

Botley West Solar Farm

Environmental Statement

Volume 3

Appendix 11.6: Botley Central Site Area - Land Parcel 8, Desktop Study and Preliminary Risk Assessment

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Annex A PRA Methodology

Annex B Limitations of Assessment

Annex C Groundsure Insights Historical Map Reports

Annex D Groundsure Insights Environmental Data Reports





Glossary

Term	Meaning
The Applicant	SolarFive Ltd
The Project	The Botley West Solar Farm (Botley West) Project
Conceptual Site Model	used to identify potential sources, pathways and receptors and how they interact (i.e. potential pollutant linkages) on site post development
Controlled Waters	Controlled waters means territorial waters within the 3 nautical mile limit, coastal waters extending inland, inland waters and ground water
Desk Top Study	A desk study is the collation and review of information already available in the public domain and is carried out at an early stage of site appraisal and forms the basis of the preliminary risk assessment
Pathway	How the contaminant may be expected to move/migrate to a receptor
Preliminary Risk Assessment	Report that presents a summary of readily-available information on the geotechnical and/or geo-environmental characteristics of the site and provides a qualitative assessment of geo-environmental and/or geotechnical risks in relation to the proposed development.
Principal Aquifer	These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale
Receptor	Target that could be adversely affected by contaminants
Secondary A Aquifer	These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
Secondary B Aquifer	These formations are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering
Secondary Undifferentiated Aquifer	Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value
Site of Special Scientific Interest	Sites designated by Natural England under the Wildlife and Countryside Act 1981. This can include sites of national and international importance for sediments, rocks, fossils, and features of the landscape
Source	Source of contamination
Unproductive Strata	These formations have a low permeability and have negligible significance for water supply or base flow





Abbreviations

Abbreviation	Meaning
AOD	Above Ordnance Datum
bgl	Below Ground Level
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
CSM	Conceptual Site Model
DTS	Desk Top Study
EA	Environment Agency
HDD	Horizontal Directional Drilling
NGET	National Grid Electricity Transmission
NGR	Ordnance Survey National Grid Reference
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
PAOC	Potential Areas of Concern
PRA	Preliminary Risk Assessment
PV	Photovoltaic
PVDP	Photovolt Development Partners GmbH
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special Protection Area
SPZ	Groundwater Source Protection Zone
SSSI	Site of Special Scientific Interest
UXO	Unexploded Ordnance
WFD	Water Framework Directive

Units

Unit	Description
%	Percentage
m	Metres
kV	Kilovolt
km	Kilometre
MW	Megawatt
MWh	Megawatt hour





1 Botley Central Site Area - Land Parcel 8, DTS & PRA

1.1 Introduction

- 1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by PhotoVolt Development Partners GmbH on behalf of SolarFive Ltd to undertake a Desk Top Study (DTS) and Preliminary Environmental Risk Assessment (PRA) of Botley West Solar Farm, Oxfordshire (The Project). The report has been commissioned prior to the proposed development of The Project.
- 1.1.2 The Project will be located in the county of Oxfordshire, across an area of approximately 1,300 ha. The Project extends from an area of land in the north, situated between the A4260 and the Dorn River Valley near Tackley and Wootton (Northern Site Area), through a central section, situated broadly between Bladon and Cassington (Central Site Area), and connecting to a section further south near to Farmoor Reservoir and north of Cumnor (Southern Site Area), where the Project will connect to the National Grid transmission network. The name 'Botley West' is derived from the location of the grid connection point. The consent being sought for the Project is a temporary one. Temporary consent is being sought for a 42-year period during which the solar farm will be constructed, operated and decommissioned.
- 1.1.3 The Project comprises three main development sites for installation of ground-mounted solar photovoltaic (PV) panels (Northern, Central and Southern Site Areas). The Project's solar arrays will be connected by electrical cables within each of the Site Areas. The interconnecting cable routes between the Site Areas will largely follow the public highway, but some parts will cross land either leased by the Client or the subject of an easement agreement.
- 1.1.4 A Site Location Plan showing the location and order limits for The Project is presented as Drawing 1
- 1.1.5 In order to provide sufficient detail for the PRA, the three main areas of The Project have been sub-divided by RPS into fourteen land parcels (referenced as Land Parcels 01 14) and the two linking cable route corridors (referenced as Land Parcels 15 and 16). Land Parcel 1 was discounted from requirement for further assessment following completion of an initial EIA Scoping exercise undertaken by RPS in February 2023.
- 1.1.6 This report presents the DTS and PRA for Land Parcel 8, forming part of the Central Site Area as shown in Figure 1.
- 1.1.7 The Desk Study assessment is based upon a review of published information available from local, regional, and national agencies. The desk study information is derived from Insights Reports provided by Groundsure, Ref. GSIP-2023-14174-15953 and GSIP-2023-14174-15954_1 which are presented as Annexes C and D. Please note the terms and conditions attached to the supply of data from Groundsure.

1.2 Objectives

1.2.1 The principal objectives of this assessment were as follows:





- Establish from published sources the geological sequence for Land Parcel 8 and potential for ground instability to occur through development proposals and the extent and nature of any safeguarded minerals reserves;
- To assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
- To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
- To produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages;
 and
- To conclude on the likely requirement for any further assessment and ground investigation required in support of the planning application.
- 1.2.2 The PRA methodology utilised in the preparation of this assessment is presented in detail in Annex A.

1.3 Legislation and Guidance

- 1.3.1 The assessment has been undertaken in general accordance with British Standard BS EN ISO 21365:2020 and is considered suitable to meet the initial requirements of planning as outlined within the National Planning Policy Framework (NPPF). The assessment also reflects the recommendations of Environment Agency guidance, Land Contamination: Risk Management, (LCRM 2023).
- 1.3.2 This report has been produced in general accordance with:
 - Contaminated Land (England) Regulations 2006 (as amended);
 - DEFRA Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
 - Environment Agency (2023) Land Contamination: Risk Management (LCRM 2023);
 - National Planning Policy Framework (2023);
 - CIRIA Document C665: Assessing Risks Posed by Hazardous Ground Gases to Buildings;
 - British Standard requirements for the 'Investigation of potentially contaminated sites – Code of practice' (ref. BS10175:2011+A2:2017);
 - British Standard requirements for the 'Code of practice for ground investigations' (ref. BS5930:2015+A1:2020); and,
 - British Standard requirements for the 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' (ref BS8485:2015+A1:2019).
- 1.3.3 Details of the limitations of this type of assessment are described in Annex B.





2 Site Description and desk study

2.1 Site Location (Land Parcel 8)

2.1.1 A representative address for Land Parcel 8 has been considered to be Cassington Wastewater Treatment Works, Yarnton Road, Worton, Cassington, OX29 4EB. It is located at approximate Ordnance Survey (OS) National Grid Reference (NGR) SP 446454, 212228. The extent of Land Parcel 8 is shown in blue in Figure 1.

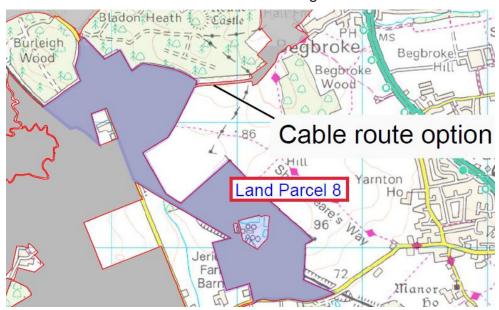


Figure 1: Extent of Land Parcel 8

- 2.1.2 The topography of Land Parcel 8 is indicated to range from approximately 64 m Above Ordnance Datum (AOD) at the southern extremity on Yarnton Road to 95 m AOD in the north close to the boundary with Bladon Heath.
- 2.1.3 A targeted site inspection has not been undertaken on this land parcel given the absence of any site permitted current activities or potential current contamination sources from environmental data searches.
- 2.1.4 From Google Earth aerial photo images (April 2022), Land Parcel 8 is located in an area of predominantly agricultural land use. From Google Earth imagery neighbouring land consisted of the following:

Table 2.1: Neighbouring Land Uses

Direction	Description	
North:	Bladon Heath, Worton Heath, agricultural land.	
East:	Agricultural Land, Cassington Road.	
South:	Sewage Works, Agricultural Land, Yarnton Road,	
West:	Agricultural Land, Burleigh Wood, railway, land parcel divided by Burleigh Road. Burleigh Farm.	





2.2 Proposed Development

- 2.2.1 The proposed development is to comprise a temporary 1,307 MWp solar farm The Project will connect to new National а Electricity Transmission (NGET) system, via a new National Grid 400 kV substation, to be located close to the existing National Grid 400 kV line between Cowley in Oxford, westwards to Walham, in that Gloucestershire. The majority of the development (840 ha) will comprise solar PV modules (solar panels). At the highest point the modules will be 2.2 m and at the lowest point the modules will be 0.8 m. The arrays are intended to be fixed, not rotating. The construction of all aspects of the Project is subject to the final Project design and potential environmental constraints.
- 2.2.2 The method of foundation support and anchoring of the solar panels has not been confirmed however it is likely that this will be through use of galvanised steel piles or screws driven into the ground by an impact piling or screwing rig, to a depth of approximately 1.0 to 2.5 m below ground level (bgl).
- 2.2.3 Cable routes are to be installed at depths ranging from 1.5 m to 30 m bgl with Horizontal Directional Drilling (HDD)to be utilised where it is not feasible to use the 'open cut' method to cross obstacles such as hedges, rivers, railway lines, public rights of way, roads and sensitive archaeological or ecological areas.
- 2.2.4 There are likely to be four main temporary construction compounds in the development areas, one in the North, two in the Central area and one in the South. All compounds have been carefully sited in order to minimise potential adverse environmental impacts. Topsoil and subsoil will be stripped from such areas and stored on site for replacement following the completion of construction works. Each compound will have fencing and suitable hard standing, offices, welfare facilities and generators to supply electricity.

2.3 Site History

Historical Map Review

2.3.1 The following review is based on past editions of readily available Ordnance Survey (OS) maps. These include scales of 1:1,250, 1:2,500, 1:10,560 and 1:10,000 dated 1876 to 2023. Extracts from historical maps are included in Annex C.

Table 2.2: Historical Site Uses

On-site Land Use and Features	Dates	
Undeveloped Agricultural Land	1876 - Present	
Pond, to north-east of sewage works	1876 - Present	

2.3.2 Pertinent off-site historical site uses within 250 m are presented below:





Table 2.3: Historical Neighbouring Site Uses

Surrounding Land Uses (250 m	Orientation	Distance	Dates	
radius)			From	То
Pond, infilled between 1982 and 1991	South-east	75 m	1974	1991
Great Western Railway (Oxford, Worcester, & Wolverhampton Branch) mainly in cutting	West – south- west divides the south- eastern part of site in two	0 m	1876	Present
Sewage Works and associated Tanks and two associated ponds, two infilled	South-west	139 m	1992	Present
Utility Poles, running north-east to southwest	East	200 m	2004	Present

Site Planning History

- 2.3.3 Relevant and readily available planning records for the site, as obtained from West Oxfordshire District Council planning website are summarised as follows:
 - 23/00882/CND The Granary, Jericho Farm Worton Witney Oxfordshire OX29 4SZ – immediately south-west of Land Parcel 8. Discharge of Conditions 4 (Construction Environmental Management Plan) and 6 (Surface Water drainage plan) of planning permission.
 - A Desk Study and subsequent Ground Investigation Report has been provided in relation to the Application above in respect to the proposed construction of a basement under a grassed area at the centre of the site and under the building.
 - Made Ground was indicated to be present on-site comprising sandy clay, brick, limestone, concrete and slate, with a groundwater strike between 1.05 and 2.00 m below ground level.
 - The scope of intrusive works undertaken included the installation and monitoring of four standpipes, trial pits, soakaway tests and contamination and geotechnical soil sample analysis.
 - Water and soil sample analysis did not find any chemical contaminants of concern however asbestos fibres were identified in one soil sample. It was concluded that due to the low concentration, it did not have the ability to generate air fibres hazardous to human health, concluding the Made Ground present within the Farm was non-hazardous.
 - Impact on Aquifer status and drainage was highlighted. It was concluded that as shallow groundwater was present, the groundwater would flow around the structure, creating a localised cut-off in flow, however, contamination from construction was not addressed.





2.4 Environmental Setting

2.4.1 The Groundsure Insight Reports utilised in preparation of the environmental setting assessment are included in Annex D.

Geology

2.4.2 Based on British Geological Survey (BGS) mapping (1:50,000-scale) and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath Land Parcel 8 are indicated to be as follows:

Table 2.4: Descriptions of Geological Strata

Stratum	Description & approximate thickness	Aquifer Classification
Superficial Deposits		
Hanborough Gravel Member – Sand and Gravel (Northwest)	Sand and Gravel deposits with approximate thickness of 0 – 6 m bgl. Nearest borehole record indicates 2.50 m in thickness.	Secondary A Aquifer
Bedrock		
Oxford Clay Formation and West Walton Formation (Undifferentiated) – Mudstone	Mudstone and silty mudstone with subsidiary calcilutite, limestone, sandstone, and siltstone. Thickness not recorded	Unproductive Strata

2.4.3 BGS borehole log (ref. SP41SE/3) located approximately 43 m north-east, indicates the Hanborough Gravel Member to be present up to a depth of 2.50 m bgl, comprising clay, sand and gravel. Indicated to underlie this deposit to a depth of 3.0 m bgl is the Oxford Clay Formation.

Hydrogeology

- 2.4.4 Land Parcel 8 is located above a Secondary A Aquifer relating to the localised cover of Hanborough Gravel Member in the west and Unproductive Stratum relating to the Oxford Clay Formation and West Walton Formation outcropping across the remainder of the land parcel.
 - Secondary A Aquifer: These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
 - Unproductive Stratum: These formations have a low permeability and have negligible significance for water supply or base flow.
- 2.4.5 According to EA data, Land Parcel 8 is not located in a groundwater Source Protection Zone (SPZ).
- 2.4.6 Information provided by the EA indicates that there are two records active licensed groundwater abstractions within 2 km of Land Parcel 8. These are detailed in the table below:





Table 2.5: Groundwater Abstractions

Licence Holder	Approx. Distance and Direction from Site	Source	Use
Hanson Quarry Products Europe Ltd	890 m south	Thames Groundwater	Transfer Between Sources (Post Water Act 2003)
Hanson Quarry Products Europe Ltd	1448 m south-east	Thames Groundwater	Mineral Washing

Surface Water

2.4.7 There is one recorded watercourse within 500 m of Land Parcel 8 classified within a River Basin Management Plan published by the EA under the European Water Framework Directive (2000). A list of readily identifiable nearby watercourses and water bodies is as follows:

Table 2.6: Nearby Watercourses and Water Bodies

Watercourse / Body	Quality Classification	Approx. Distance and Direction from Site
Thames (Evenlode to Thame)	Overall – Moderate (2019) Chemical Rating – Fail (2019)	On Site
River Evenlode	N/A	160 m south-west
Unnamed Inland River	N/A	On Site parallel to Burleigh Road
Lake, Loch or Reservoir	N/A	On Site
Inland River – unnamed stream narrower than 5 m	N/A	1 m south
Inland River – unnamed stream narrower than 5 m	N/A	187 m north-west

2.4.8 Information provided by the EA indicates that there are no records of active licensed surface water abstractions within 2 km of Land Parcel 8.

Ecologically Sensitive Sites

2.4.9 Natural England data indicates that there are the following ecologically sensitive sites located within a 500 m radius of the Land Parcel 8.

Table 2.7: Ecologically Sensitive Sites

Environmental Designation	Name	Approx. Distance and Direction from Site
Green Belt	Cherwell Green Belt	On Site
Designated Ancient Woodland	Burleigh Wood	0 m north-west
Designated Ancient Woodland	Bladon Heath	73 m east





Environmental Designation	Name	Approx. Distance and Direction from Site
Nitrate Vulnerable Zones	Cherwell (Ray to Thames) and Woodeaton Brook NVZ	On Site
Nitrate Vulnerable Zones	Thames (Leach to Evenloade) NVZ	On Site

2.4.10 A Grade II listed building identified as Burleigh Farmhouse, stables and barns is present immediately west of Land Parcel 8, alongside Burleigh Road.

Radon

2.4.11 According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England) and the British Geological Survey, Land Parcel 8 is not located in an area at risk from radon gas.

Coal Authority

2.4.12 The Interactive Map Viewer on the Coal Authority website indicates that Land Parcel 8 is not located in a coal mining reporting area.

Non-Coal Mining

2.4.13 BGS sources indicate that Land Parcel 8 is not located in an area of recorded non-coal mining (vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities including ball clay, jet, black marble, graphite and chert).

Mineral Safeguarding Areas

2.4.14 Reference to the Oxfordshire County Council, Minerals and Waste Local Plan (2017) and the Oxfordshire Minerals and Waste Local Plan Policies Map (2017) indicates that the extreme south of Land Parcel 8 falls within designated Minerals Safeguarding and Minerals Consultation Areas for sharp sand and gravel reserves. In accordance with the plan requirements for non-mineral related development that affect a safeguarded site, further assessment would be required to demonstrate economic viability and sustainability considerations of the mineral resource and that pre extraction is not required.

BGS Ground Stability Hazard Ratings

2.4.15 British Geological Survey Ground Stability Hazard ratings for Land Parcel 8 are summarised as follows:

Table 2.8: BGS Ground Stability Hazard Ratings

Ground Stability Hazard	BGS Risk rating
Collapsible ground	Very Low
Compressible ground	Negligible
Ground dissolution	Negligible





Ground Stability Hazard	BGS Risk rating
Landslide	Very Low
Running sand	Negligible / Very Low
Shrinking or swelling clay	Moderate – High Plasticity

2.5 Authorised Processes and Pollution Incidents

Landfills and Waste Sites

2.5.1 Data provided by the EA, Local Authority and BGS indicates that there are no recorded licensed or known historical landfill or waste sites located within 250 m of Land Parcel 8.

Environmental Permits

2.5.2 EA and Local Authority data indicates that there are no processes regulated by an Environmental Permit (under the Environmental Permitting Regulations 2010) within 500 m of Land Parcel 8.

COMAH Sites

2.5.3 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations (1999), located within 500 m of Land Parcel 8.

Pollution Incidents

2.5.4 Environment Agency data indicates that there is one record of a 'major' or 'significant' pollution incident within 500 m of Land Parcel 8. This is outlined in the table below:

Table 2.9: Pollution Incidents within 500 m

Approx. Distance and Direction from Site	Receiving Medium and Date	Severity of Incident and Type
415 m south-west	Incident Date: 06/09/2012 Incident Identification: 1034867 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)

2.6 Unexploded Ordnance

- 2.6.1 CIRIA Report C681 (Stone et al (2009)) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating to WWII bombing and military sites.
- 2.6.2 Reference to the Zetica Unexploded Bomb Risk mapping indicates that the site is in an area of low potential risk from Unexploded Bombs. As the site is not within an area of known military history, in general accordance with CIRIA





Report C681 no further consideration of Unexploded Ordnance is considered necessary.

3 Outline Conceptual Site model

3.1 Background

- 3.1.1 An outline conceptual site model (CSM) consists of an appraisal of the source-pathway-receptor 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.
 - Source referring to the source of contamination (Hazard).
 - Pathway for the contaminant to move/migrate to receptor(s).
 - Receptor (Target) that could be affected by the contaminant(s).
- 3.1.2 Receptors include human beings, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A.
- 3.1.3 As part of the assessment the potential risks to receptors for potential source is given one of the following classifications:
 - Low risk it is considered unlikely that issues within the category will give rise to significant harm to identified receptors.
 - Moderate risk it is possible, but not certain that issues within the category will give rise to significant harm to receptors.
 - High risk there is a high potential that issues within the category will give rise to significant harm to identified receptors.

3.2 Potential Pollutant Linkages

3.2.1 Each stage of the potential pollutant linkage sequence has been assessed individually on the basis of information obtained during the site reconnaissance and desk study exercise and are discussed in the following section.

Potential Contaminant Sources

On Site - Current

3.2.2 No current on site potentially contaminative land uses have been identified.

On Site - Historical

3.2.3 No historical on site potentially contaminative land uses have been identified.





Off-site - Current

3.2.4 Current off-site potential sources of contaminants of concern include Cassington Sewage Works to the south-west of the Land Parcel. This facility comprises two settlement lagoons, and two former lagoons in the east. A 'significant' pollution incident has been linked to the works location regarding water and land impact, and the release of crude sewage into waterways.

Off-Site - Historical

3.2.5 No historical off site potentially contaminative land uses have been identified. Ground gases have been discounted as a viable contaminant source from the DTS findings indicating an absence of known landfill sites within 250 m.

Potential Pathways

- 3.2.6 The site is indicated to be underlain predominantly by the outcropping low permeability mudstone strata of the Oxford Clay Formation And West Walton Formation, which will likely retard the downward or lateral migration of contaminants of concern via leaching or shallow groundwater (where present).
- 3.2.7 The low permeability strata will also retard the lateral migration of any liquid or gaseous contaminants from off-site sources such as the sewage works.
- 3.2.8 The use of driven pile foundations would indicate minimal generation of spoil at the surface therefore airborne migration of dust unlikely.
- 3.2.9 It should be noted that pathways may be modified or exacerbated by disturbance of the site.

Potential Receptors

Controlled Waters

- 3.2.10 The Oxford Clay Formation and West Walton Formation are classed as unproductive strata. The Hanborough Gravel Member, considered a Secondary A Aquifer is extremely localised to the north-west. Land Parcel 8 is not within any SPZ's. i.e. Groundwater is not considered a sensitive receptor and is discounted from further assessment in this PRA.
- 3.2.11 A number of surface water features have been identified on and within 250 m of Land Parcel 8. These features are considered to represent the main controlled waters receptor, however the absence of identified on-site sources and limited lateral migration potential of the bedrock geology would indicate no significant risk to these water bodies.

Human Health

3.2.12 Following construction of The Project it is not envisaged that there will be any full-time occupants of the site however it is expected that there will be periodic requirements for maintenance work/checks. The risks posed to maintenance workers are considered to be negligible given the historical site usage, low risk of contact with residual soils and likely absence of shallow groundwater.





- 3.2.13 Off-site users are unlikely to be adversely impacted by any site derived contaminants the nearest large-scale residential development being more than 650 m east and off-site users have therefore also been discounted as significant receptors.
- 3.2.14 The assessment does not consider the risk to construction/demolition workers during redevelopment. These risks will be managed through appropriate Health & Safety legislation include H&S At Work Act (1974) and in accordance with the Construction Design and Management (CDM, 2015) regulations.

Solar Farm Structures

3.2.15 Another potential receptor are the foundations, cables, and steel structures likely to be placed within the shallow soils. There is a risk to chemical attack from sulphates present within natural strata anticipated to be present or corrosion / degradation of steel anchors, cables from a high water table or acidic ground conditions.

Sensitive Land Use

3.2.16 There are a number of designated Ancient Woodland sites bordering or in close proximity to this land parcel. The construction/operational phases of the proposed solar farm development are considered unlikely to adversely impact on these off-site receptors.

3.3 Outline Conceptual Site Model

3.3.1 An outline CSM has been developed on the basis of the desk study. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site post development and is summarised in the table below.





Table 3.1: Outline Conceptual Site Model

Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	Qualitative Risk Rating	Notes
On site – Natural strata (Oxford Clay)	Chemical attack (sulphates)	Chemical Attack	Direct contact	✓	Concrete slabs, foundations	Low/Moderate	Natural strata are prone to elevated sulphate concentrations which may affect choice of concrete grade for foundations or slabs for construction of any sub-stations or other structures.
Off-site – current: Cassington Sewage Works	Sewage effluent (bacterial)	Groundwater	Direct contact /ingestion	×	Future site users (maintenance workers	N/A	Lateral migration likely to be minimal due to low permeability of outcropping strata in the area of the sewage works and likely absence of shallow groundwater in these areas.

Note

3.3.1 Based on the identified potential sources and the site setting there is not considered to be a significant risk to ecological receptors, crops/vegetation or archaeological receptors from contamination.

^{*} The Qualitative Risk Rating does not consider the potential for the pathway to be active. In the event that a Moderate or High Qualitative Risk Rating is identified further assessment is recommended.





4 Conclusions and Recommendations

4.1 Preliminary Geo-Environmental Conclusions

- 4.1.1 The PRA undertaken has not identified any potentially significant potential source-pathway-receptor linkages relating to the proposed temporary solar farm development of Land Parcel 8.
- 4.1.2 The presence of unknown soil contamination being discovered during construction works cannot be discounted entirely and it is recommended that if encountered works should stop and specialist advice obtained on how to proceed.

4.2 Preliminary Geotechnical Conclusions

- 4.2.1 The available geological data suggests that bedrock strata of the Oxford Clay Formation And West Walton Formation outcrop across most of the area, likely to comprise mudstones or silty mudstones. These strata are likely to be suitable for installation of driven foundations or anchors for photovoltaic panels, however the mudstones tend to weather to high plasticity clays which could be prone to shrinkage/heave effects particularly in close proximity to mature trees bordering the site or seasonal variations in moisture content. This would accord with the moderate risk rating designated by BGS.
- 4.2.2 Pile refusal, or failure to reach the target embedment depth, can result in insufficient capacity against lateral and uplift loads, and require remediation or alternate installation procedures therefore ground investigation is recommended to determine suitability of shallow ground conditions for driven foundation types. Alternative ground-based anchor systems may have to be considered if deemed unsuitable for achieving the required lateral loading parameters.

4.3 Recommendations

- 4.3.1 We recommend the following actions to clarify potential land stability risks at the site:
 - Based on anticipated ground conditions there is the potential for clay heave/shrinkage issues to affect the proposed development and a risk of concrete degradation from the natural strata which would indicate requirement for a suitable sulphate resistant grade of concrete. Ground Investigation should be undertaken to inform appropriate geotechnical design of foundations, slabs and access roads.





5 References

BGS. British Geological Survey Onshore GeoIndex. [online] Available at: http://www.bgs.ac.uk/geoindex/ [Accessed 13th June 2023].

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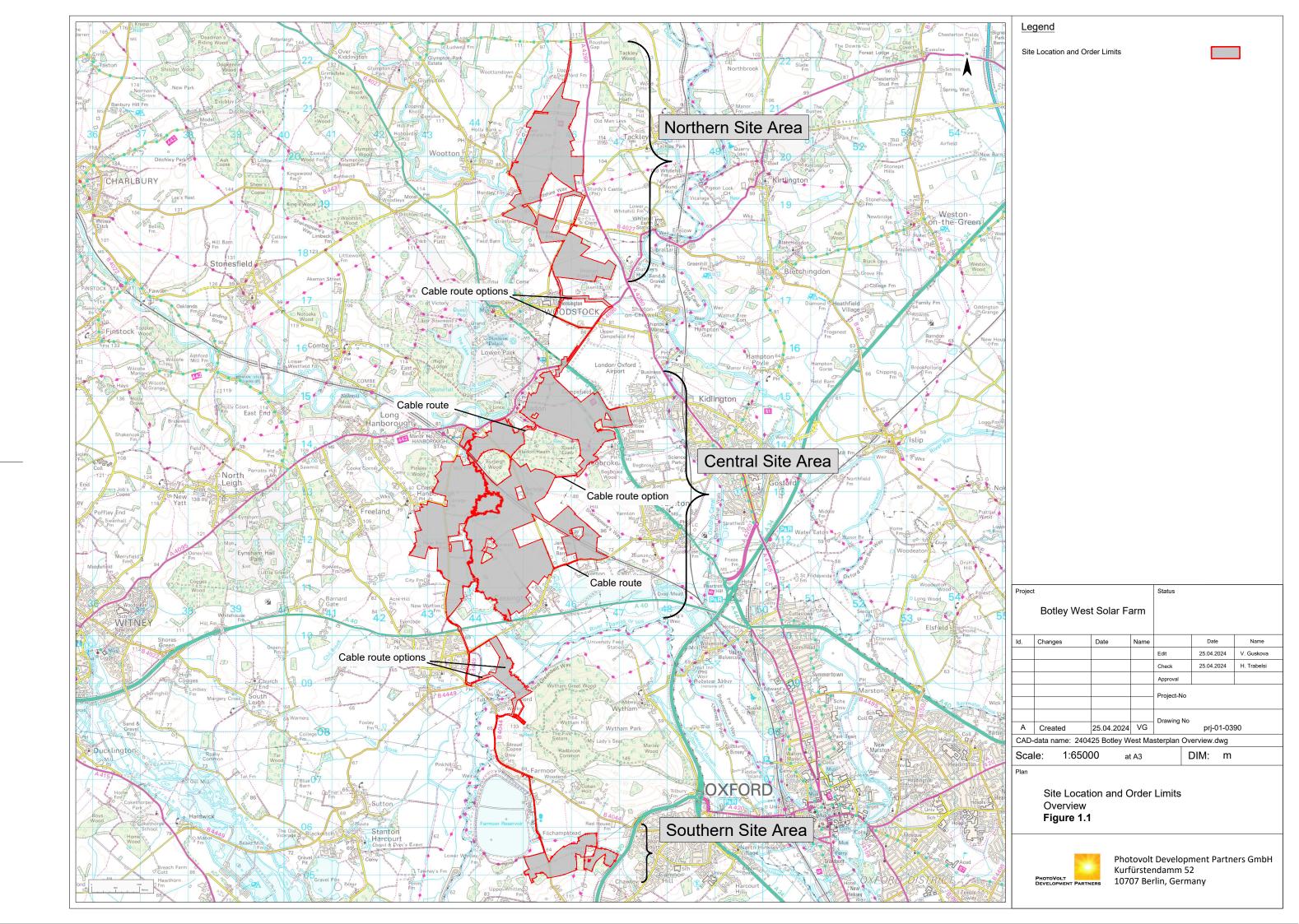
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Drawings Drawing 1: Site Location Plan







Annex A PRA Methodology





PRA METHODOLOGY

INTRODUCTION

This report provides available factual data for the site obtained only from the sources described below and related to the site on the basis of the location provided by the client. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.

This report is written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission. The report is provided for sole use by the client and is confidential to them and their professional advisors. No reliance whatsoever is provided to any party other than the client unless otherwise agreed.

INFORMATION SOURCES

Current and Historical Land Use

This section establishes the former and current uses of the site, which could have caused contamination. Details of the site location, the current and proposed site uses have been provided by the client.

Information about the history of the site has been obtained through an inspection of historical maps at 1:10,000, 1:2,500 and 1:1,250 scales and historical aerial photographs (where available). The accuracy of maps cannot be guaranteed, and it should be recognised that different conditions on-site may have existed between, and subsequent to, the map survey dates.

Regulatory Records

Regulatory records including landfills, pollution incidents ('major' and 'significant' only), industry authorisations and licensed water abstractions are derived from information purchased from Groundsure Ltd (unless otherwise specified).

Environmental Setting

The geological sequence underlying the site and the approximate depths of strata are provided by maps published by the British Geological Survey (BGS) 1:50,000 scale and available borehole records held by the BGS.

The hydrogeological classification is obtained from Groundwater Vulnerability mapping by the BGS/EA/National Resources Wales (NRW). The vulnerability of groundwater is determined from this mapping and geological information.

The location of surface watercourses is obtained from an inspection of current OS maps. Flood risk details and information on groundwater Source Protection Zones are obtained from readily available EA/NRW information published on-line and supplied by Groundsure Ltd.

Details of sensitive ecosystems/habitats and coal mining areas are supplied by Natural England, Natural Resources Wales and Scottish Natural Heritage and the Coal Authority respectively via Groundsure Ltd and inspection of the MAGIC website.

Radon is a radioactive gas produced naturally by certain types of geology. This report uses the Indicative Atlas of Radon in England and Wales (2007) produced by the Health Protection Agency (HPA) and the British Geological Survey (BGS) to determine whether the site is located in an area at risk from radon gas. Where potential issues are identified, a site-specific radon report is obtained from the HPA and BGS to provide a more accurate estimate of the probability of the site being affected by radon gas ingress.





Annex B Limitations of Assessment





General Notes

RPS Consulting Services Ltd

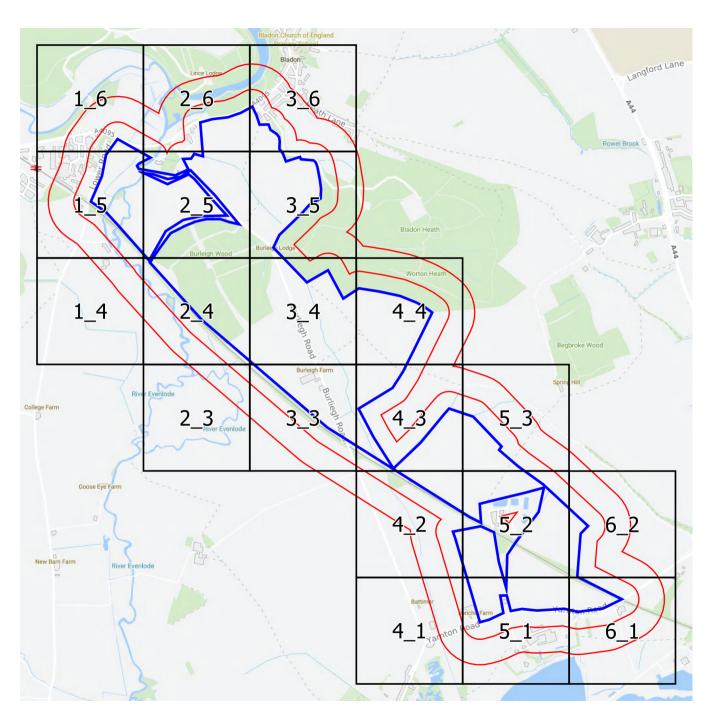
Phase 1 - Environmental Risk Assessment / Desk Study Environmental Review

- A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
- 1. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
- 2. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
- 3. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
- 4. No sampling or analysis has been undertaken in relation to this desk study.
- 5. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
- 6. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
- 7. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
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- 10. These terms apply in addition to the RPS "Standard Terms & Conditions" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms & Conditions the said Standard Terms & Conditions shall prevail.) In the absence of such a written contract the Standard Terms & Conditions will apply.





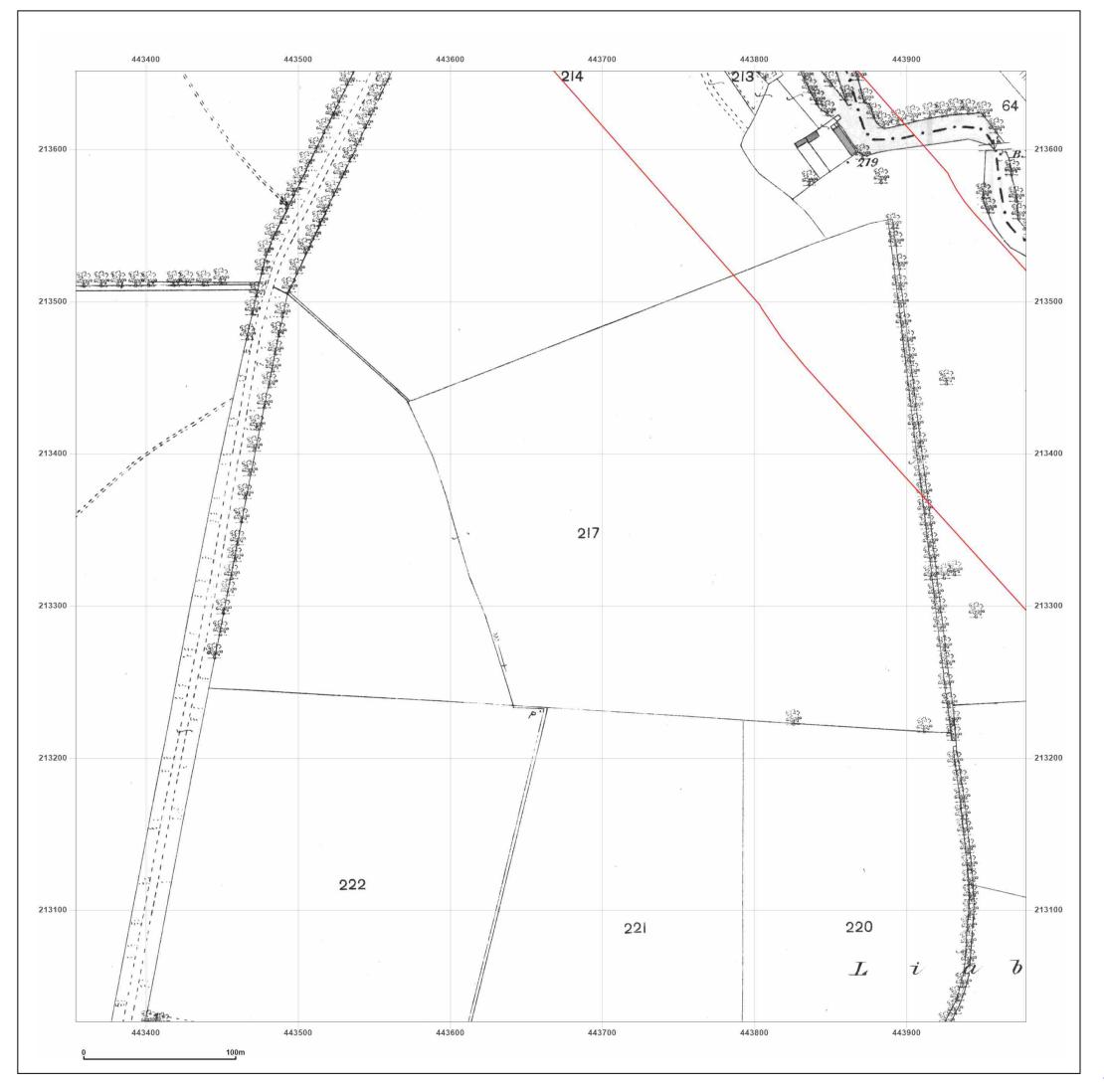
Annex C Groundsure Insights Historical Map Reports



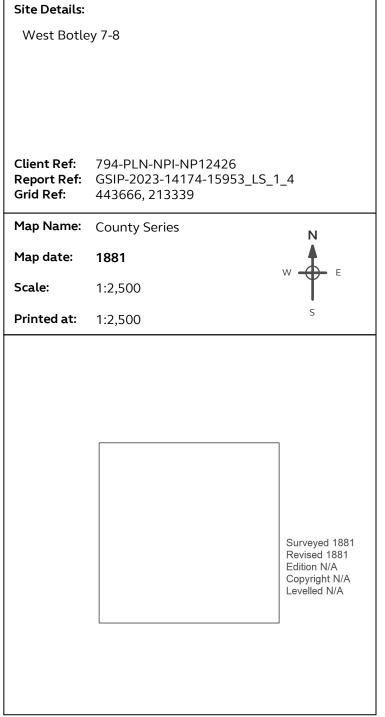


1:2,500 Scale Grid Index









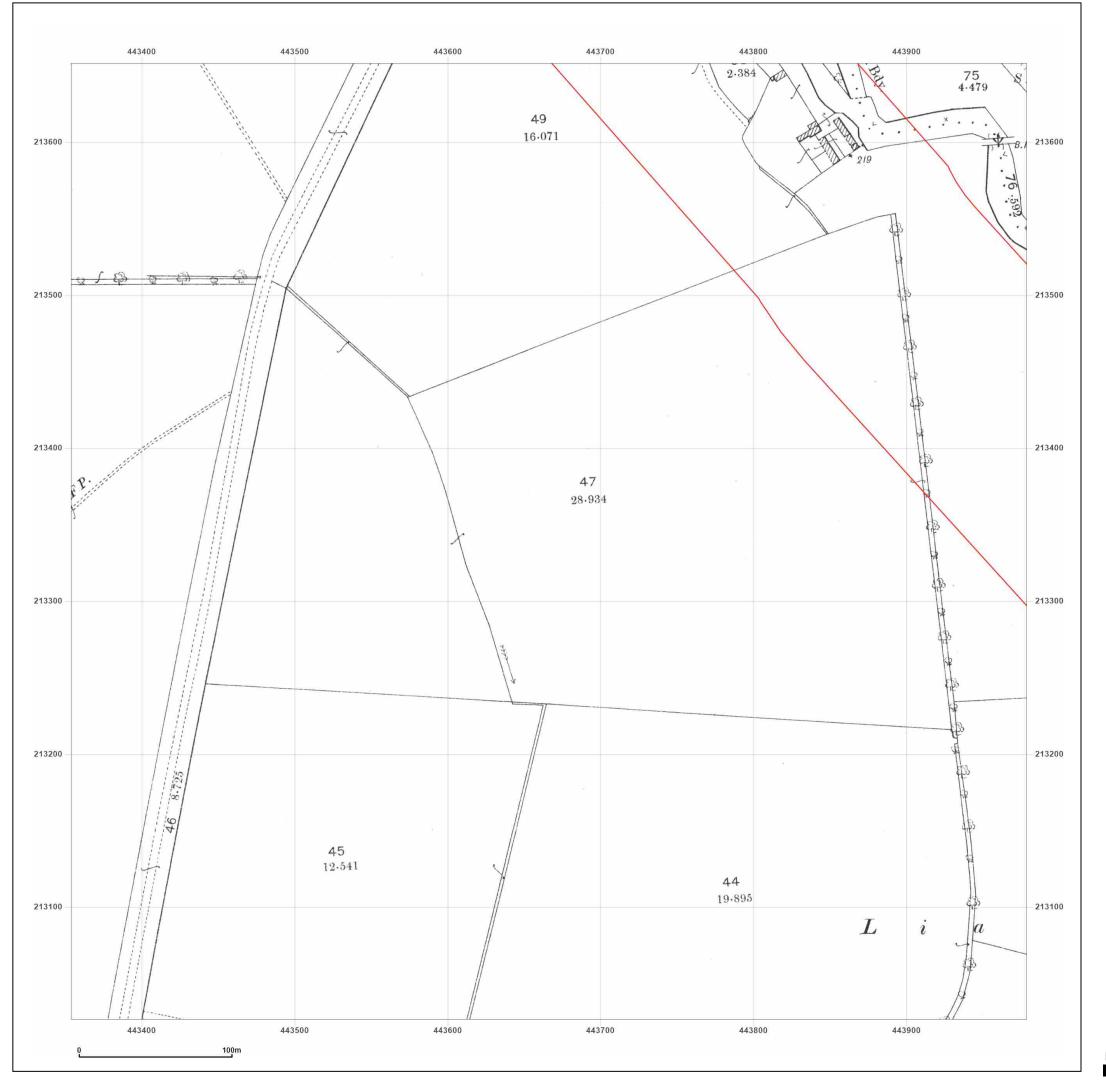


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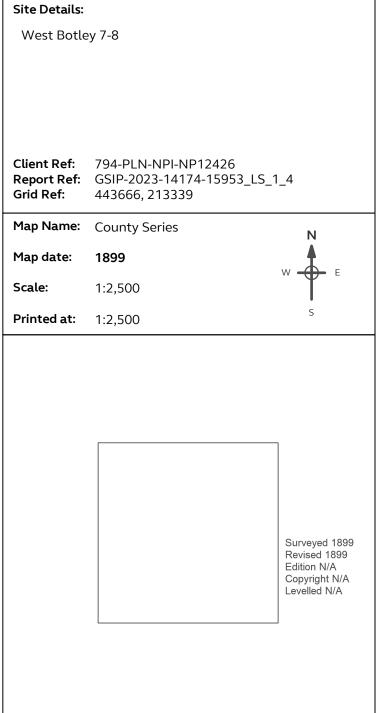
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Map legend available at:

www.groundsure.com/sites/default/files/groundsure_legend.pdf



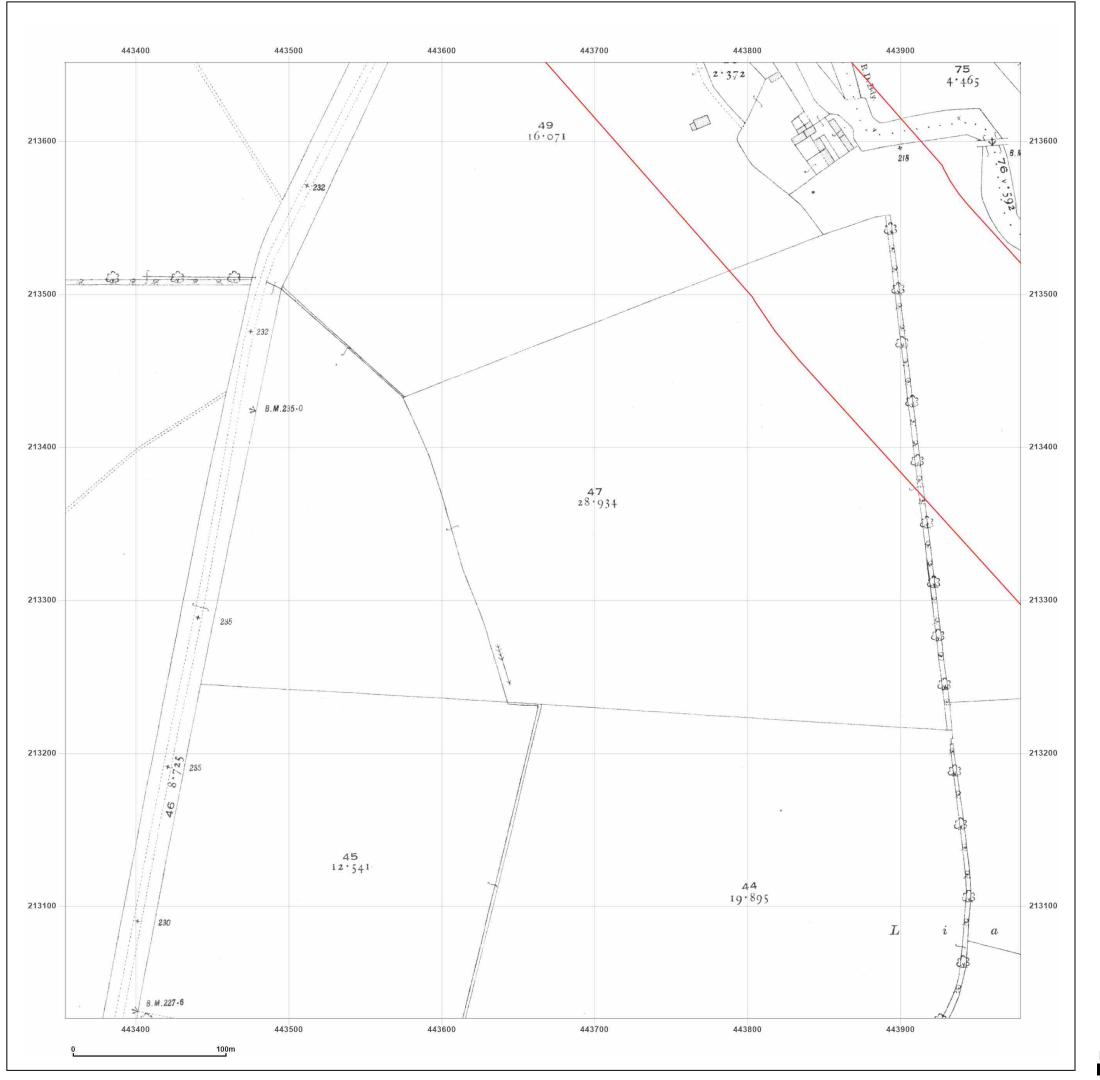




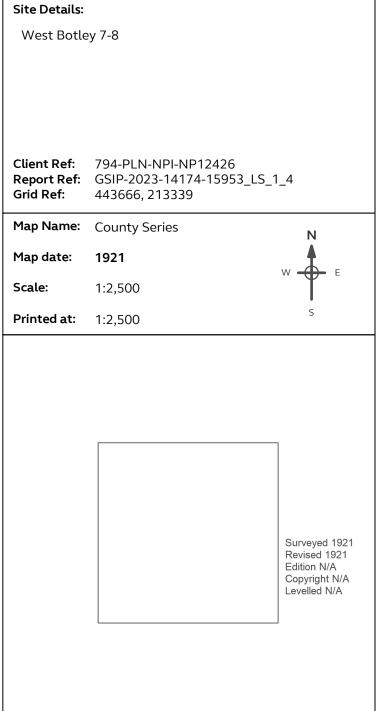


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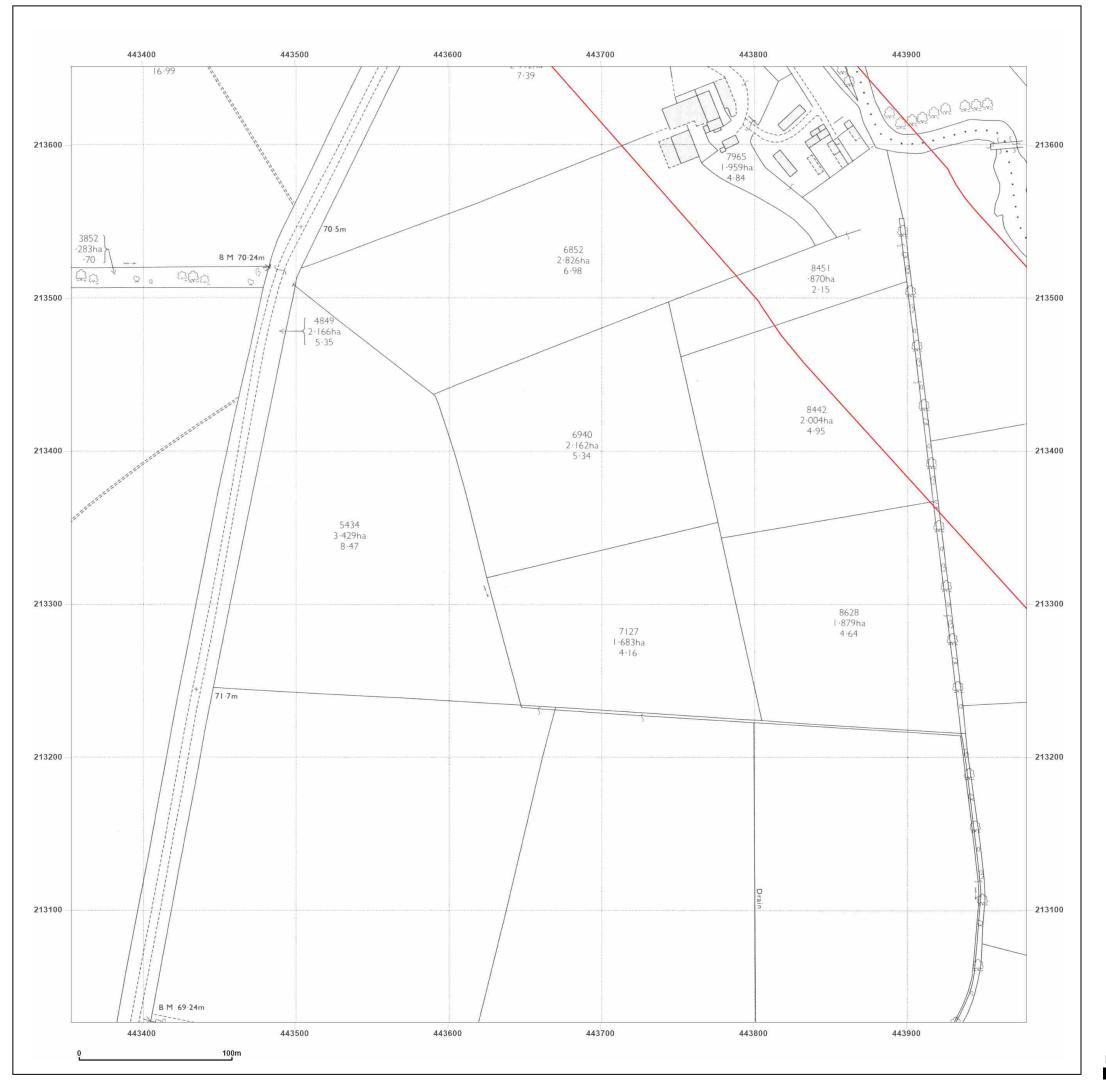






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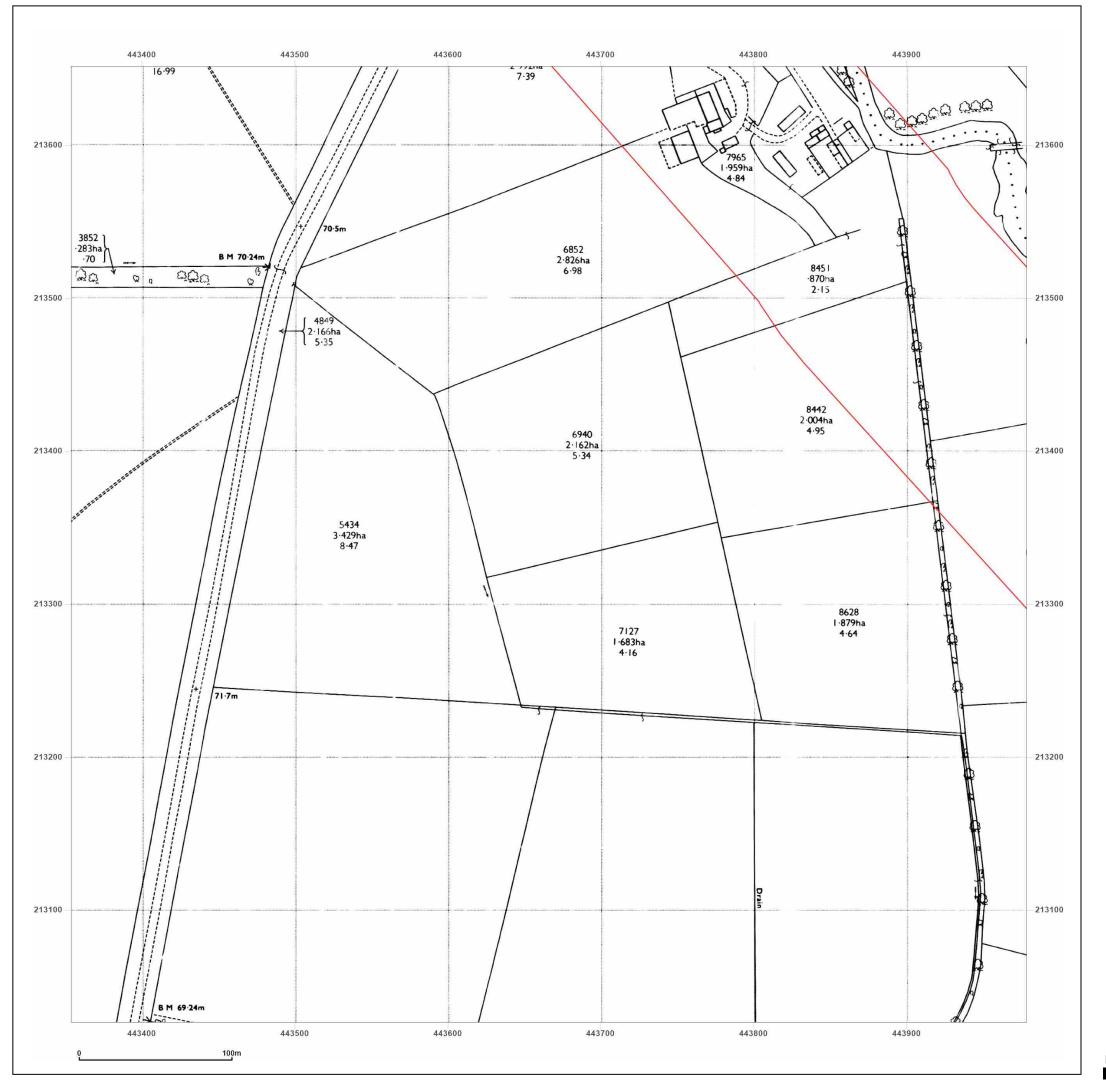


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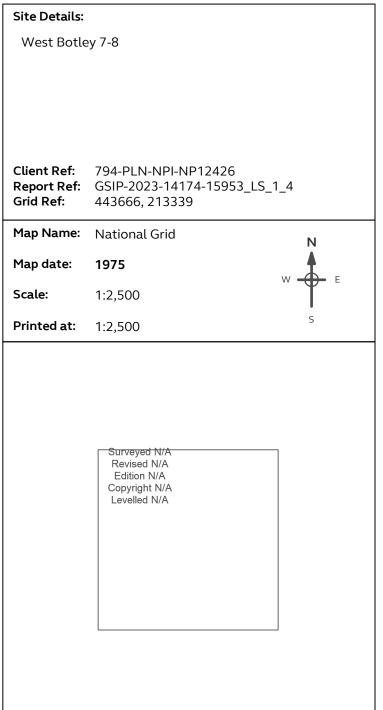


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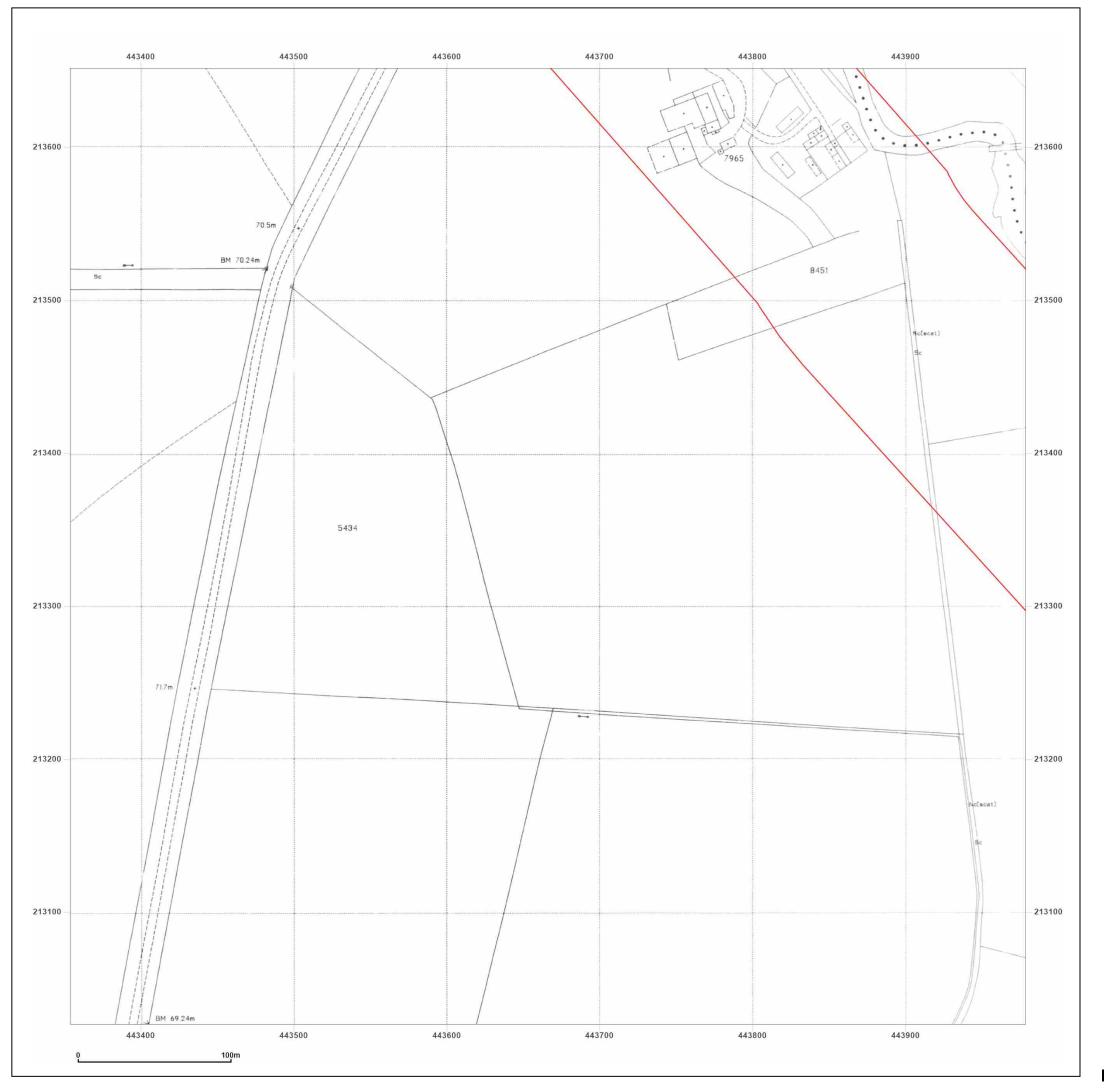




