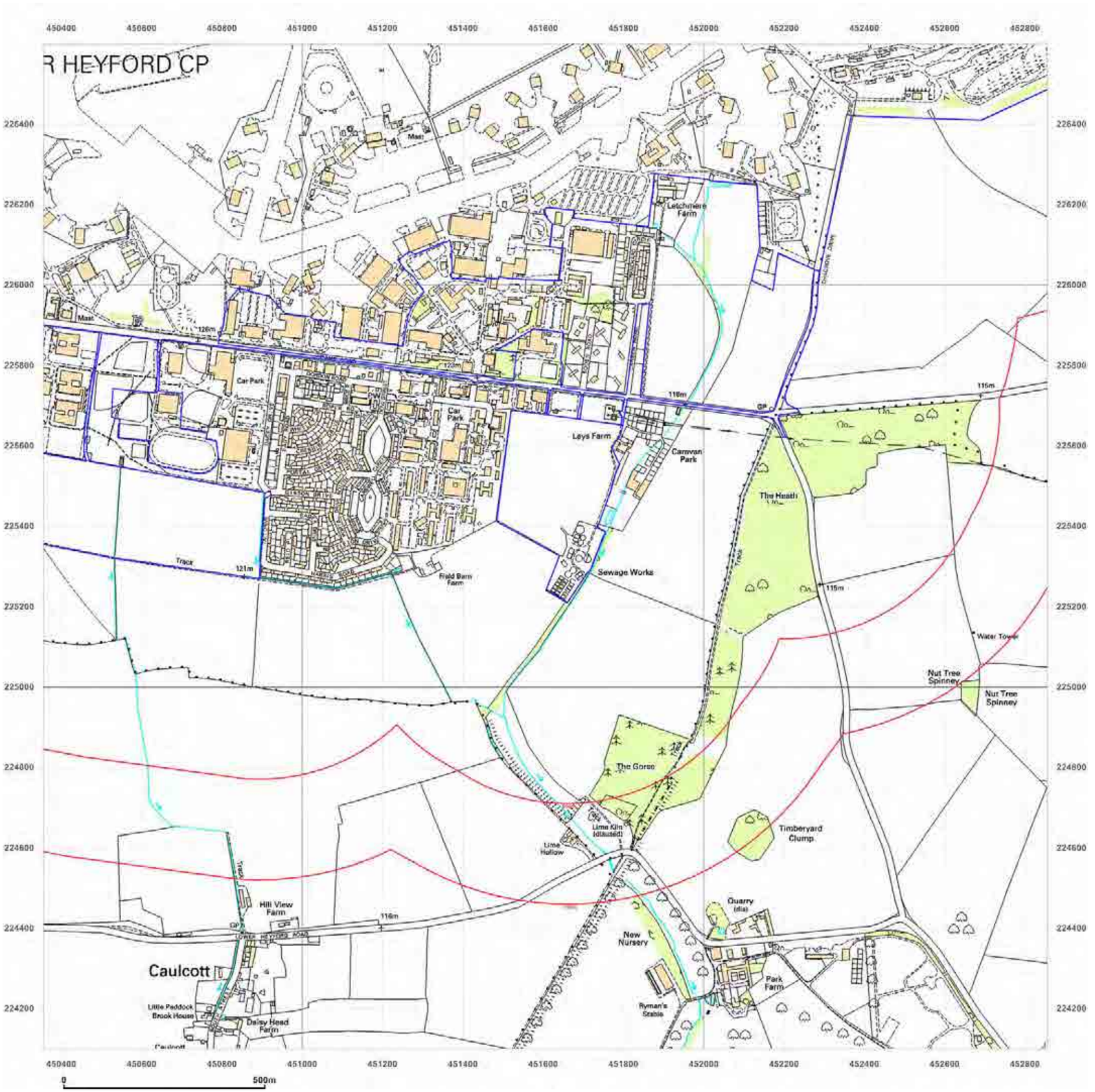
W: www.groundsure.com

Production date: 04 September 2017

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

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

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W: www.groundsure.com

Production date: 04 September 2017

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Groundsure INSIGHTS

Site Details:

HEYFORD PARK HOUSE, 52
HEYFORD PARK, CAMP ROAD,
UPPER HEYFORD, OX25 5HD

Client Ref: Heyford_Park
Report Ref: GS-4227860_SS_2_1
Grid Ref: 451605, 225350

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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W: www.groundsure.com

Production date: 04 September 2017

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