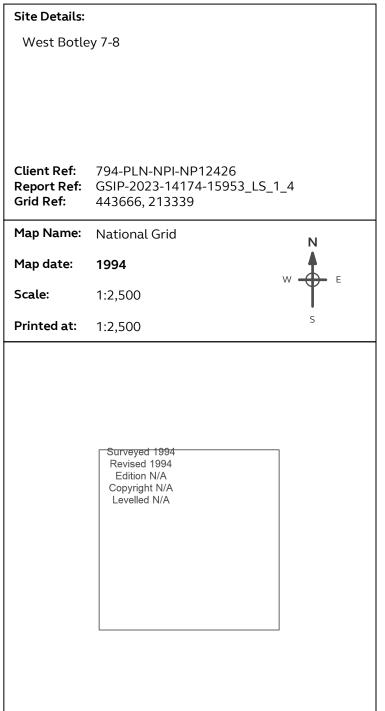


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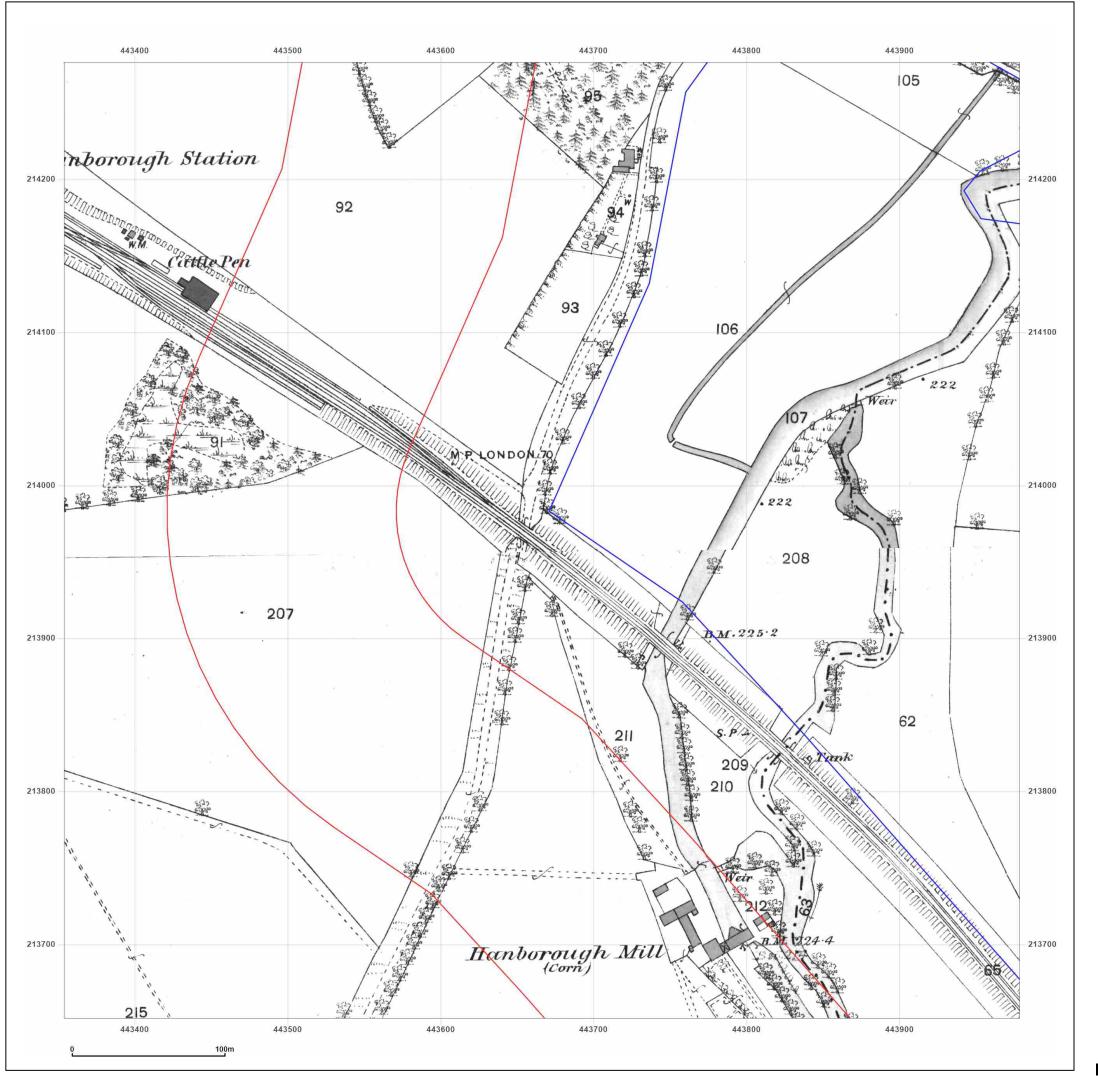




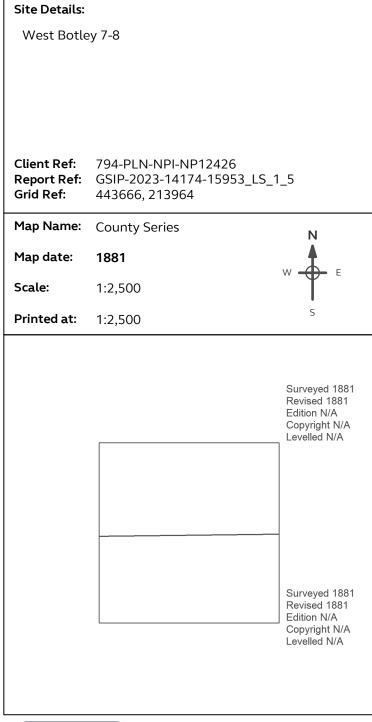


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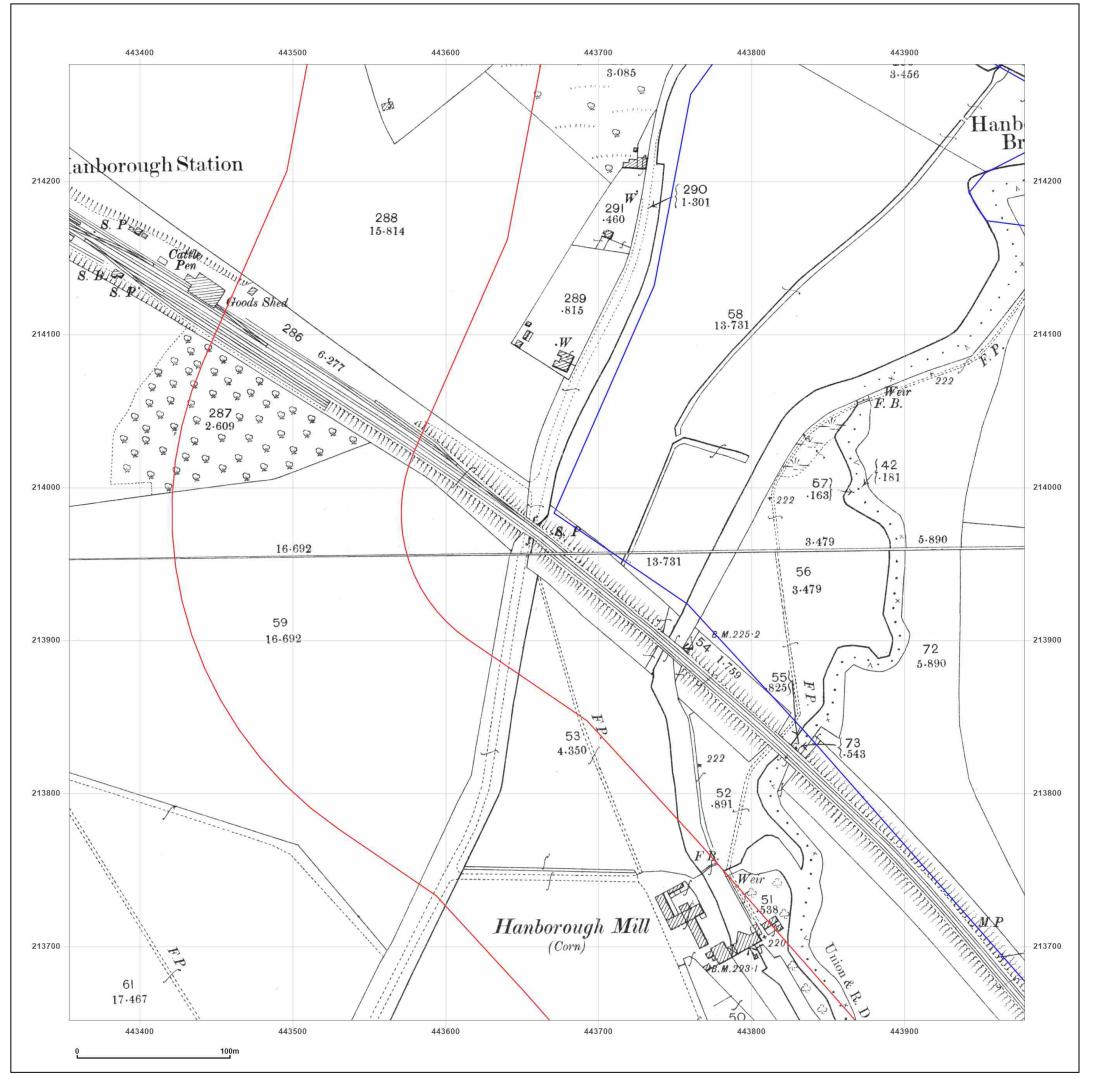




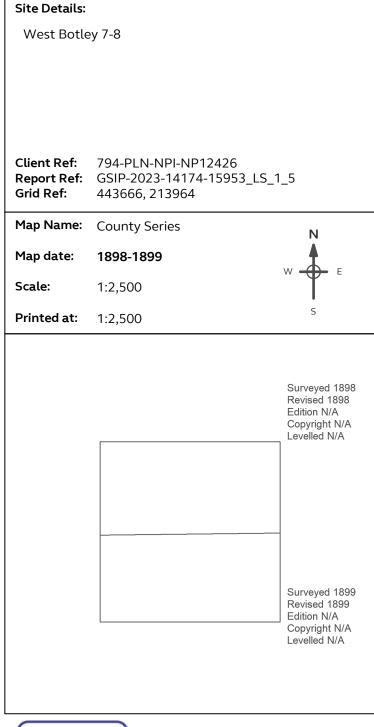


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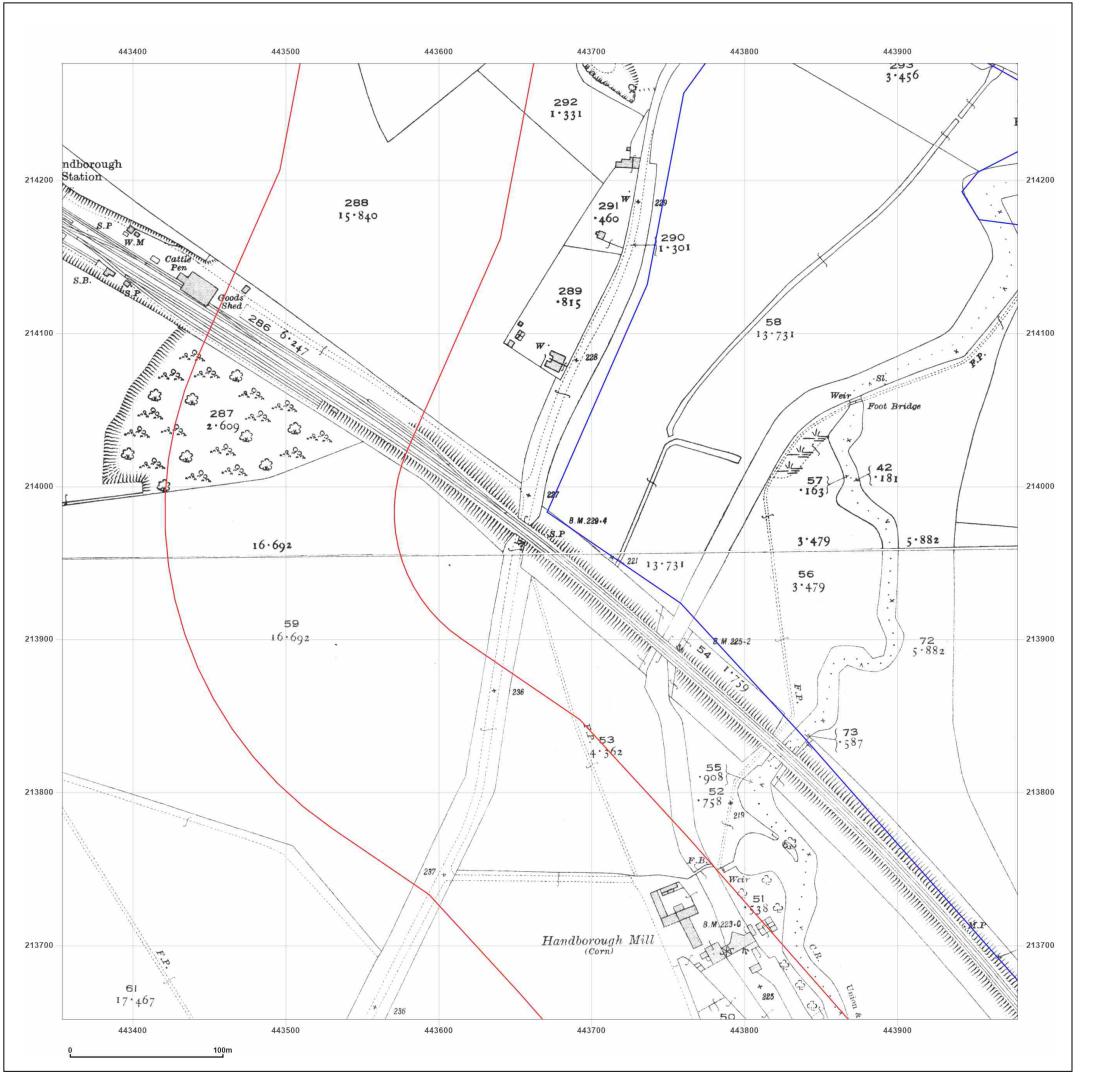




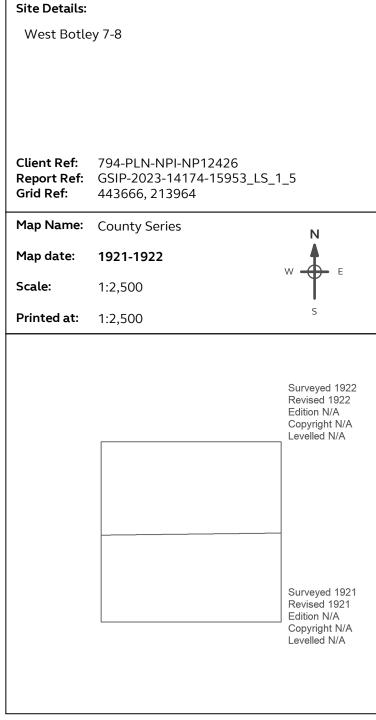


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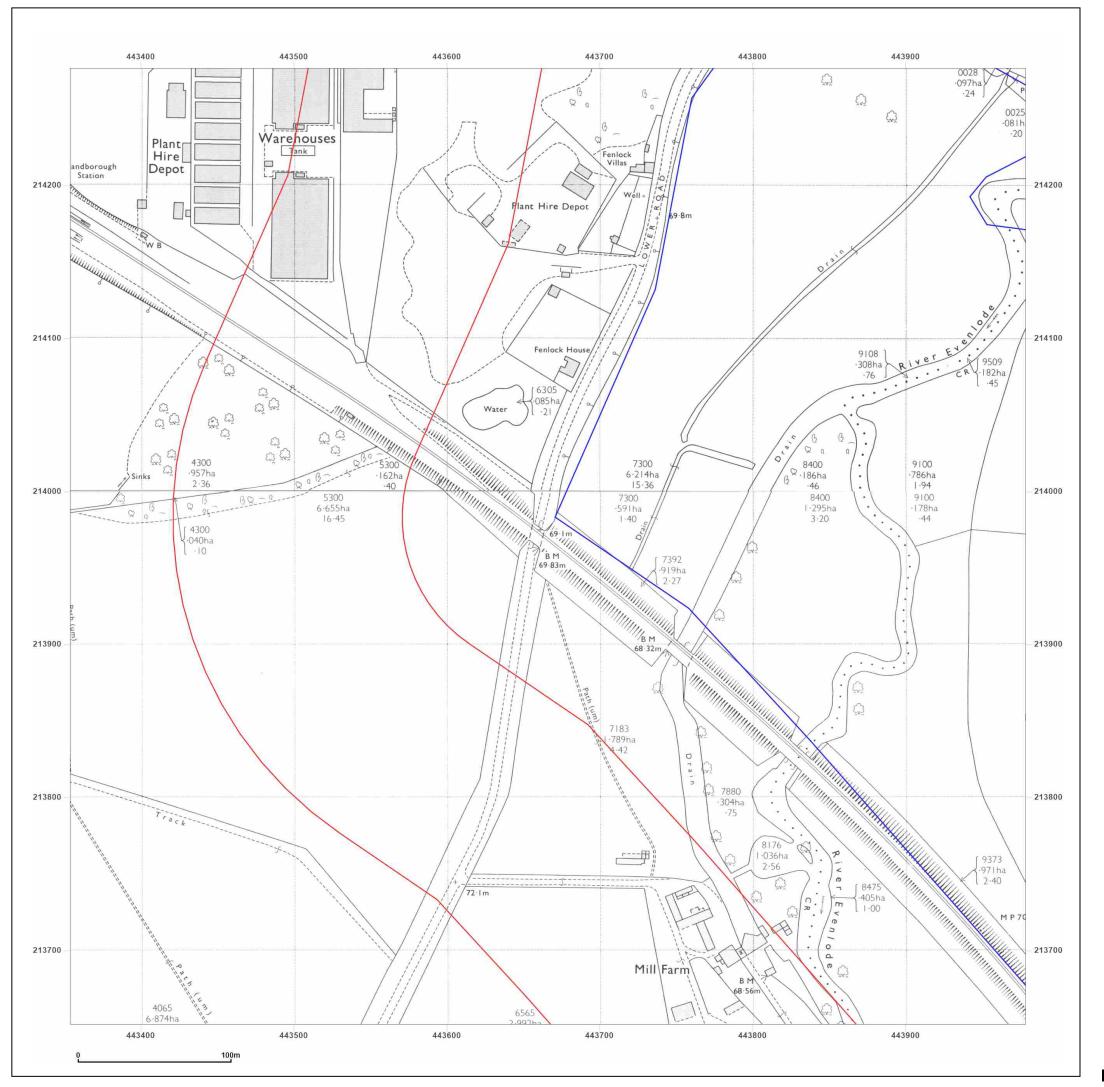






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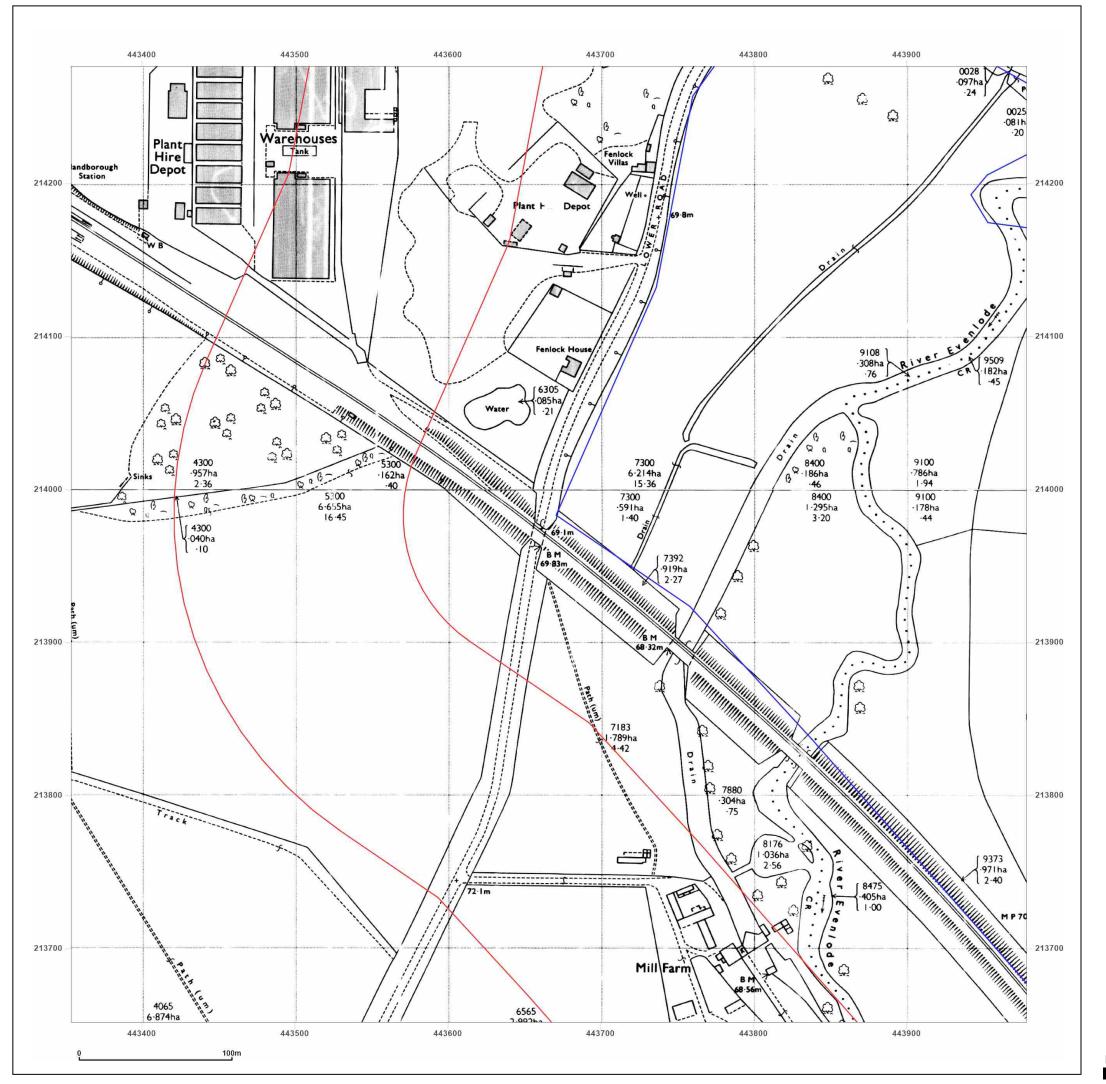


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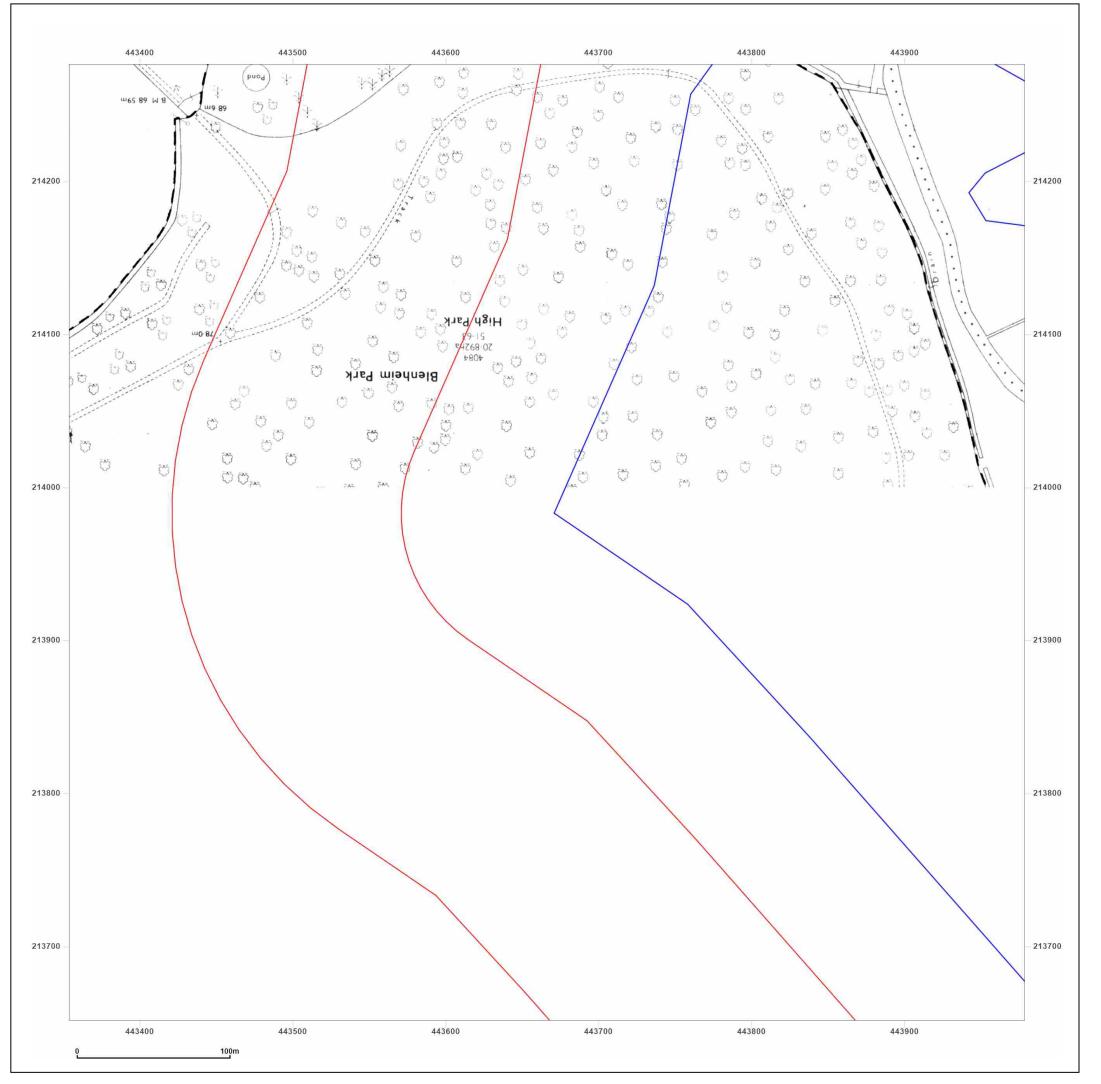


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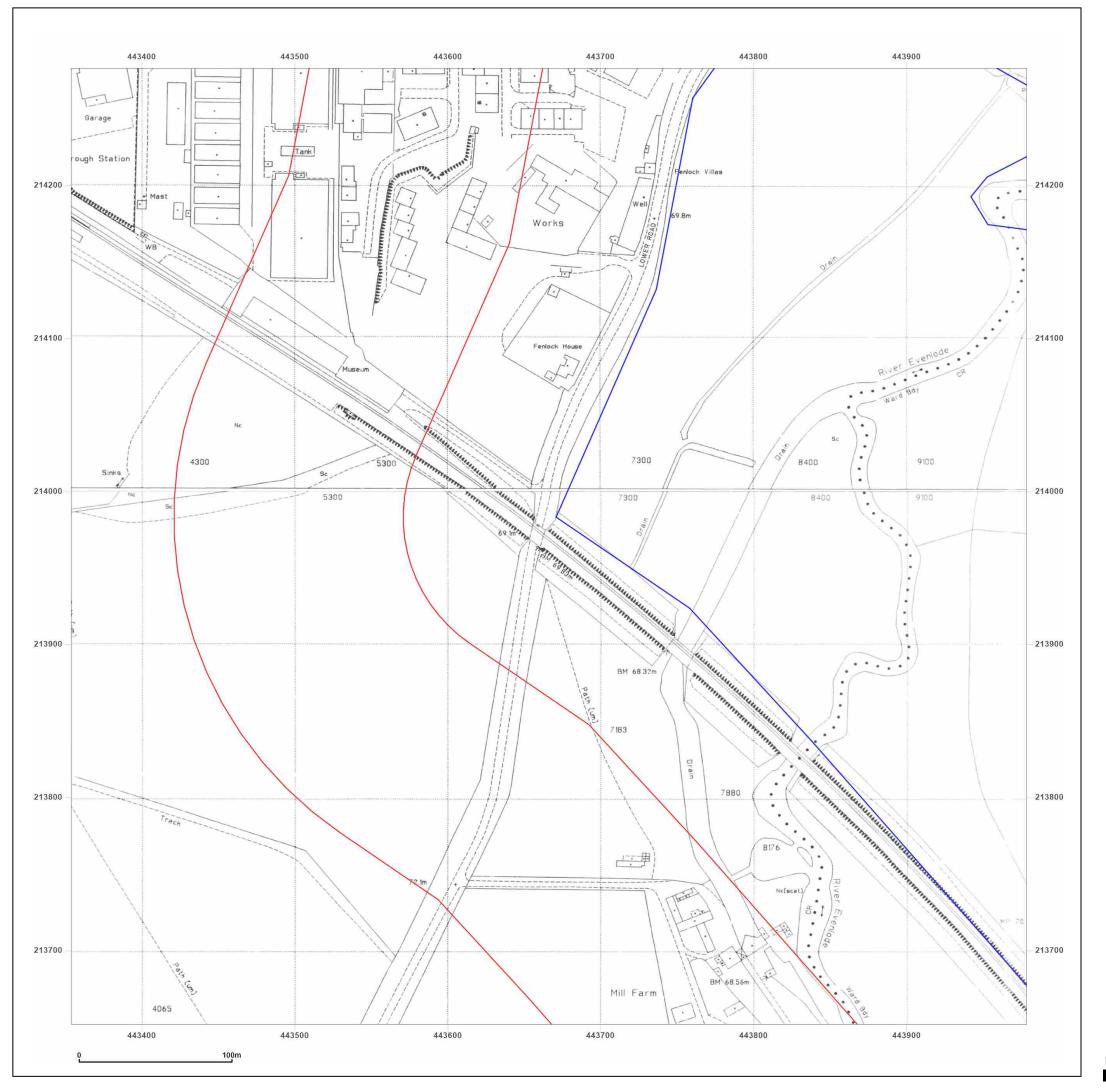


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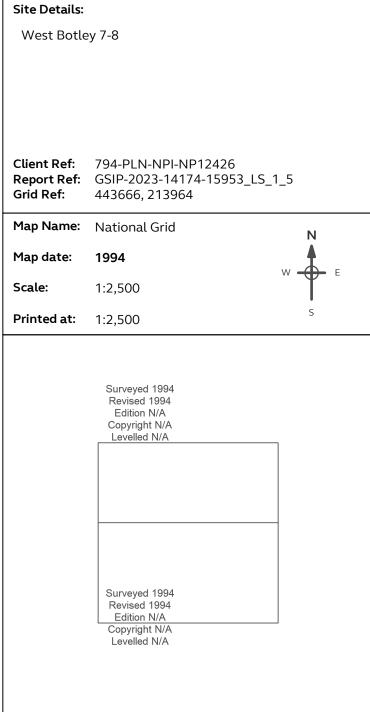


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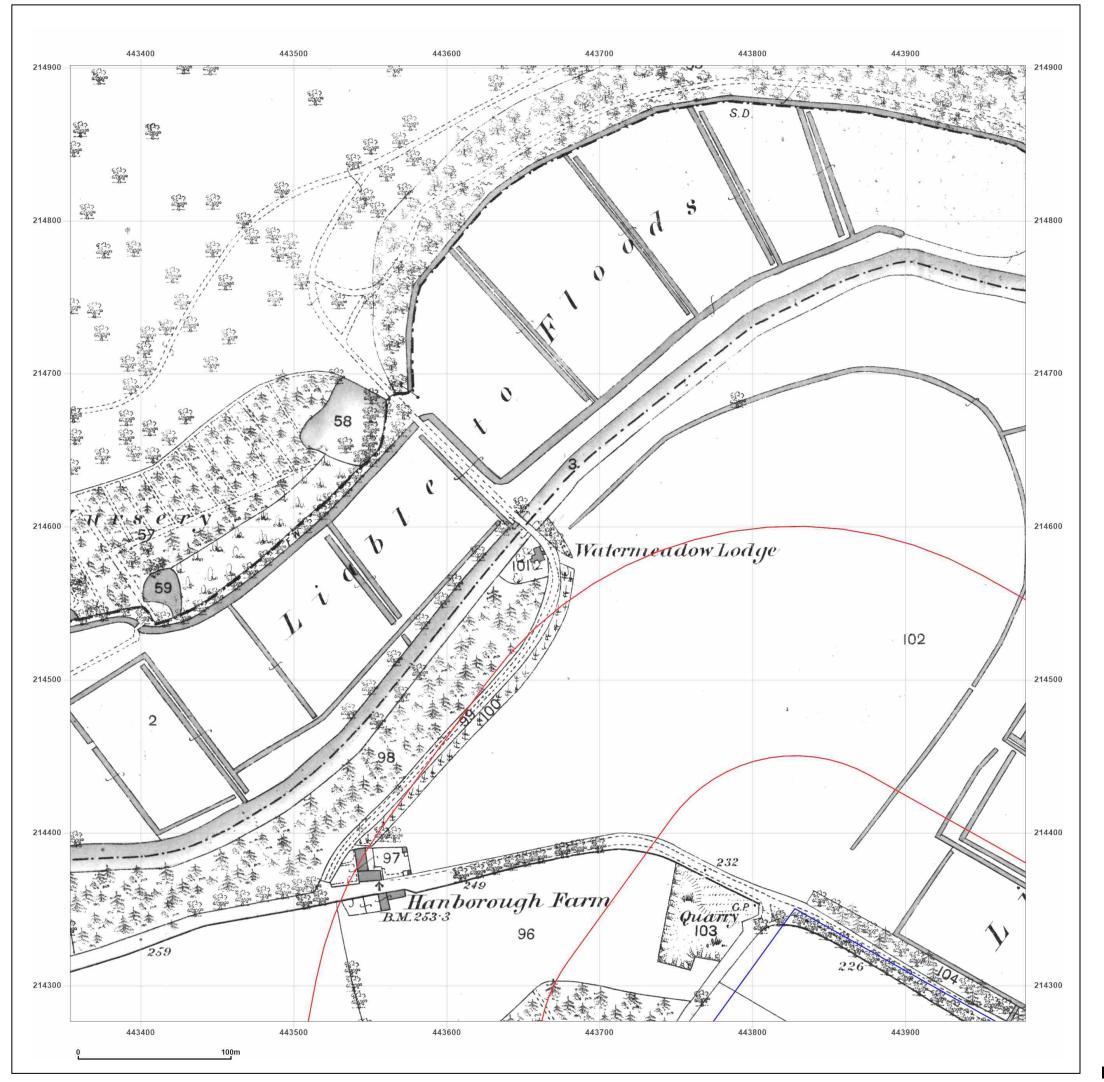






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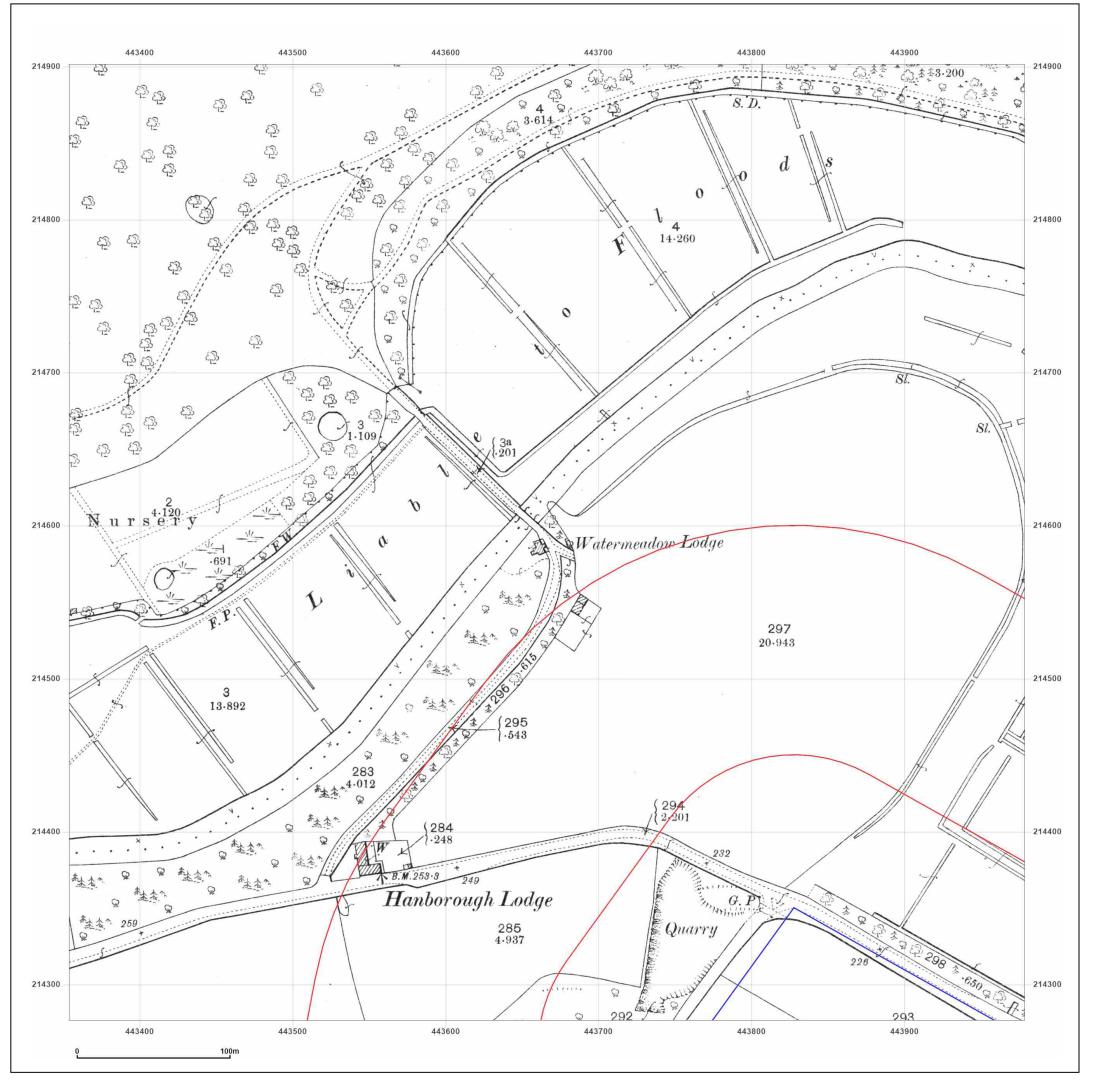
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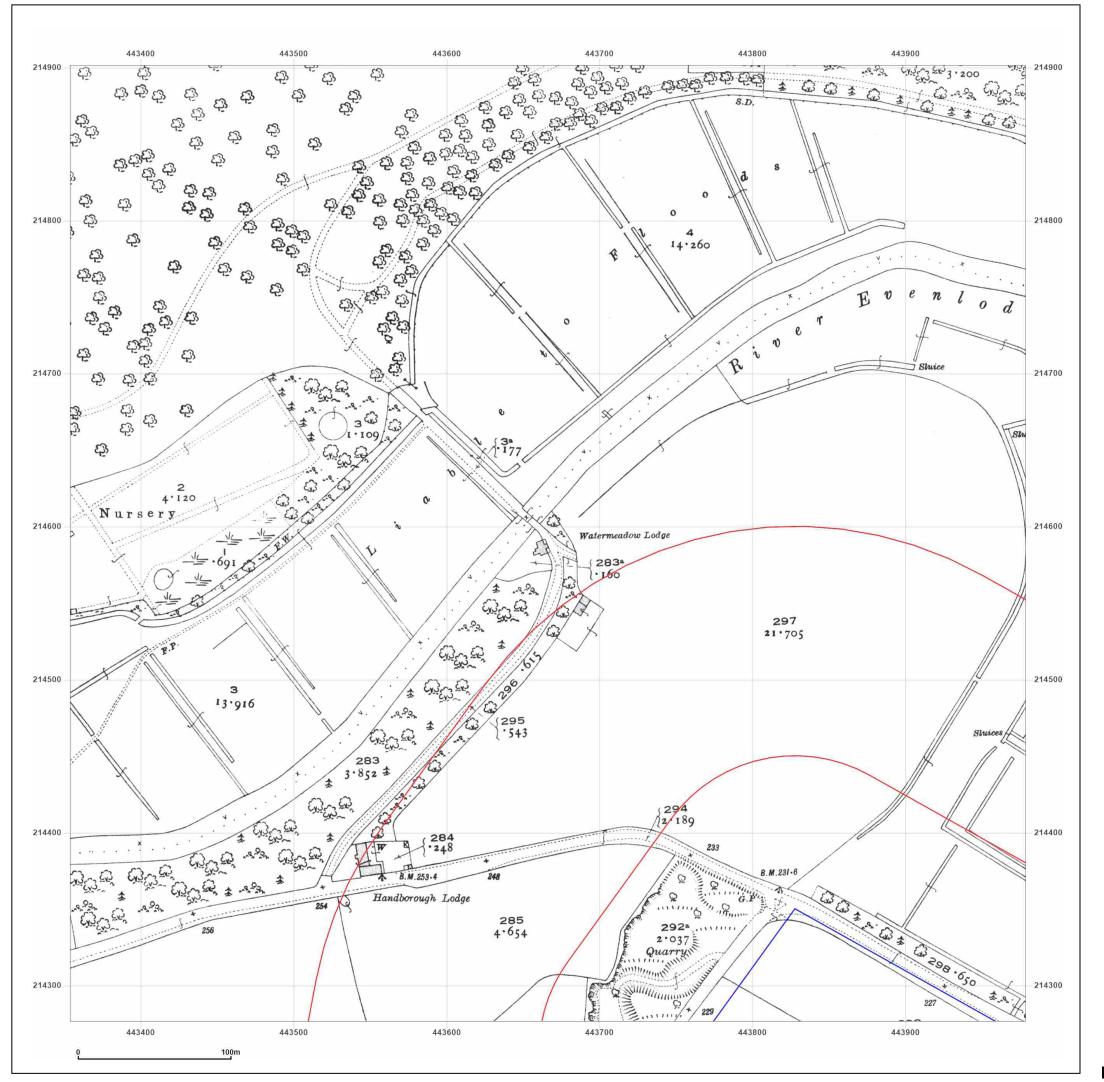
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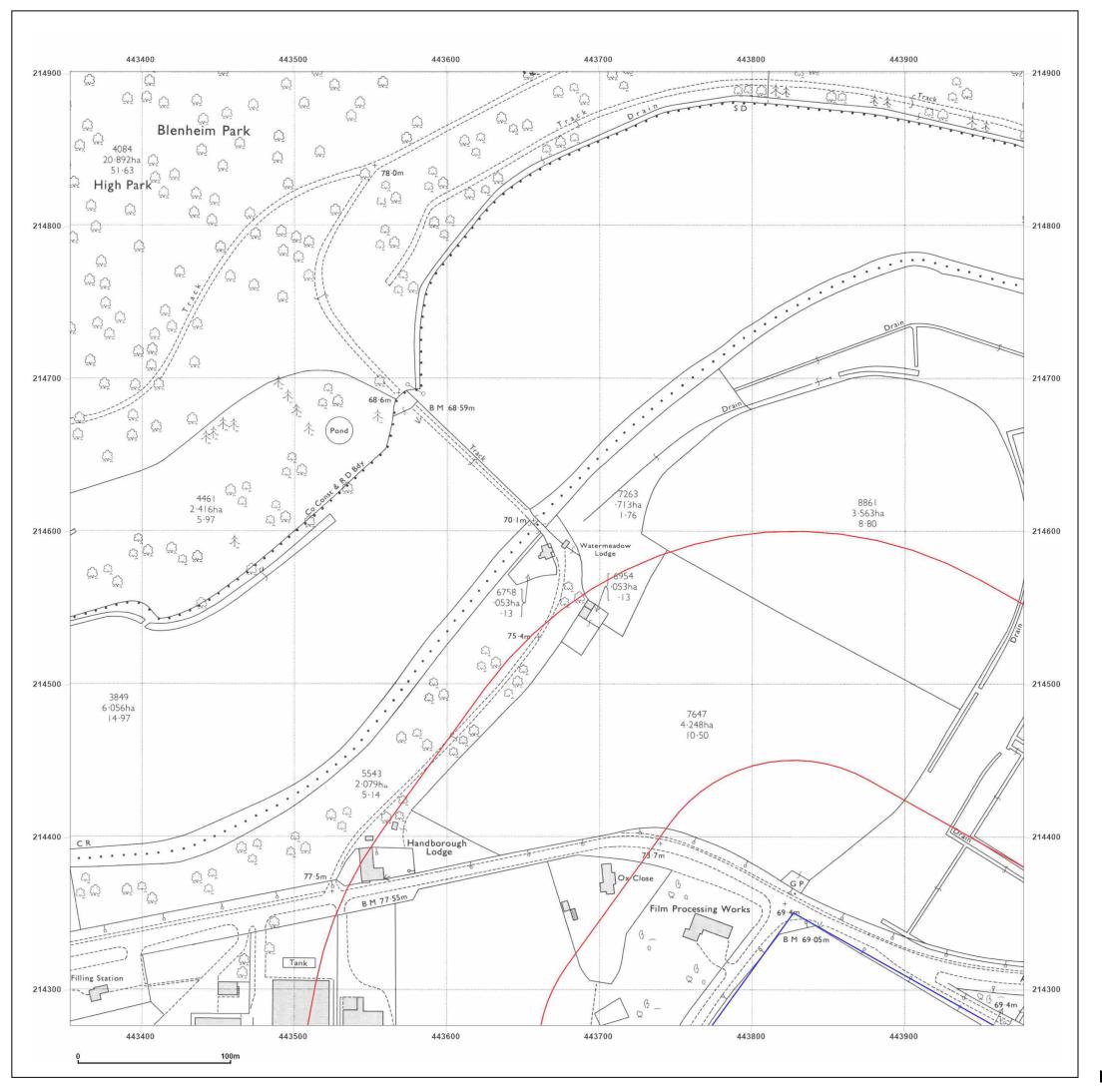
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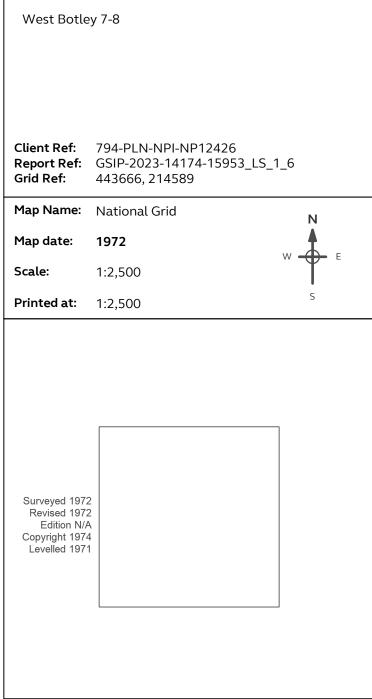
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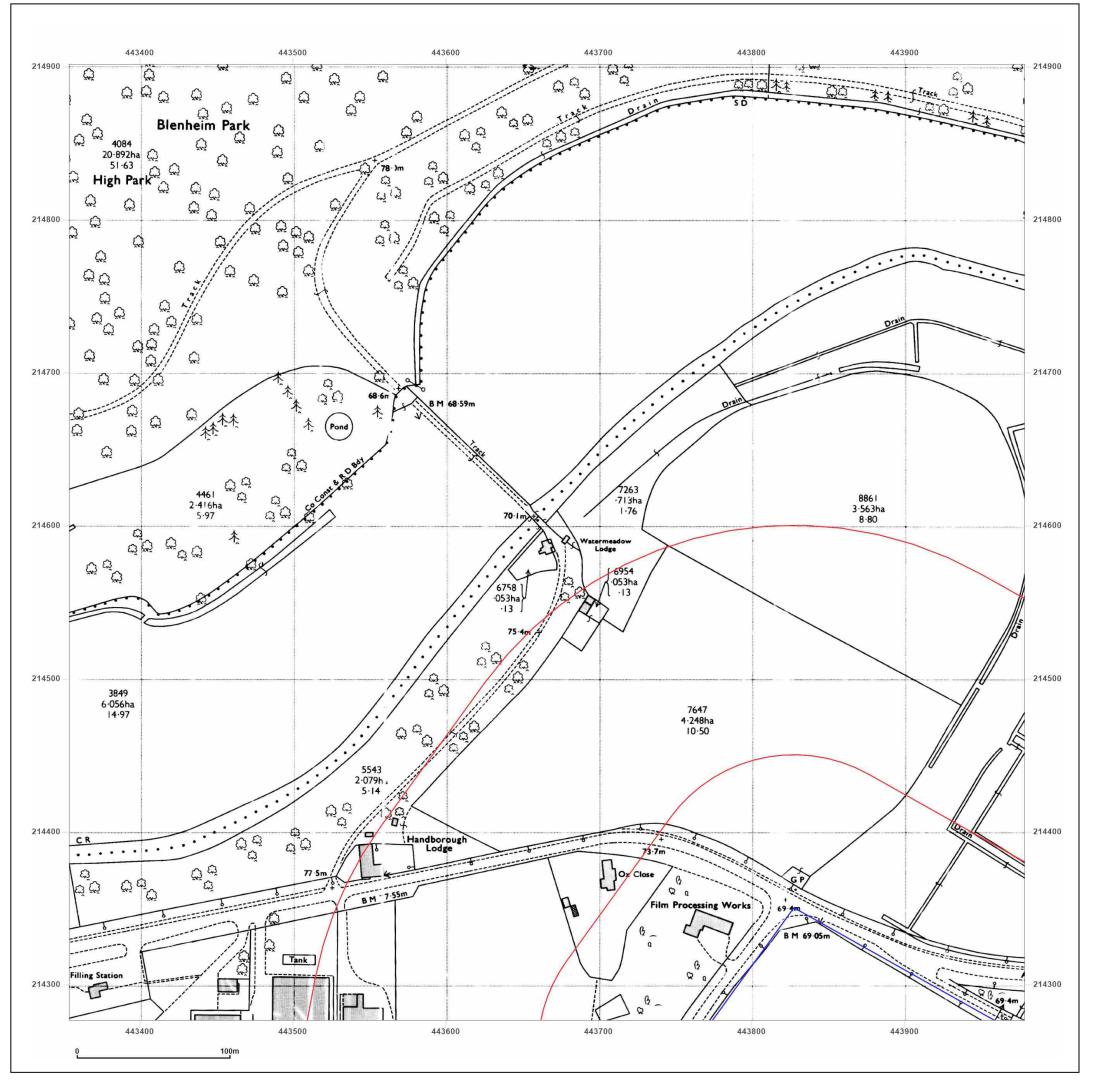




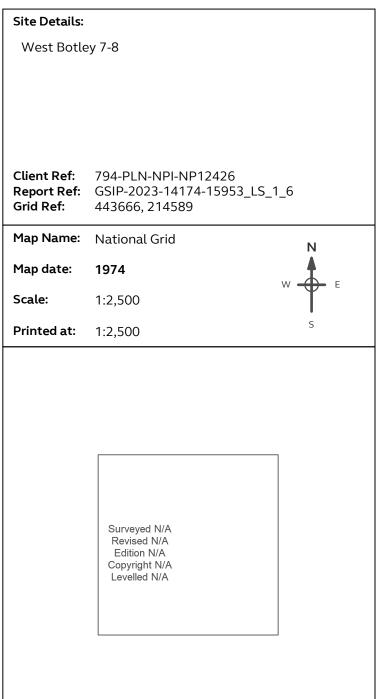
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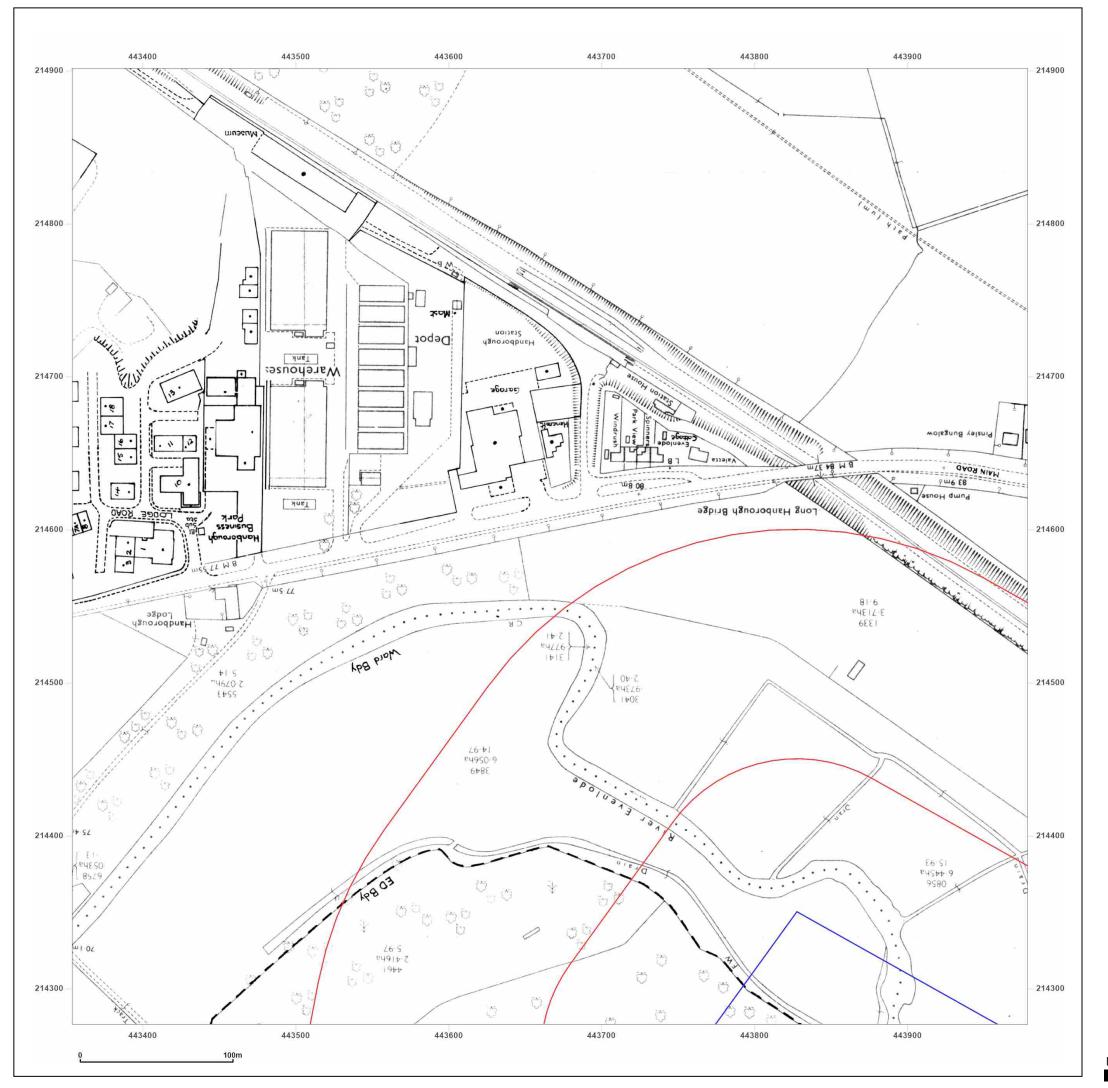




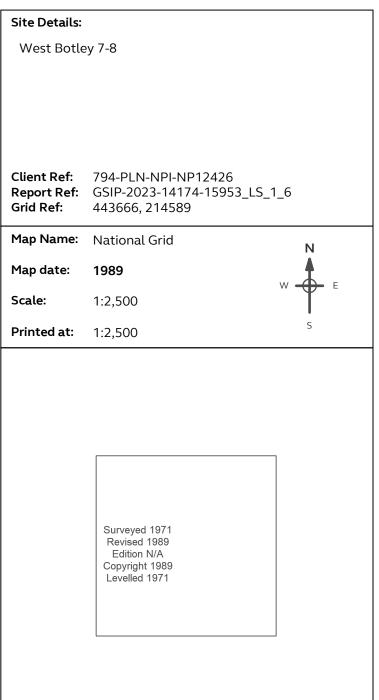


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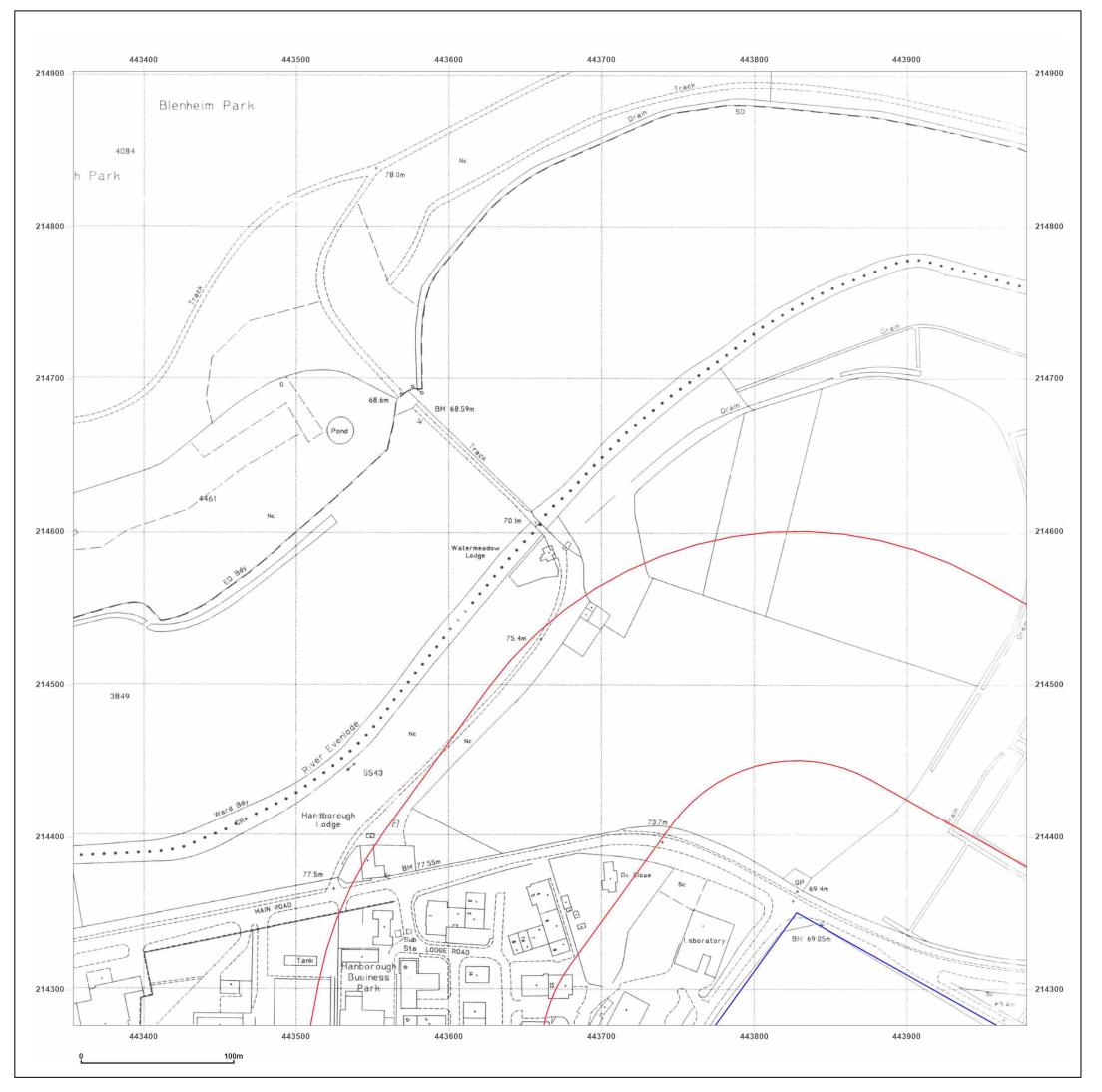




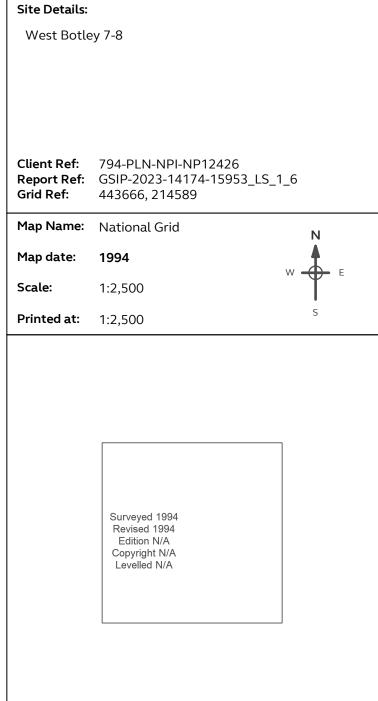


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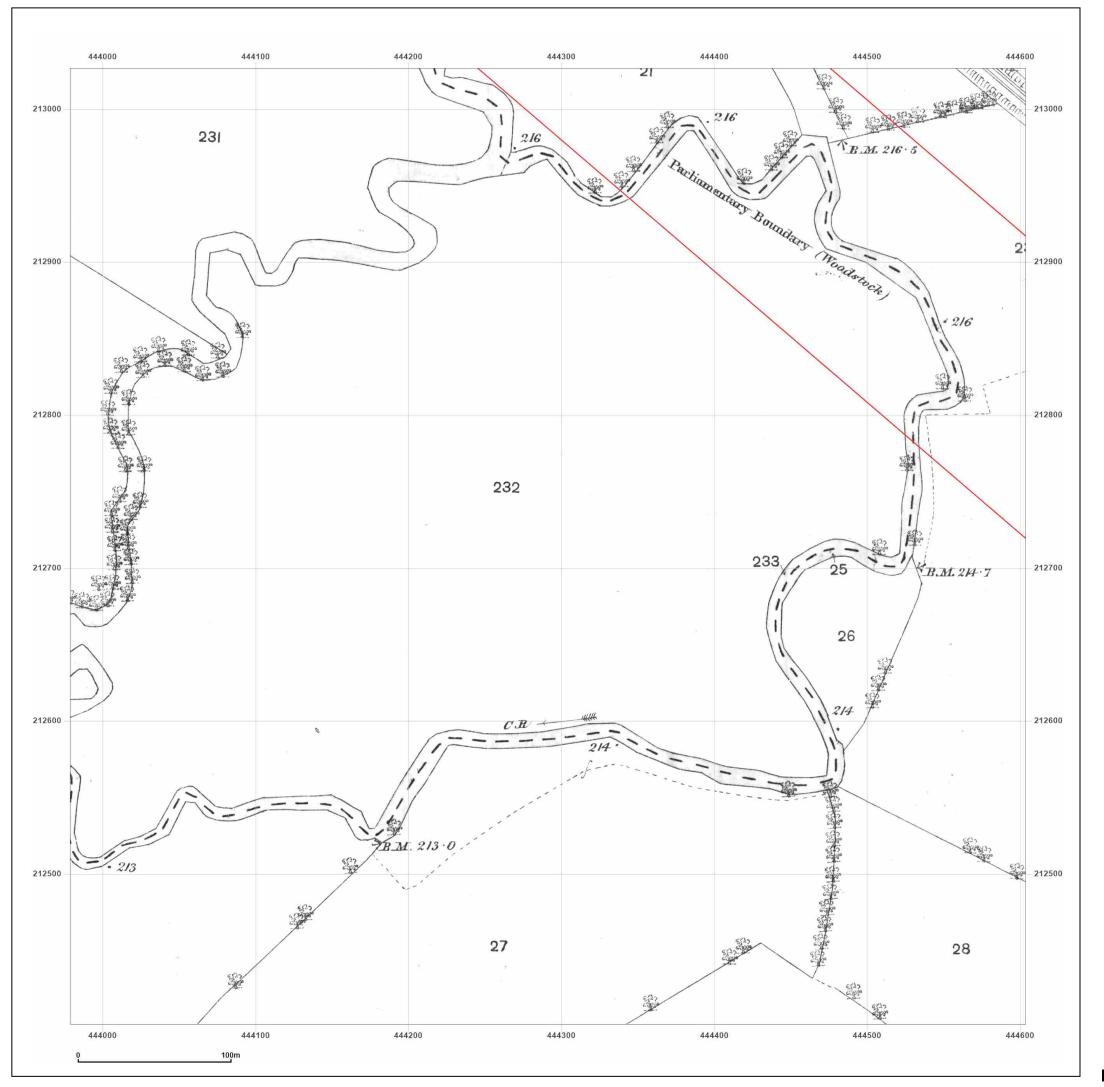




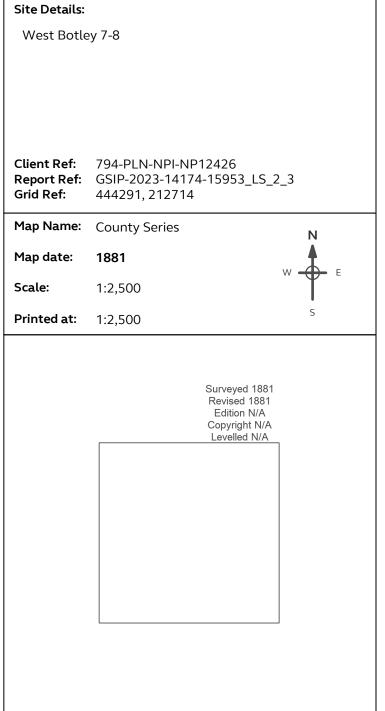


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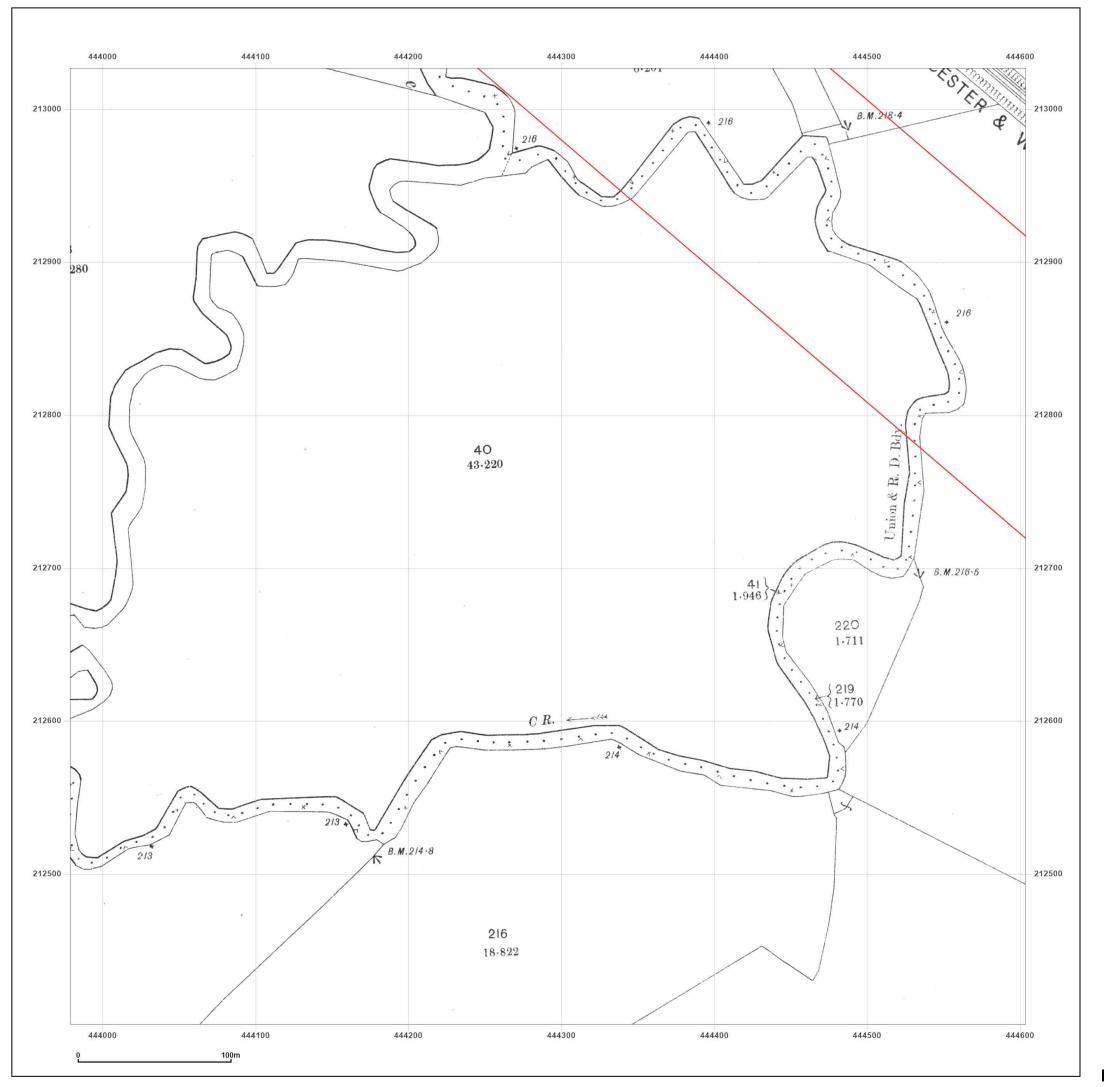




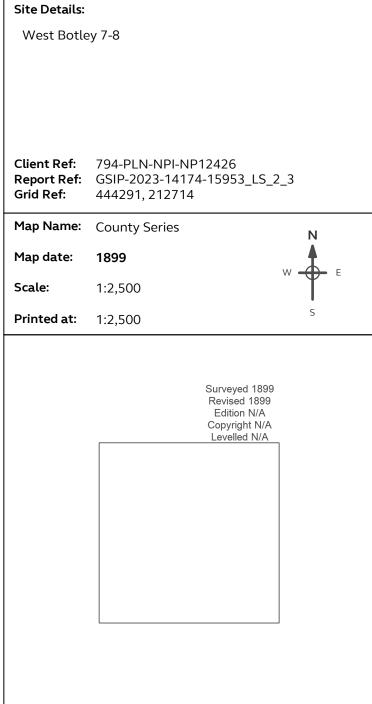


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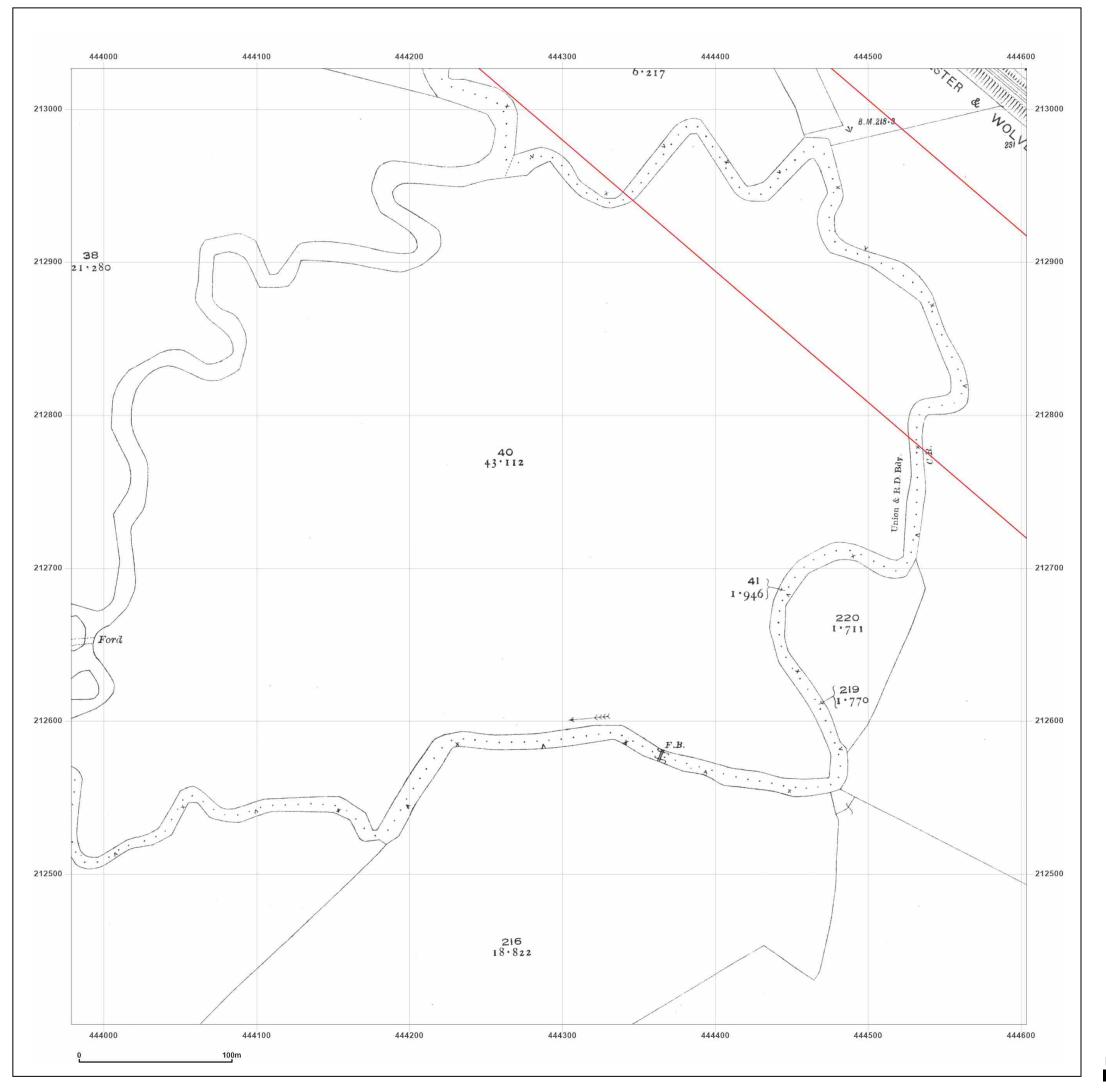




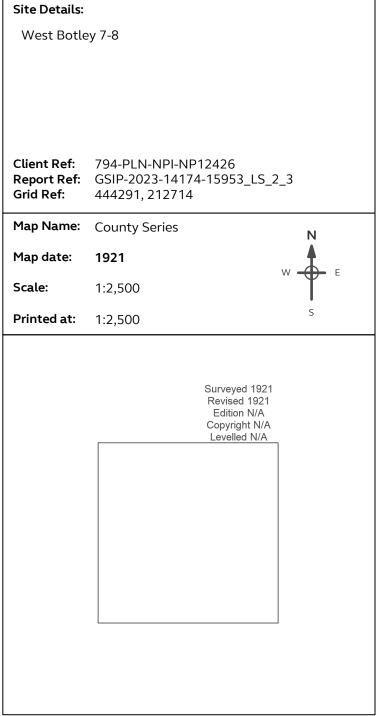


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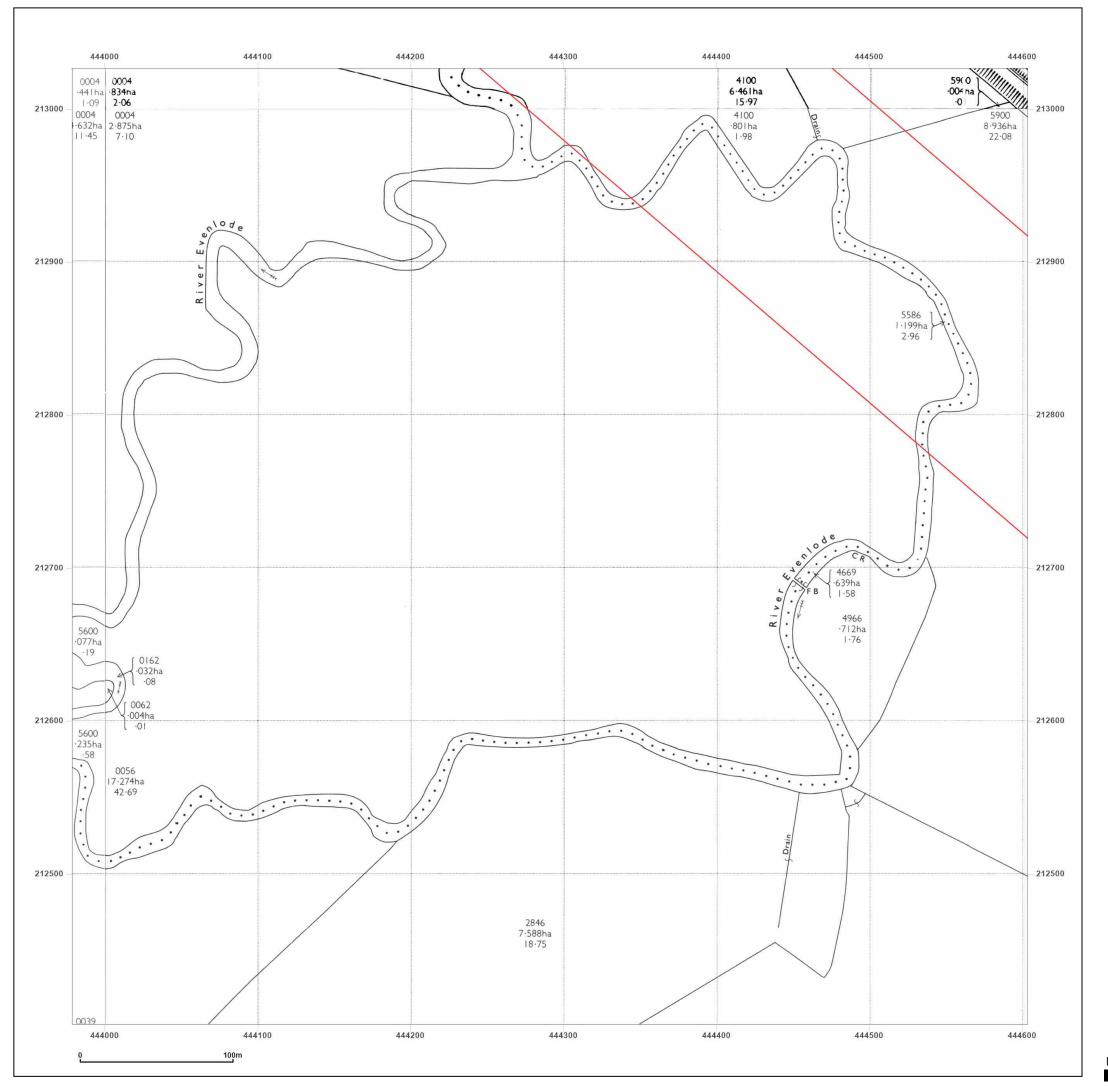




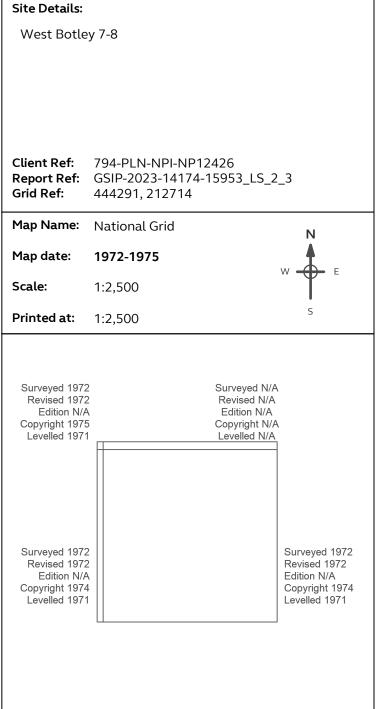


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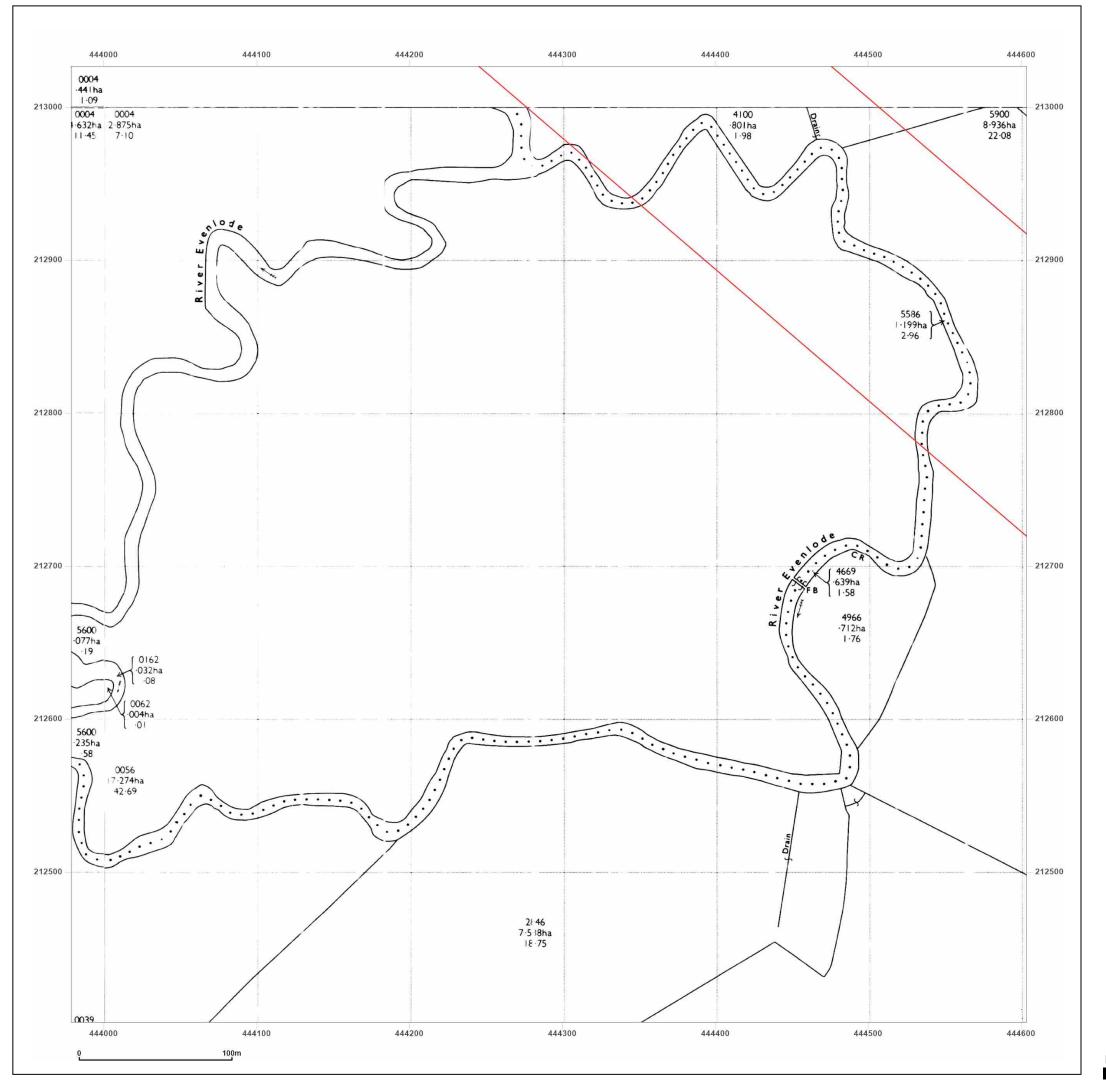




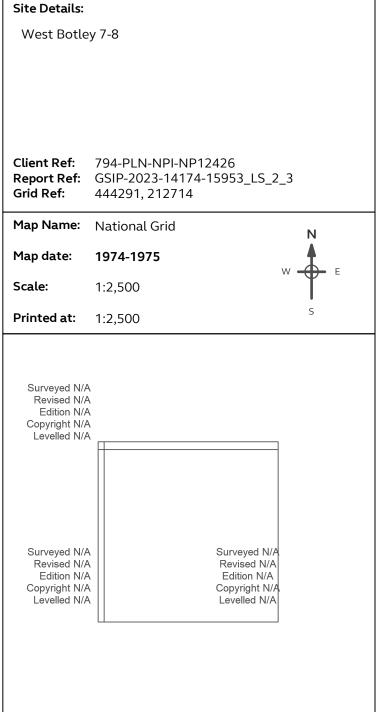


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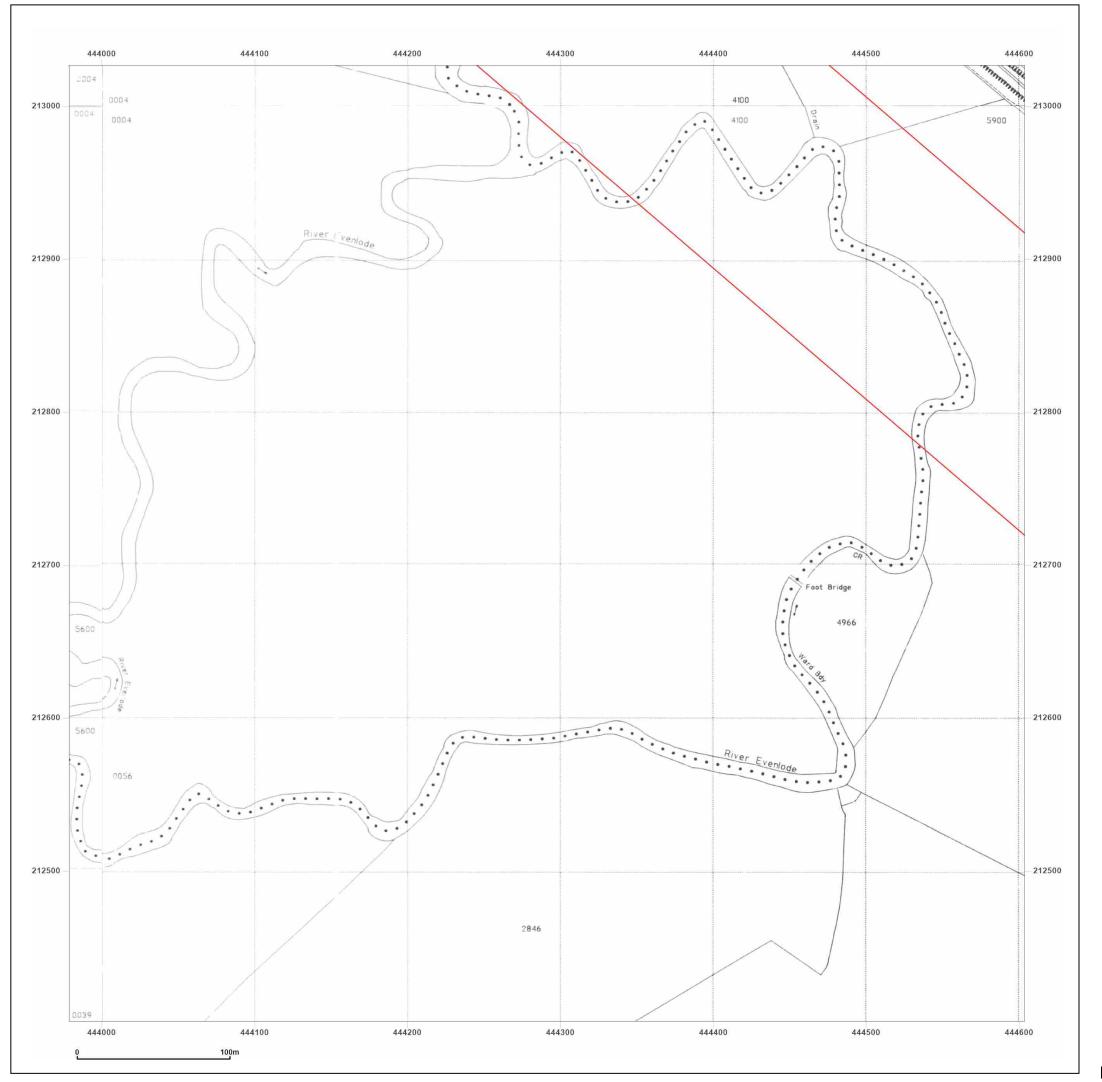




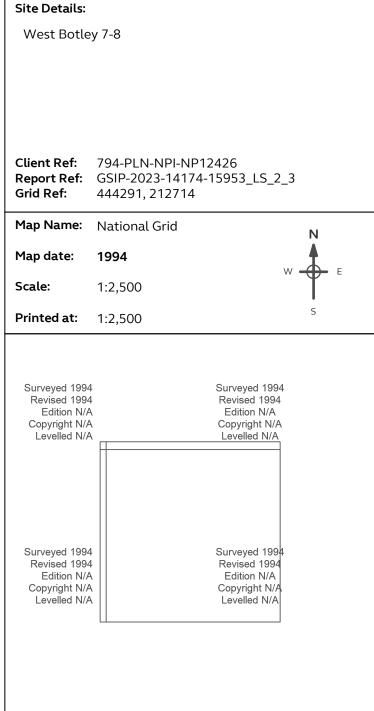


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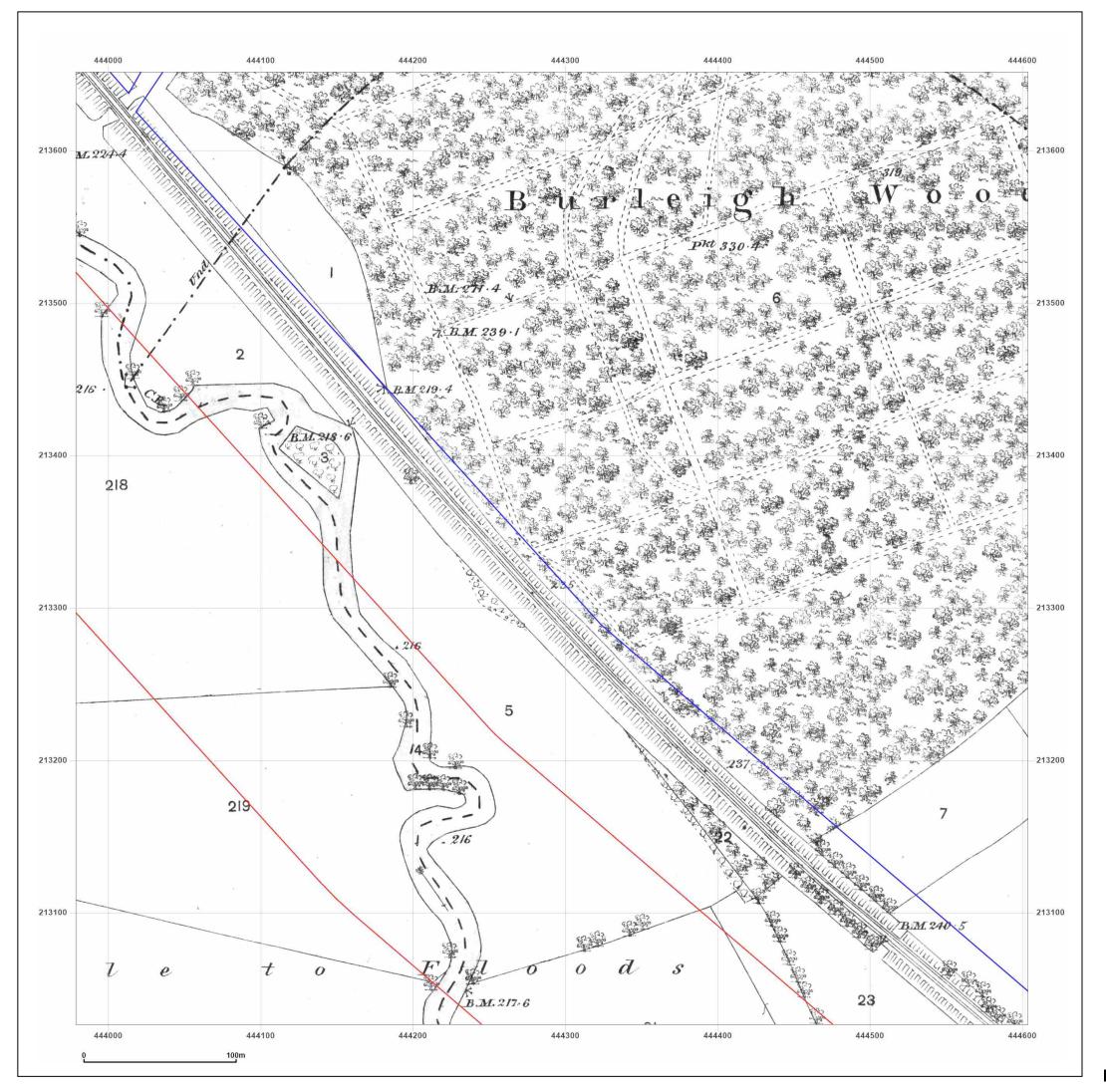




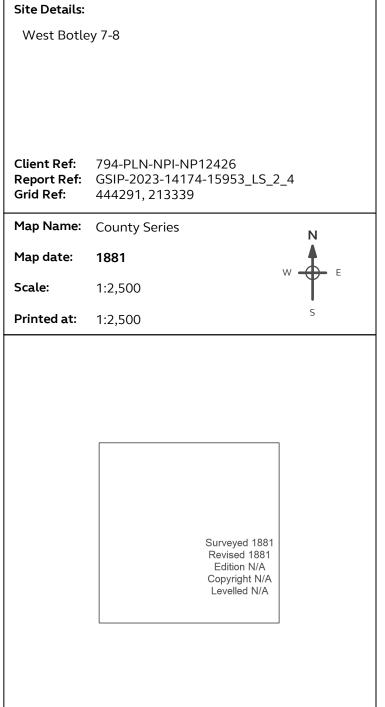


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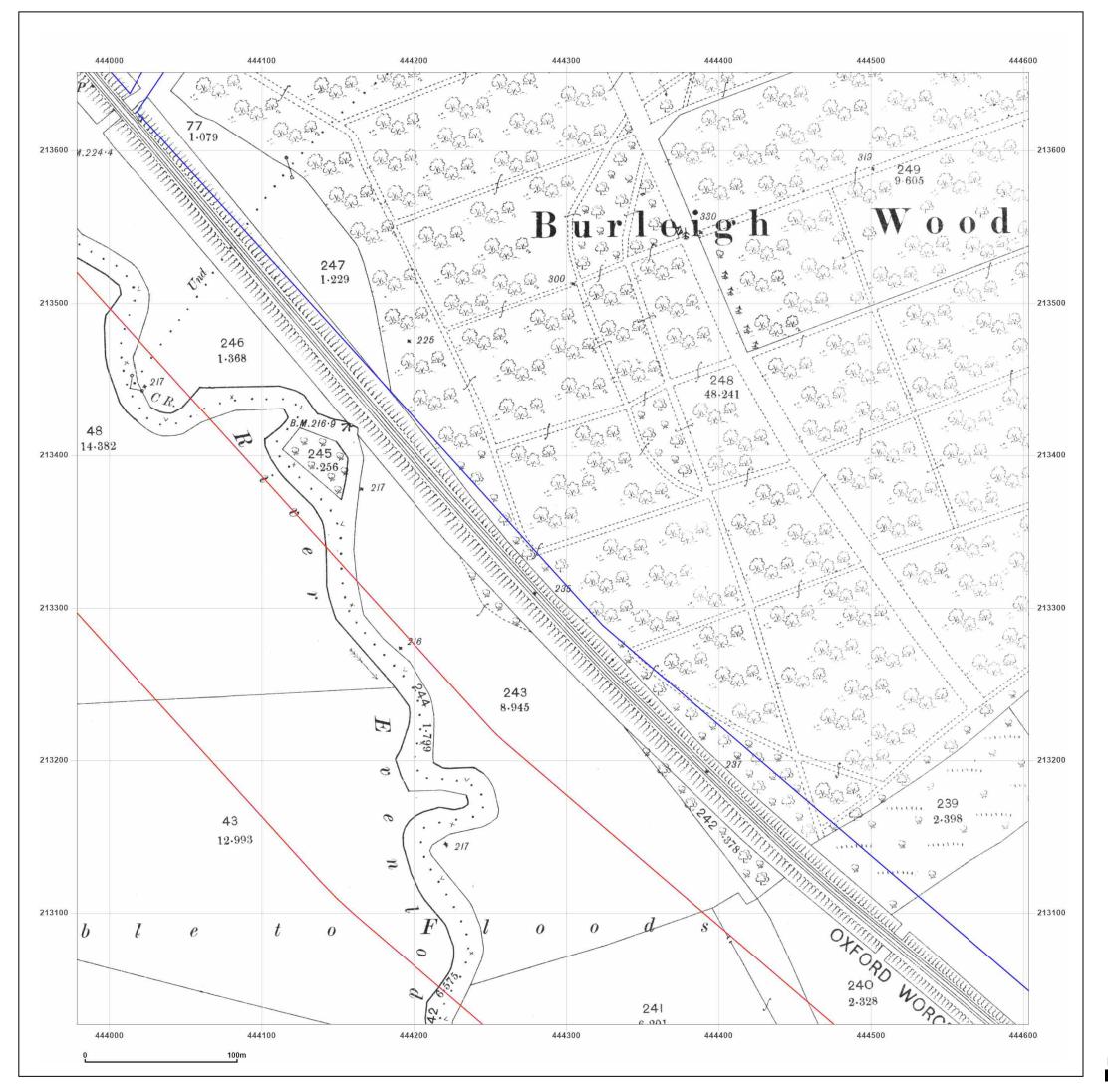




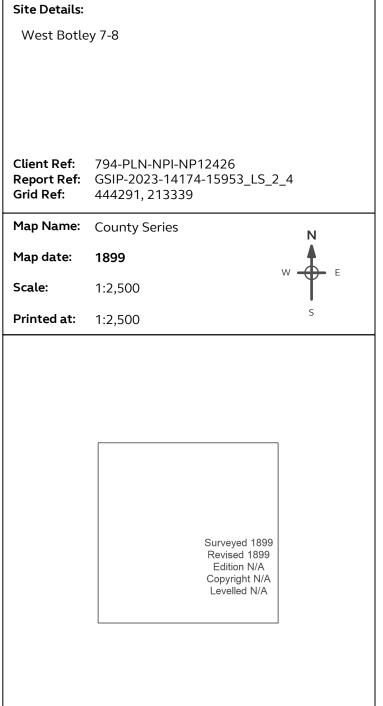


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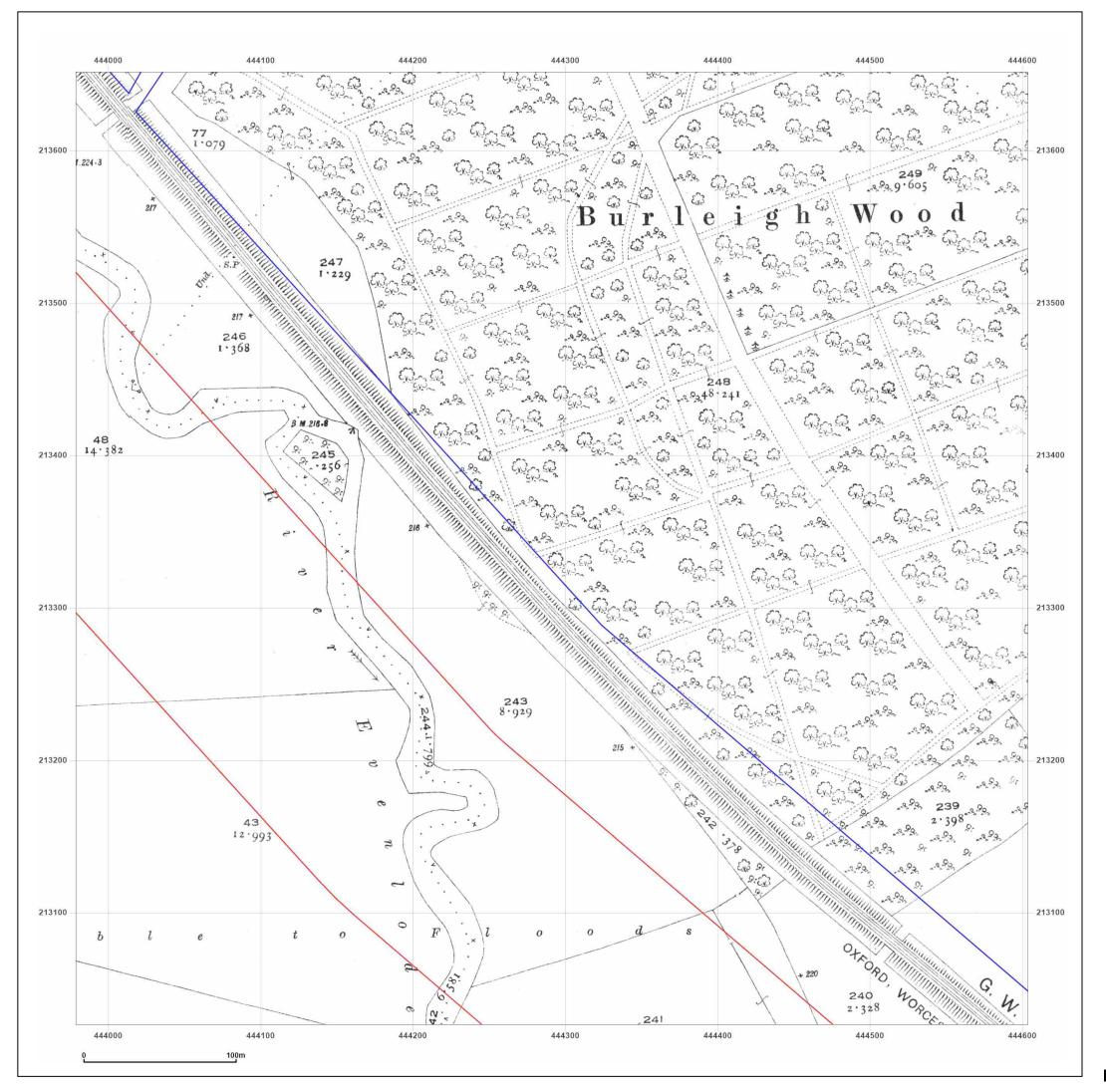




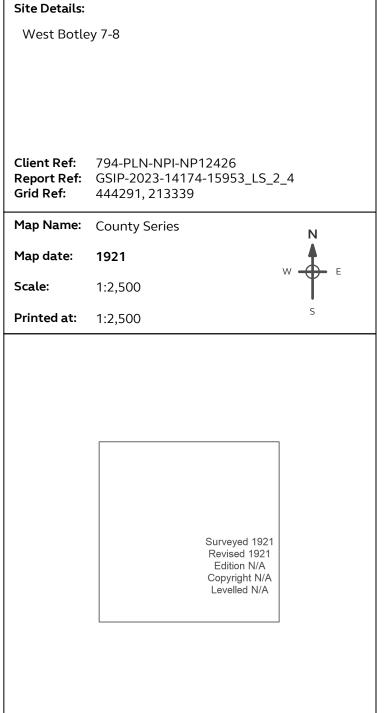


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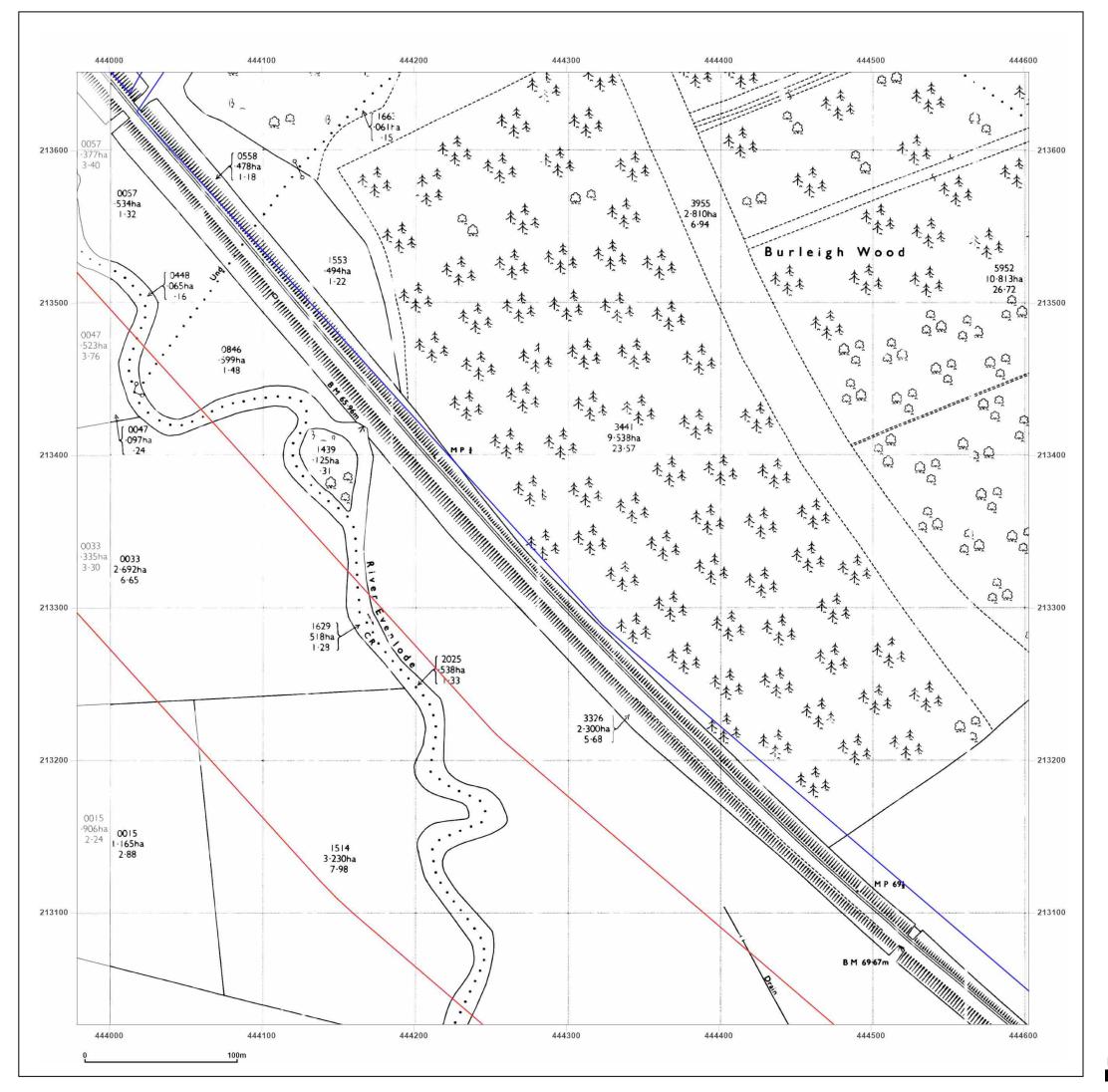




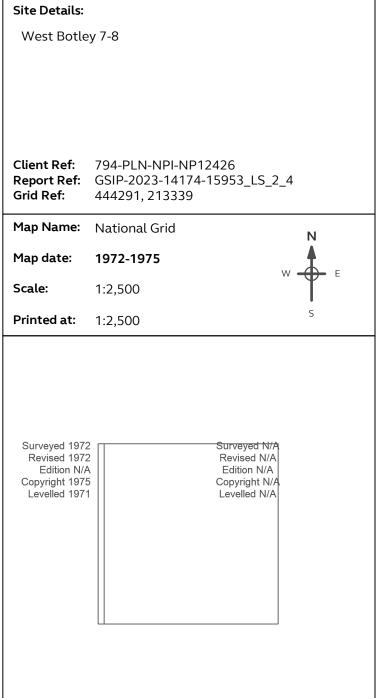


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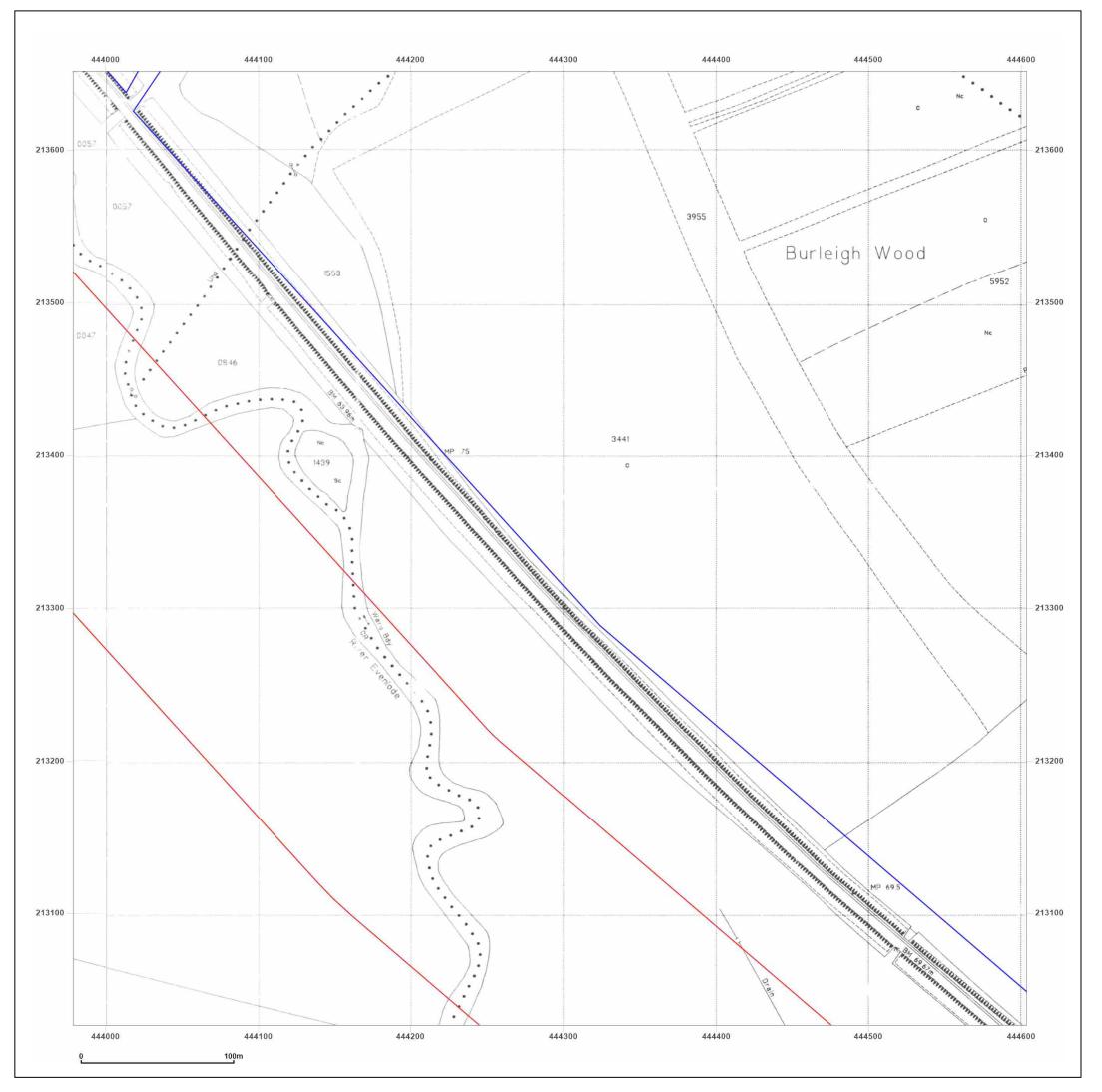




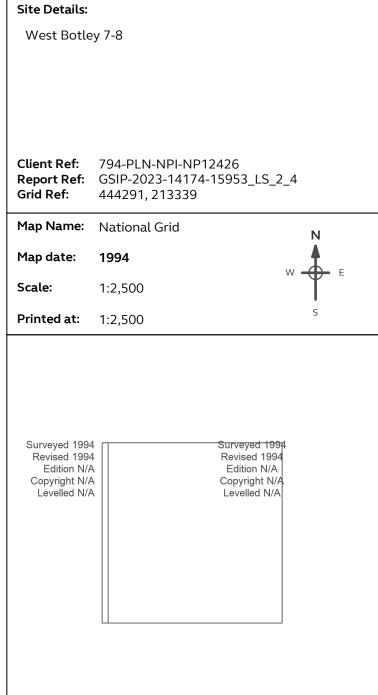


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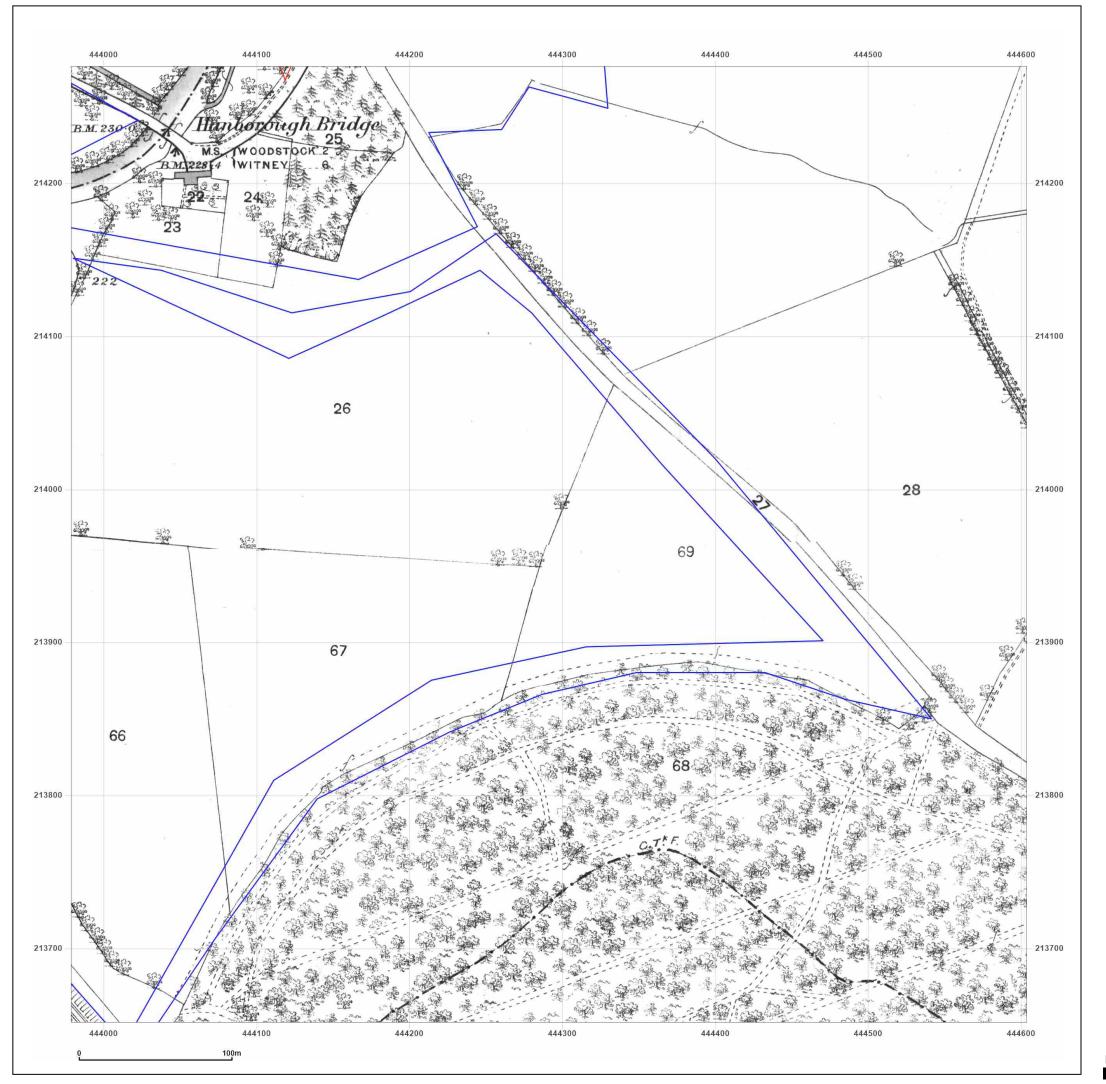




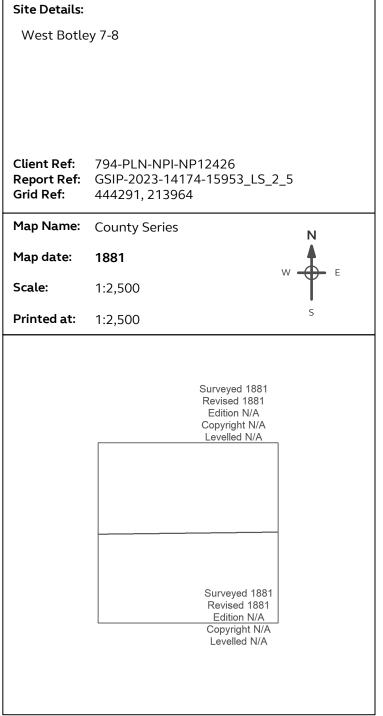


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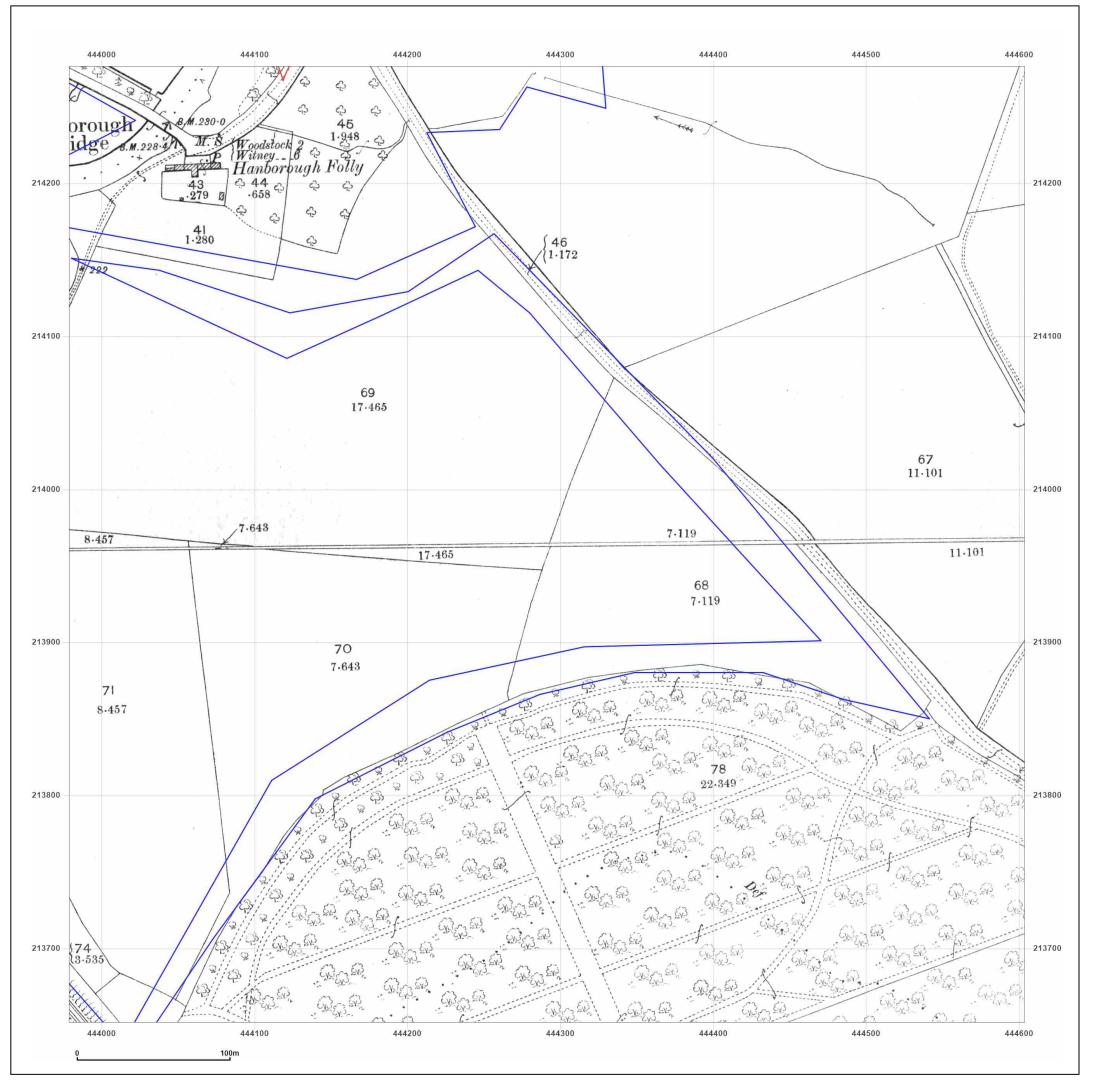




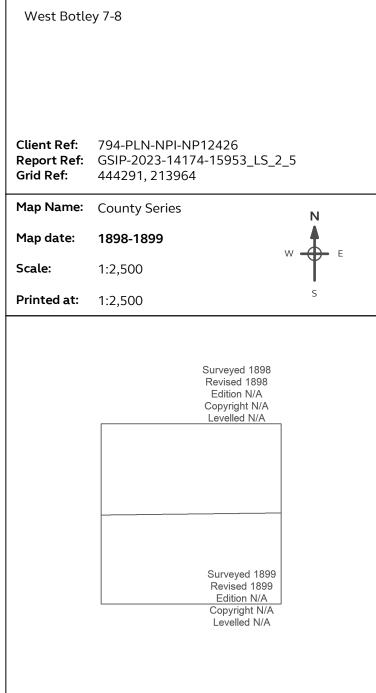


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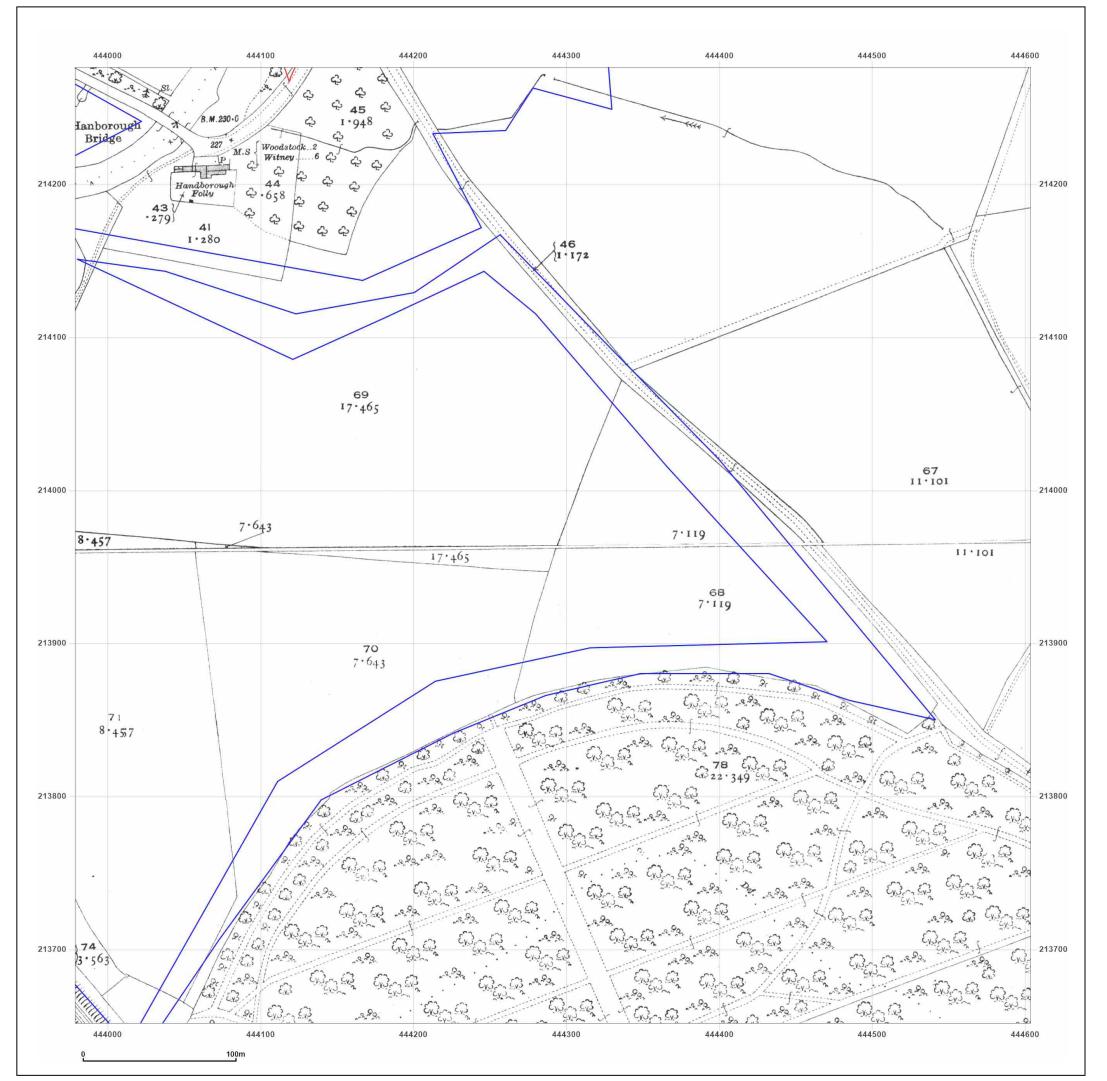




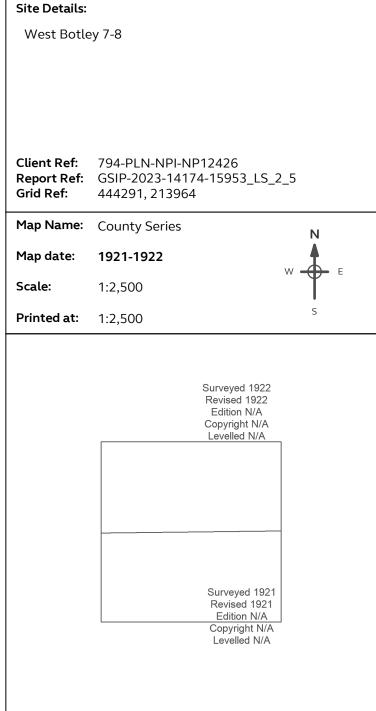
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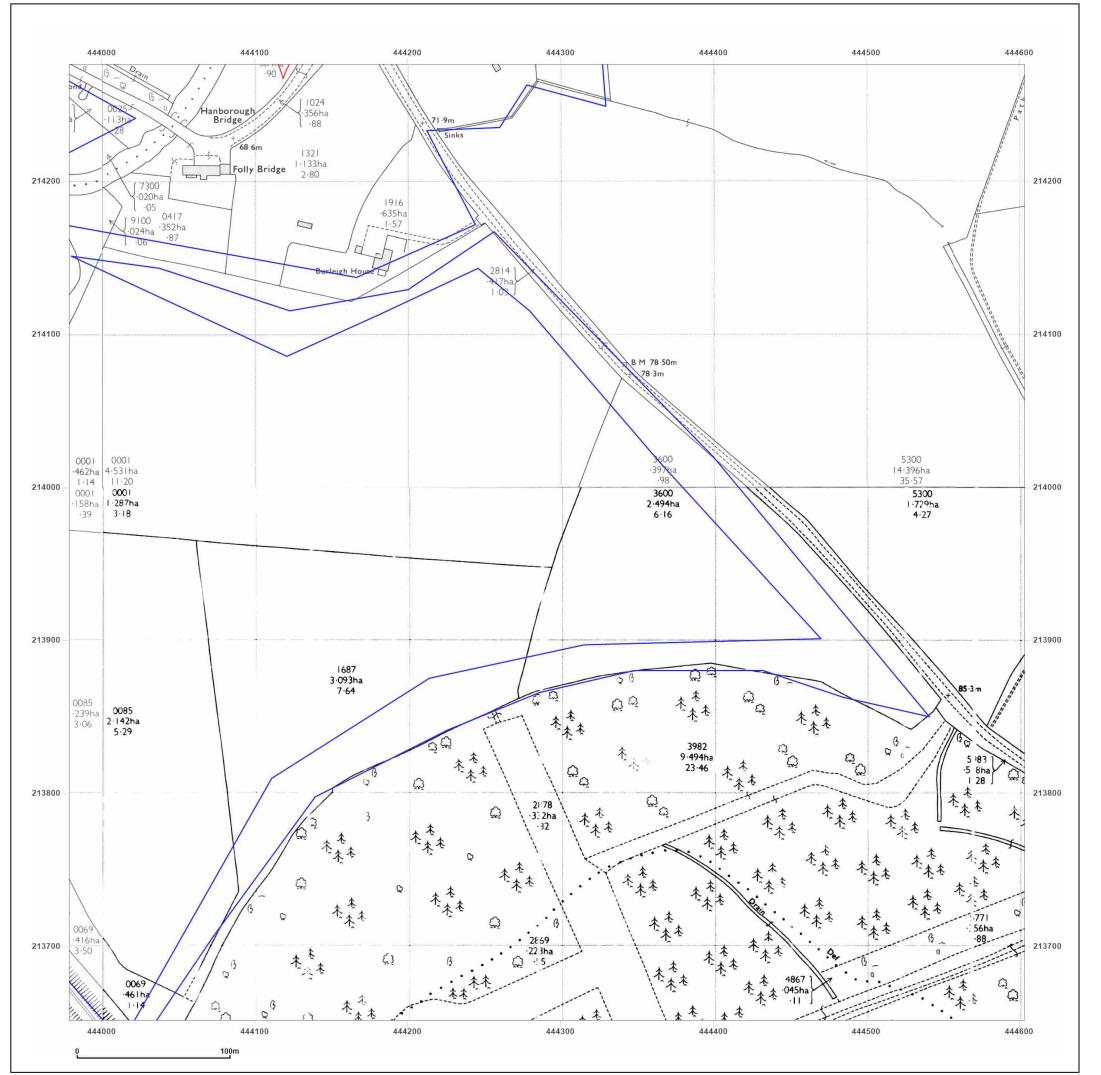




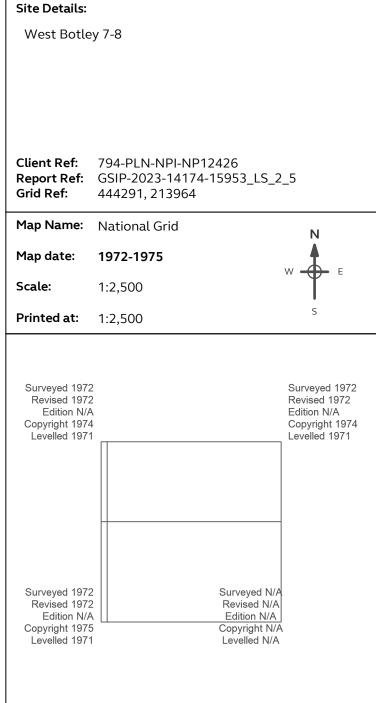


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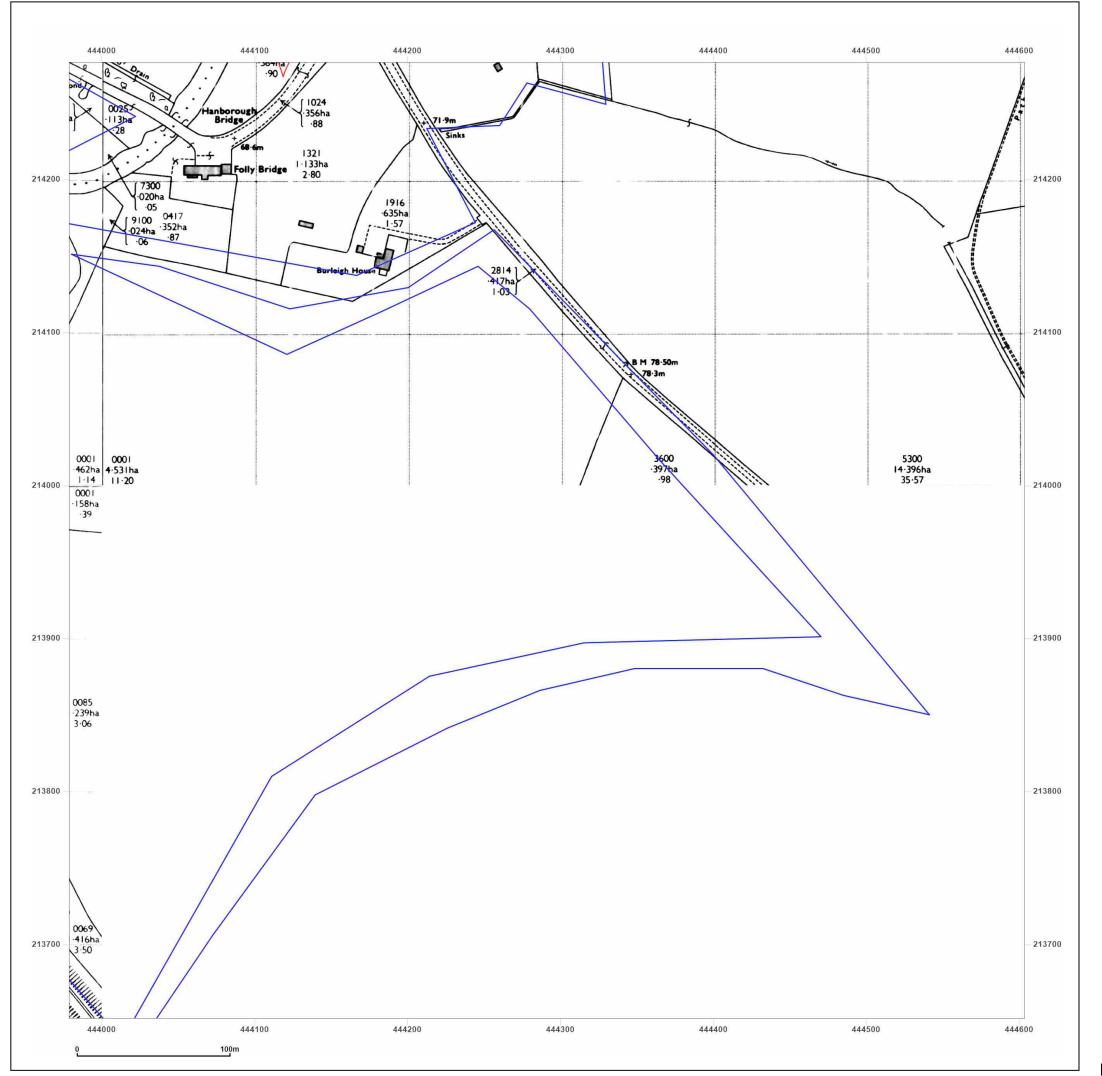




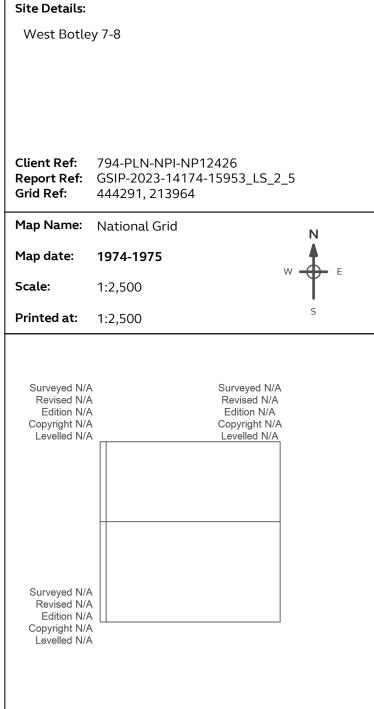


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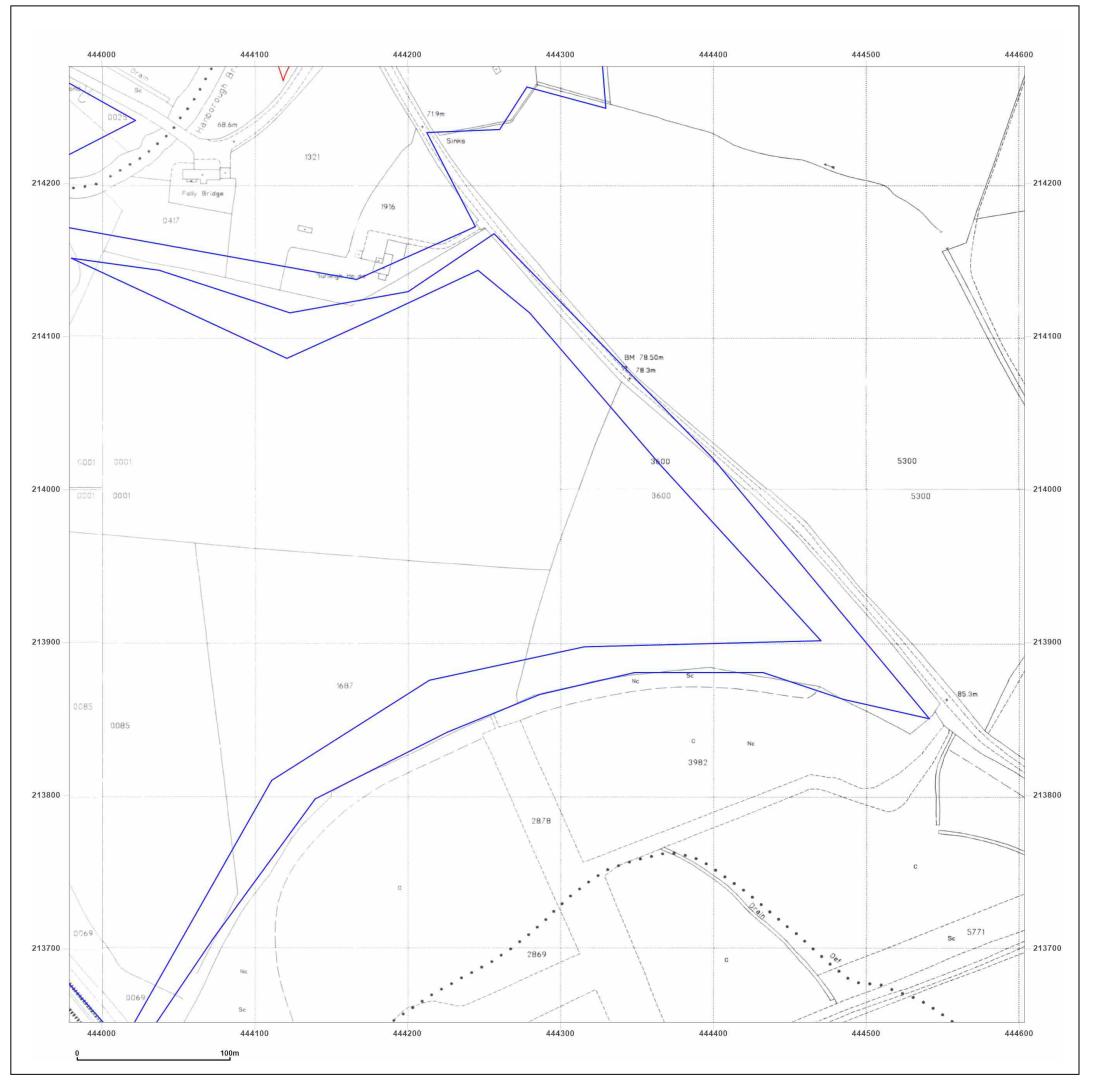




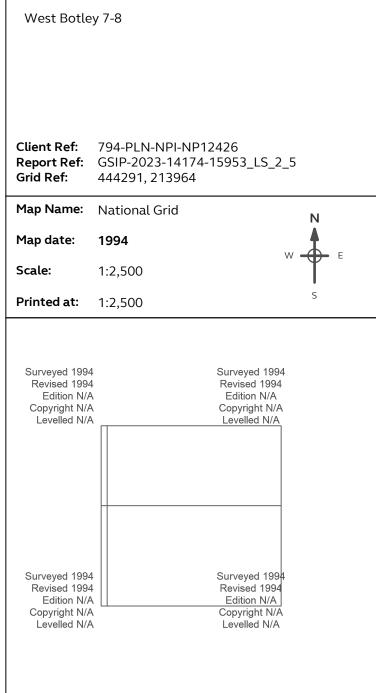


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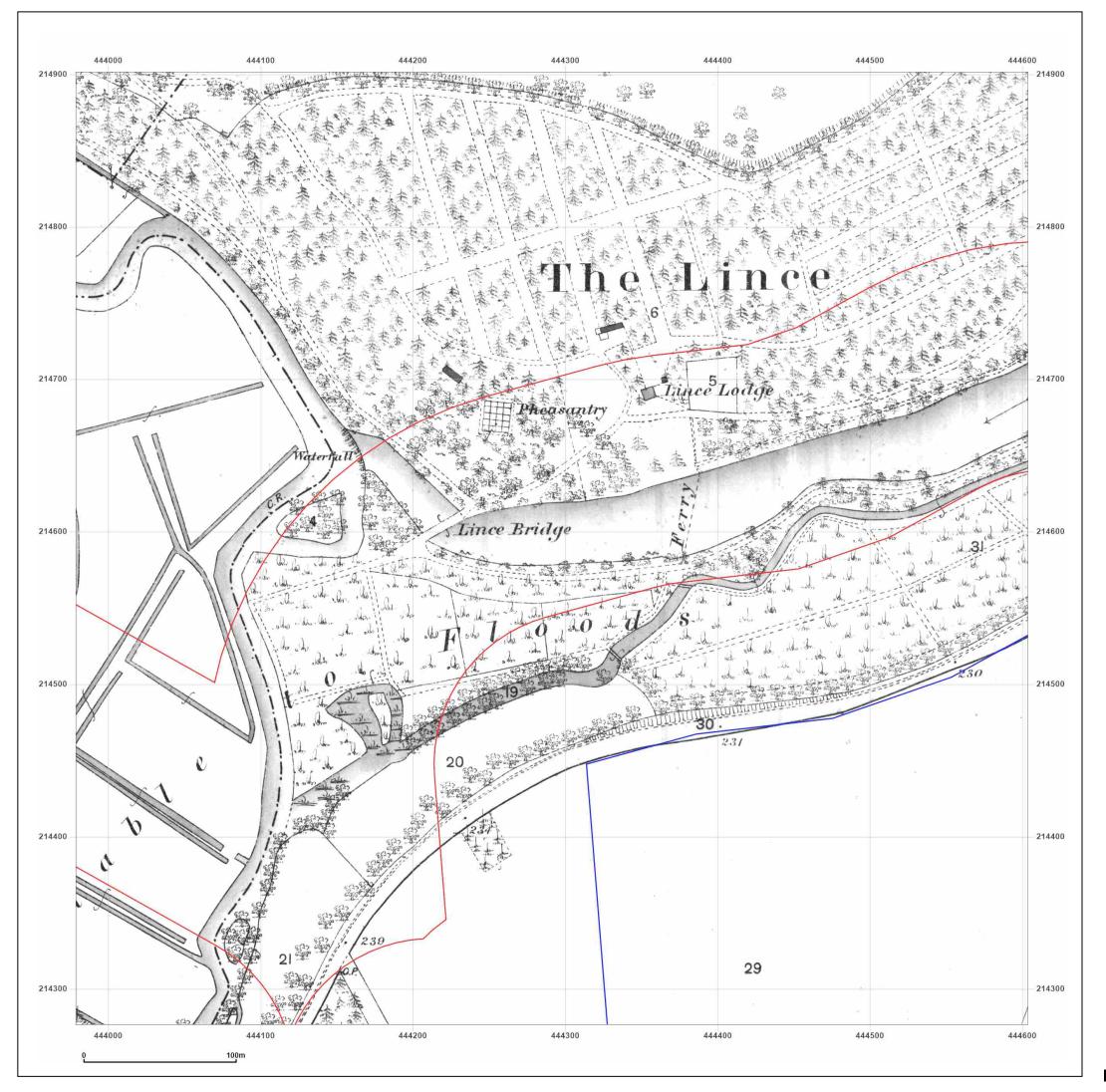




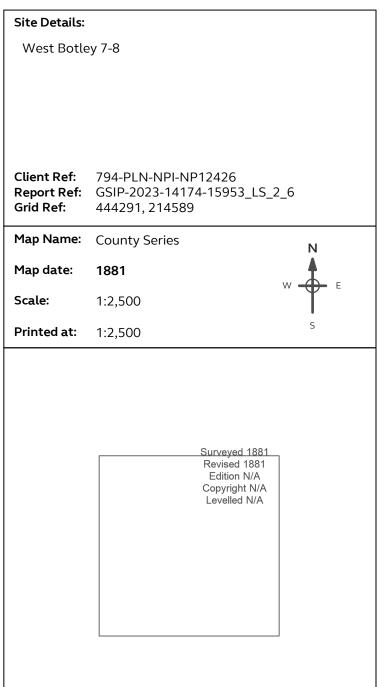
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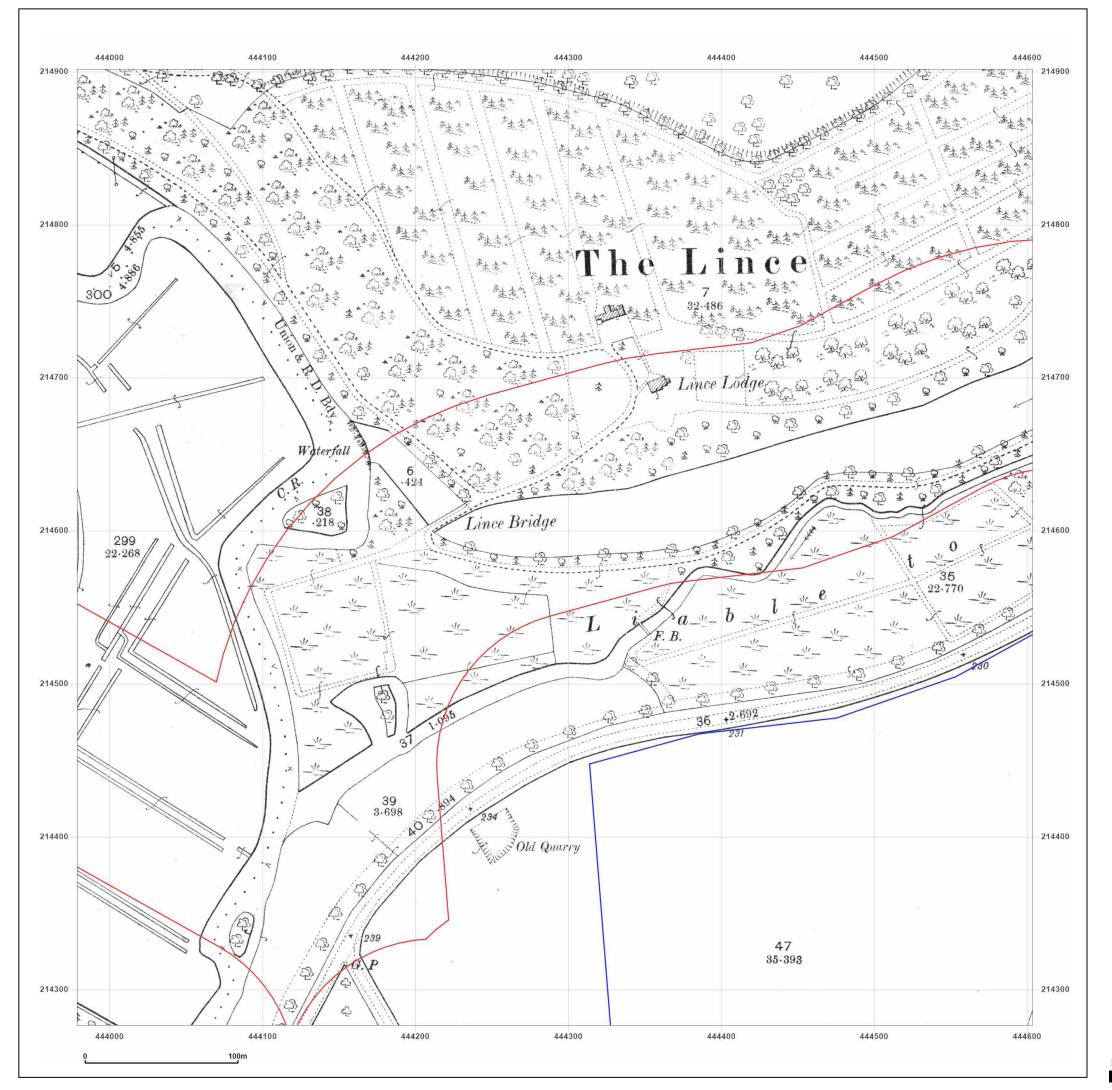




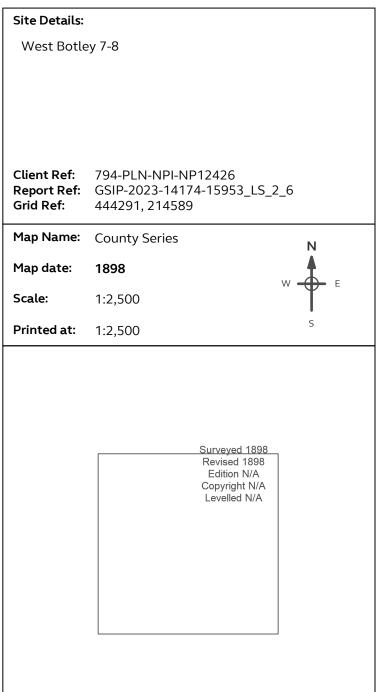


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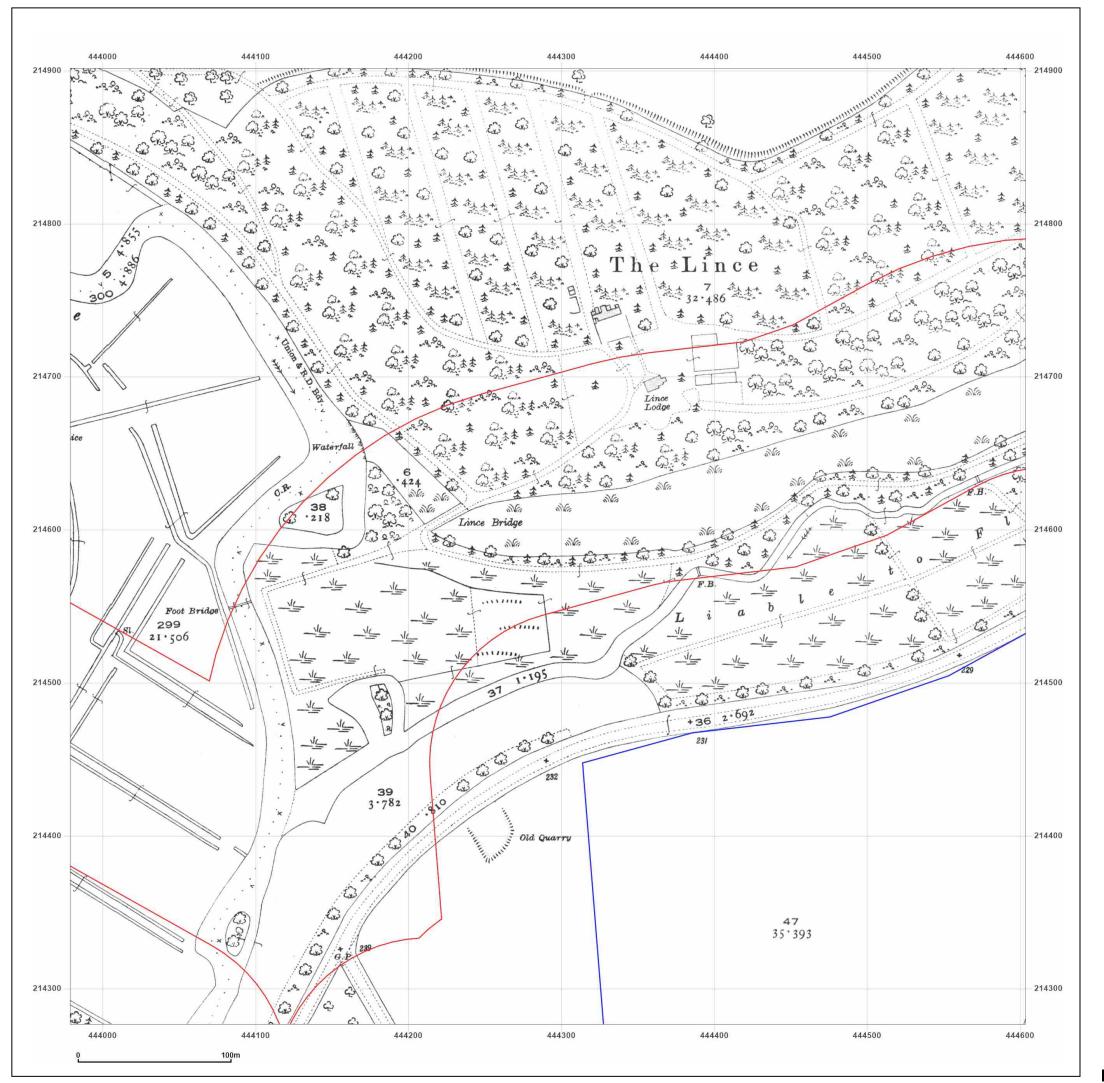






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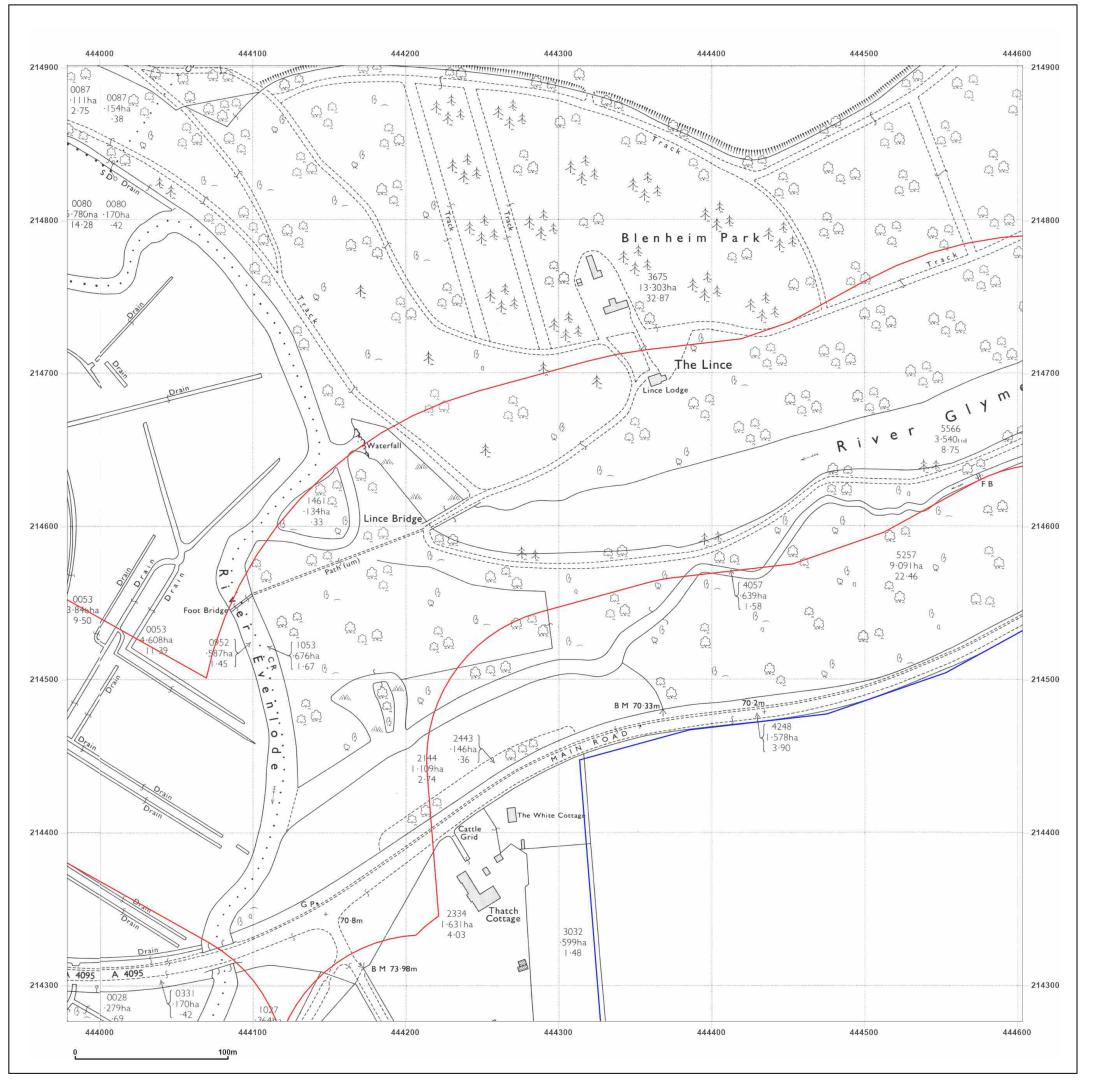
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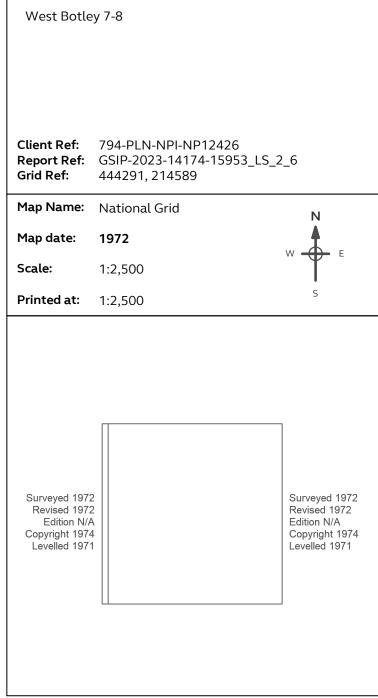
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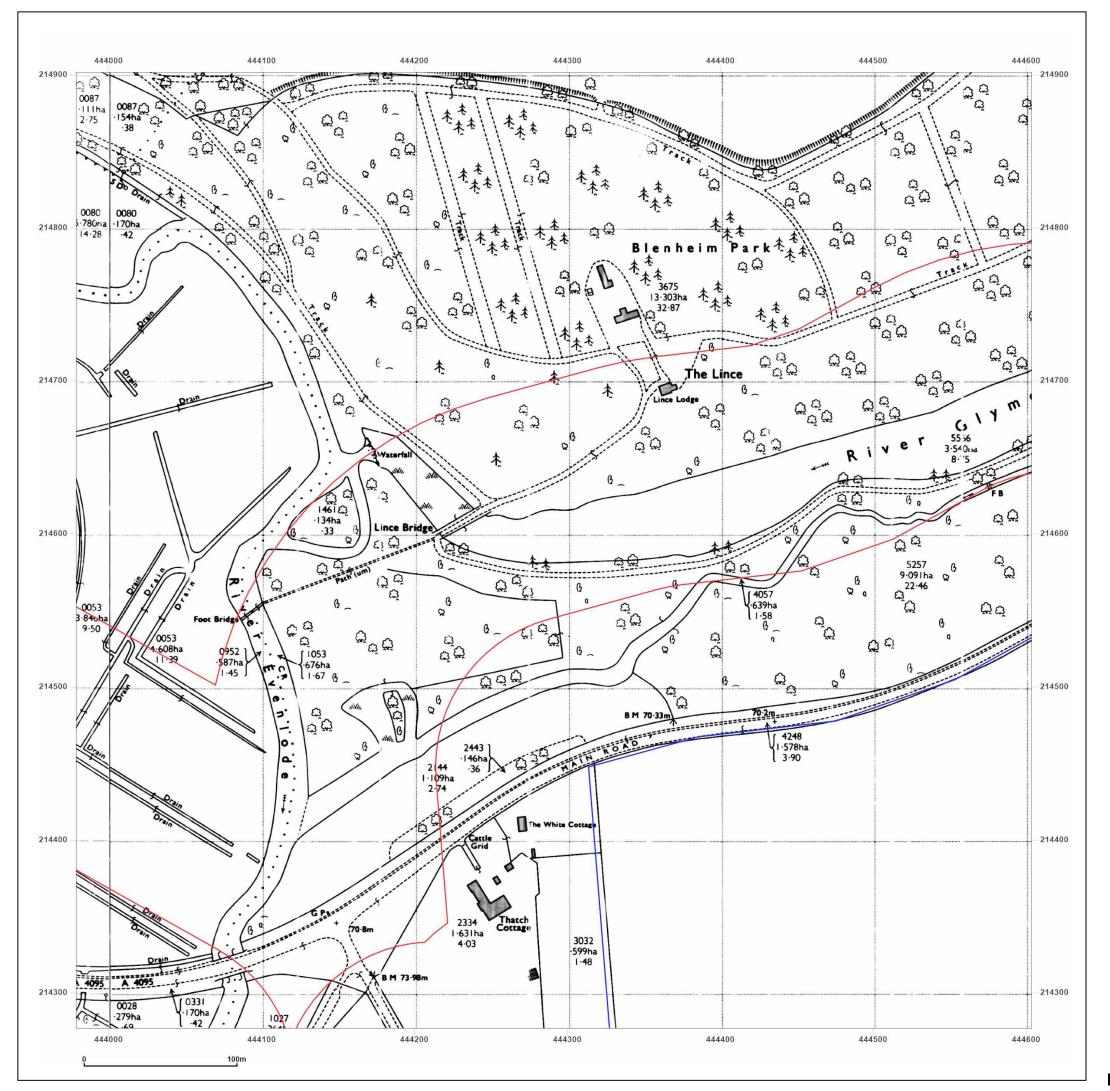




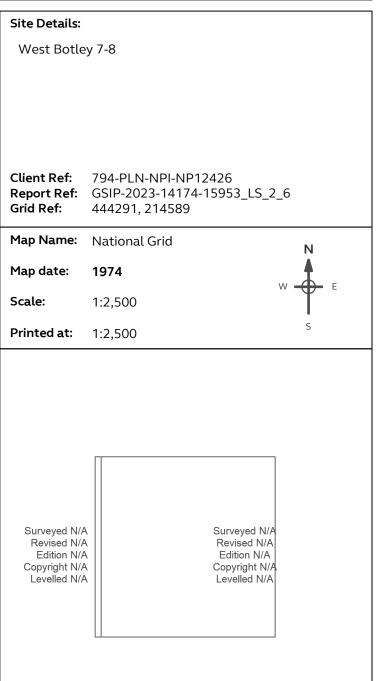
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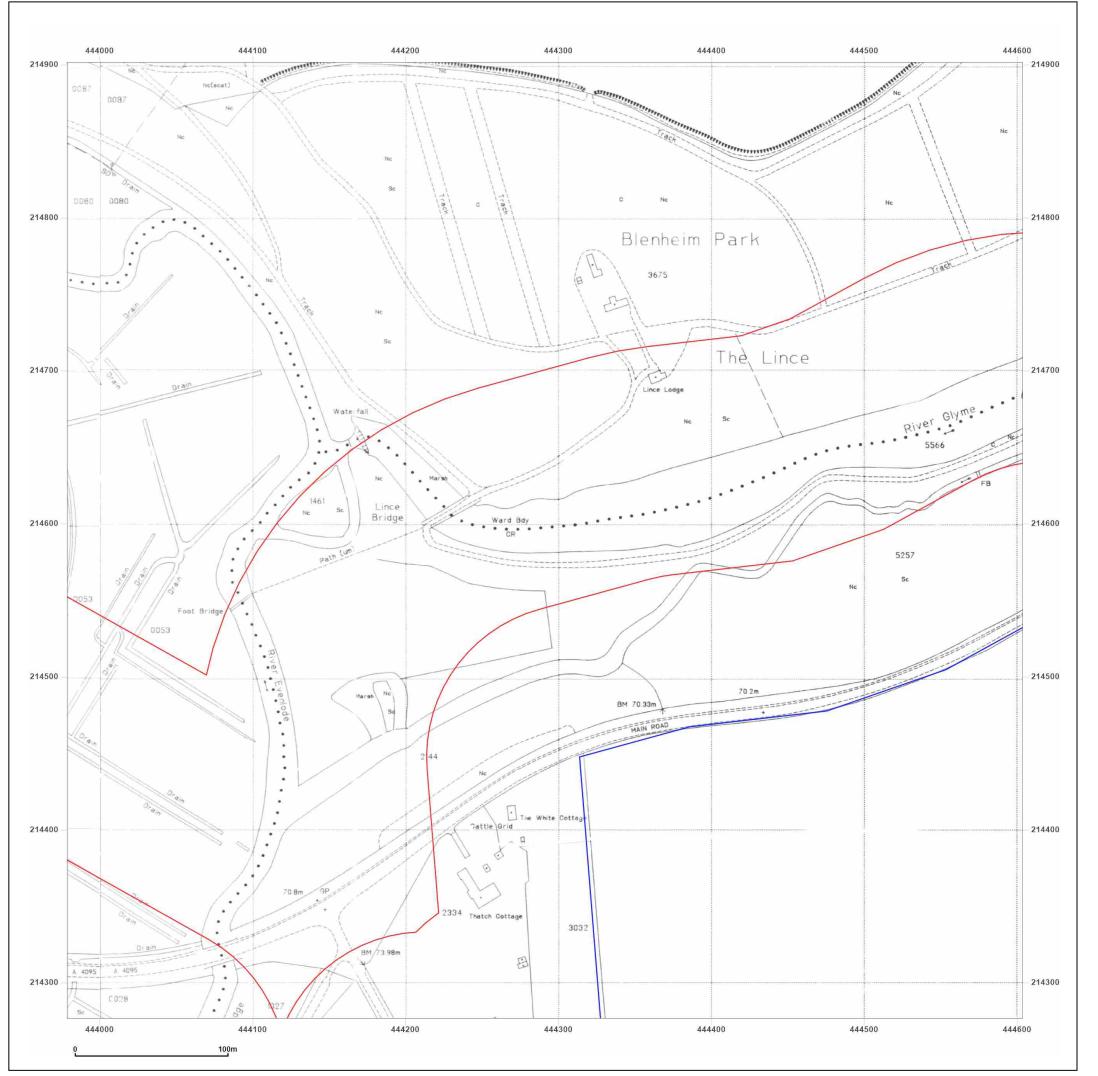




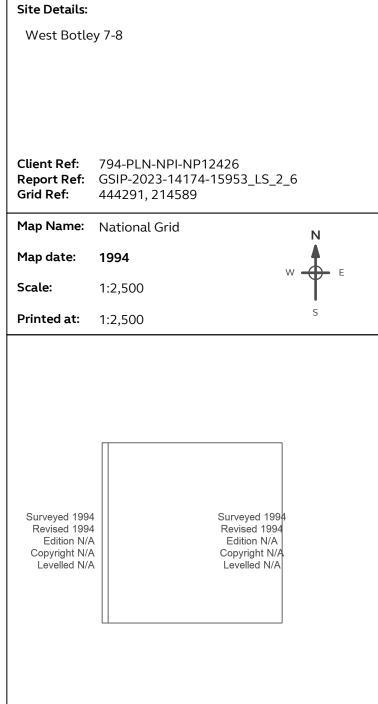


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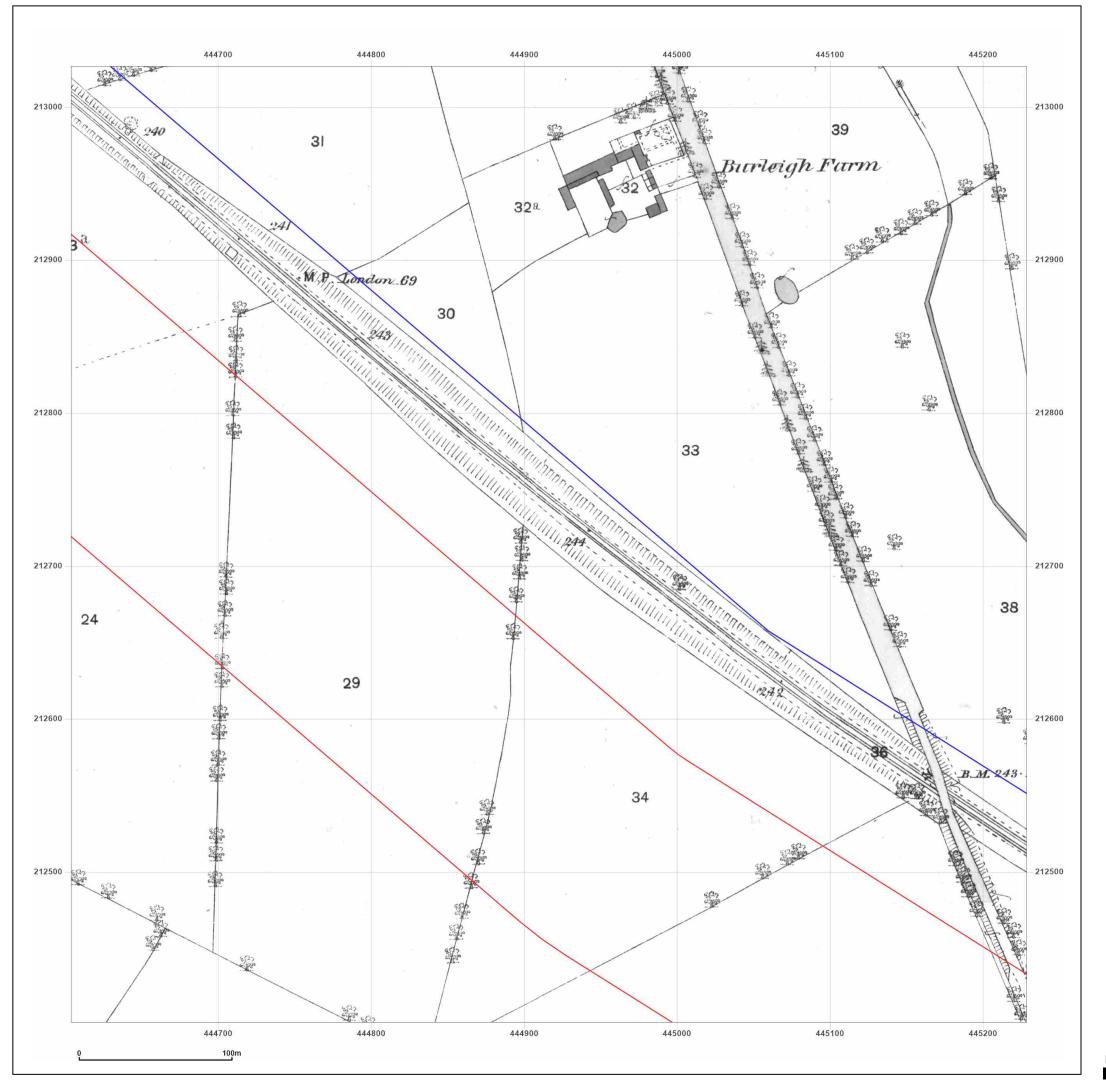




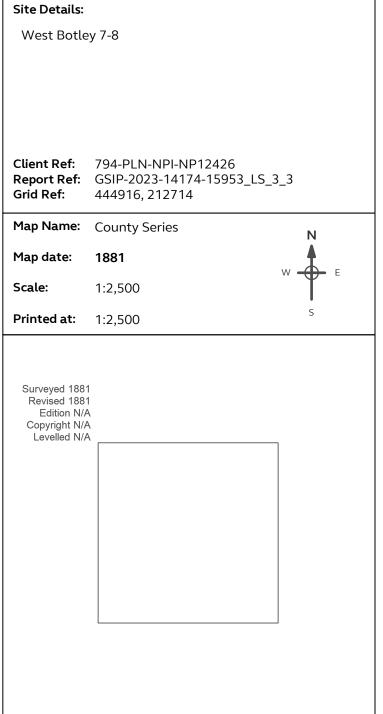


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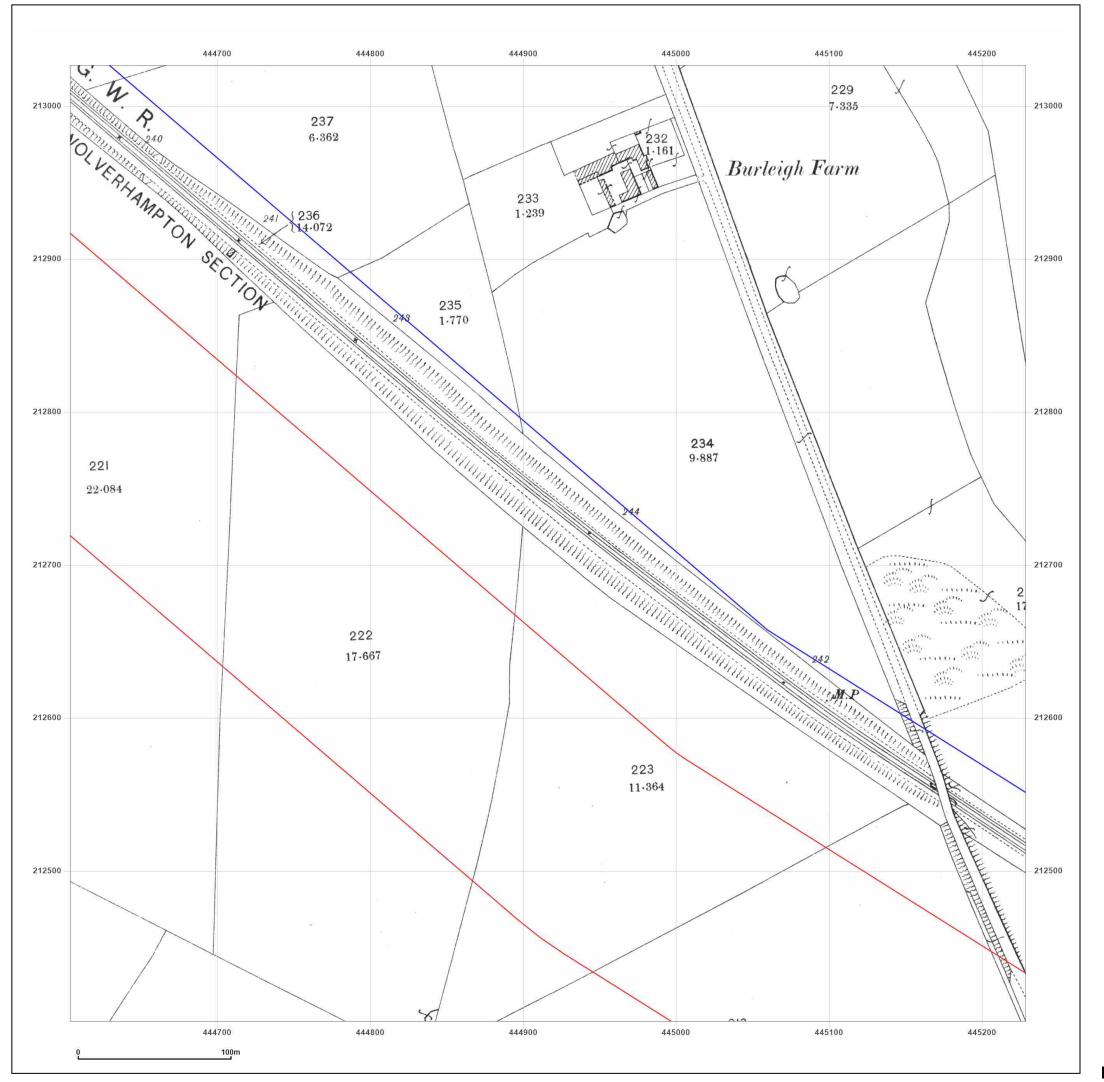




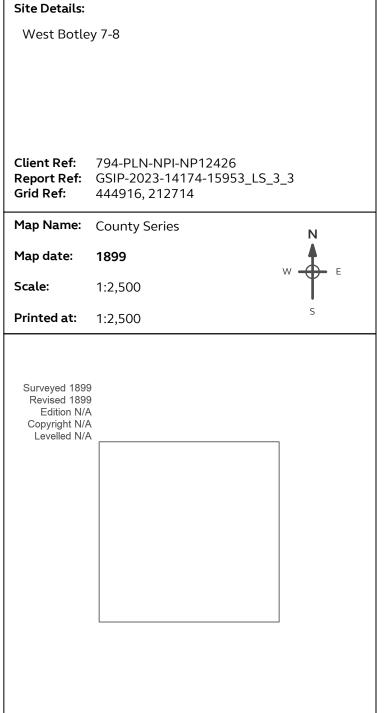


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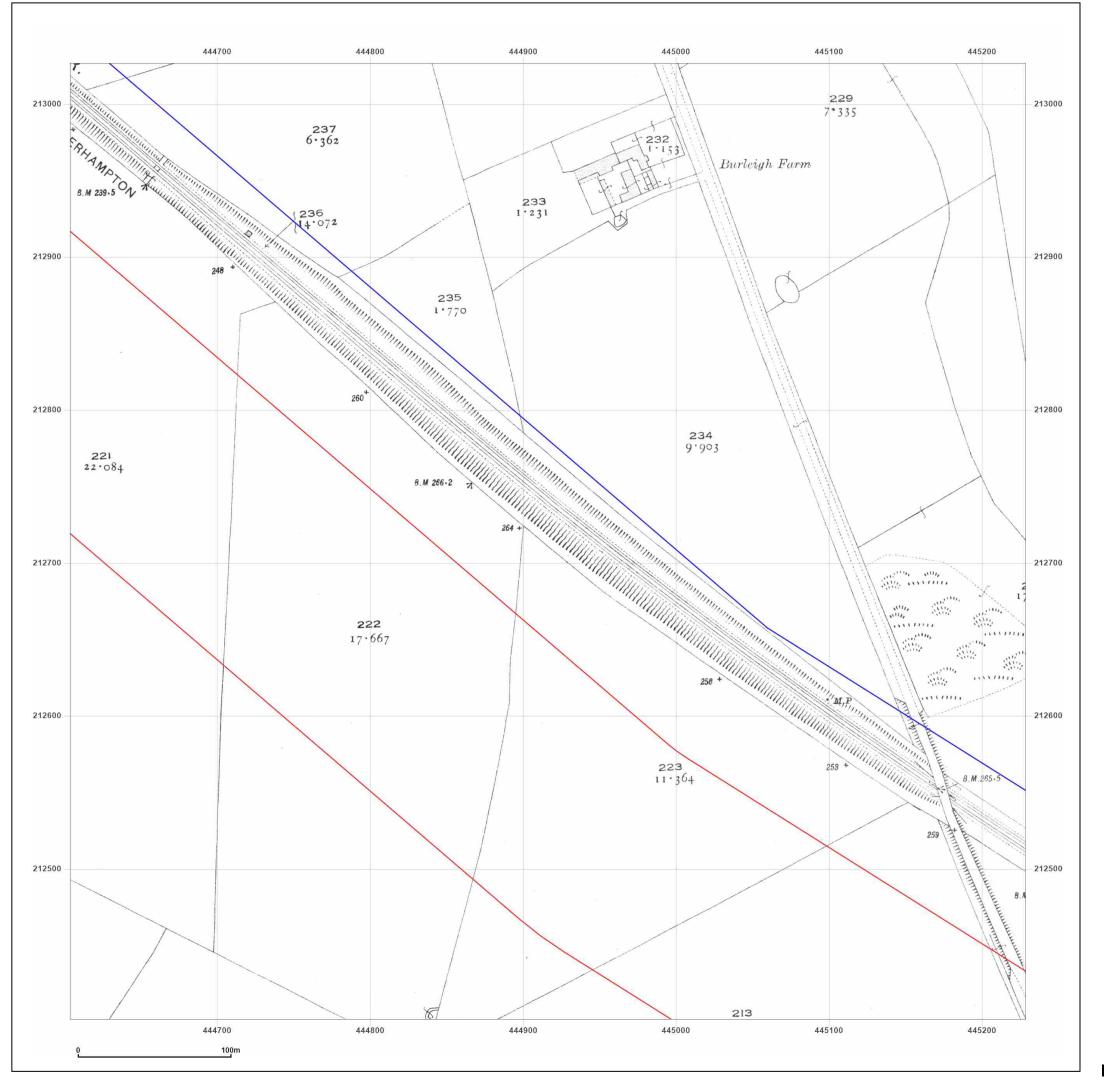




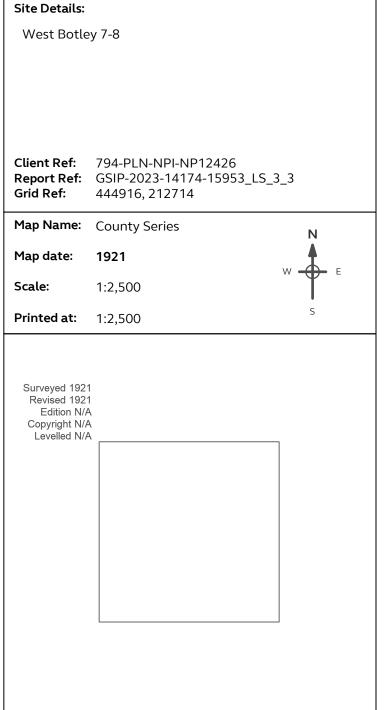


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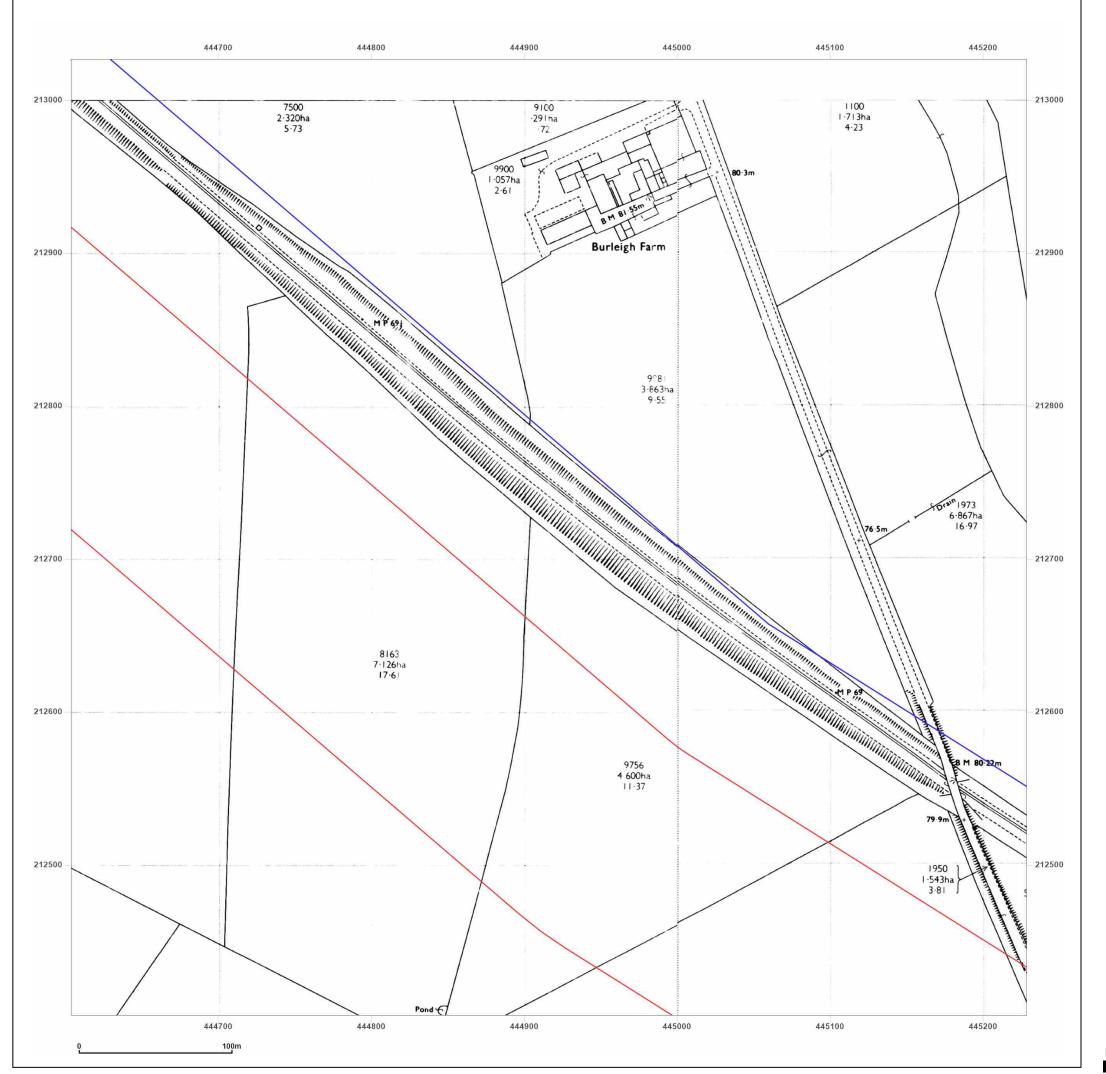




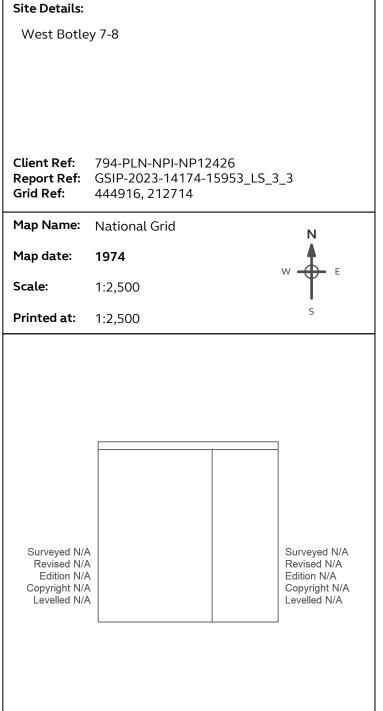


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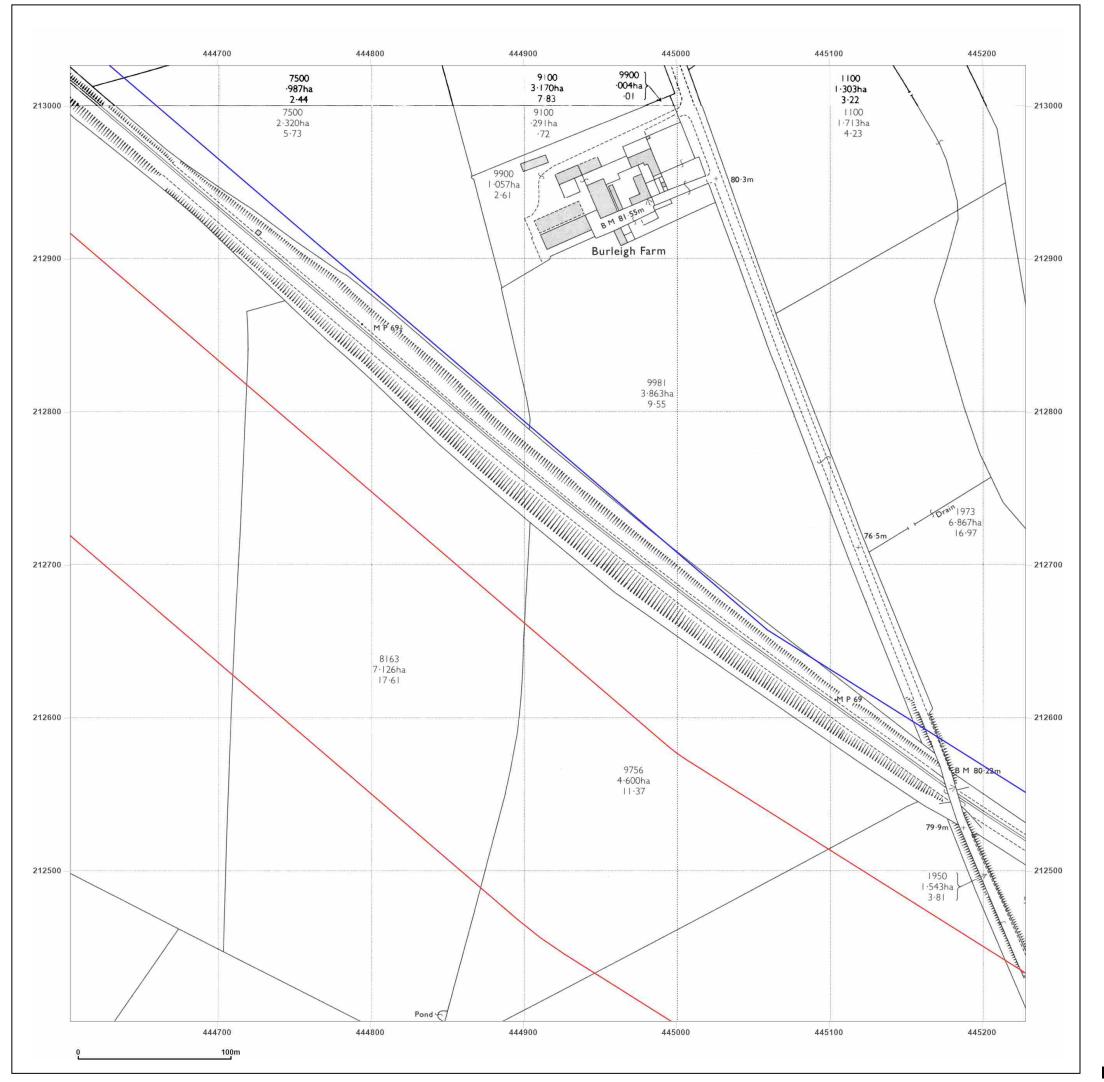




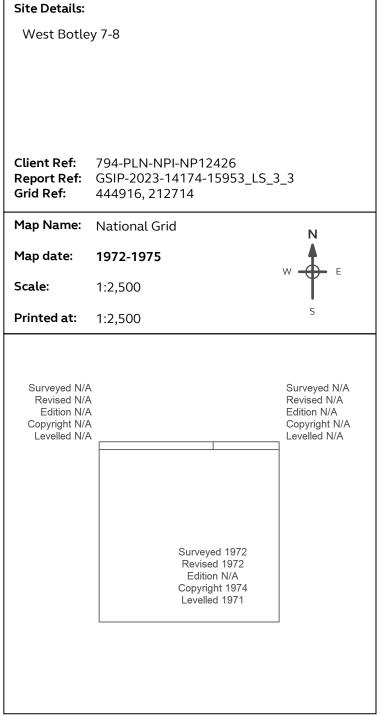


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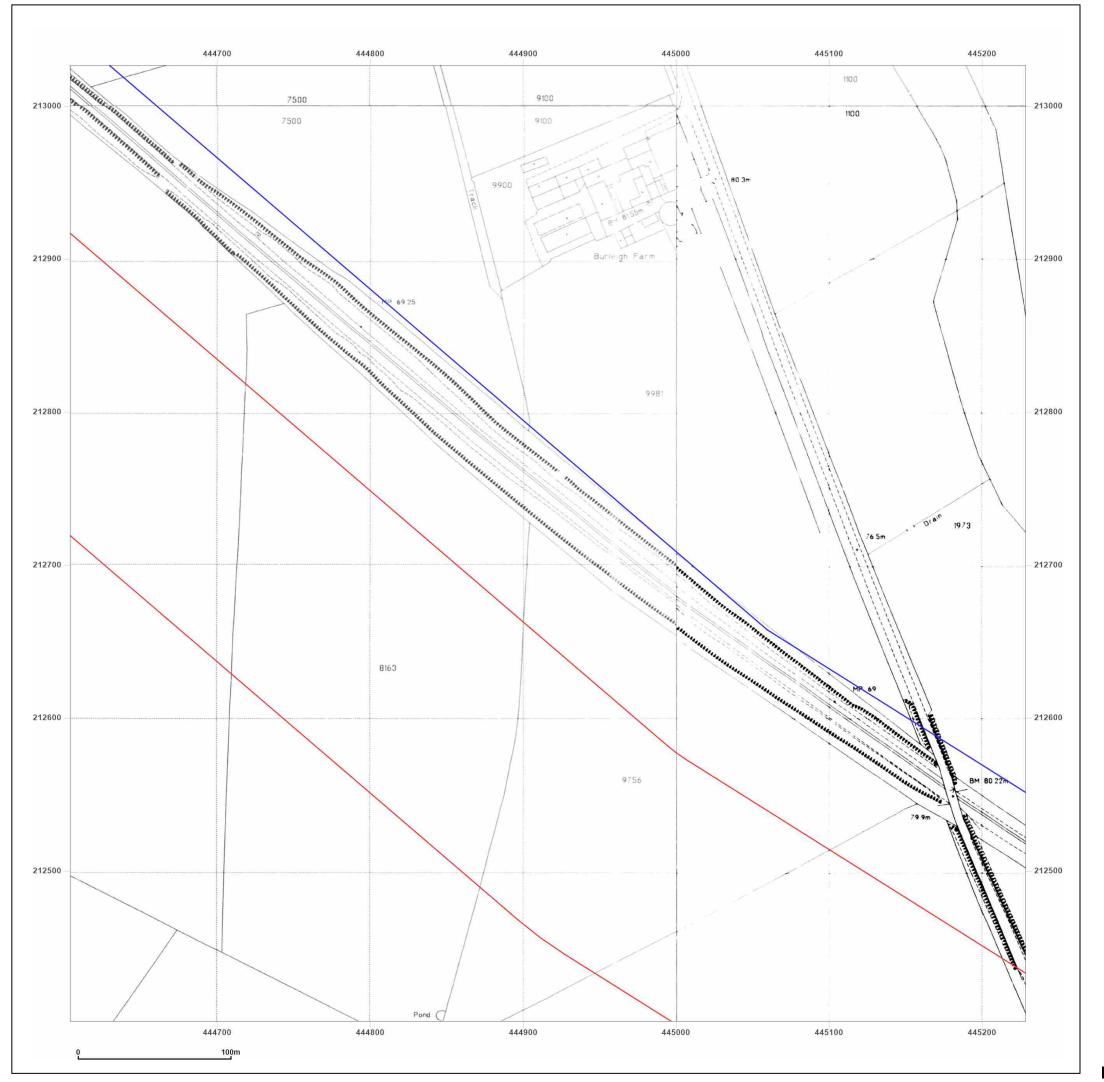




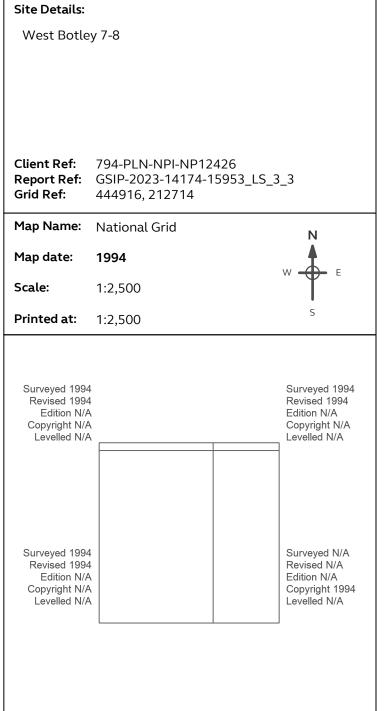


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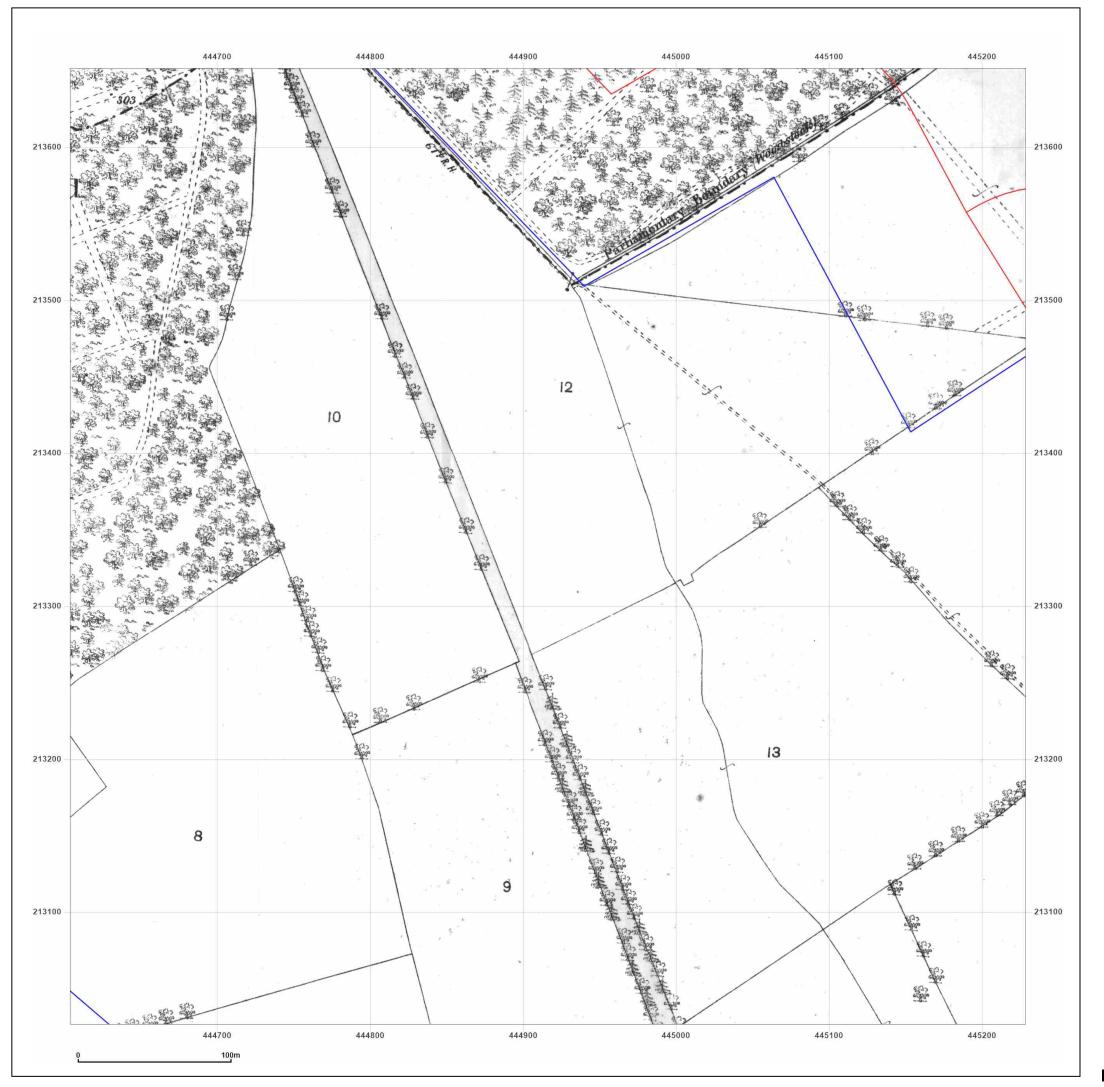




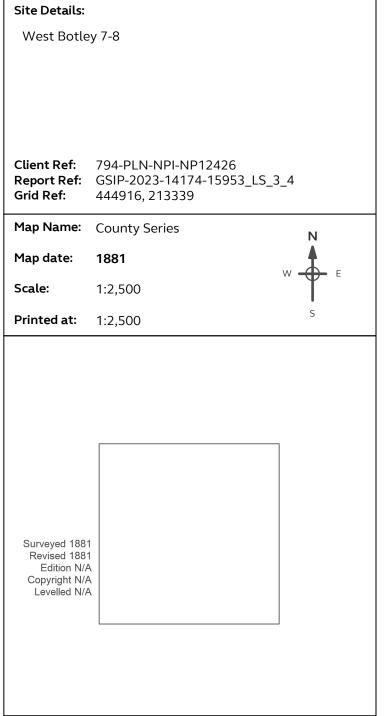


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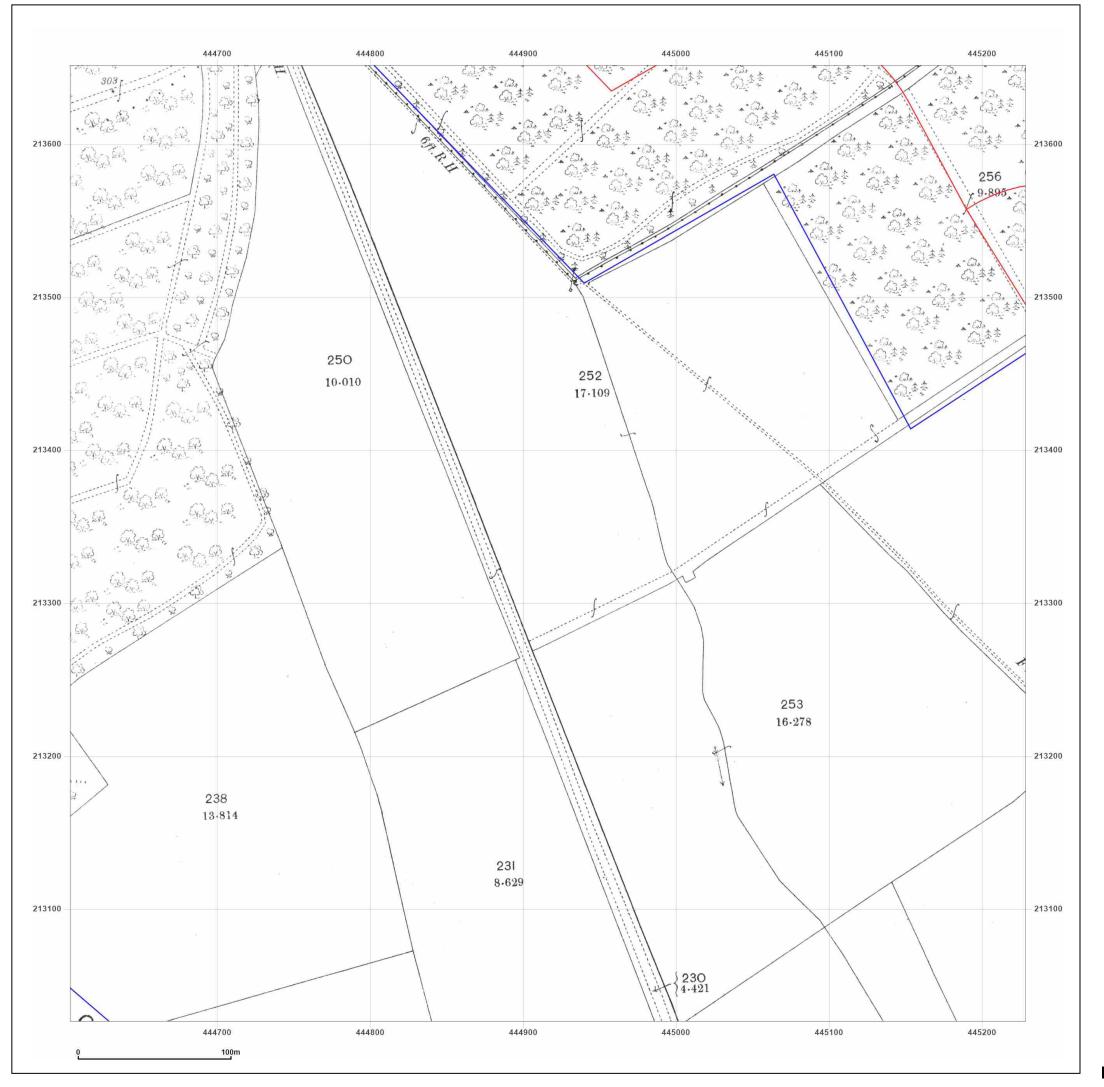




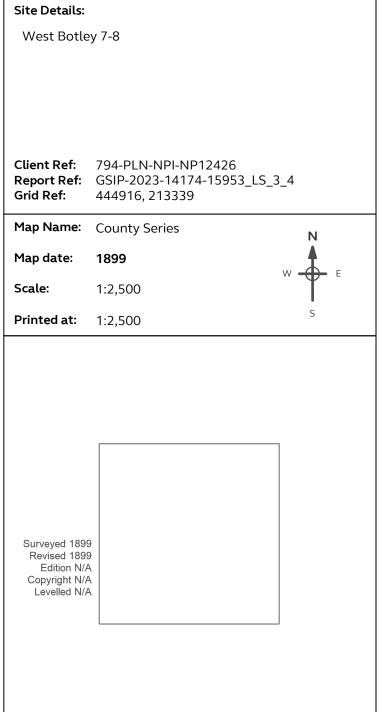


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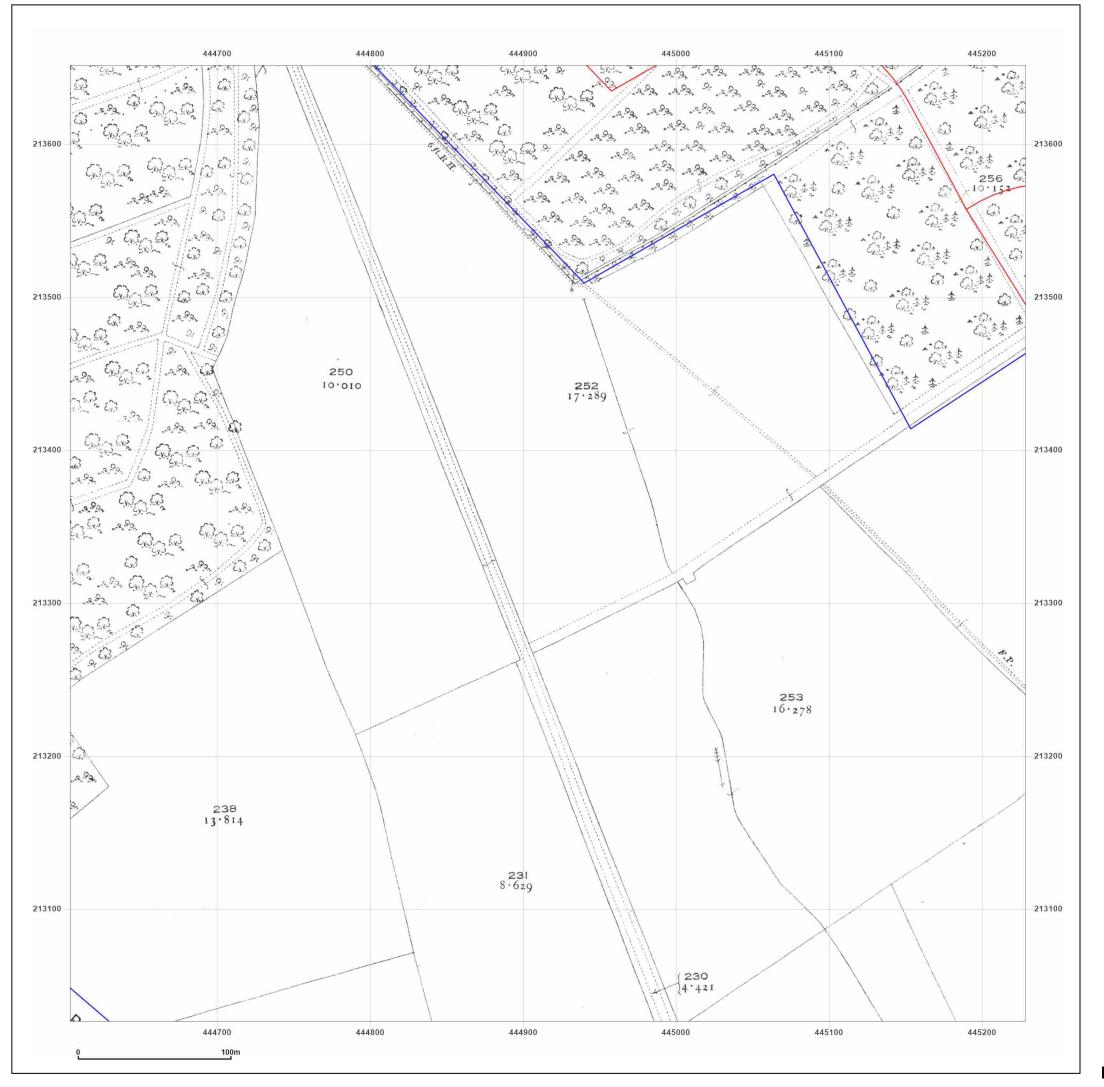




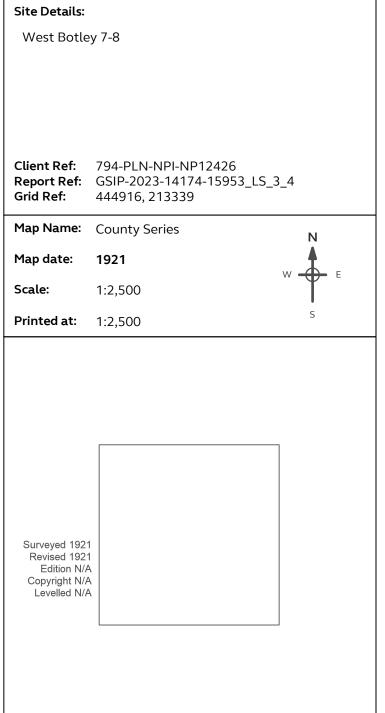


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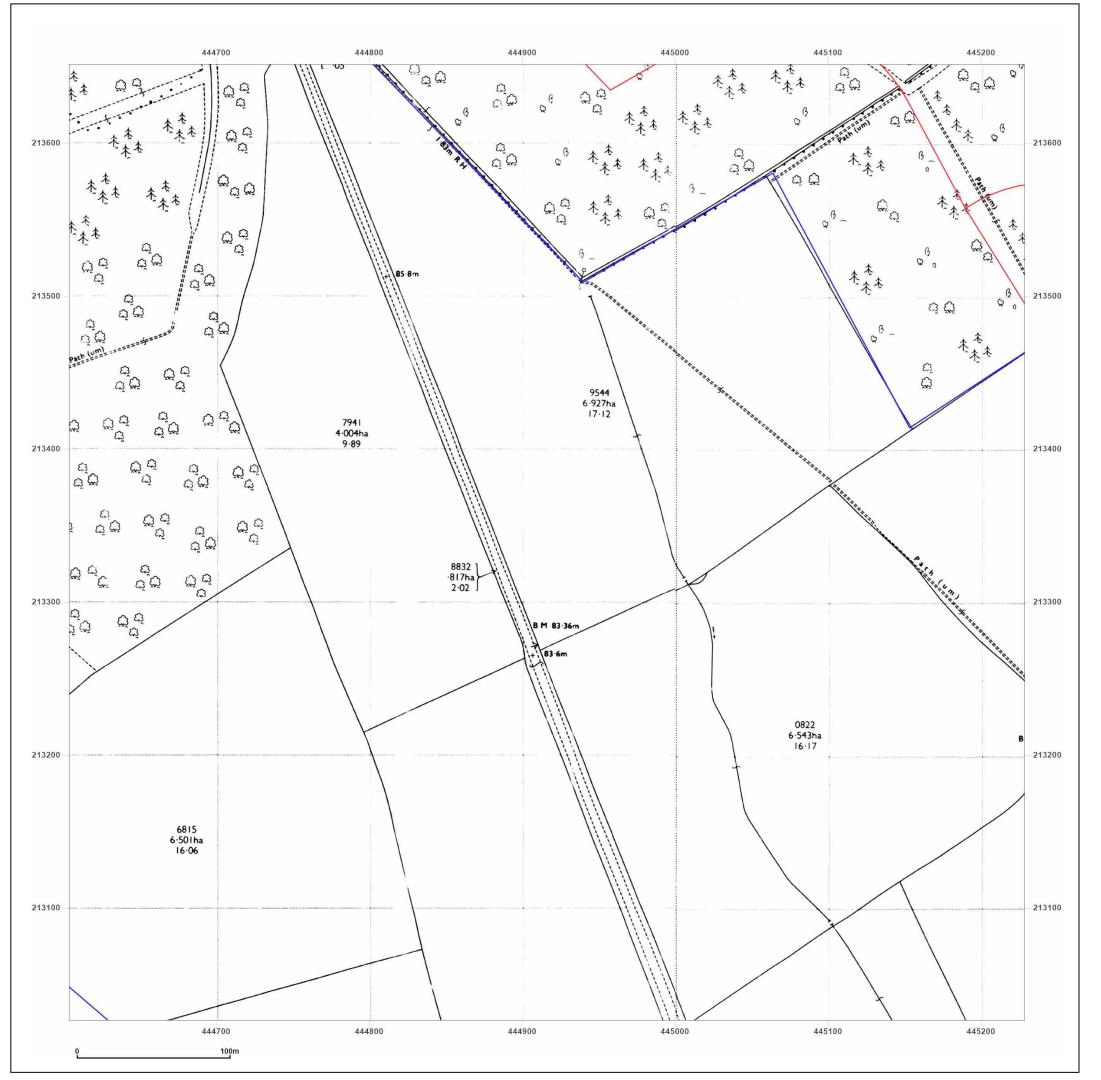






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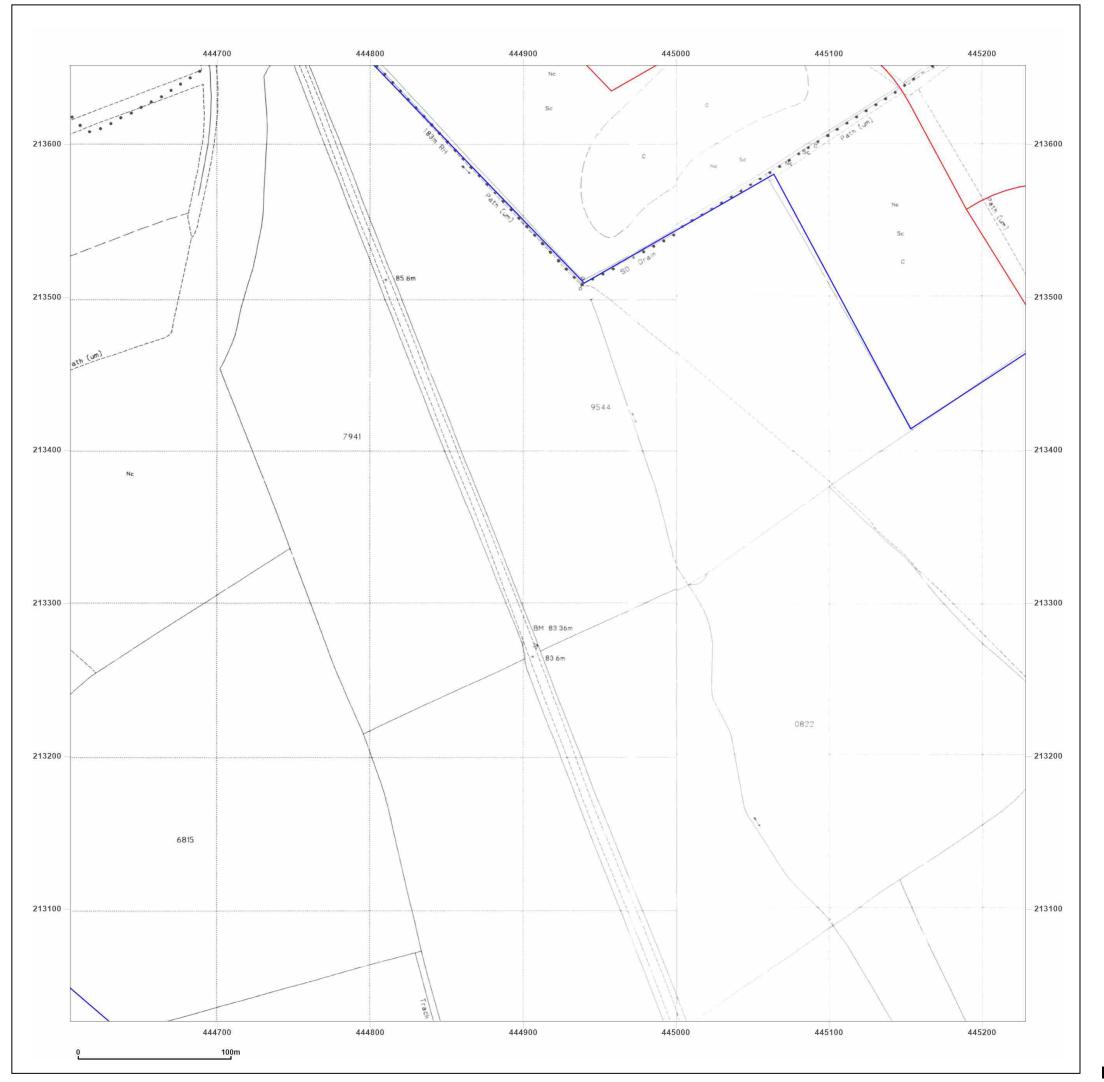


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Map date:	1975		W F
Scale:	1:2,500		
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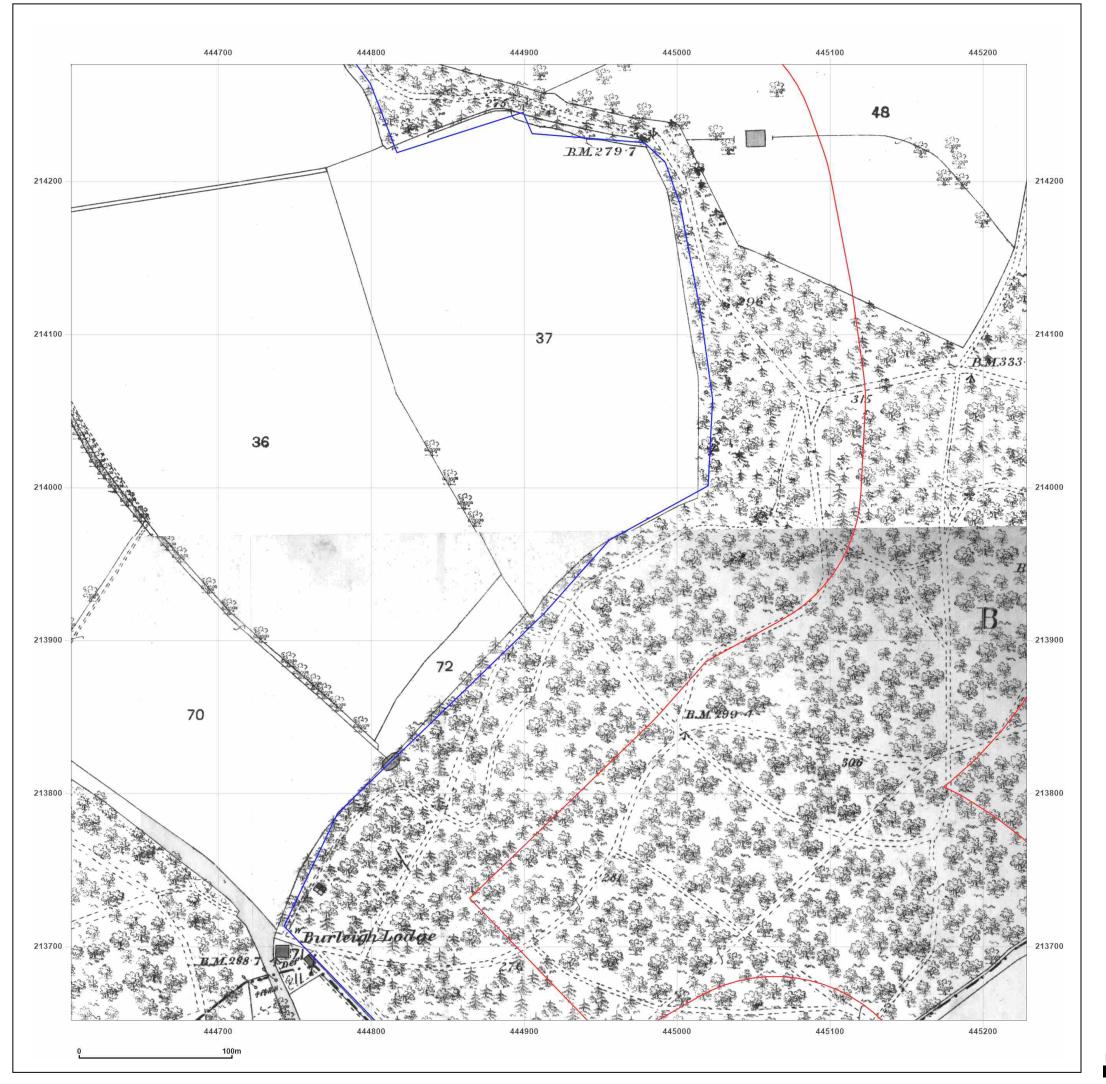


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Map date:	1994		W F
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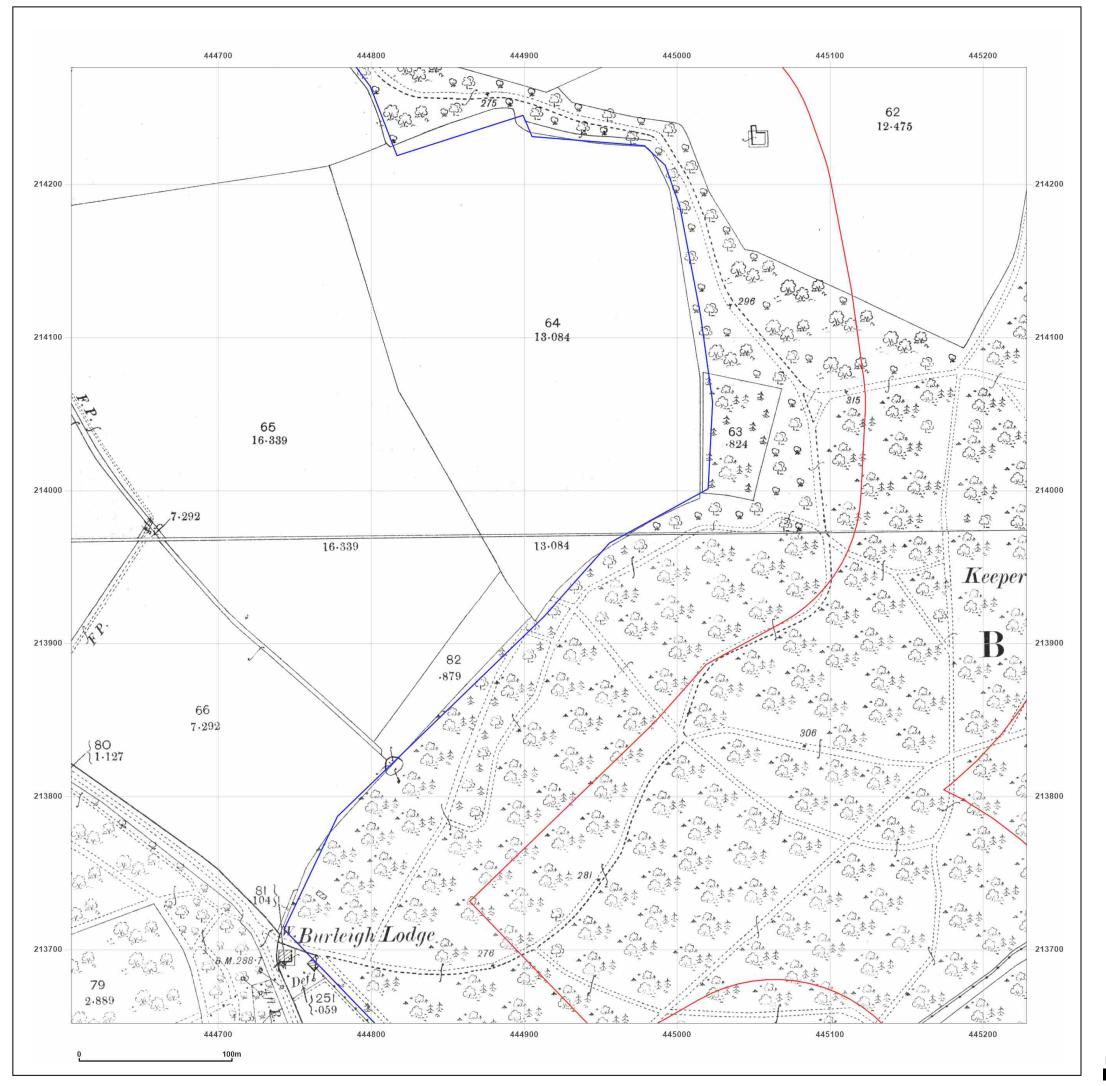


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Map Name:	County Series N
Map date:	1881
Scale:	1:2,500
Printed at:	1:2,500 S
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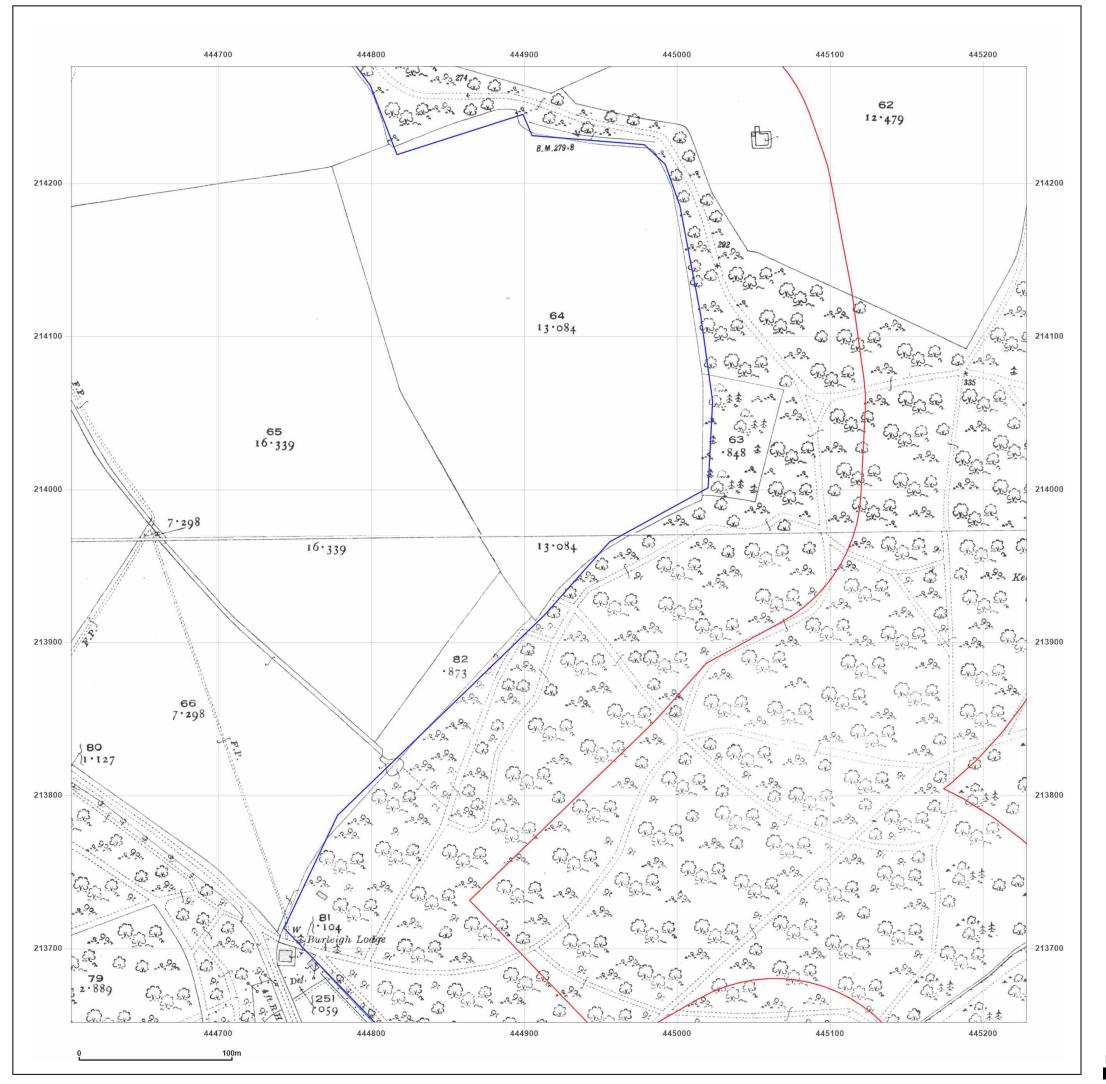


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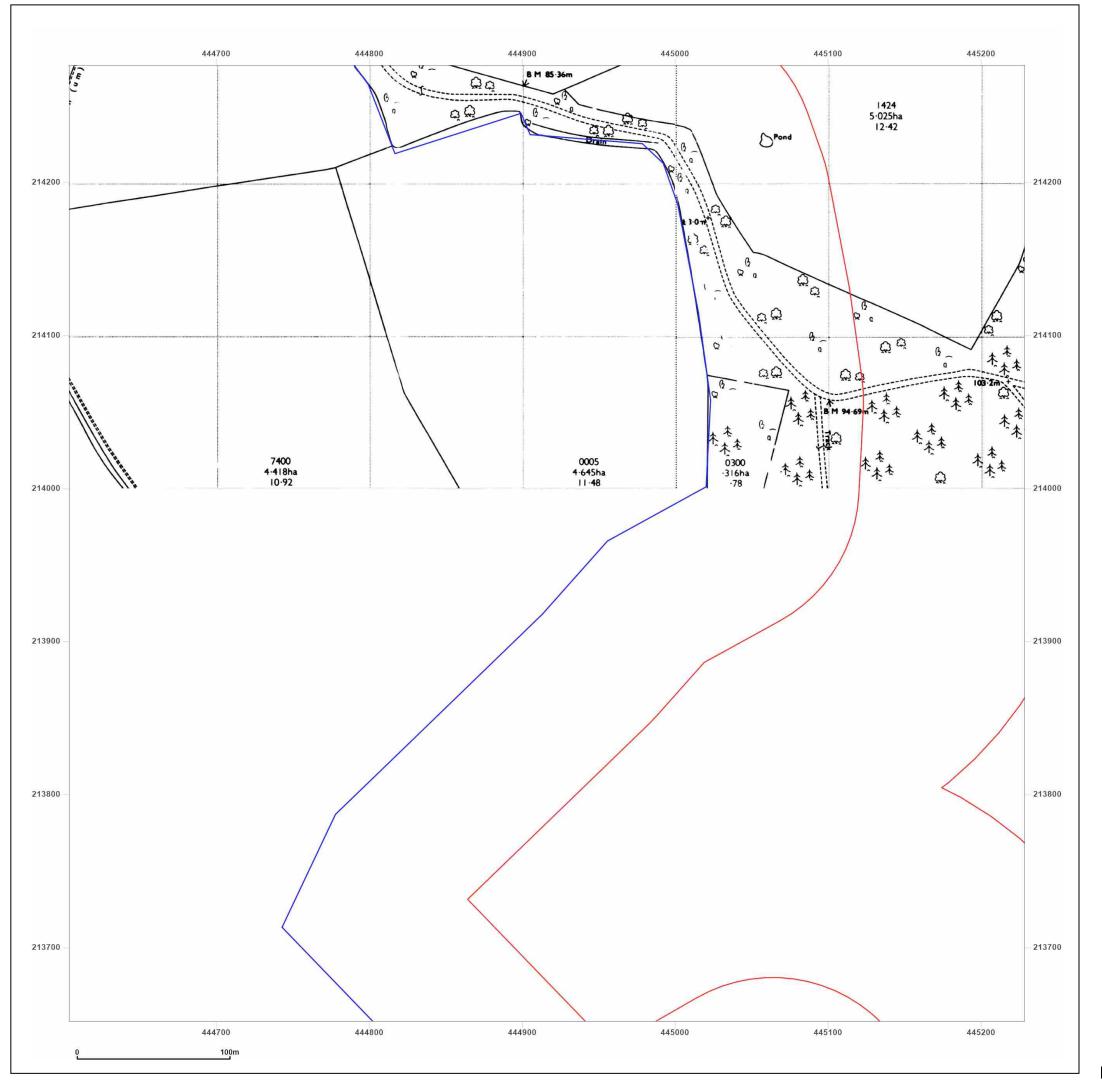


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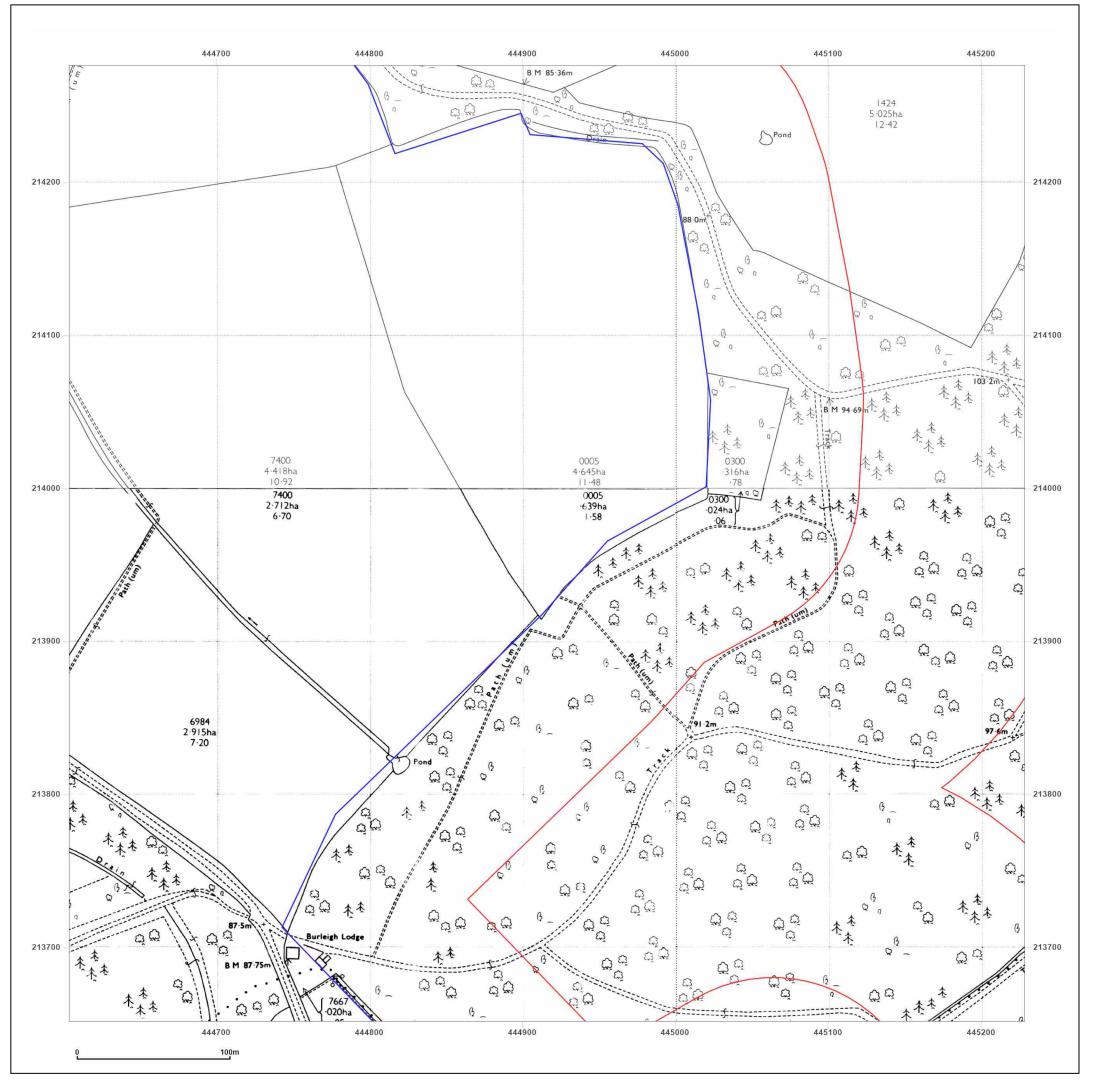


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Grid Ref:	444916, 213964		
Map Name:	National Grid	N	
Map date:	1974	W F	
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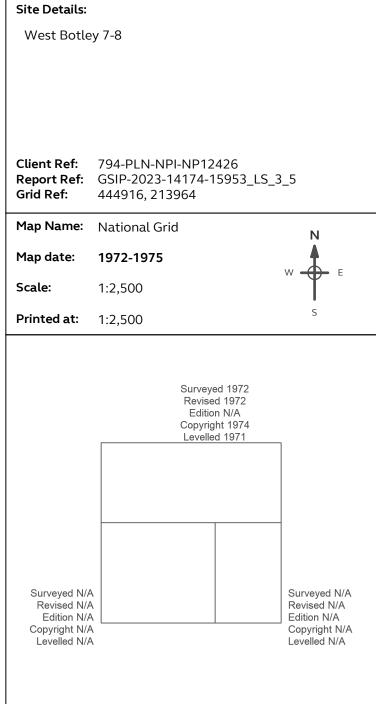


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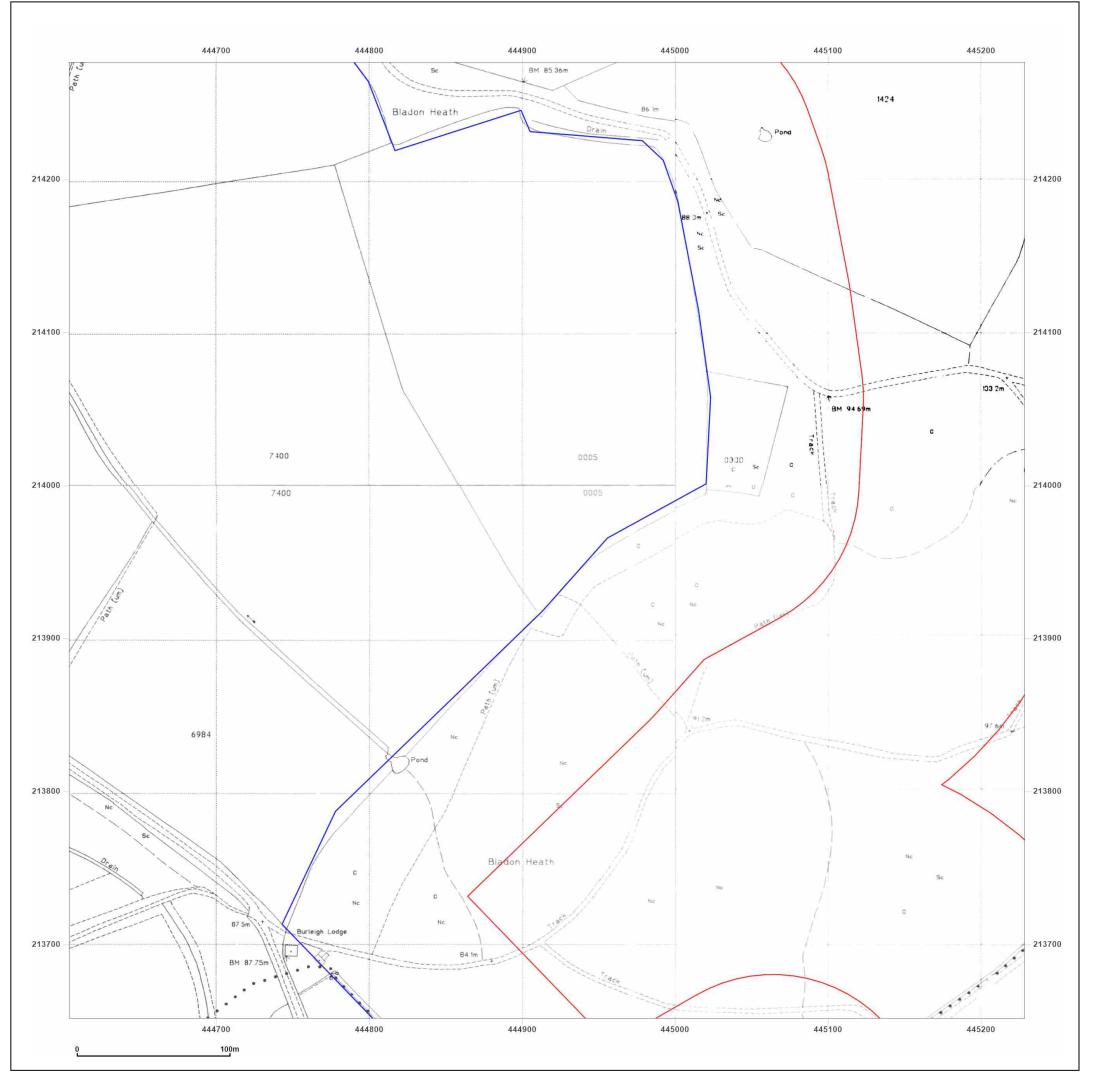






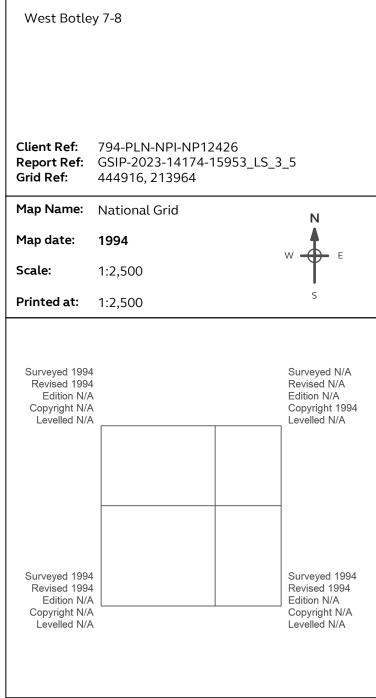
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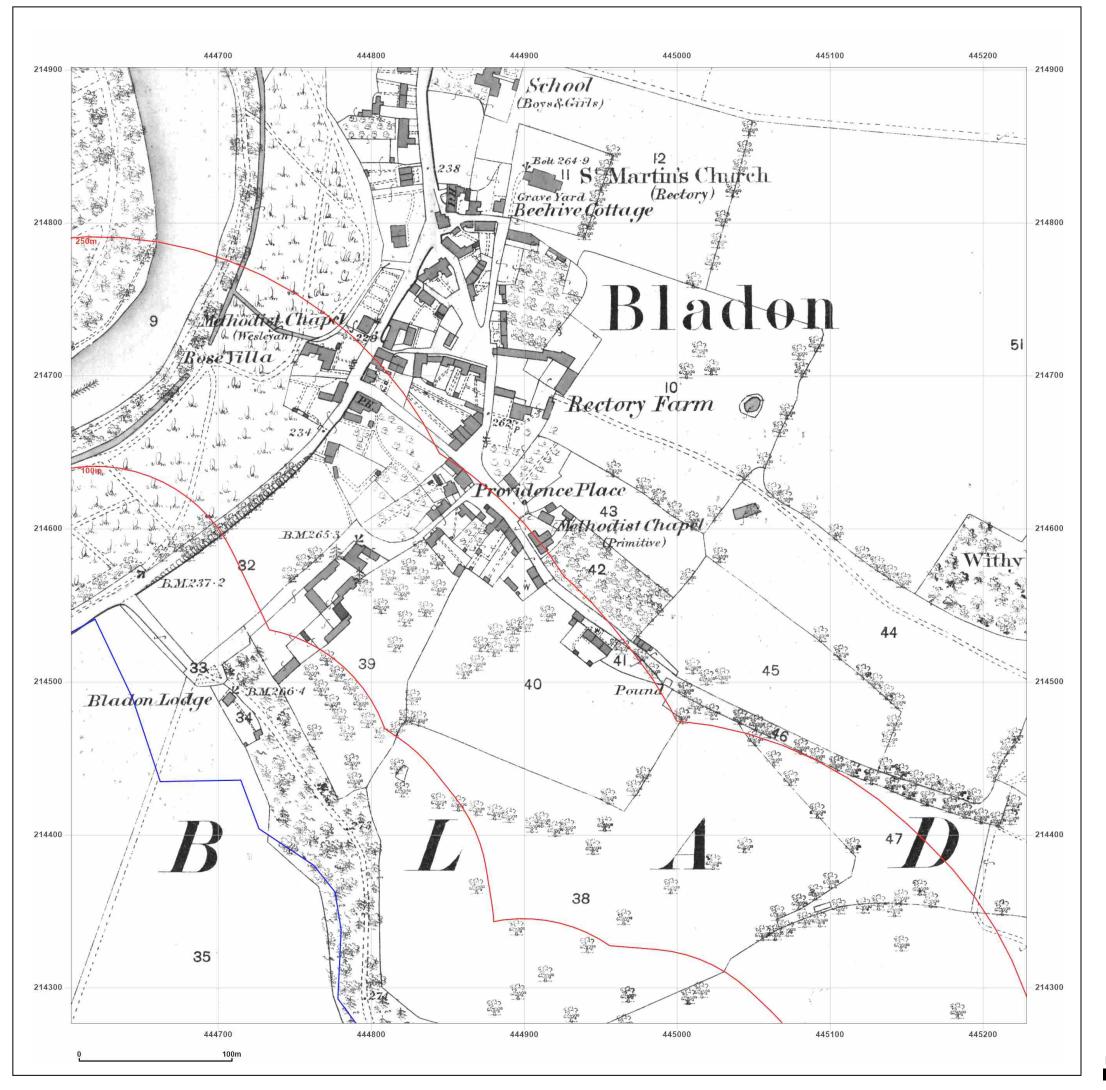




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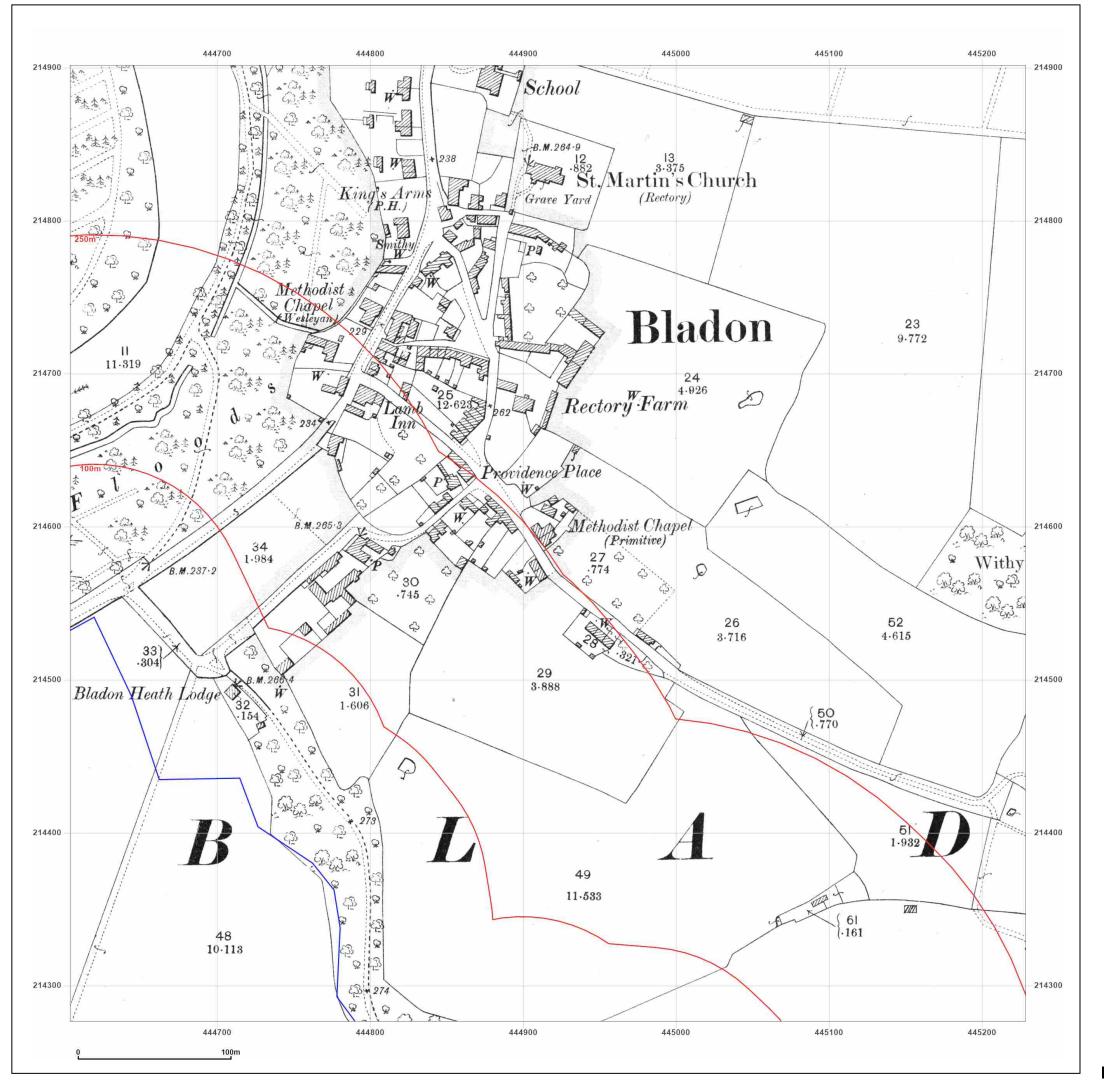


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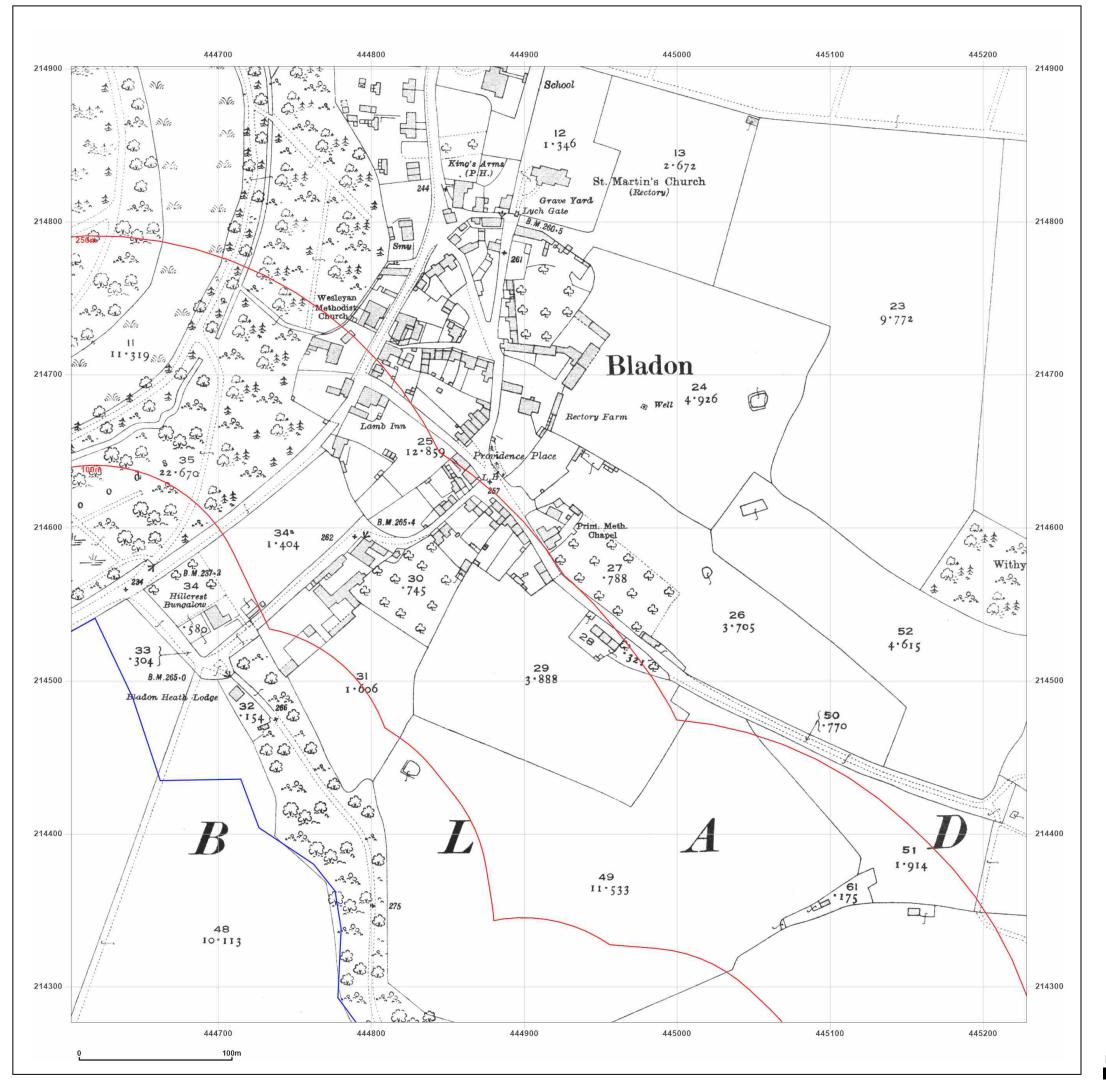


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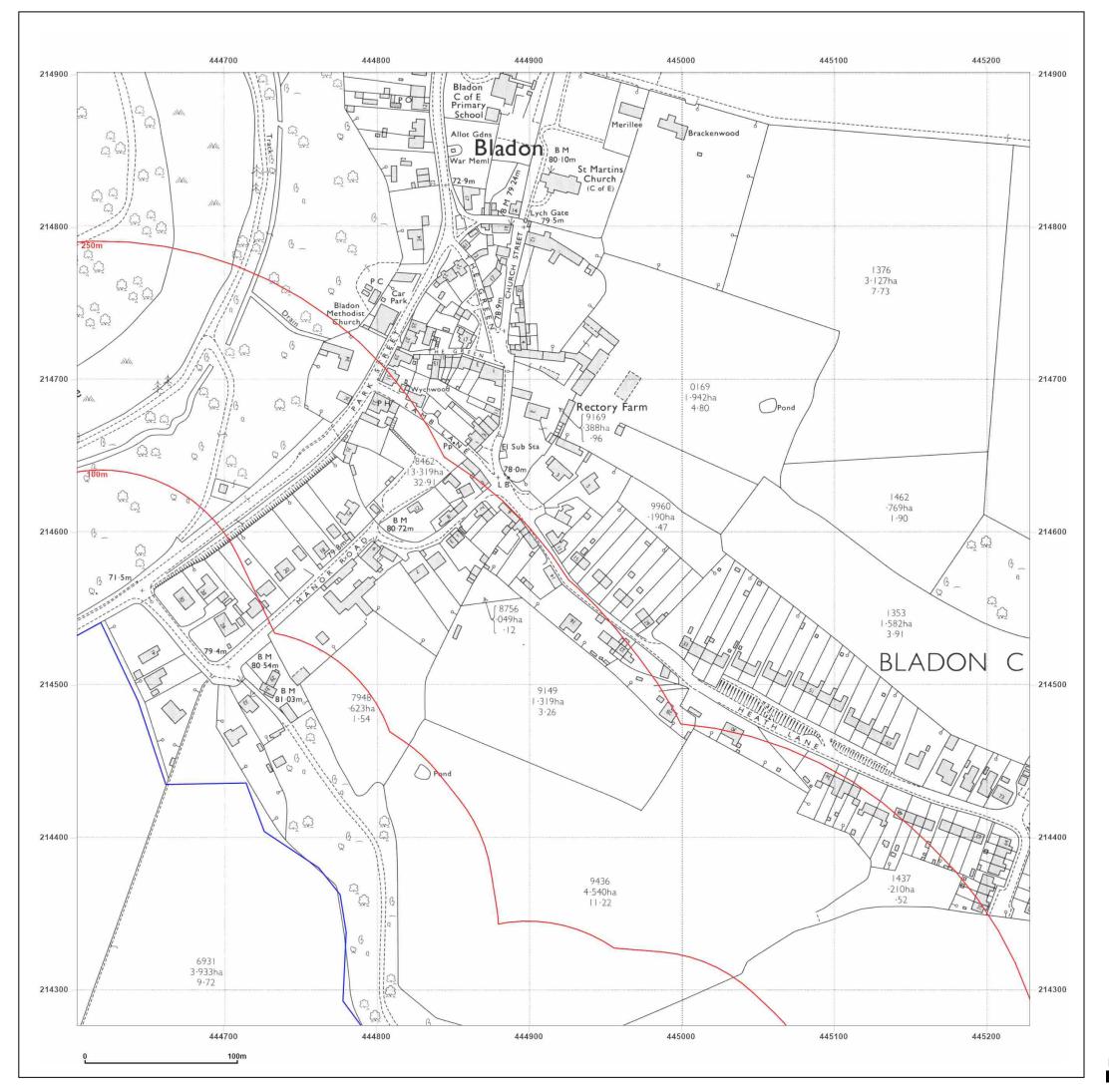


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Map Name:	County Series	N
Map date:	1922	N E
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Surveyed 1922 Revised 1922 Edition N/A Copyright N/A Levelled N/A	2 A A	

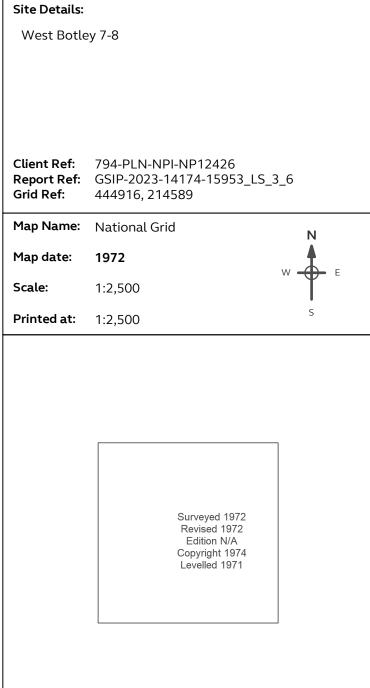


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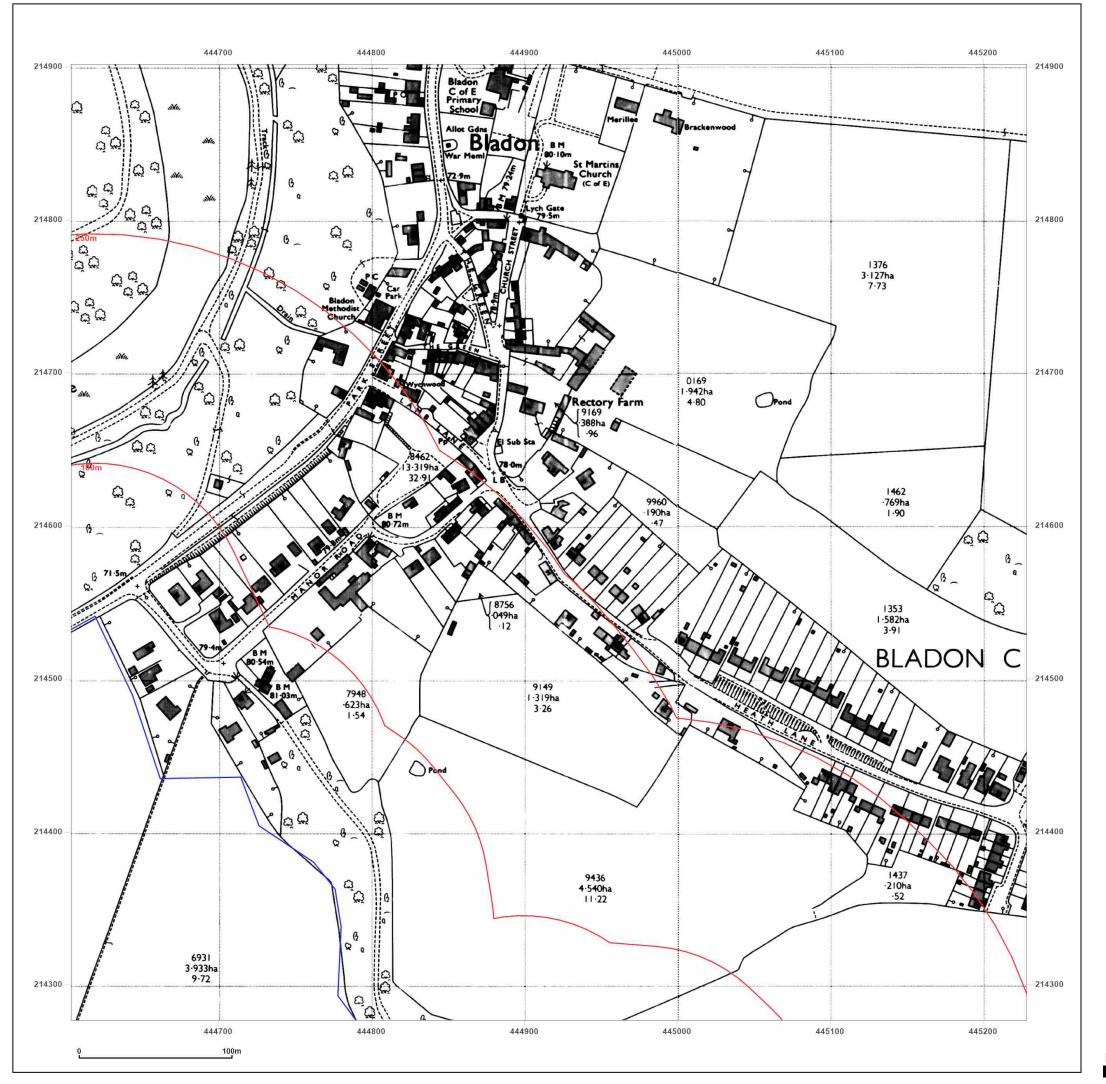




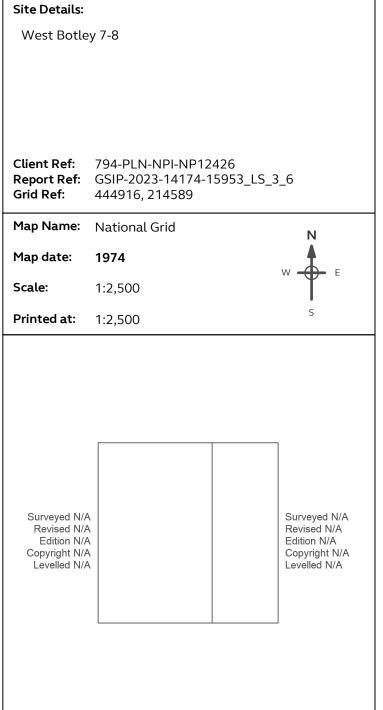


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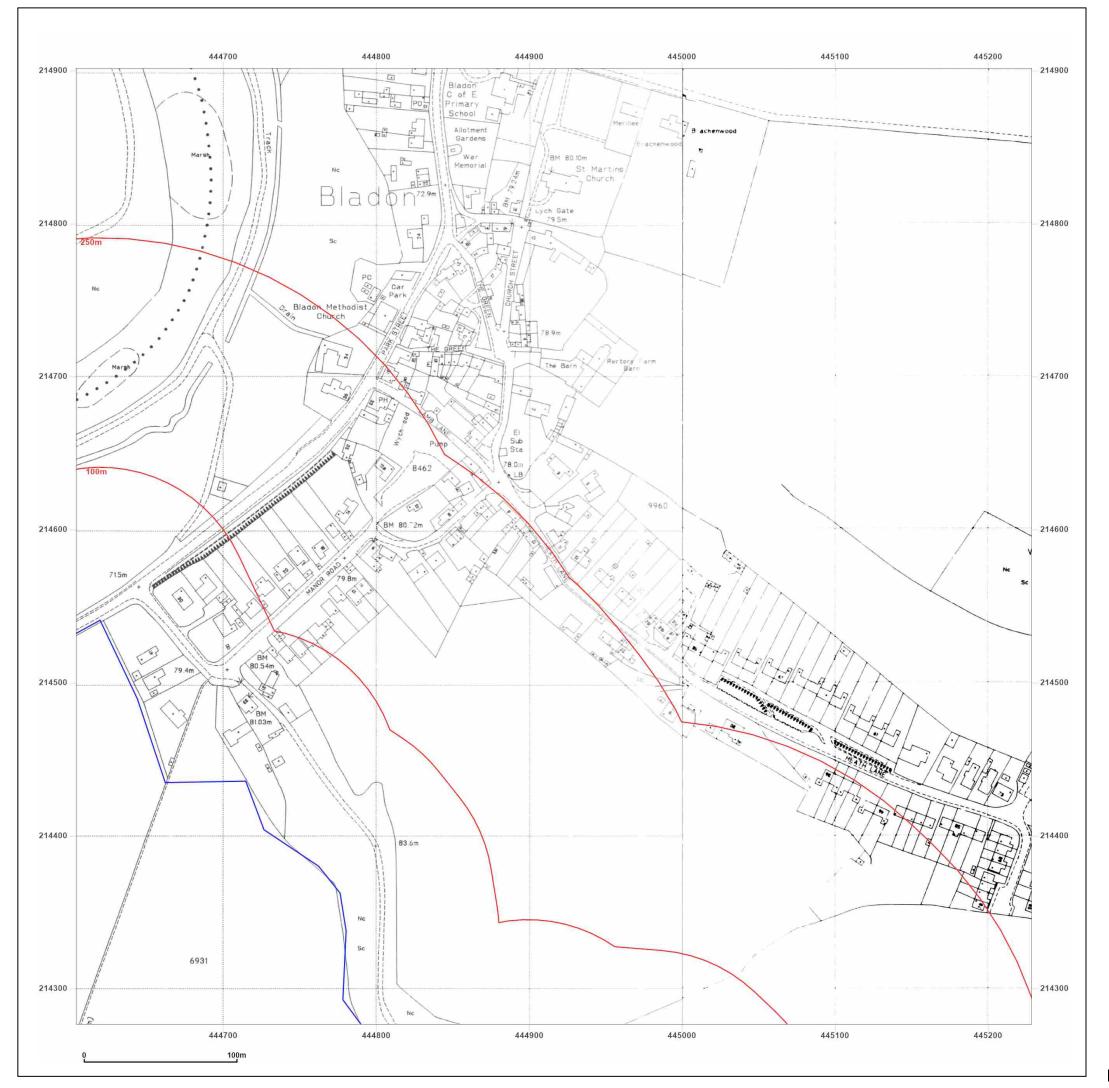




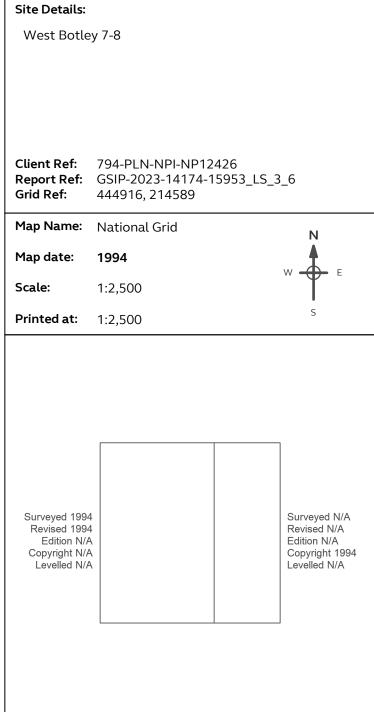


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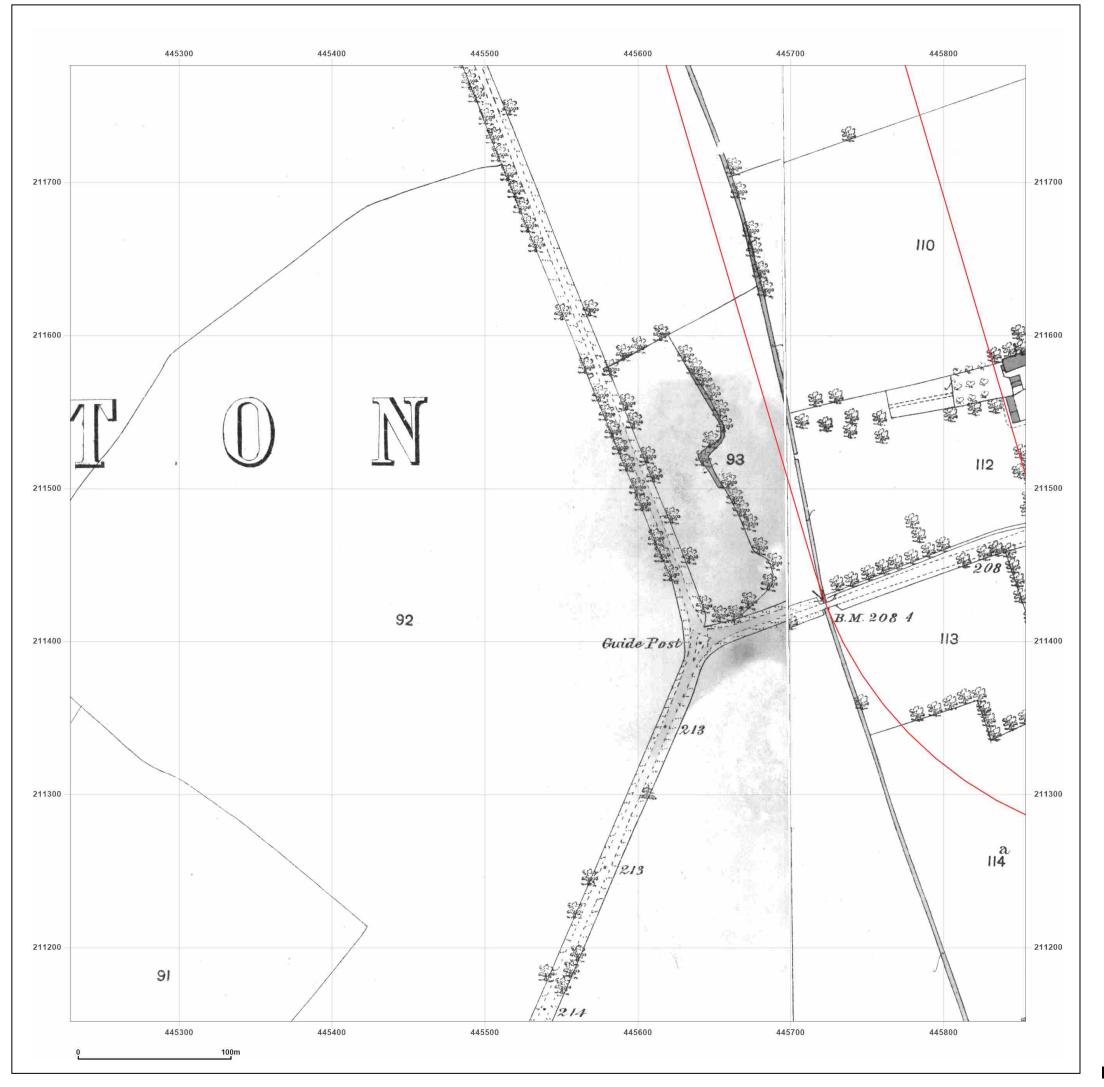




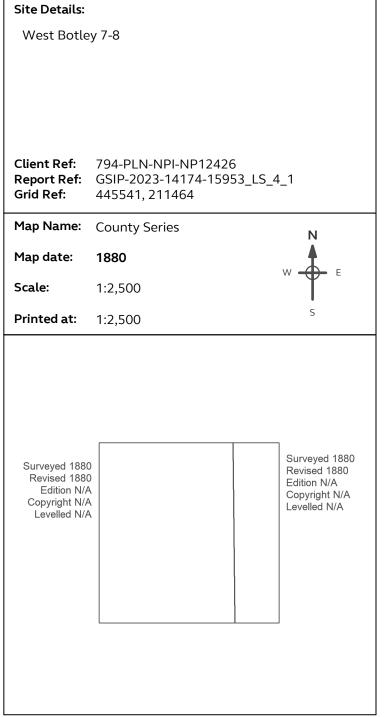


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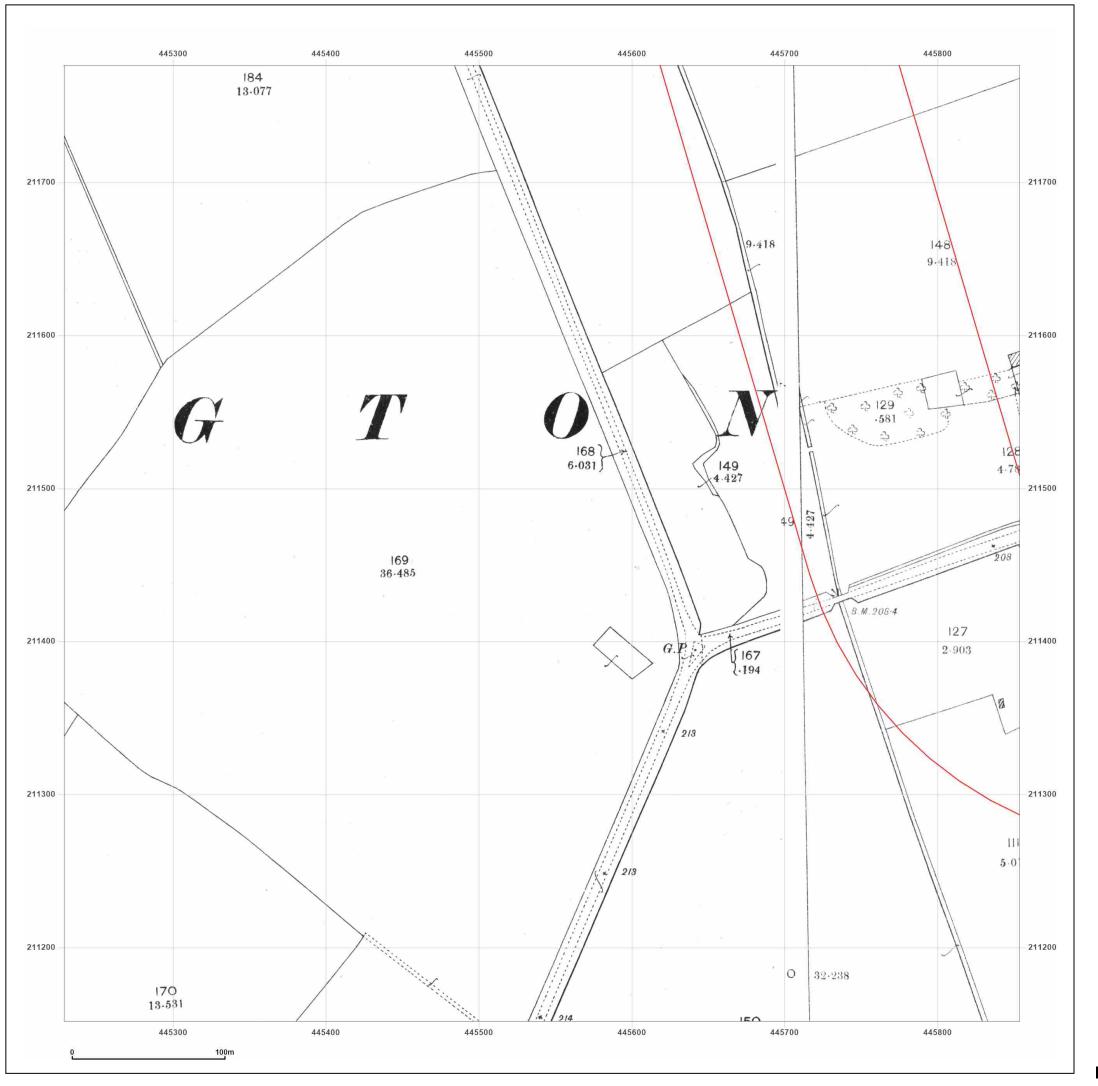




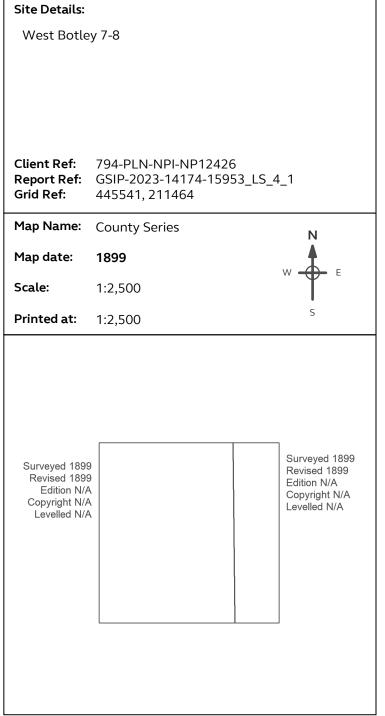


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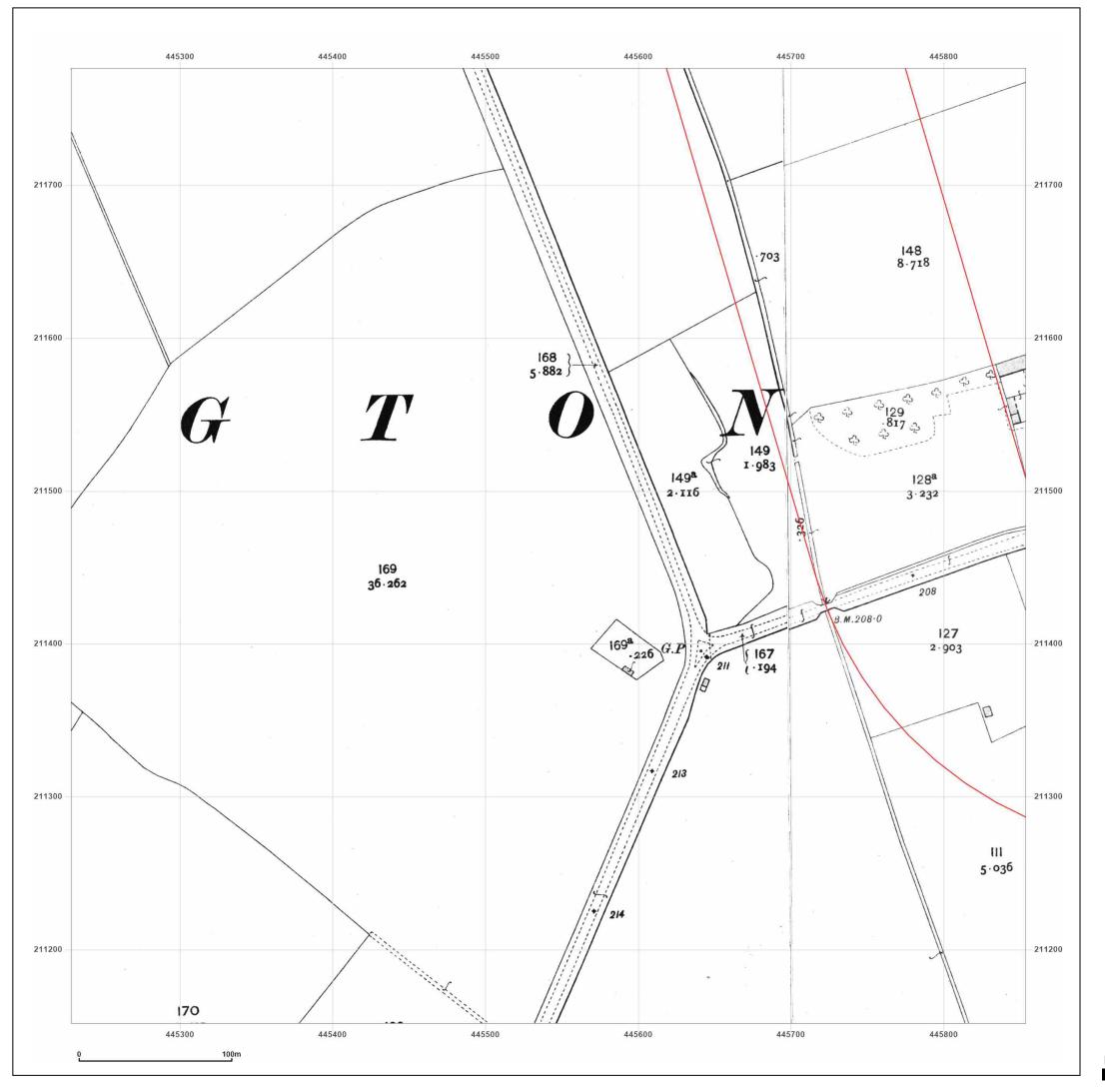




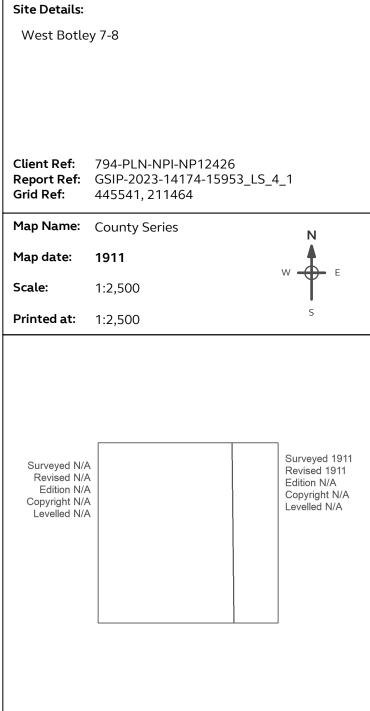


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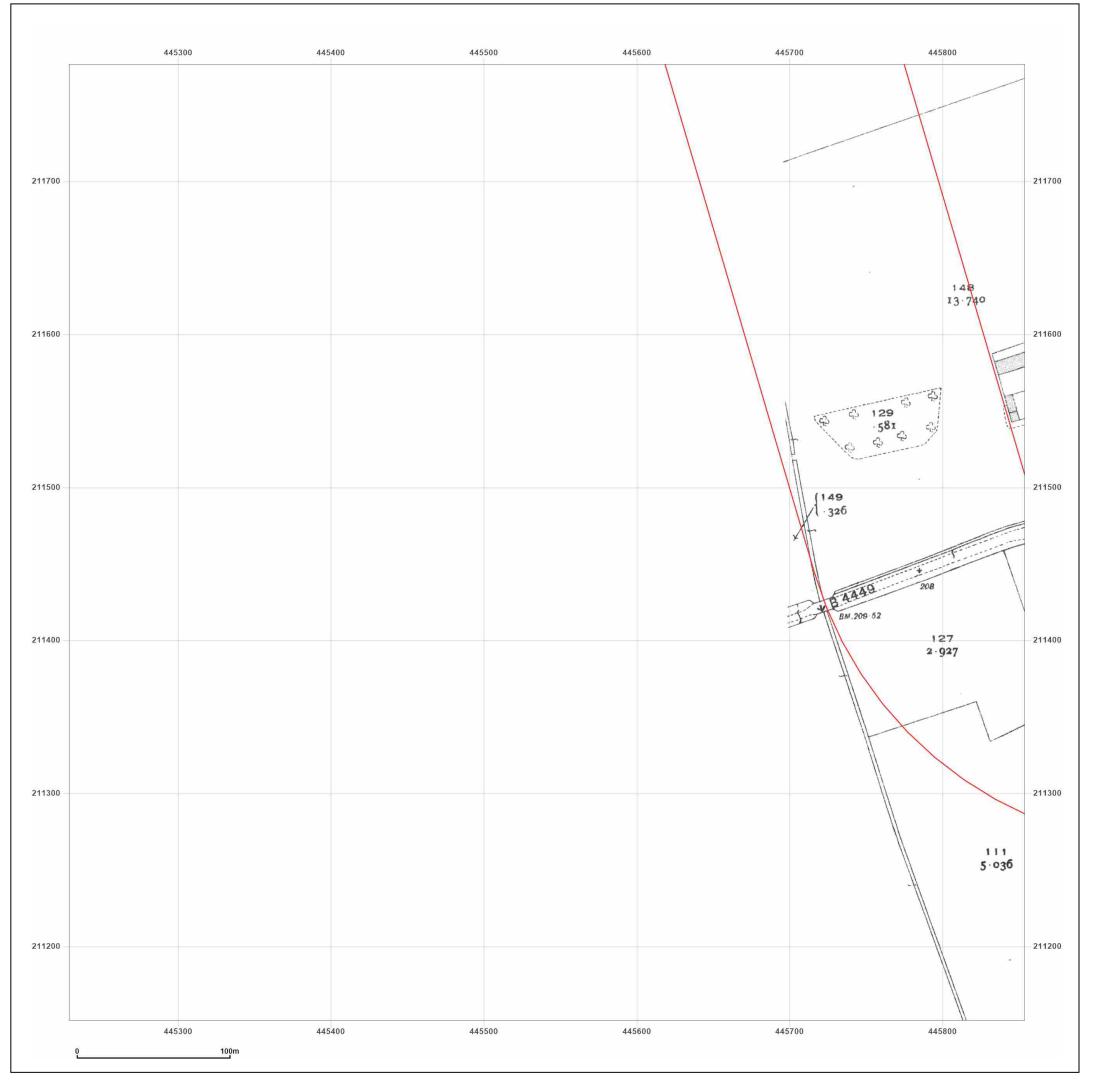






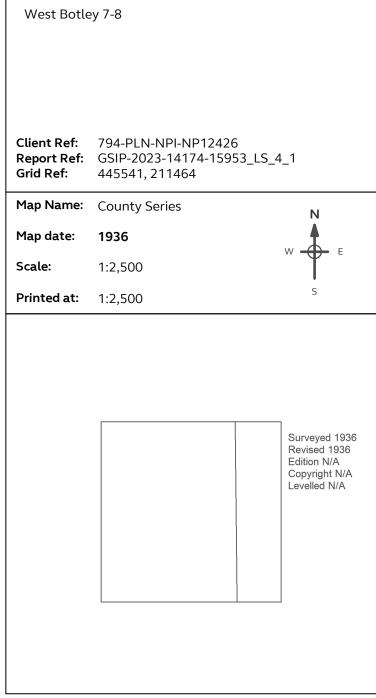
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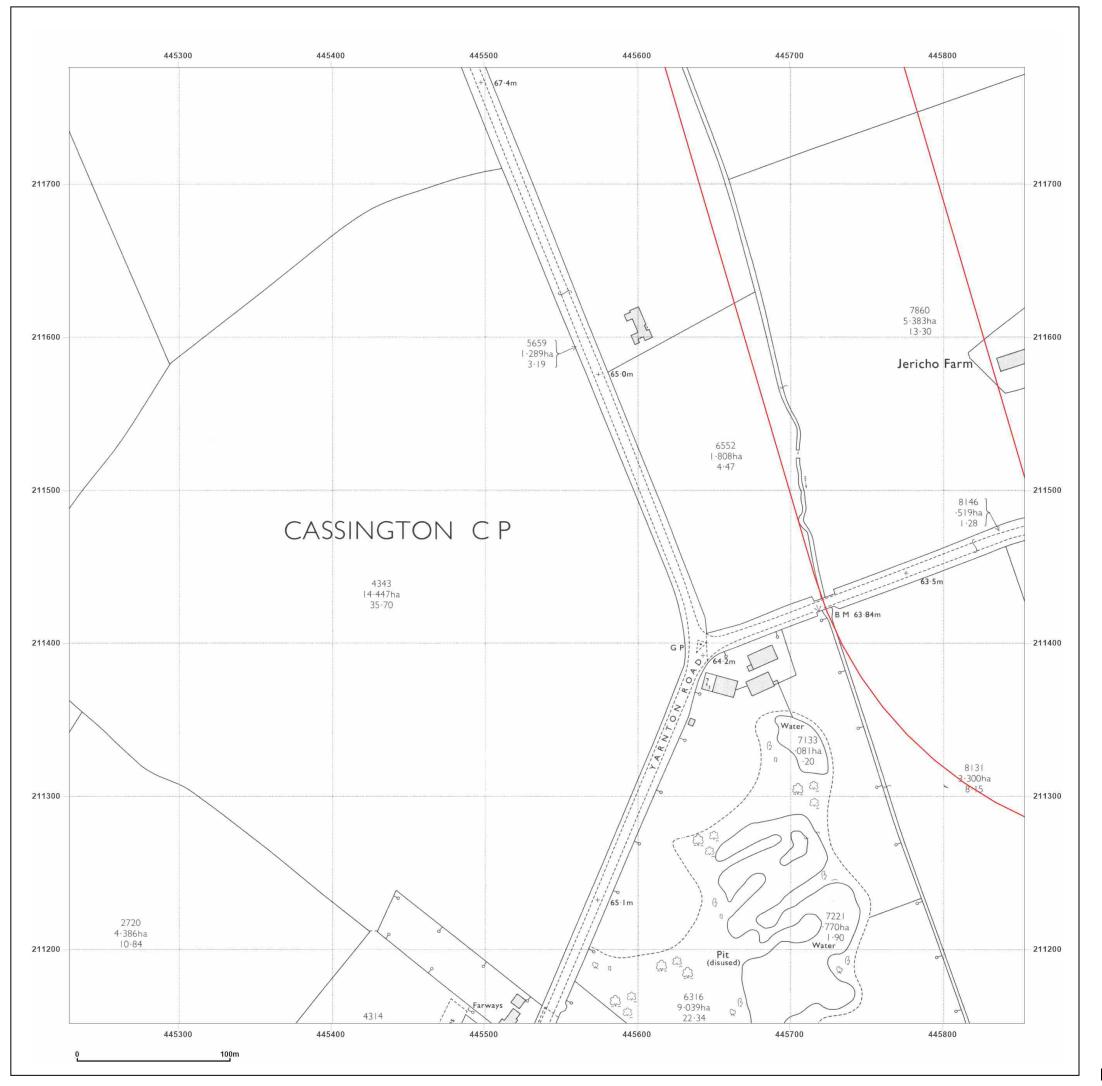




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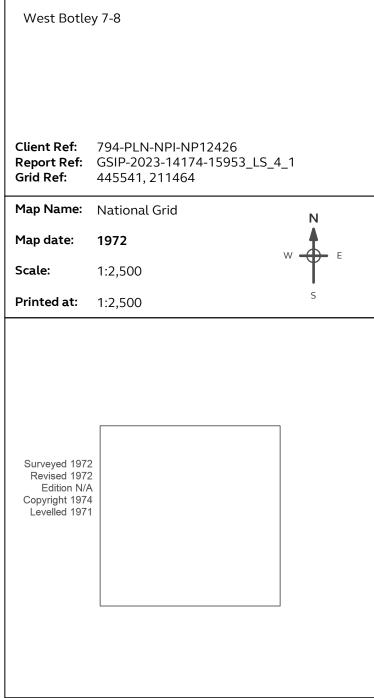
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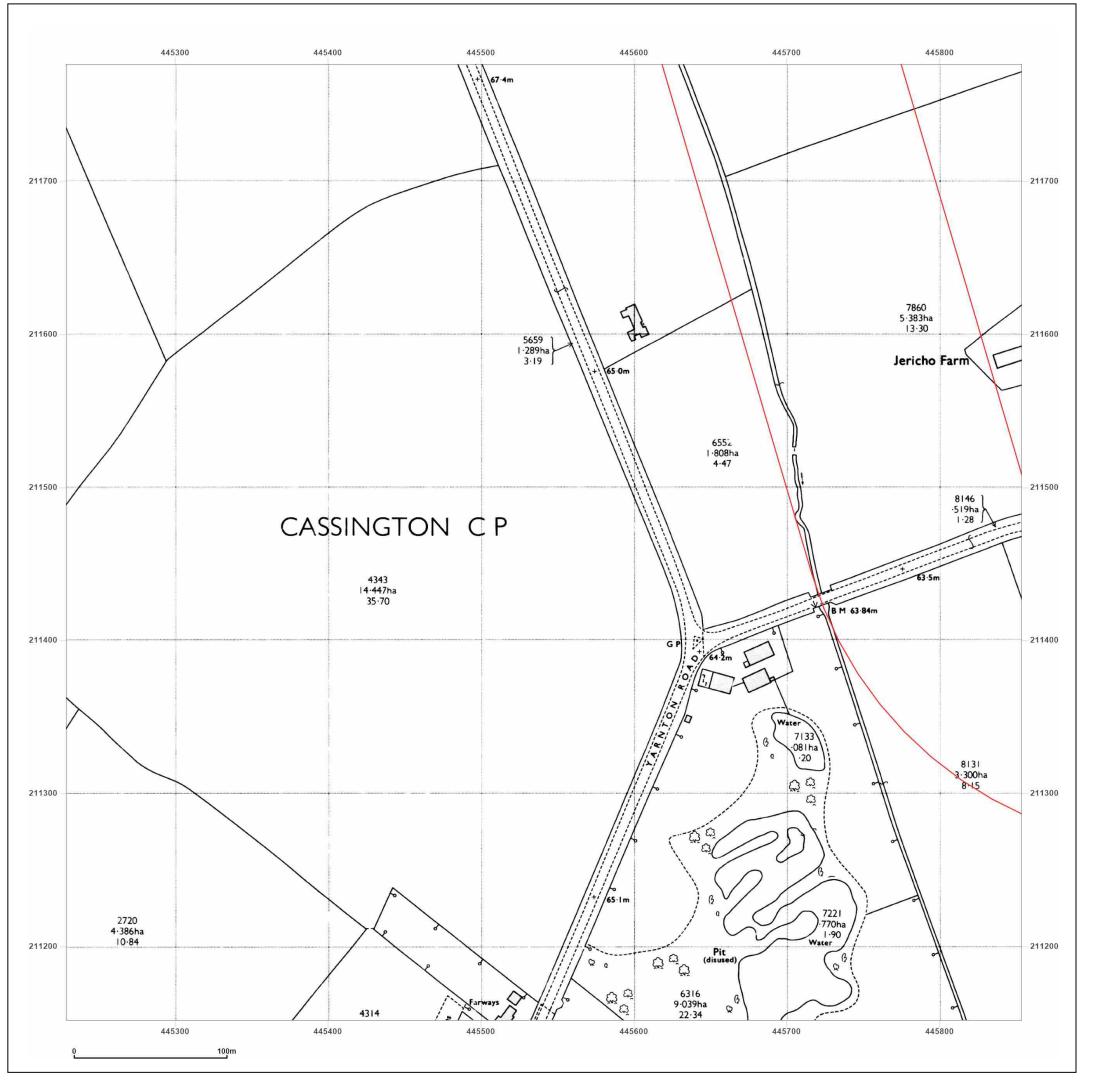




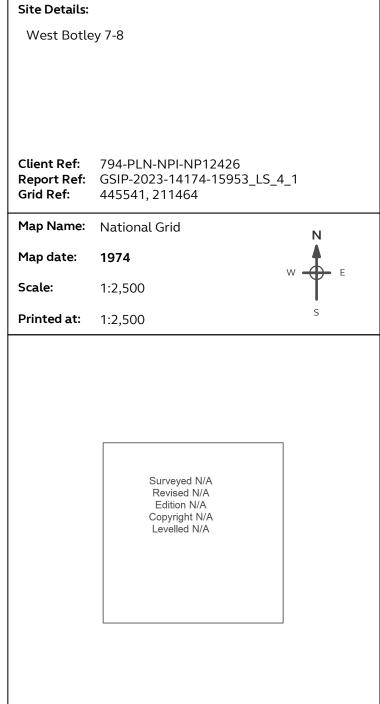
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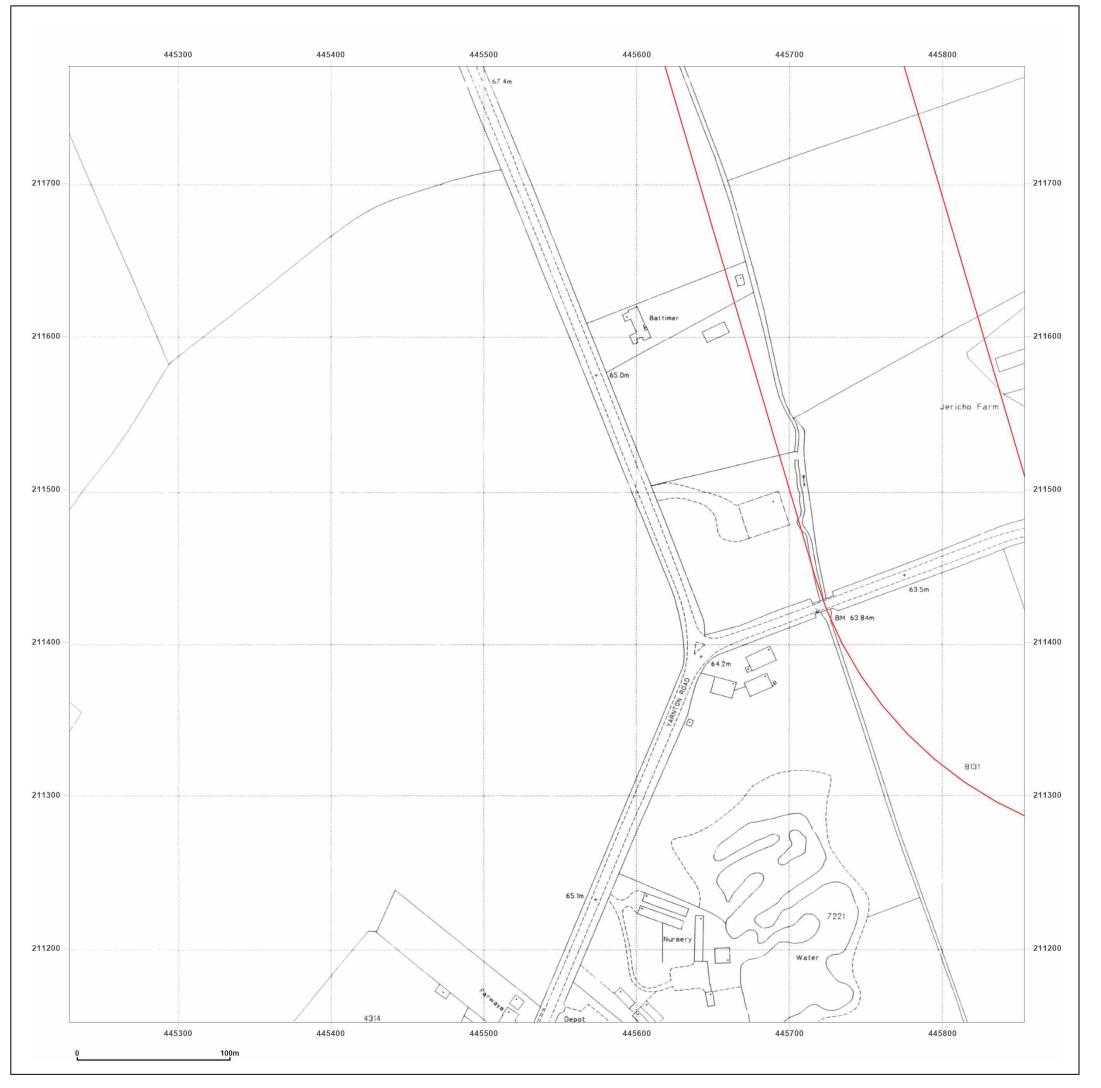




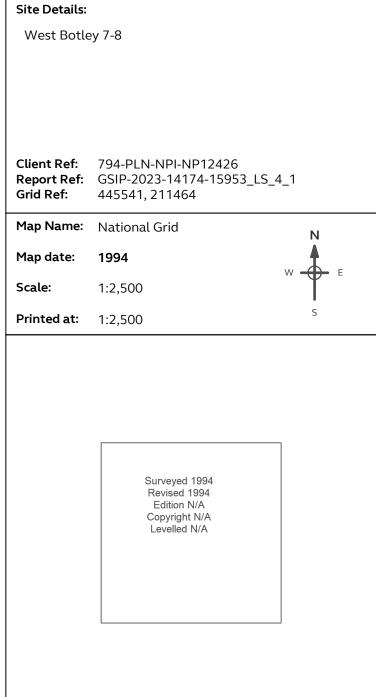


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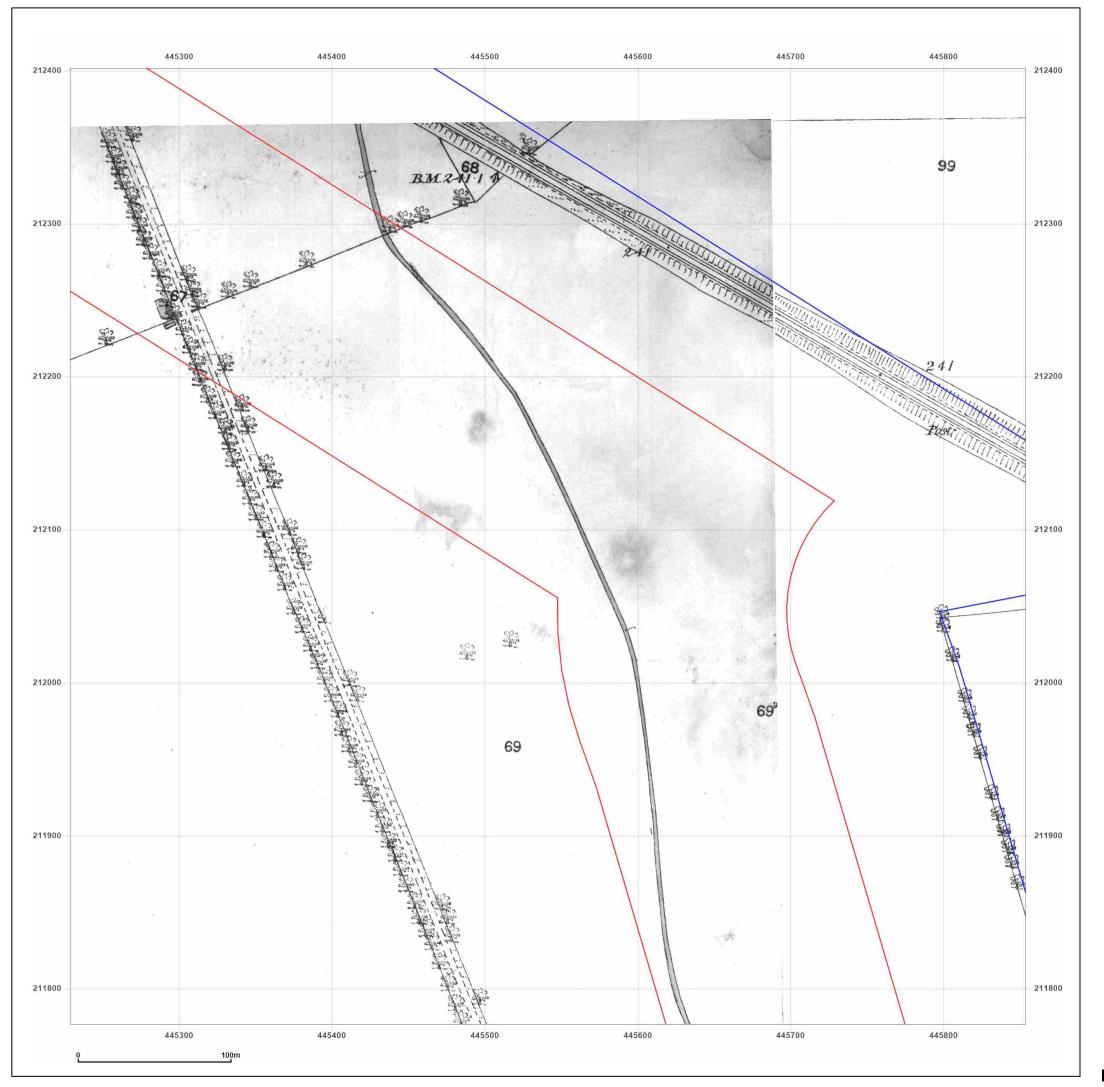




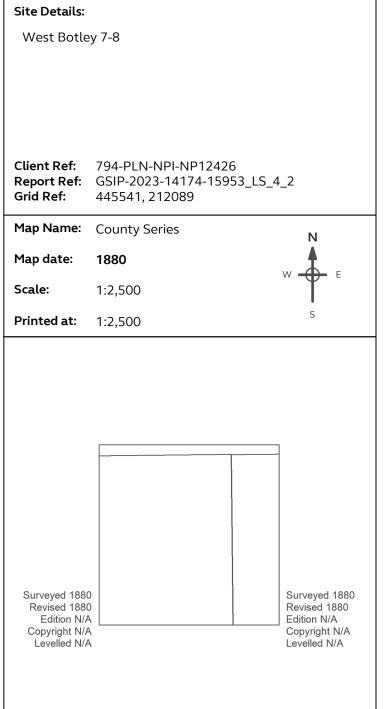


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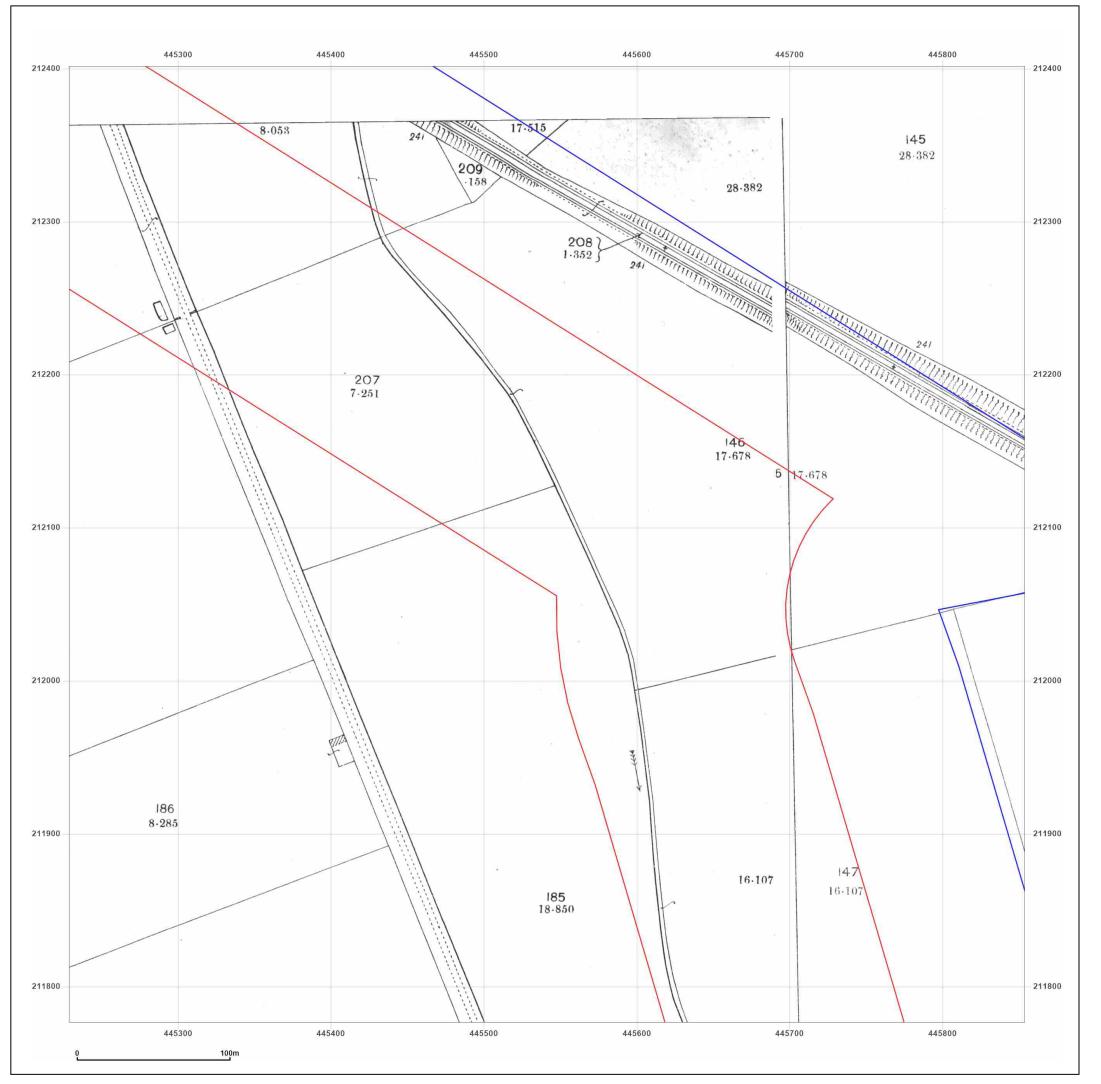




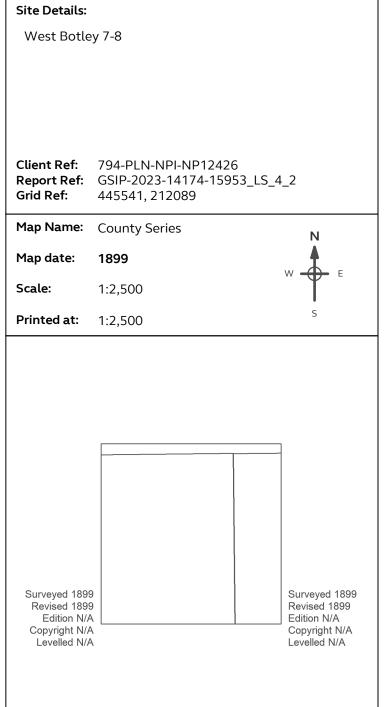


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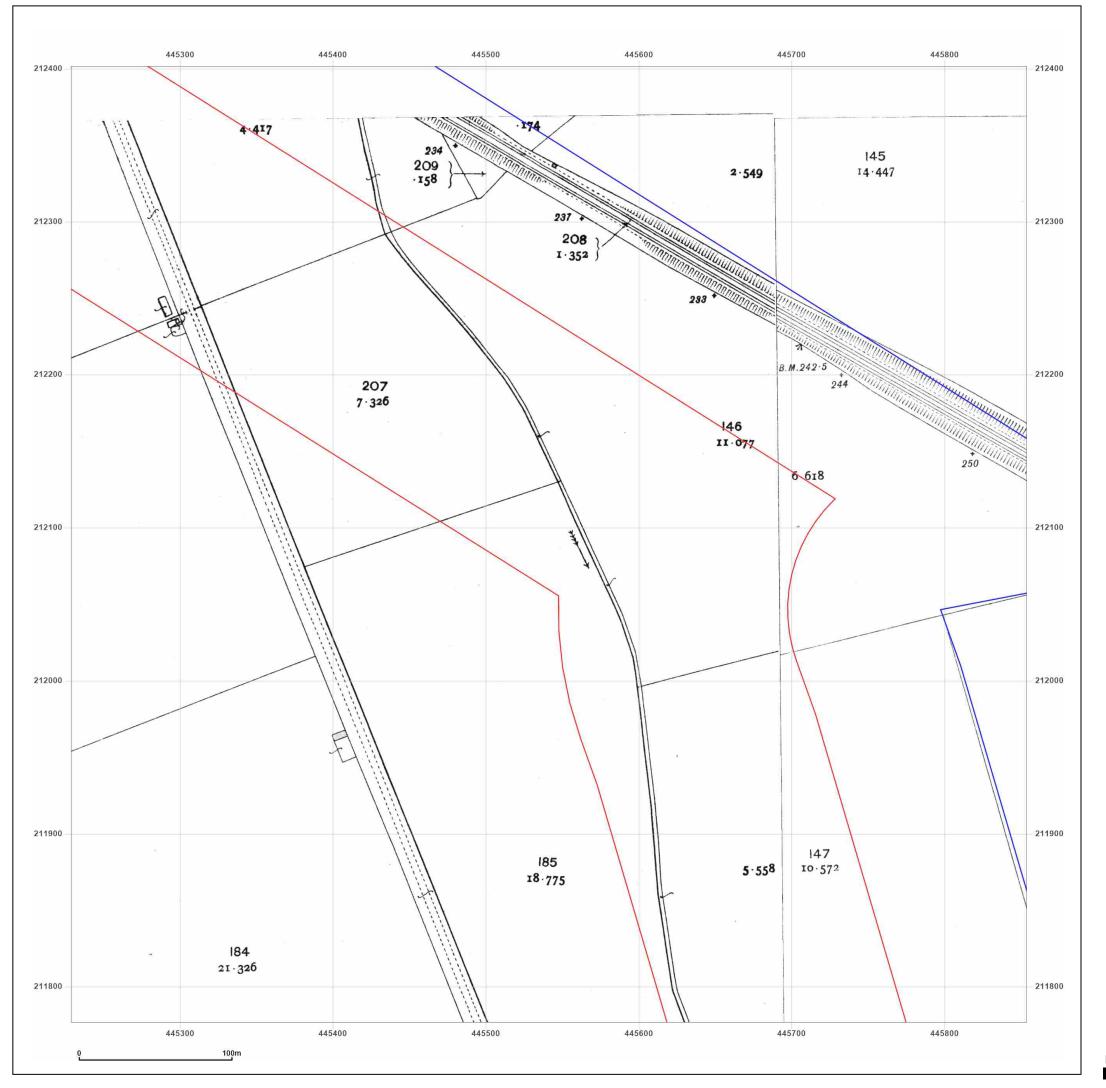




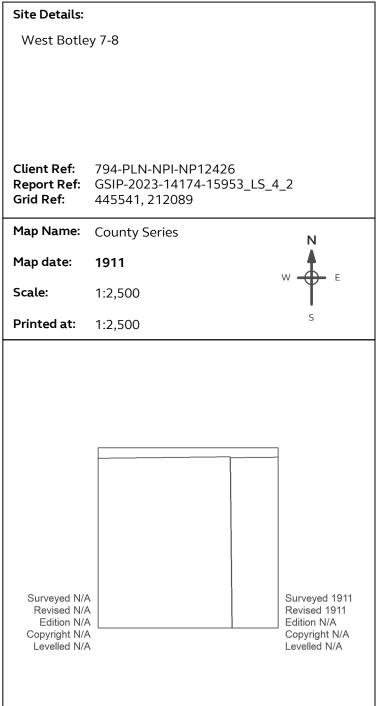


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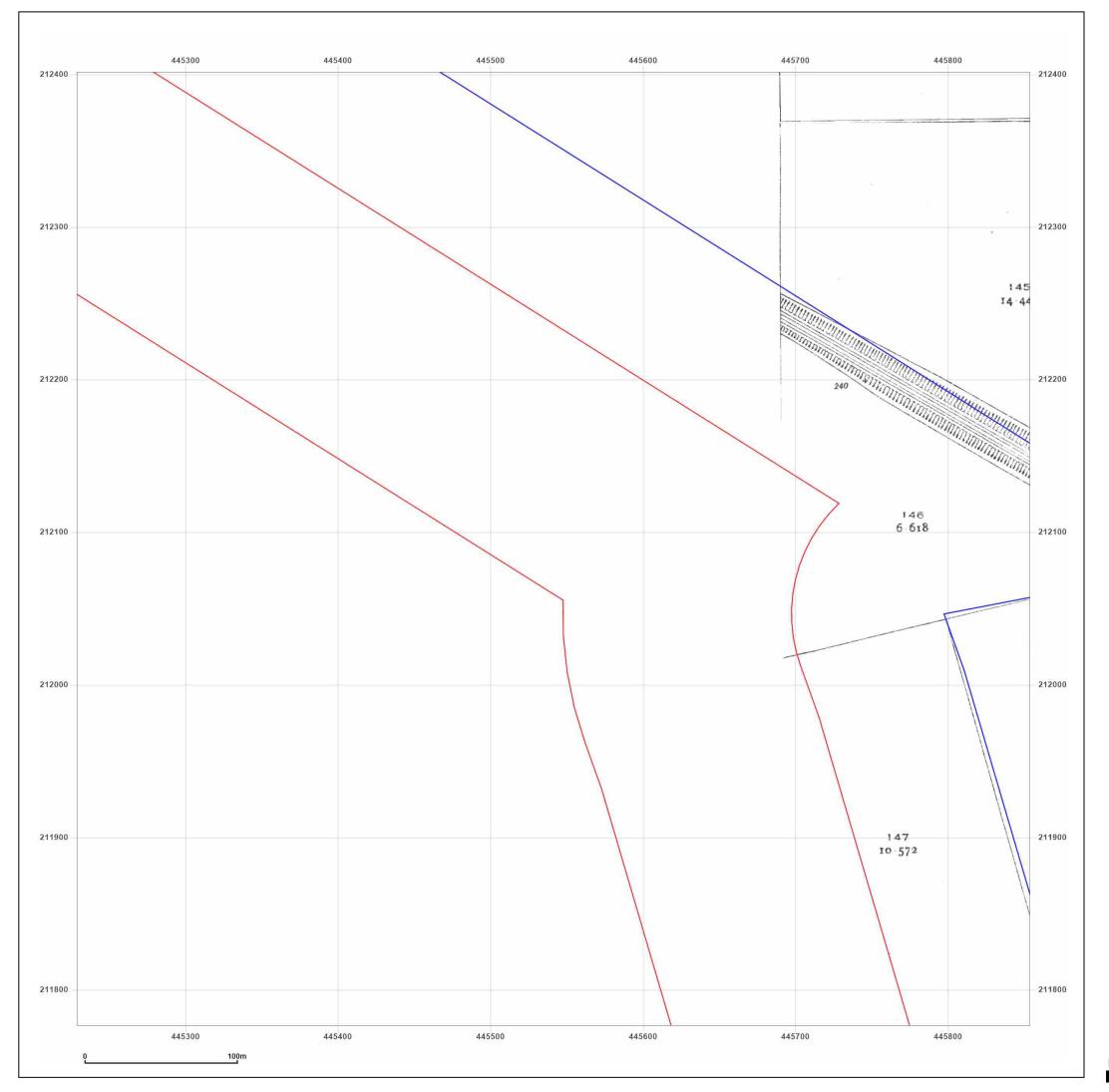




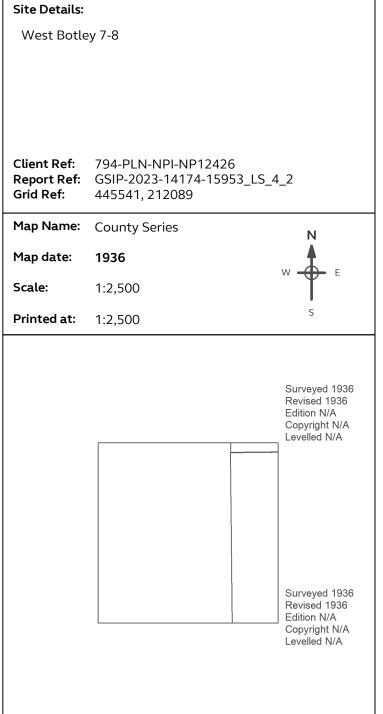


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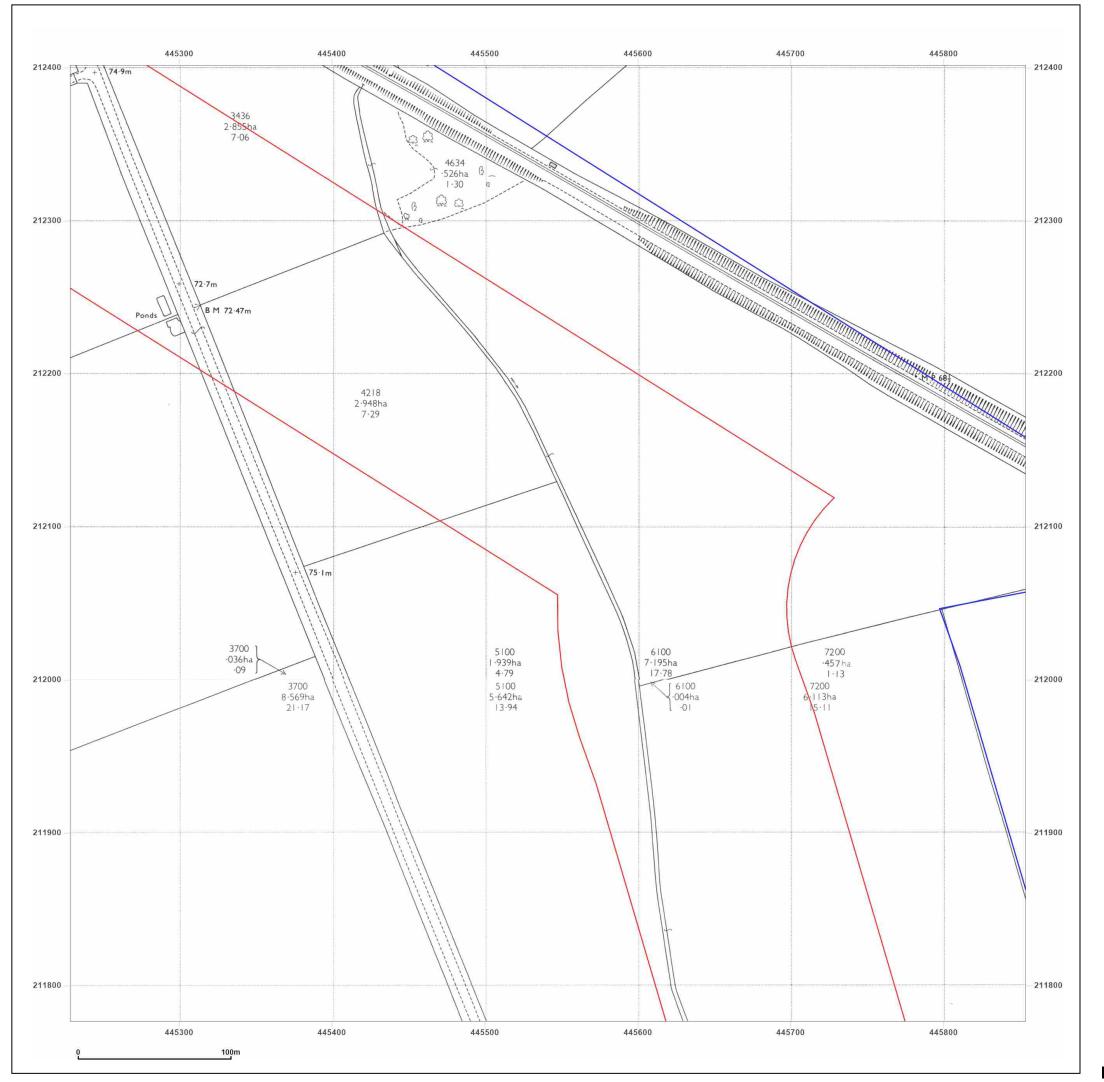




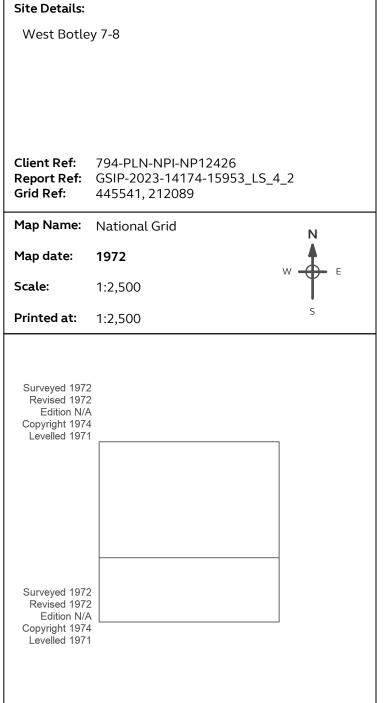


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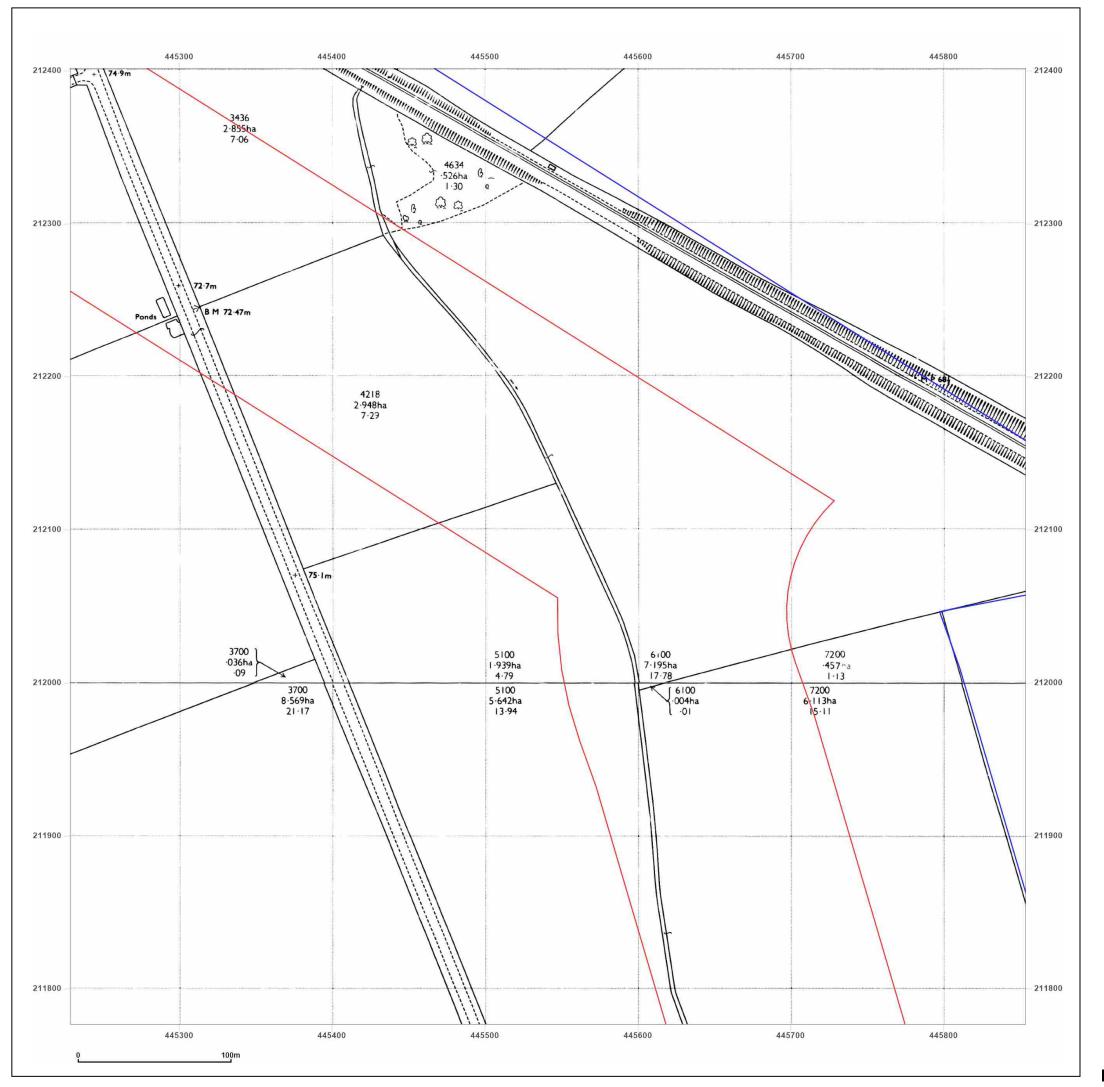




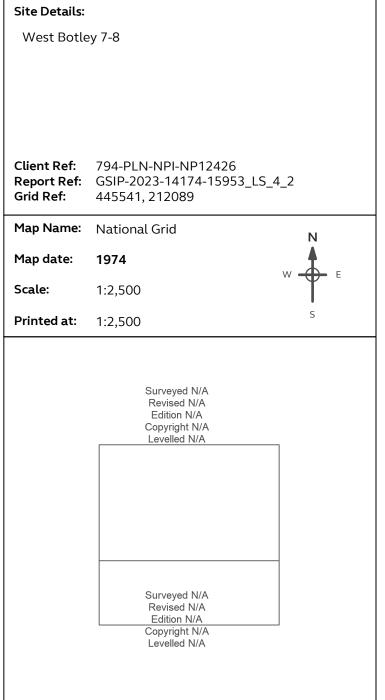


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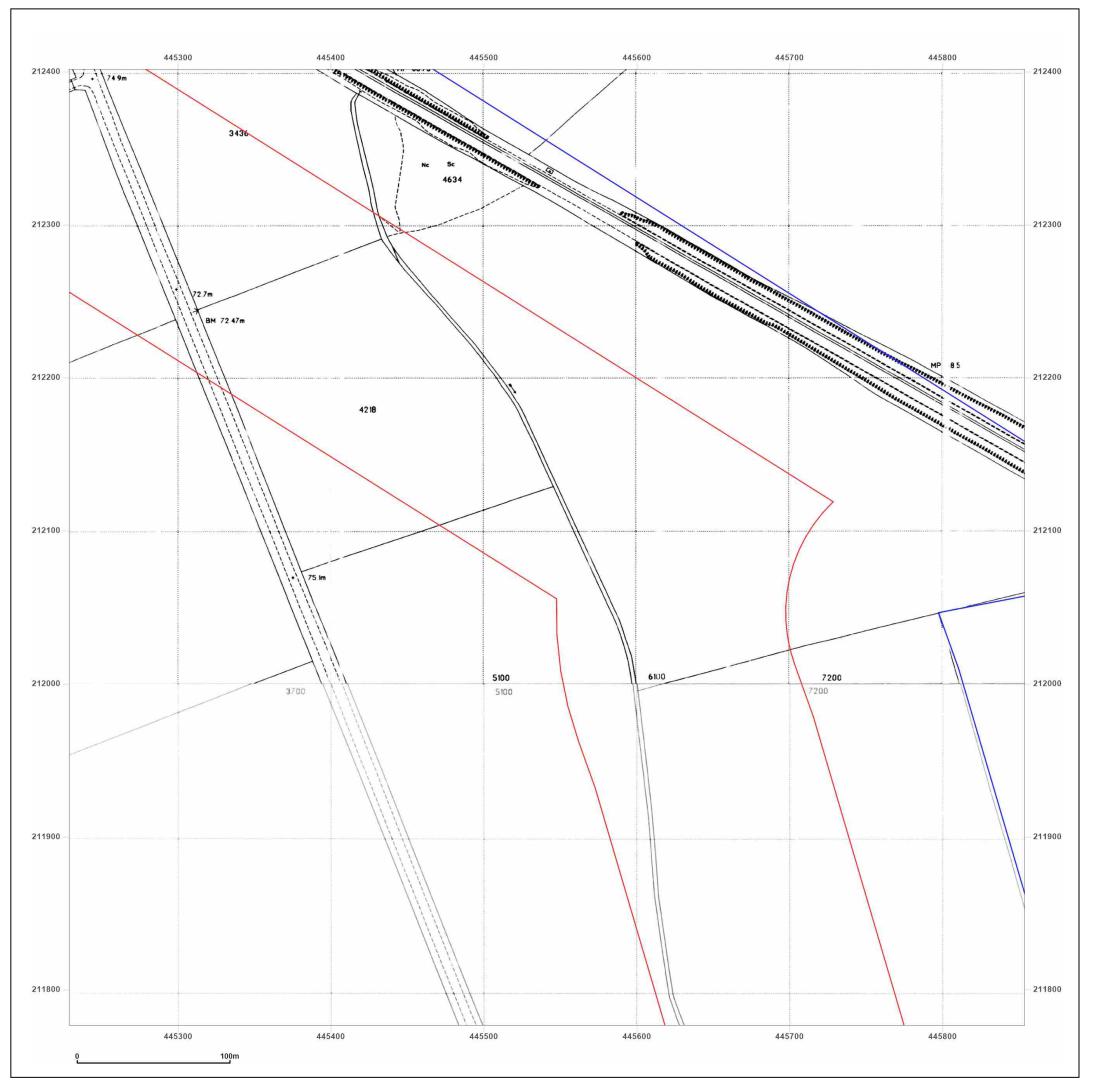




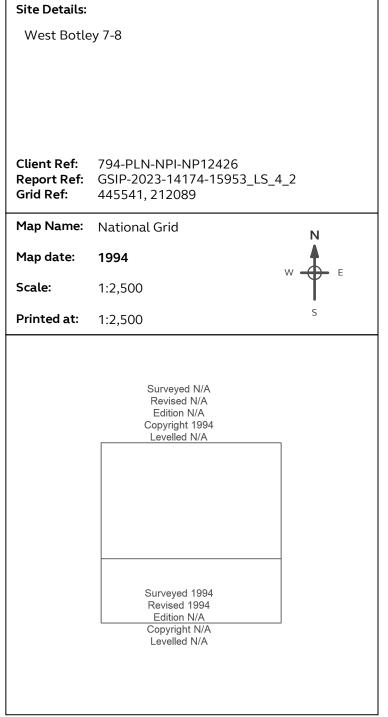


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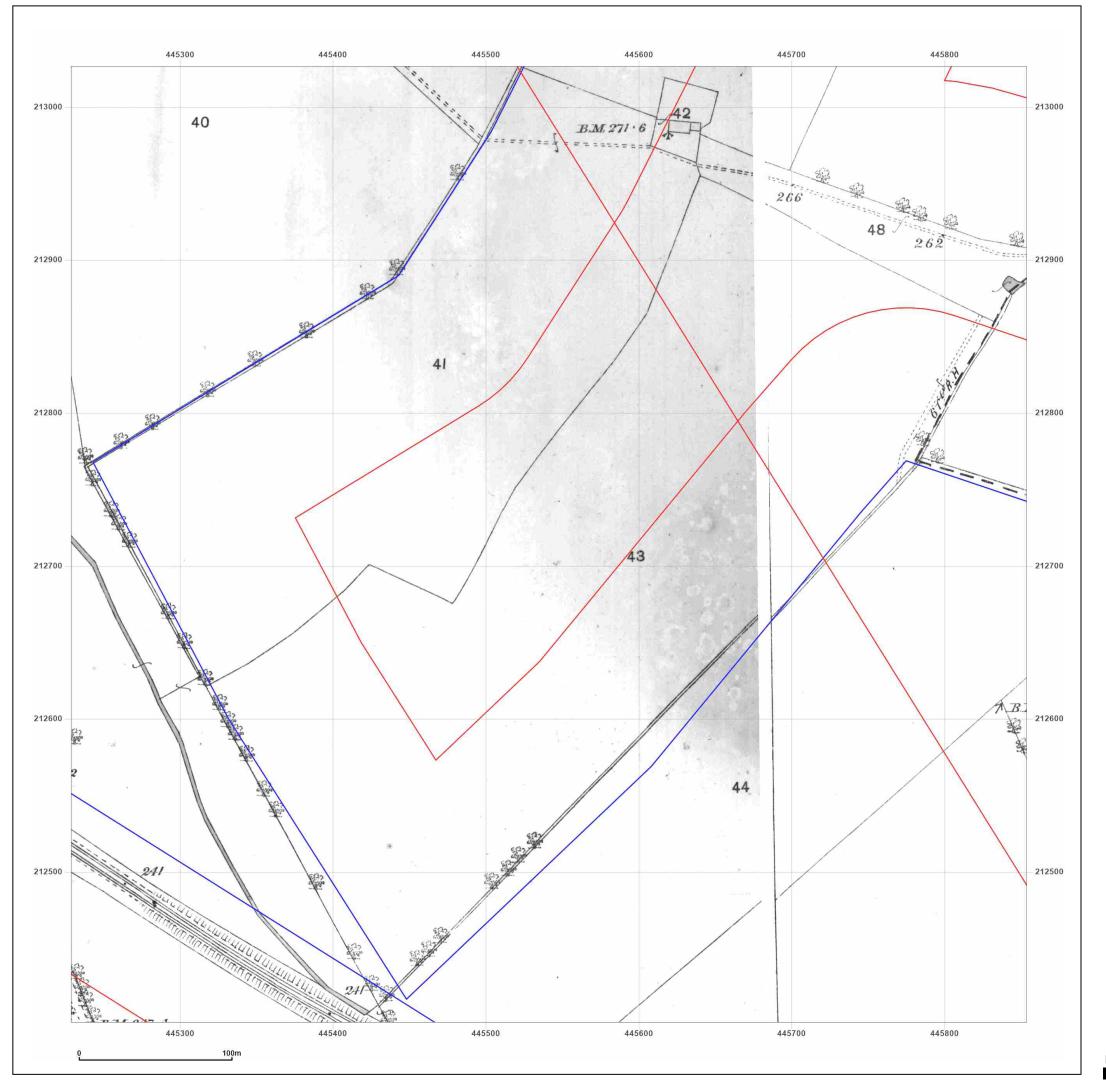




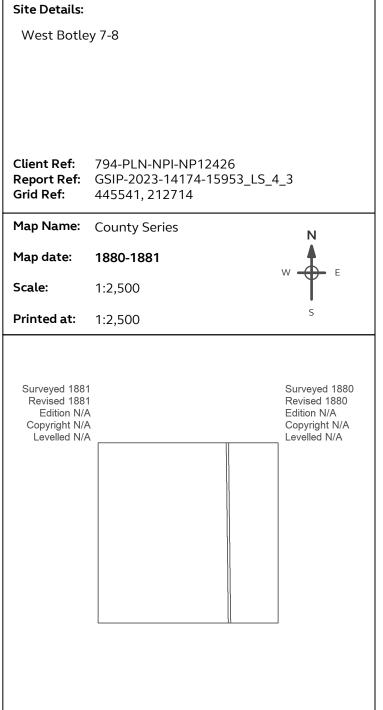


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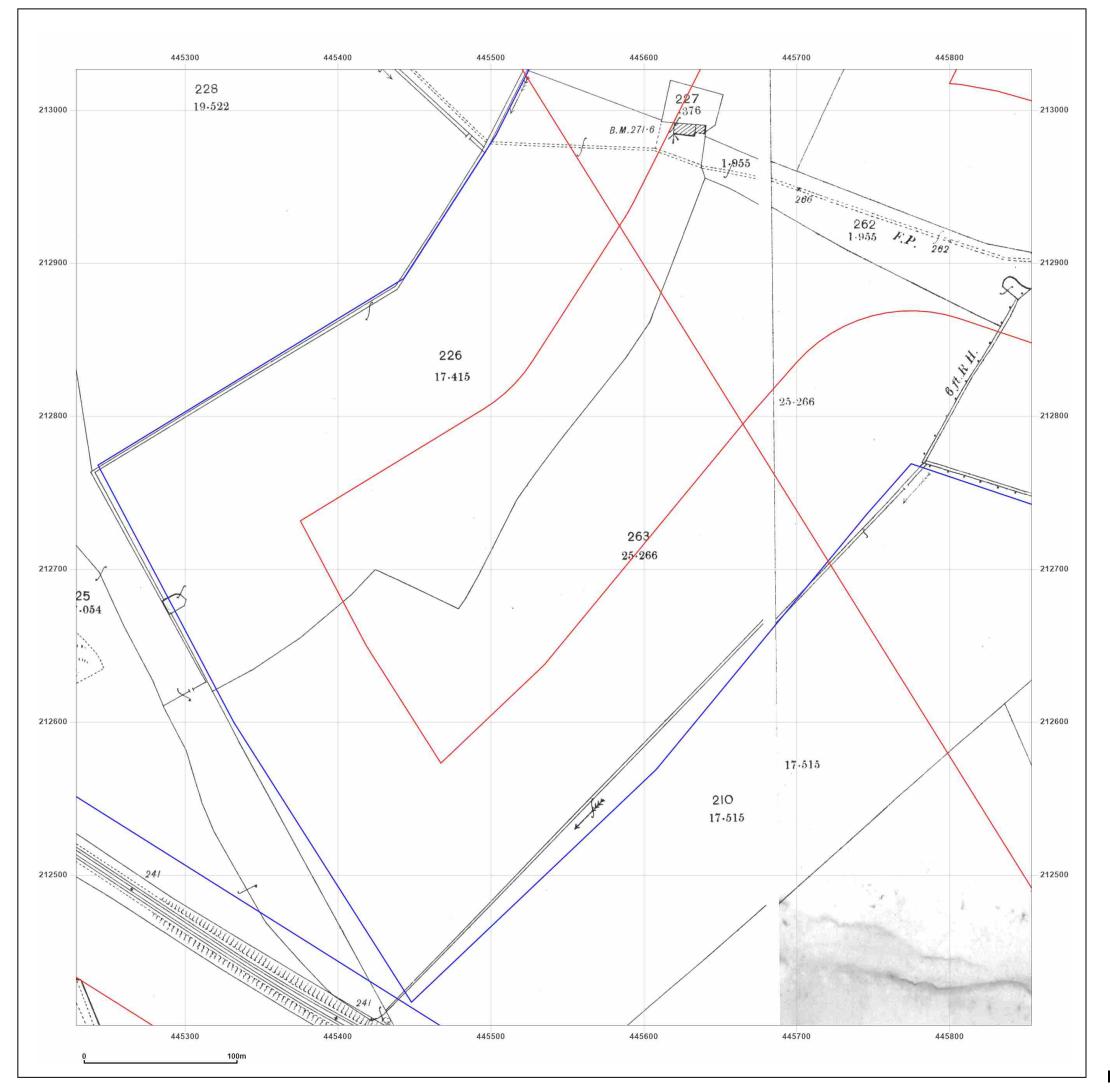




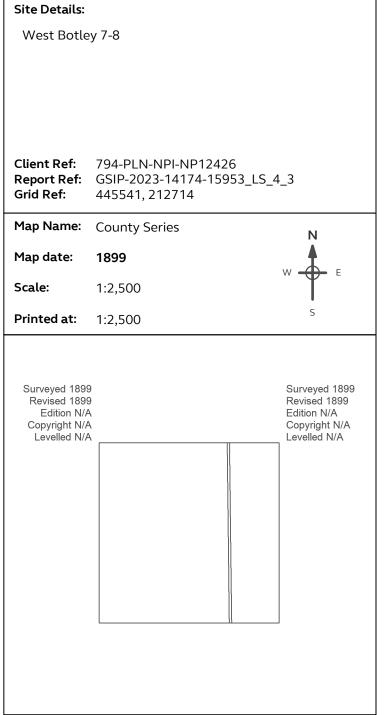


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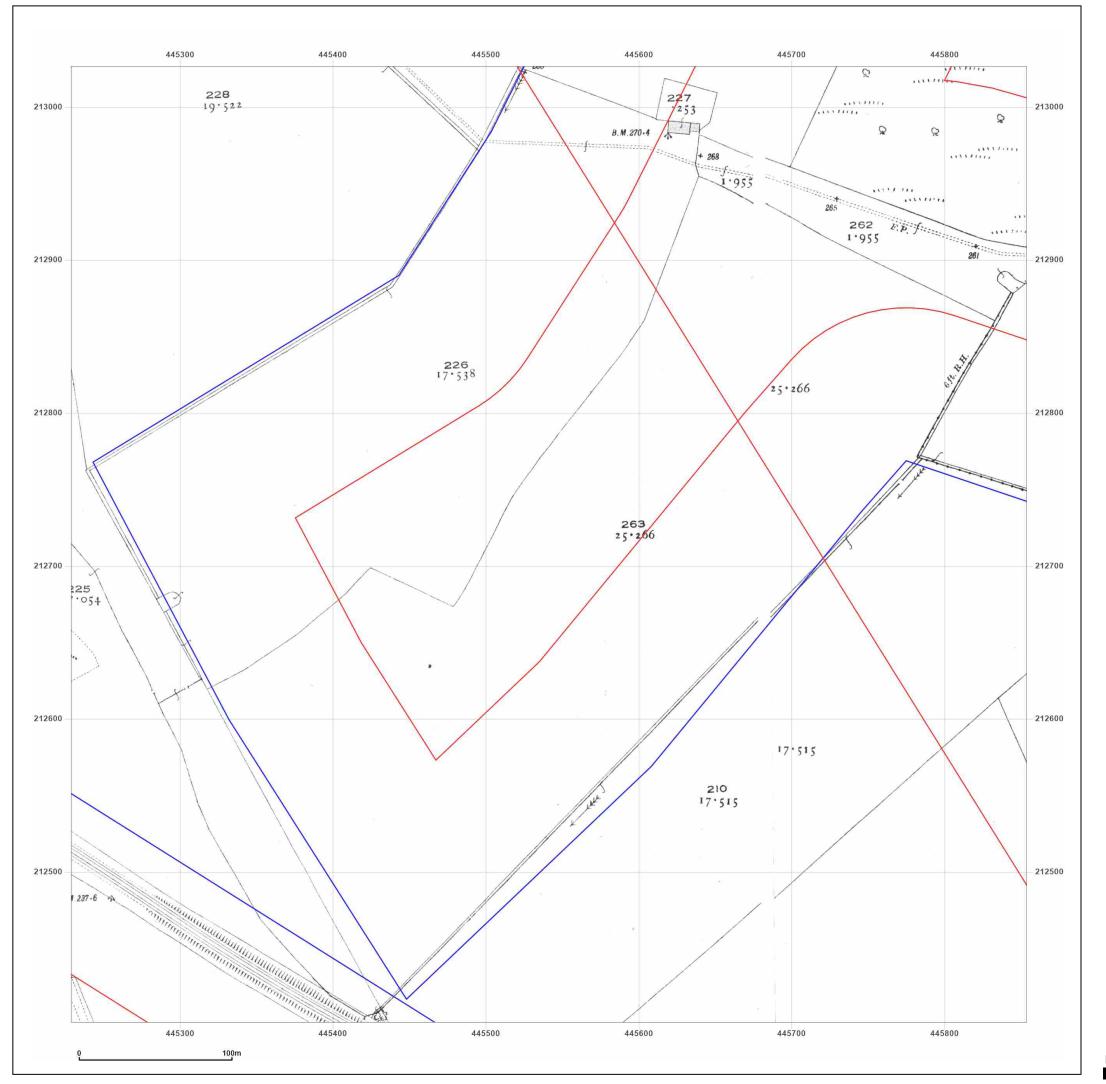




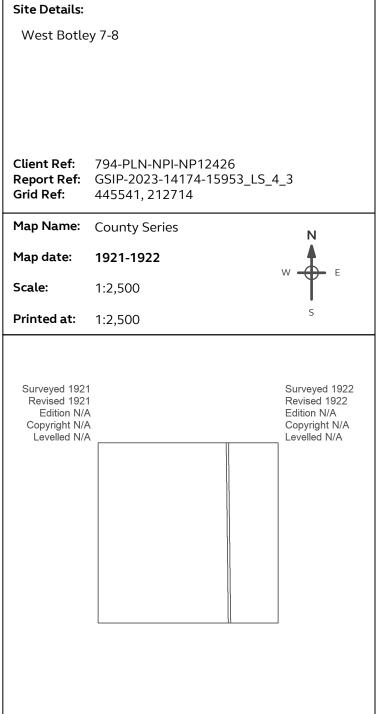


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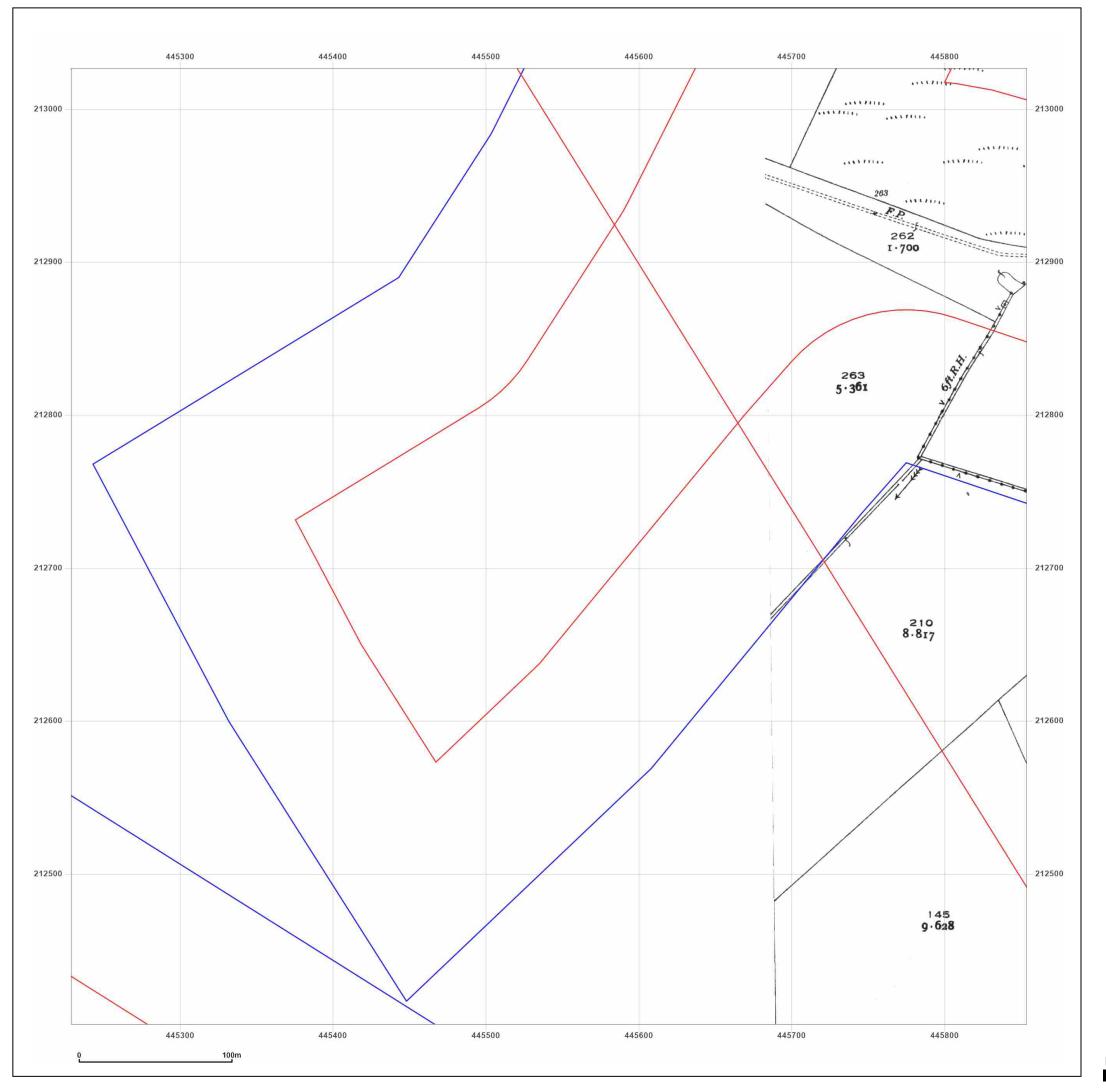




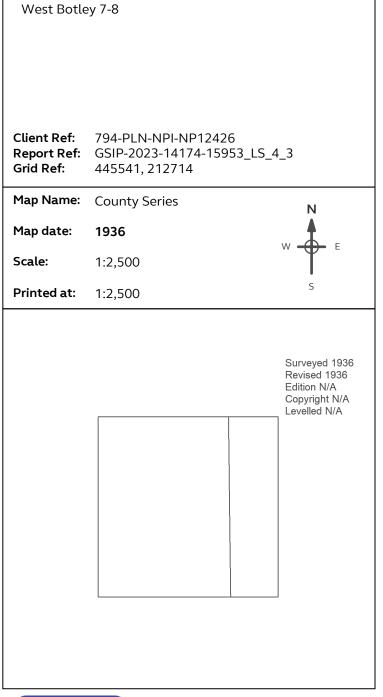


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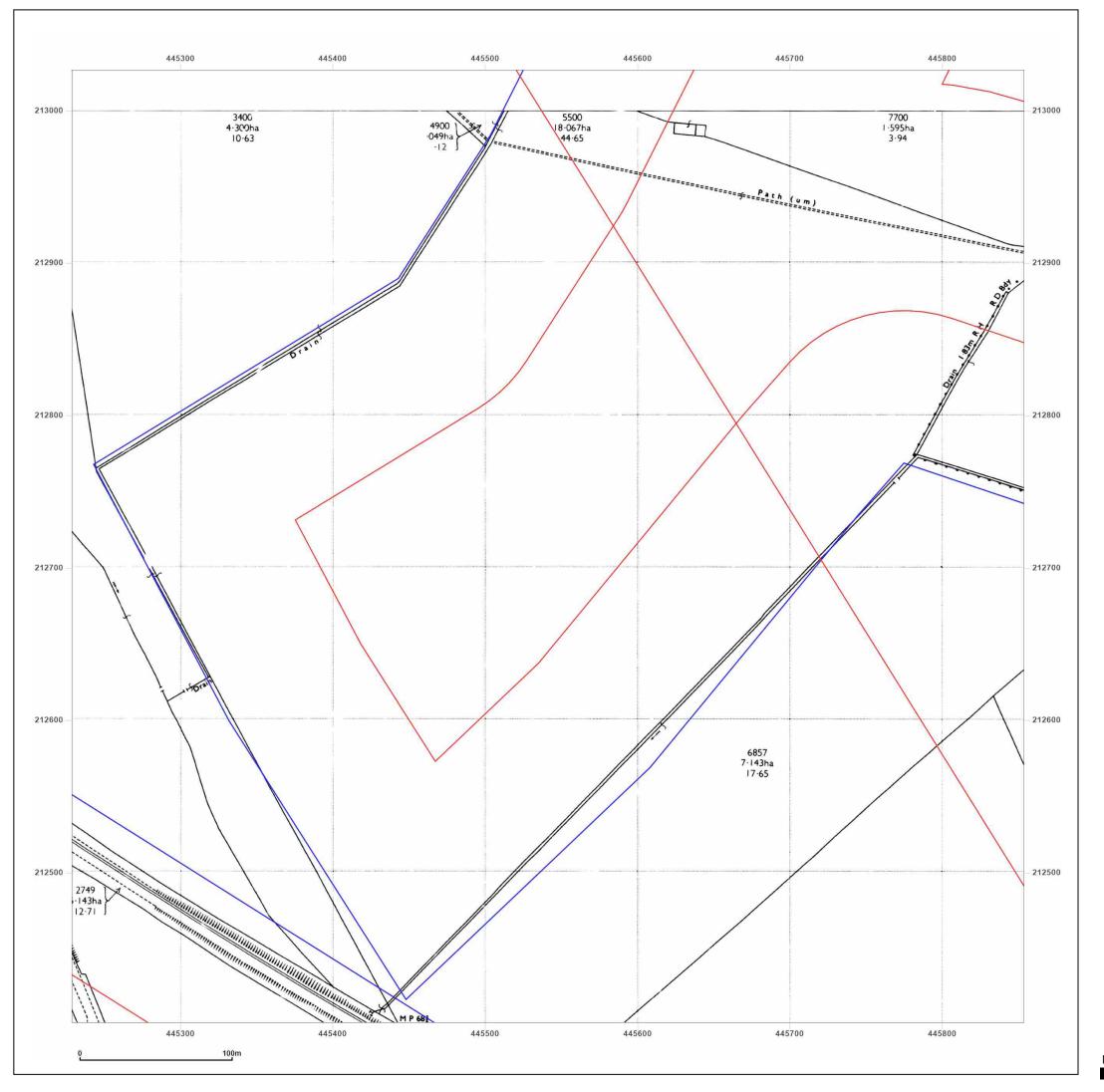




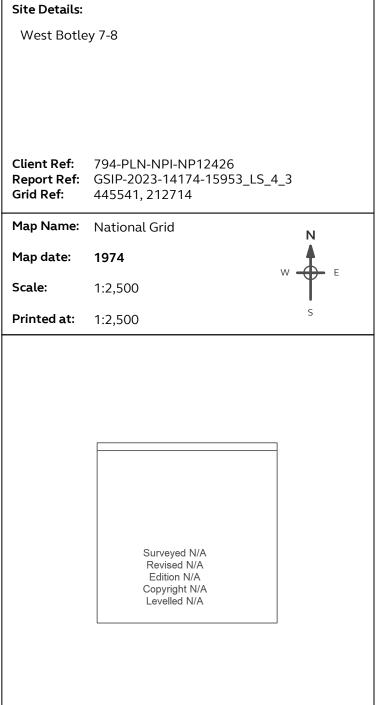
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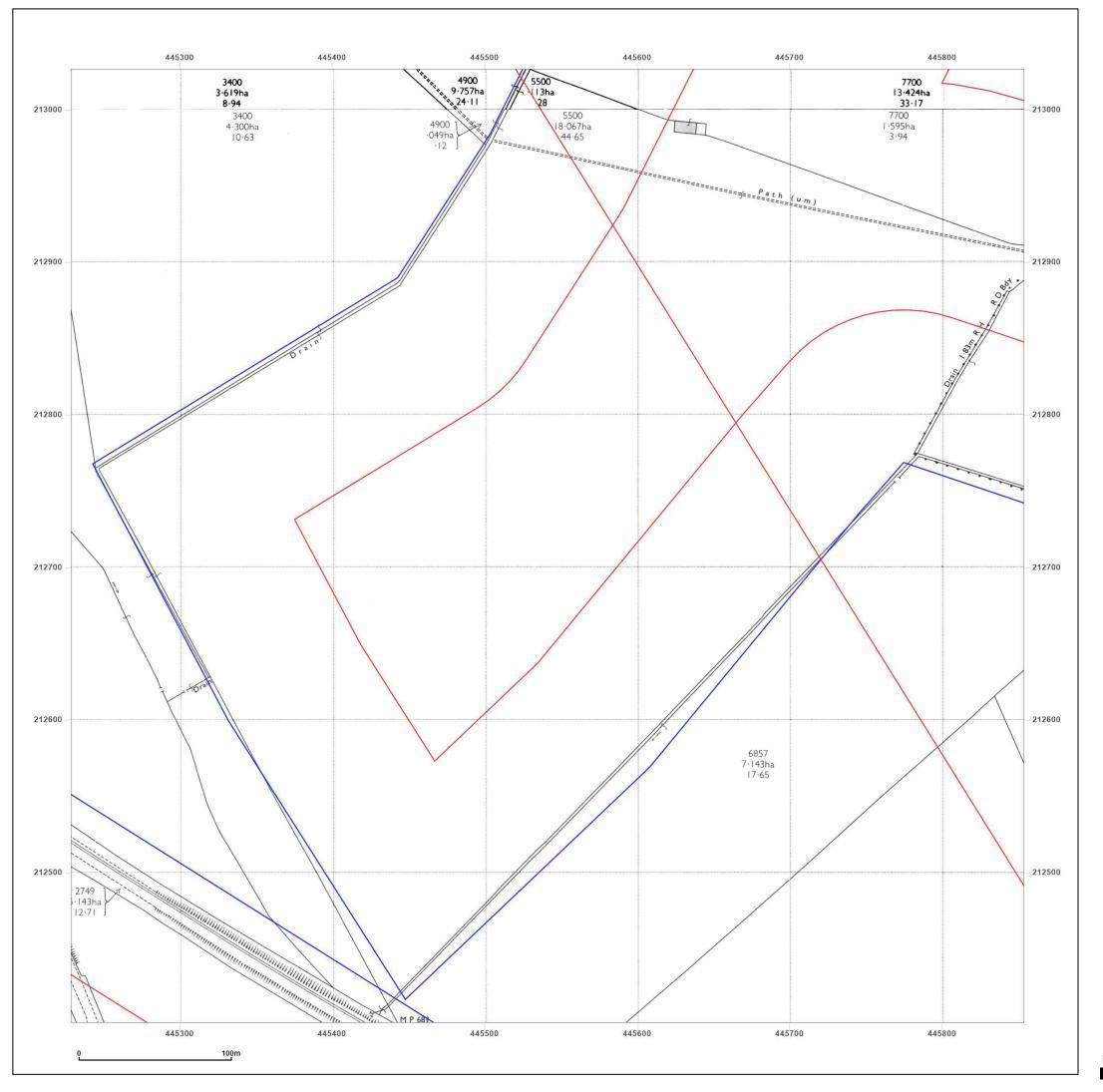




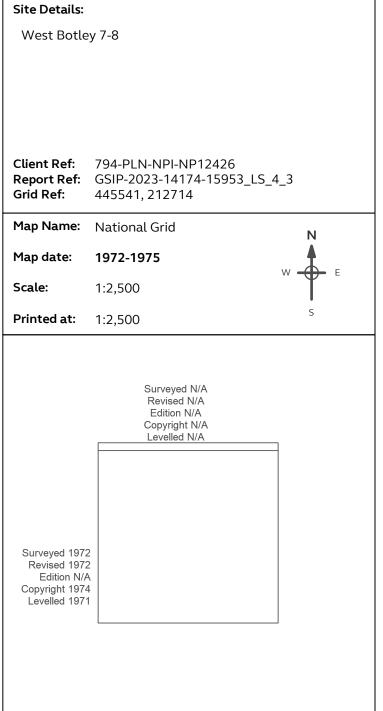


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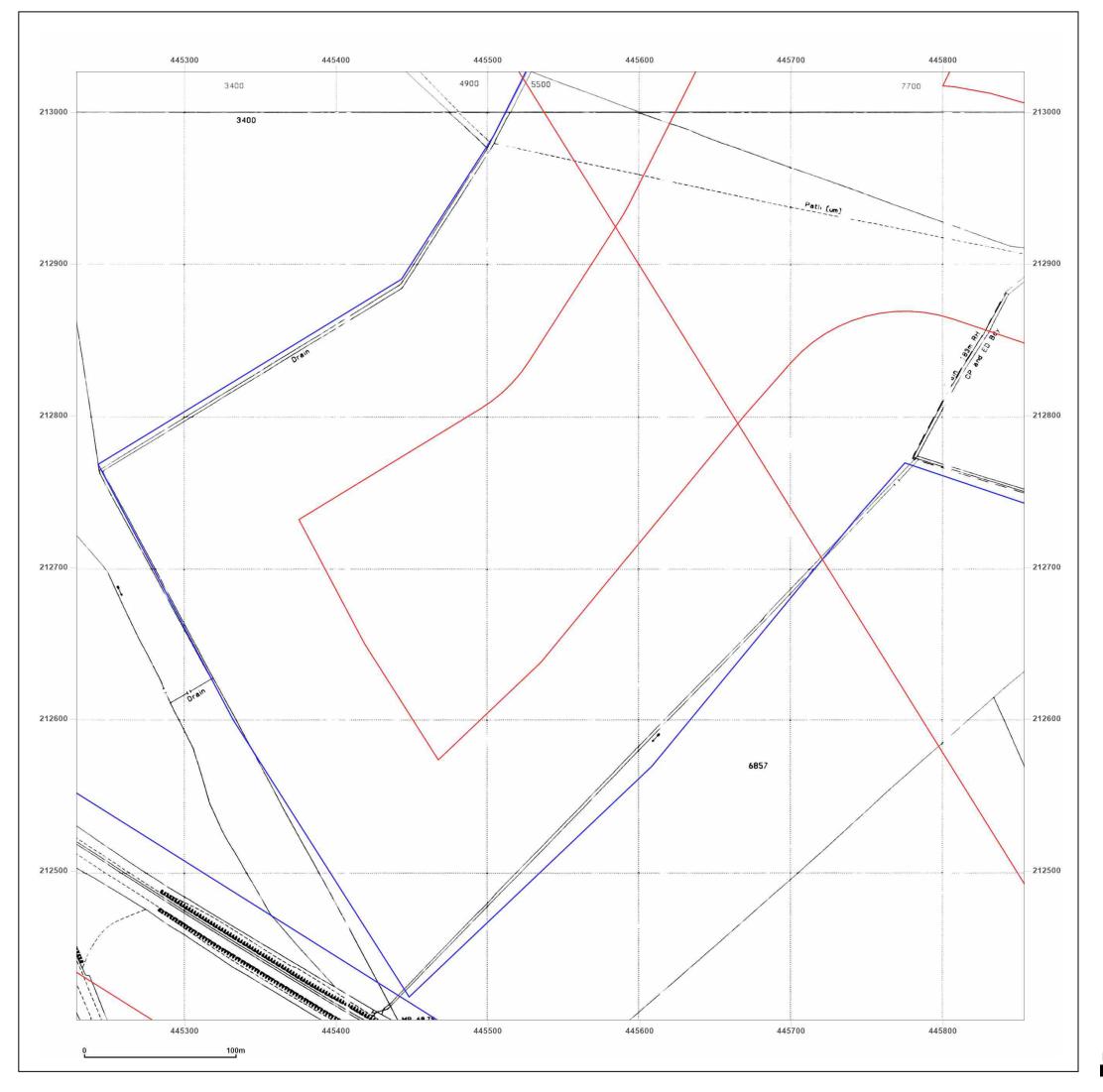




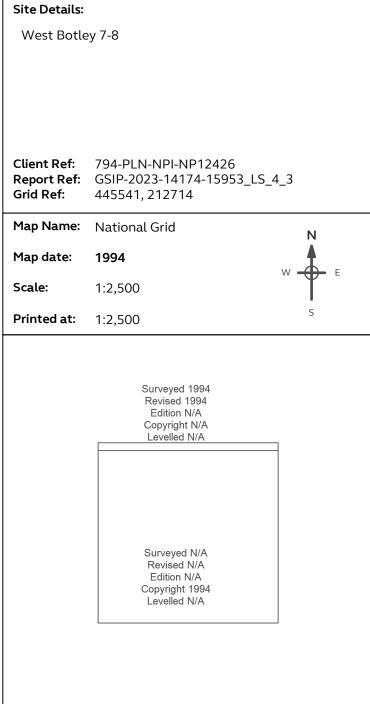


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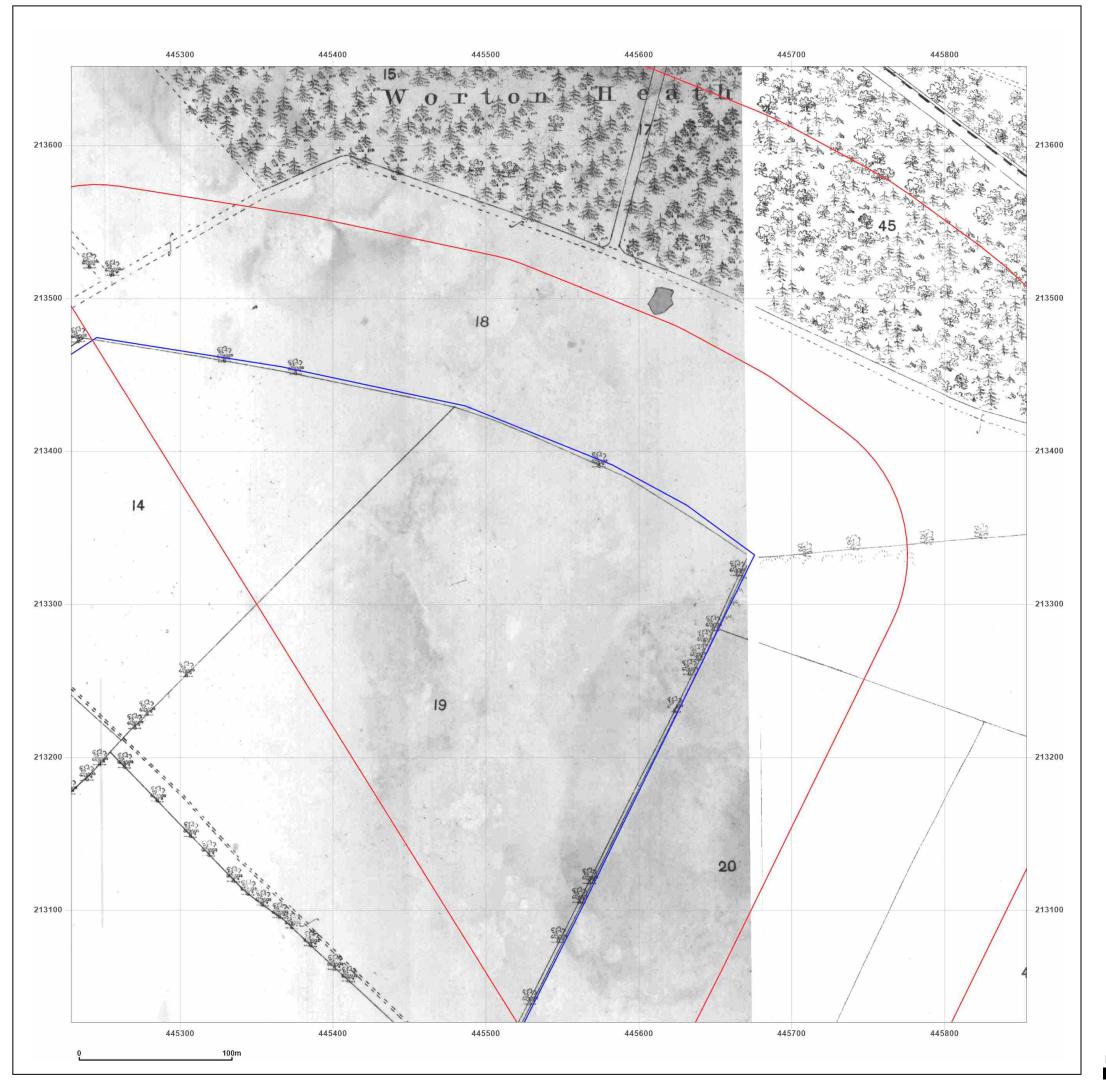




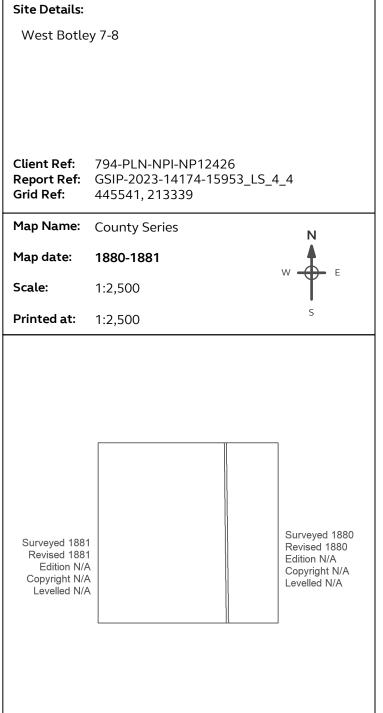


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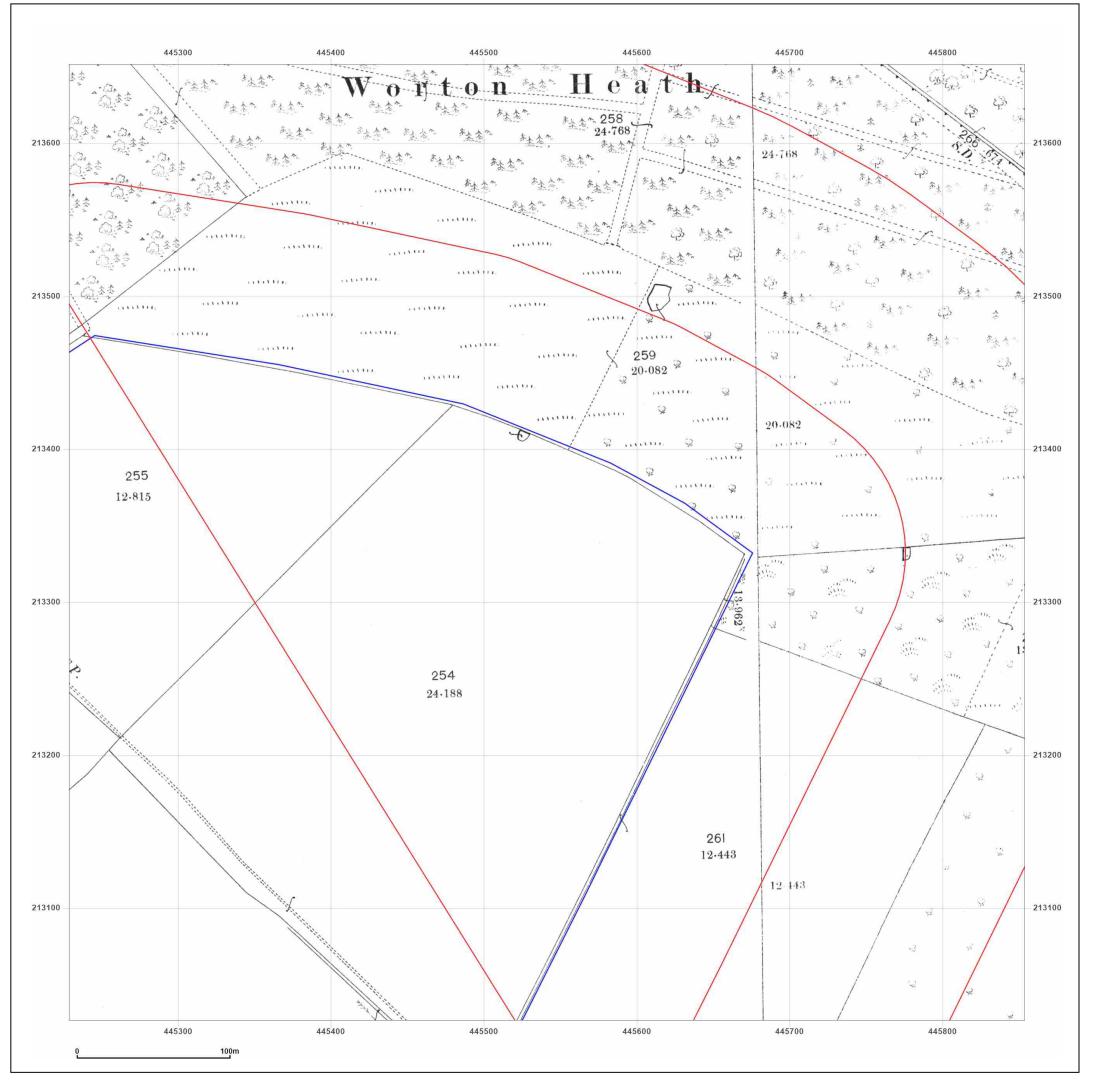




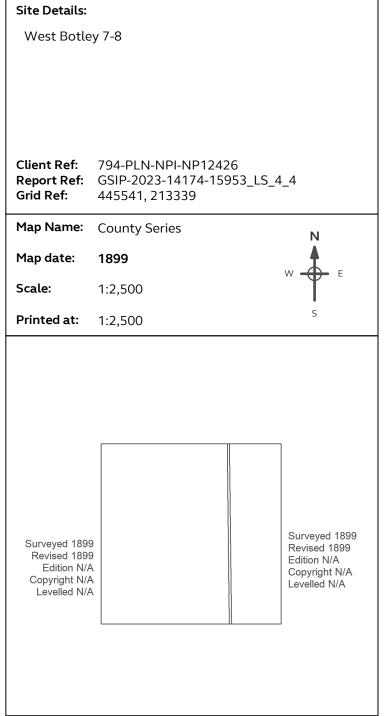


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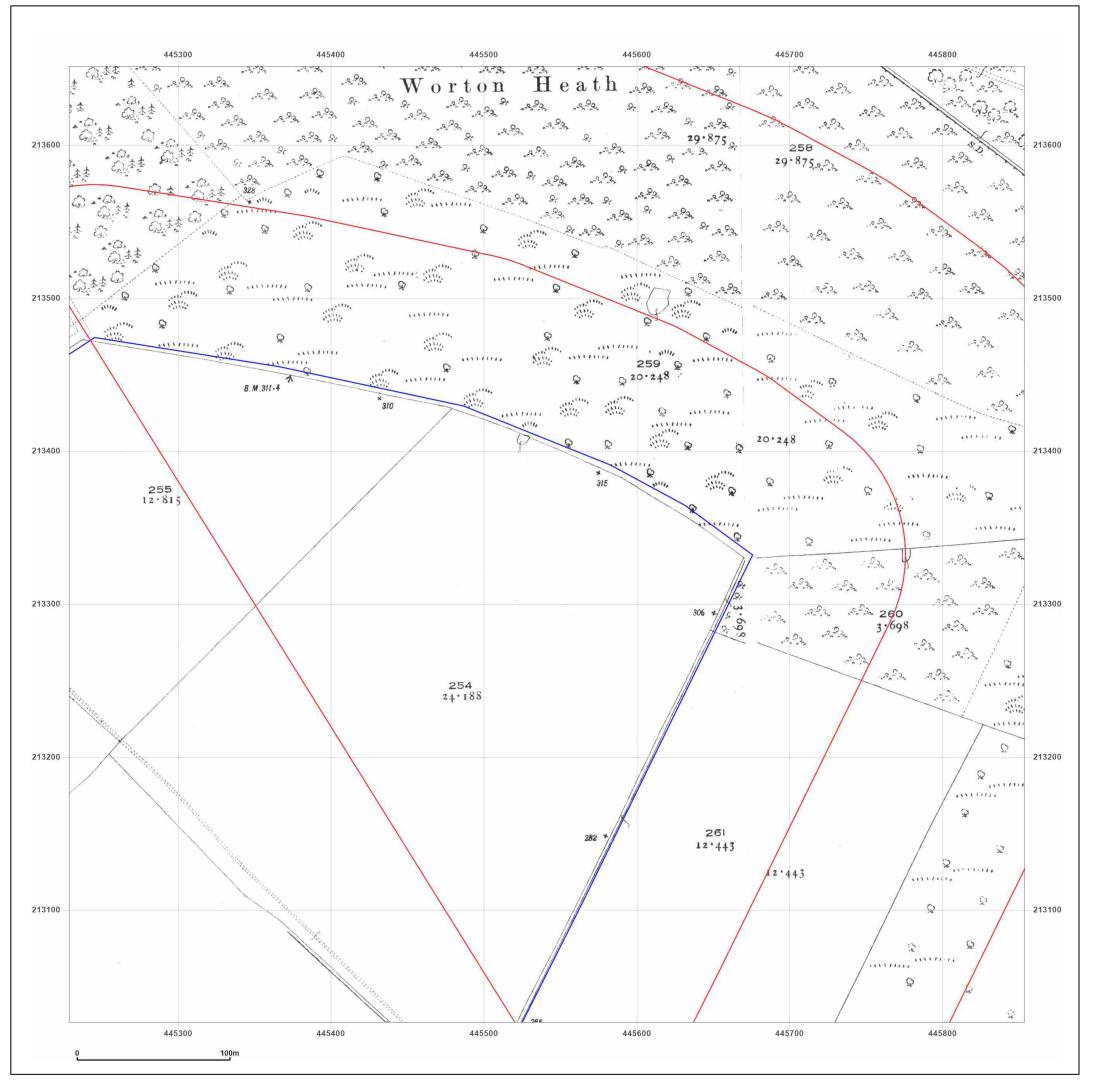




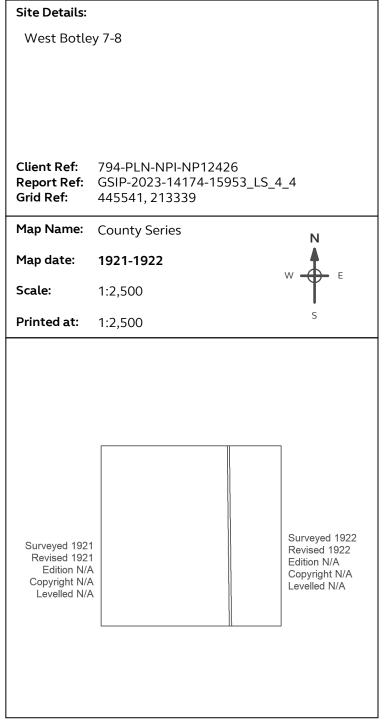


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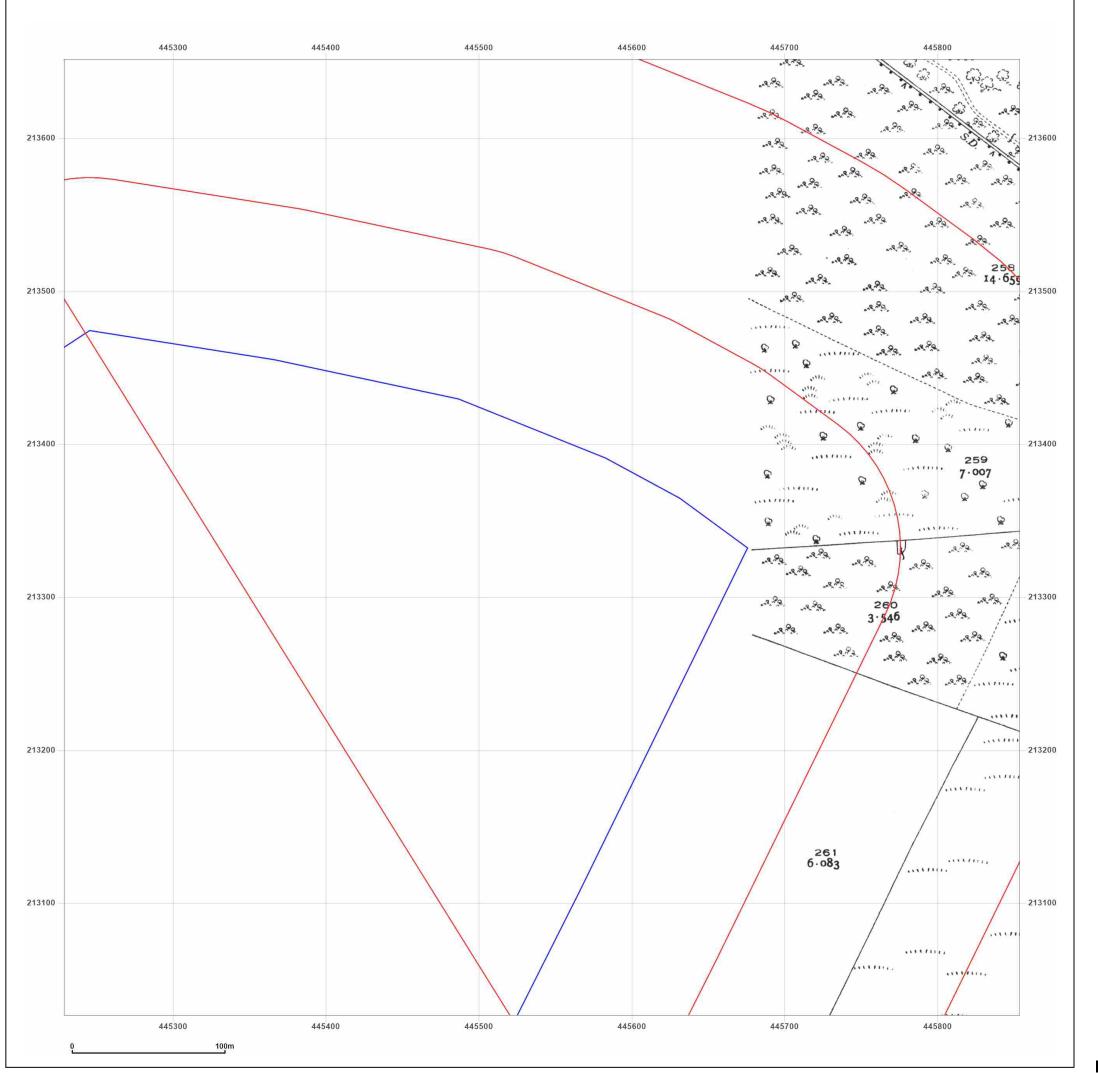




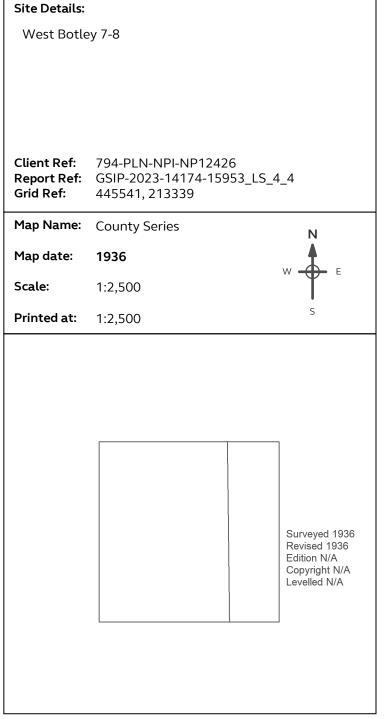


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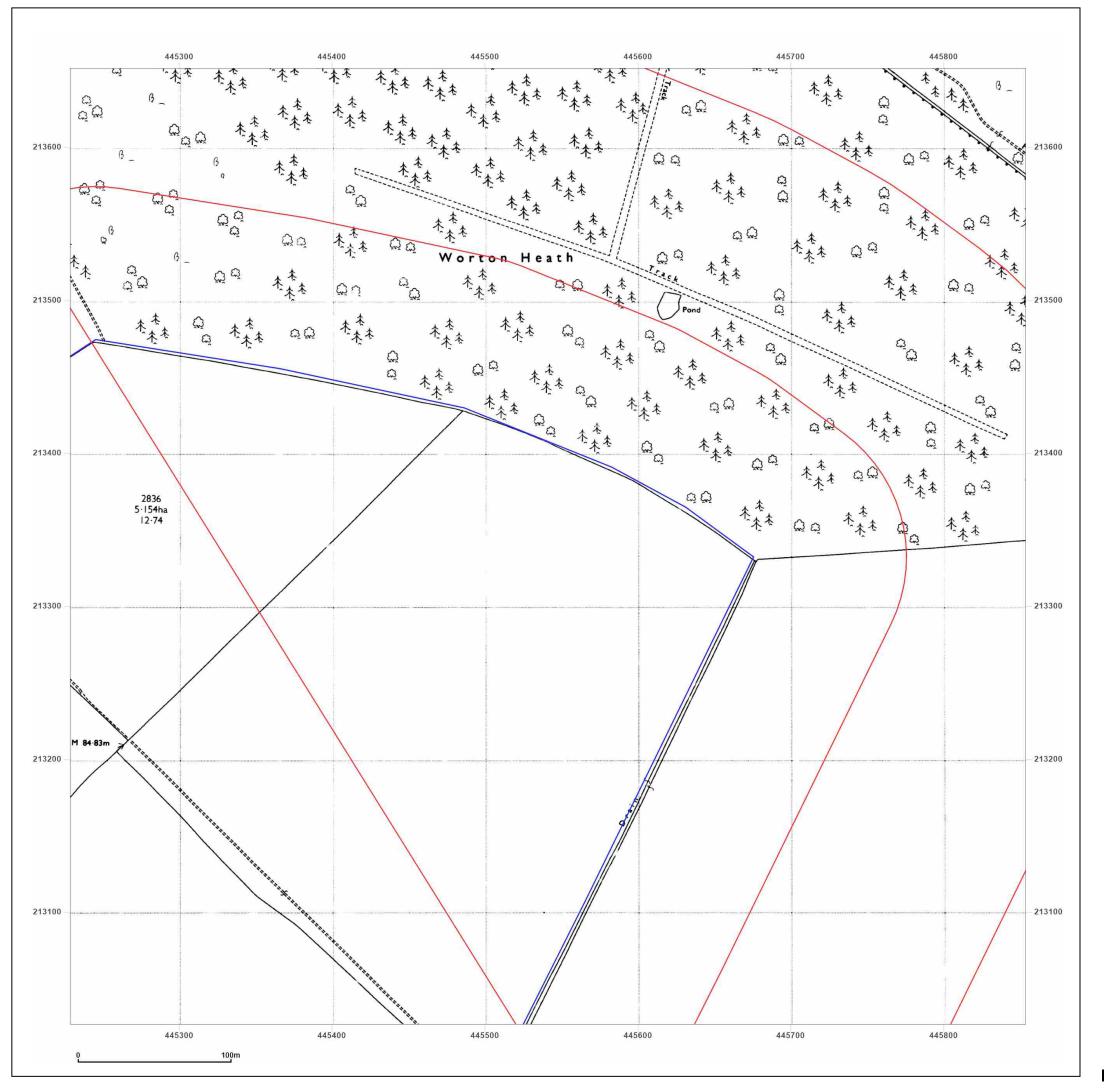




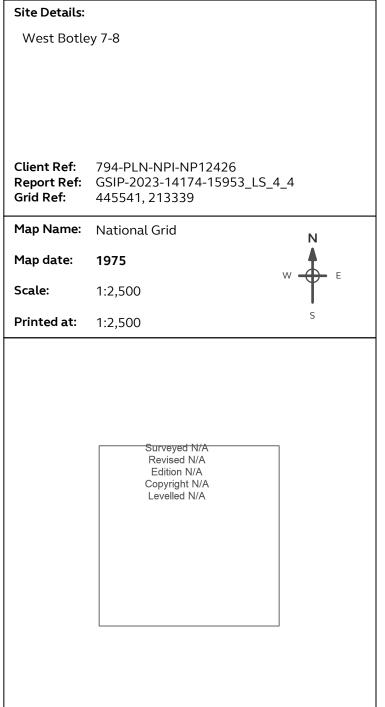


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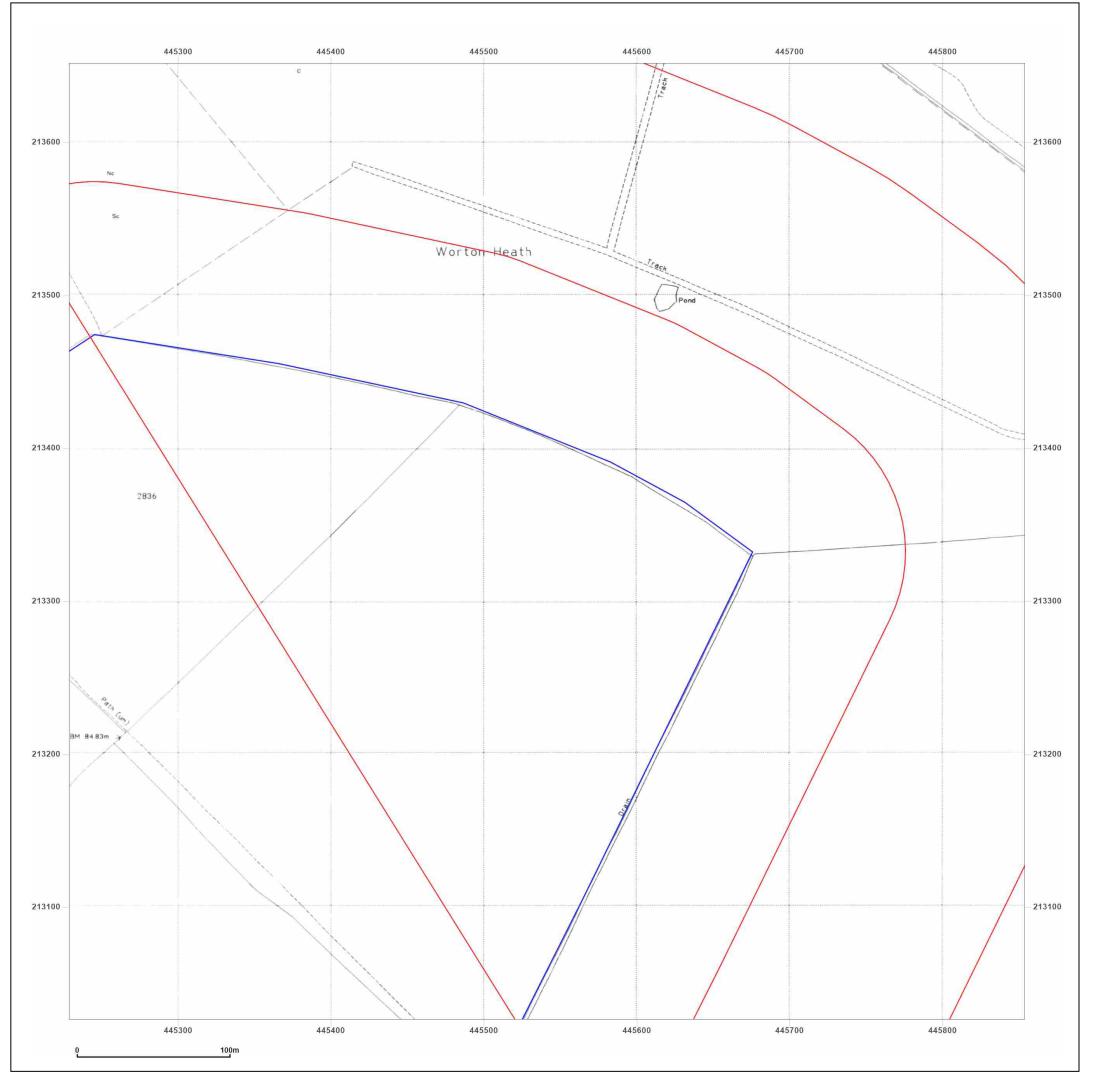




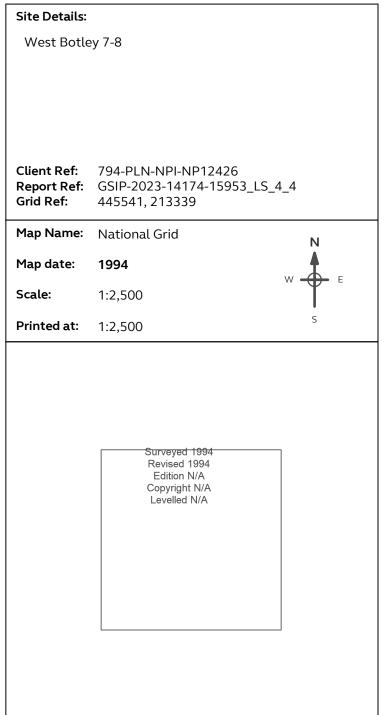


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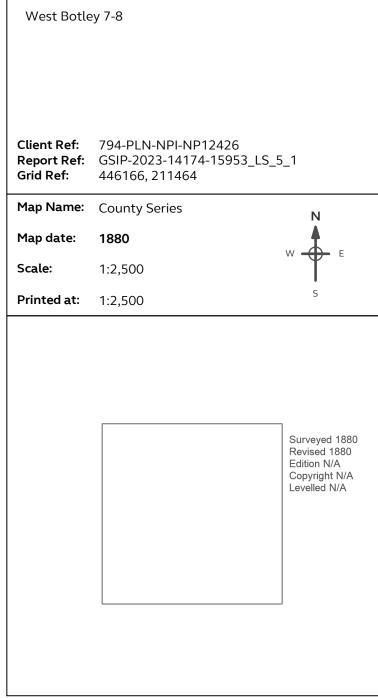


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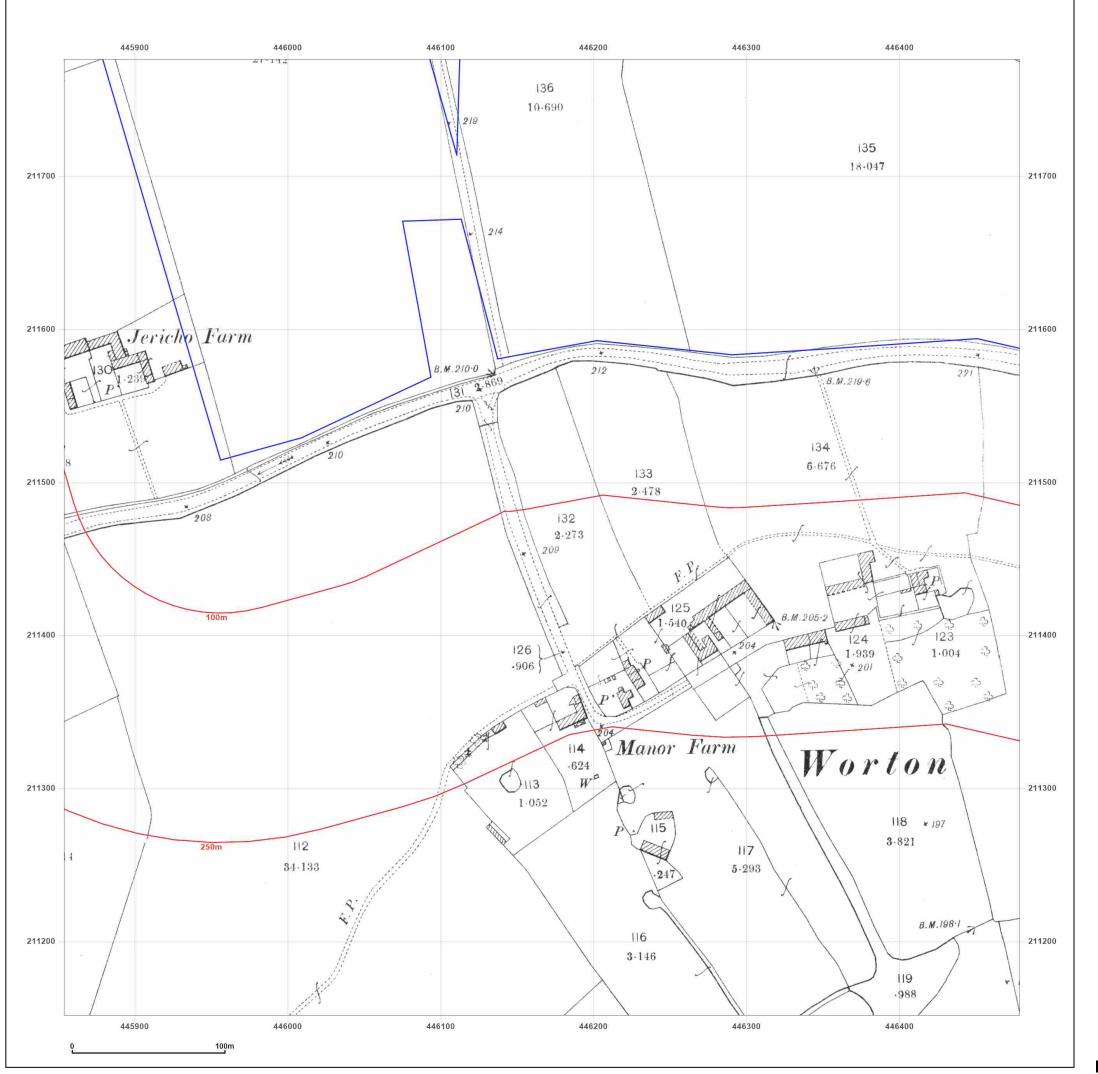




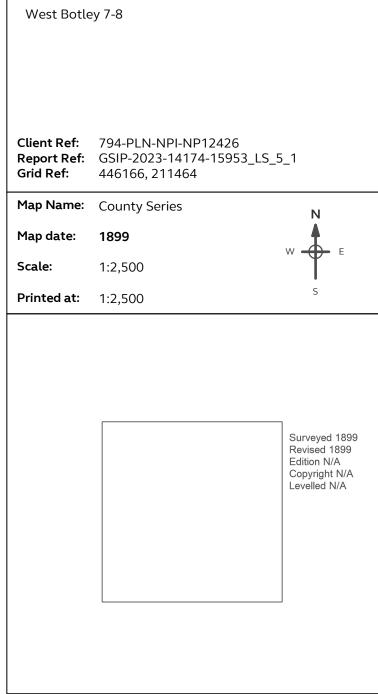
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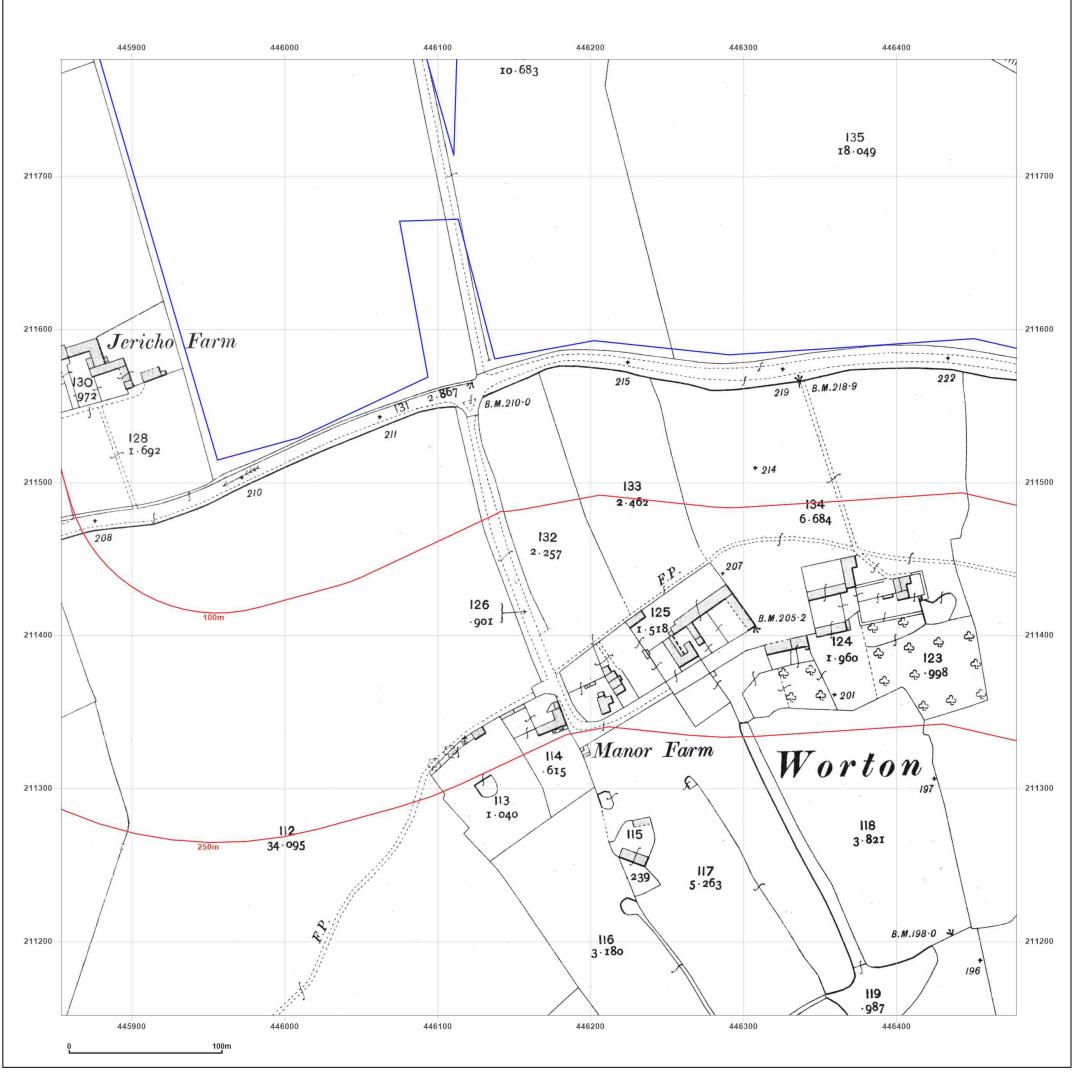




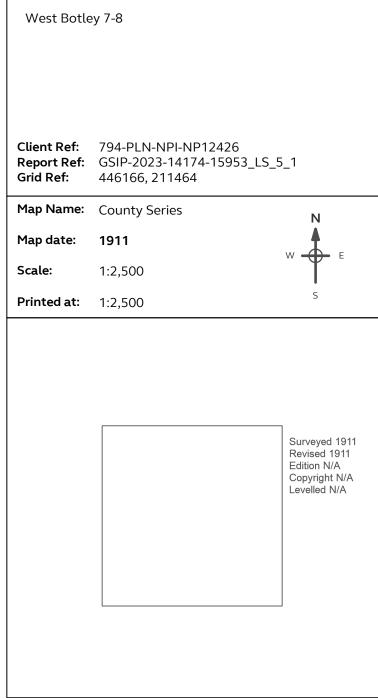
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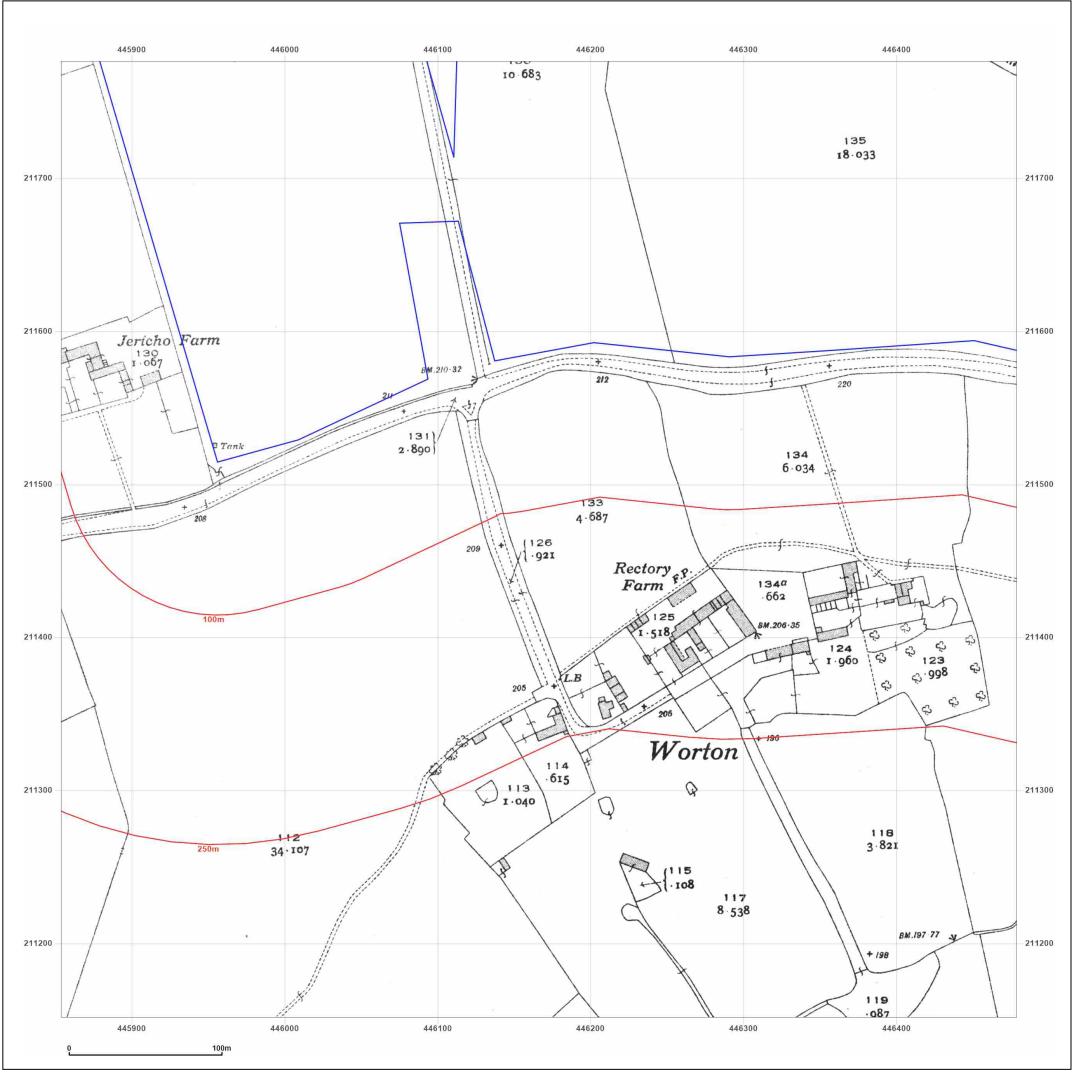




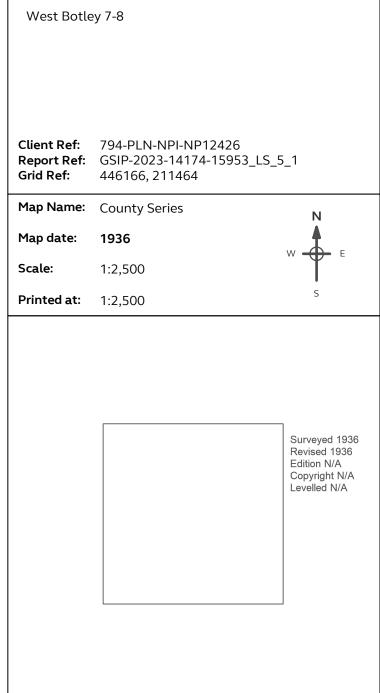
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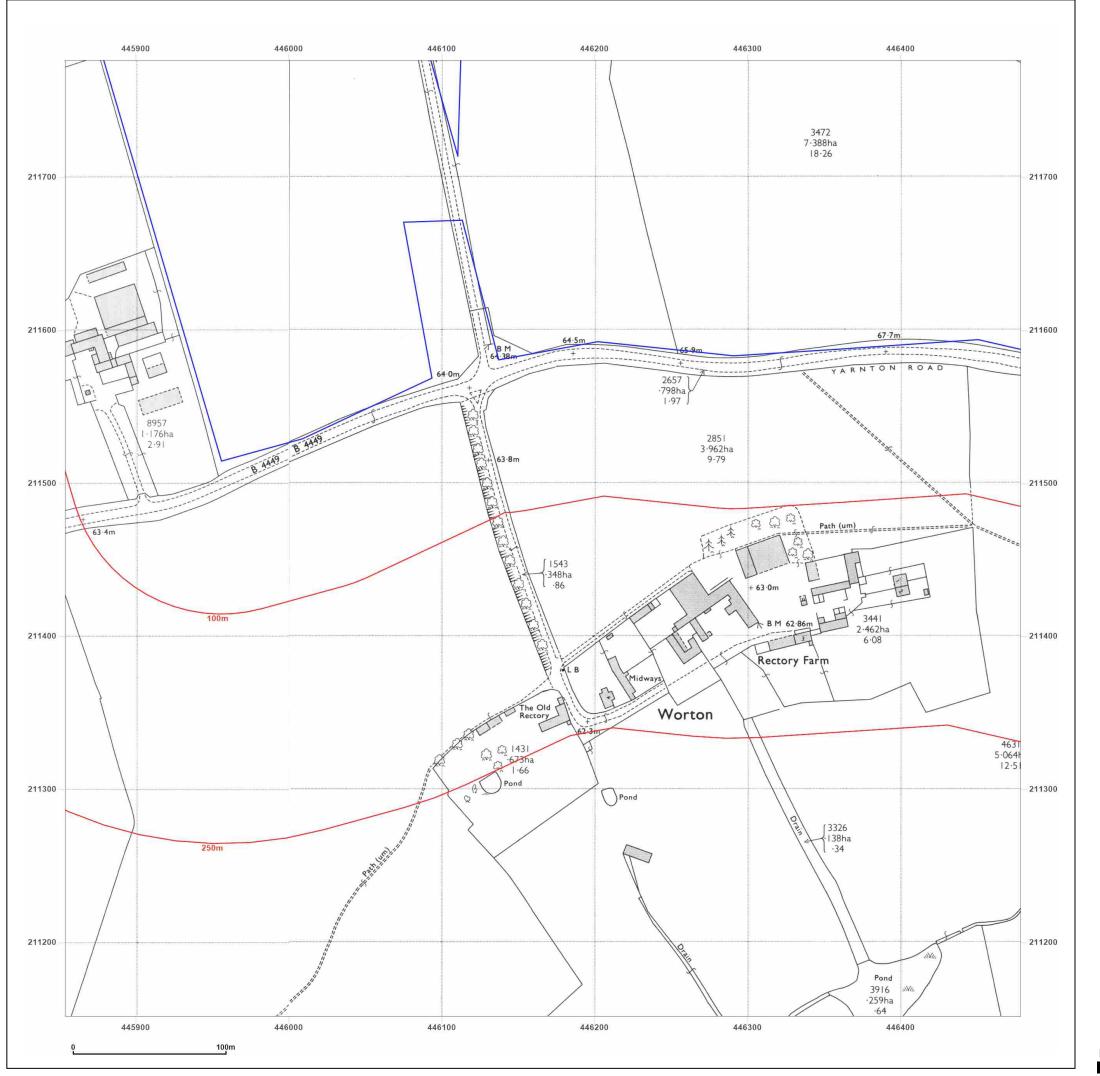




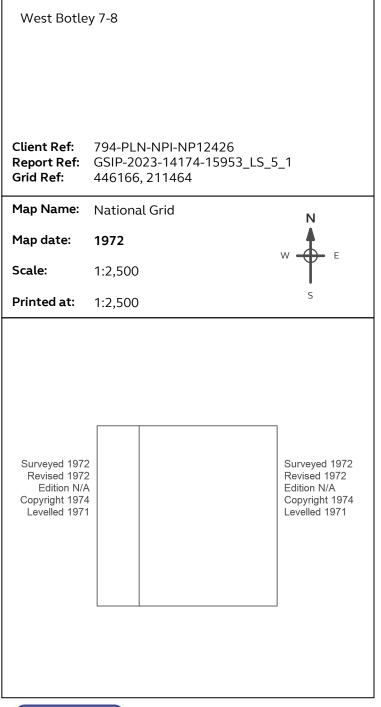
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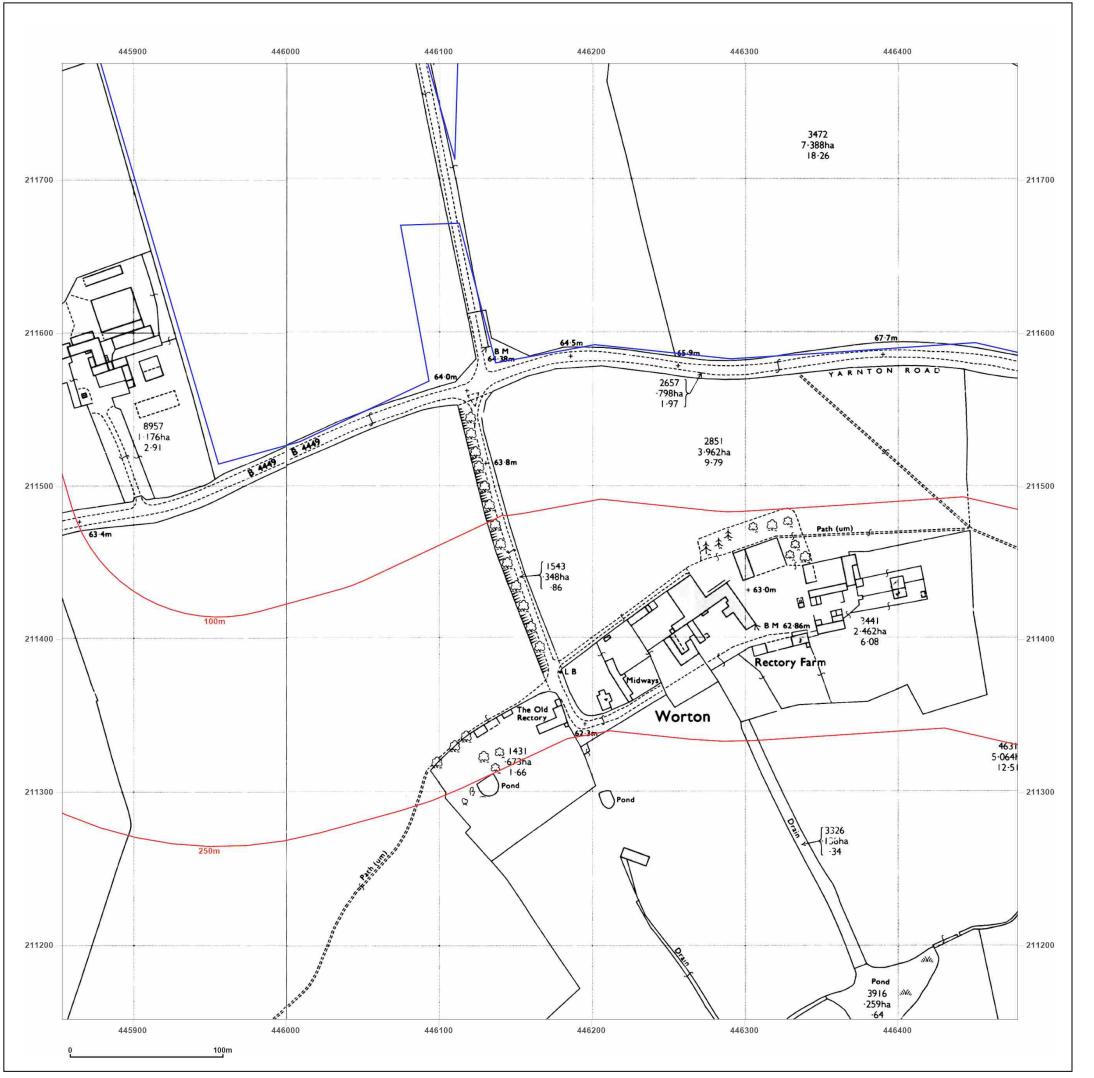




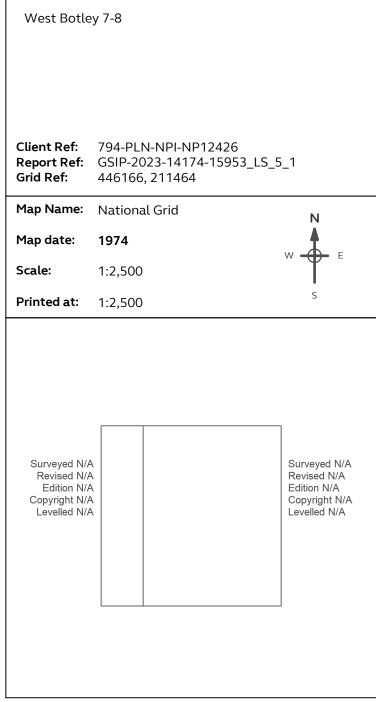
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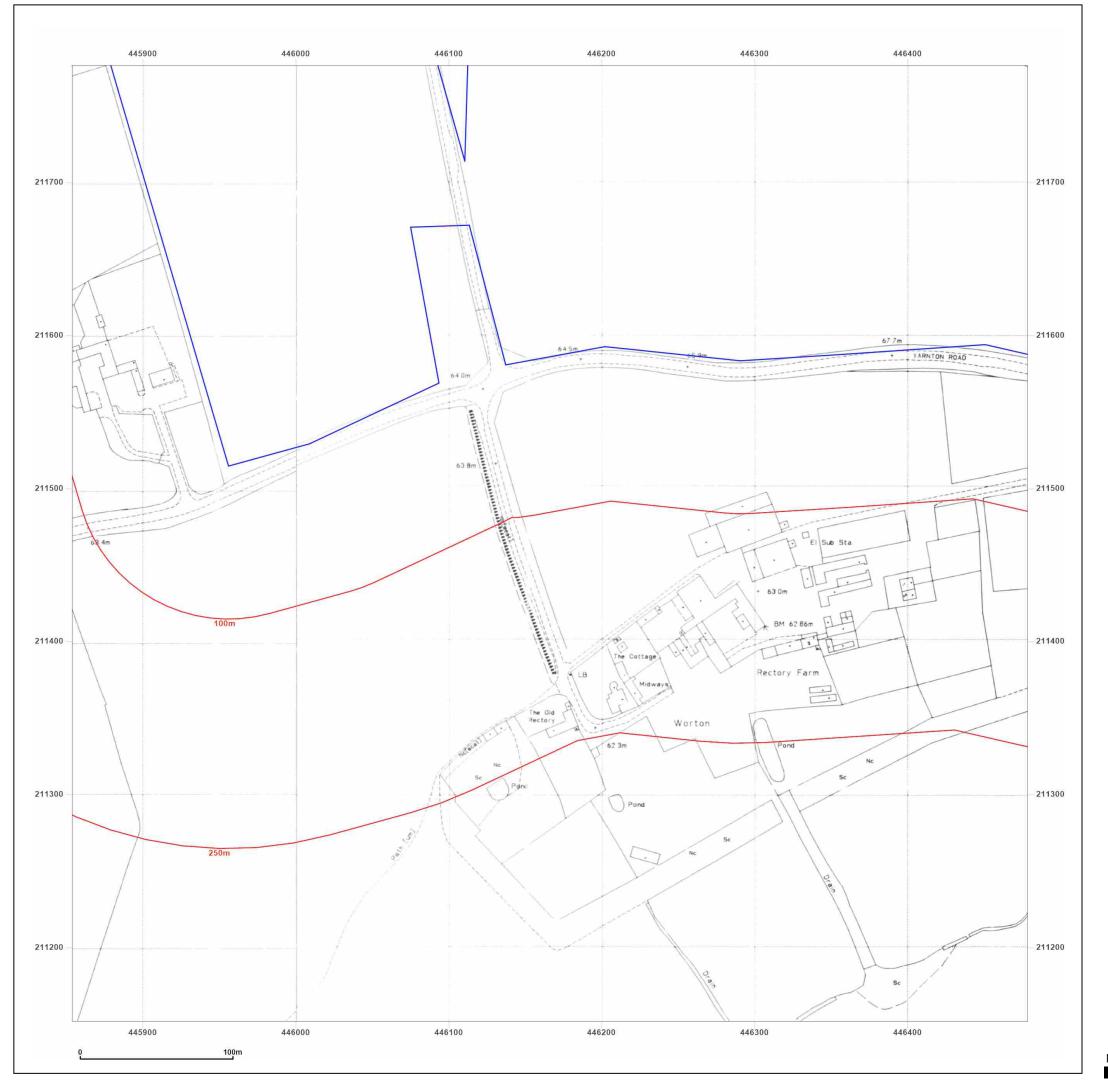




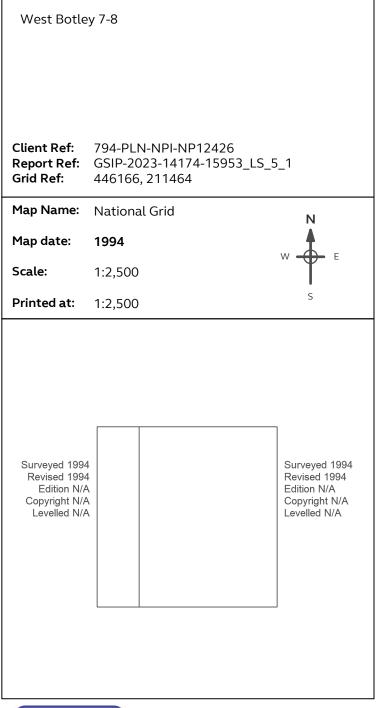
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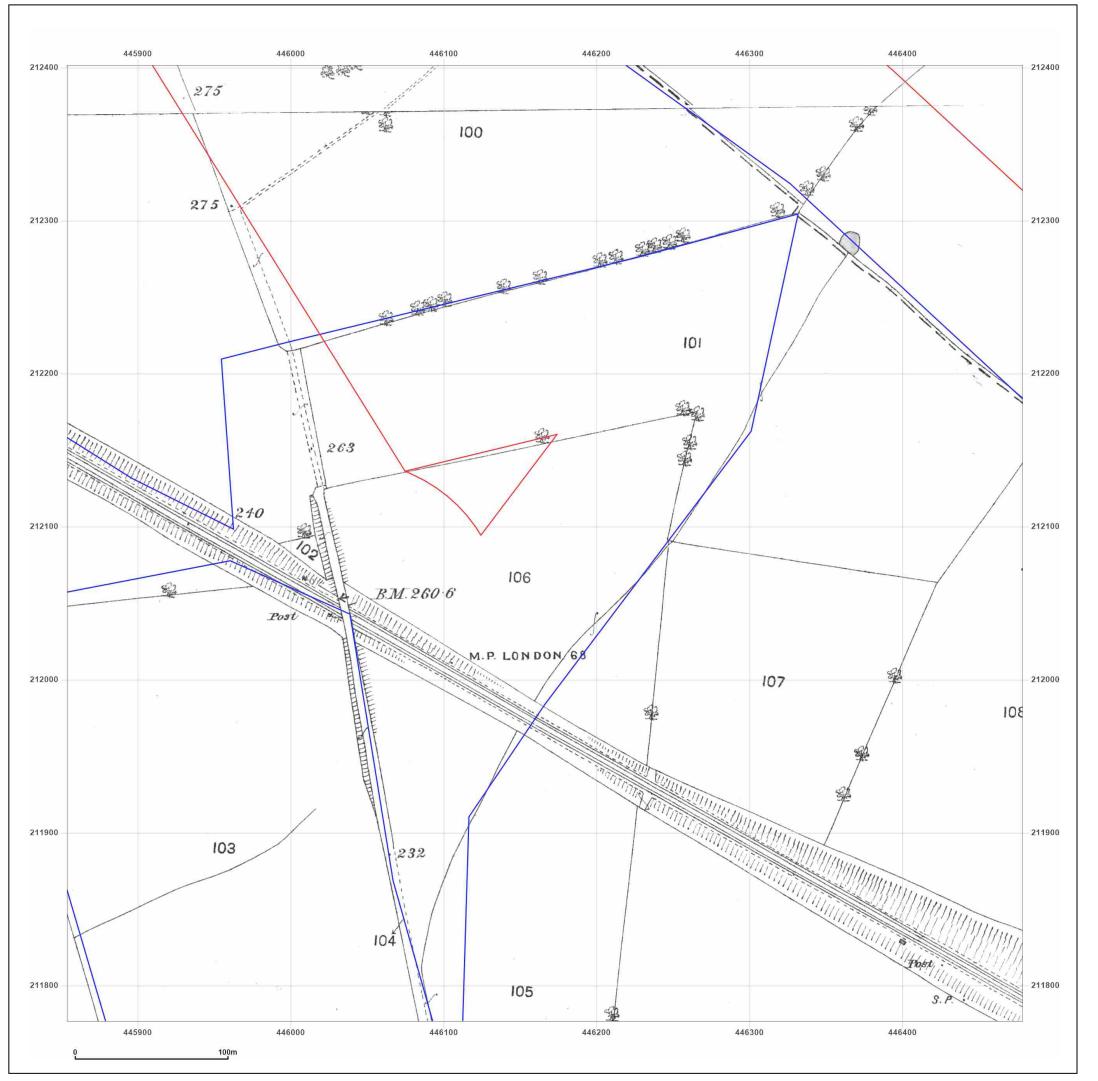




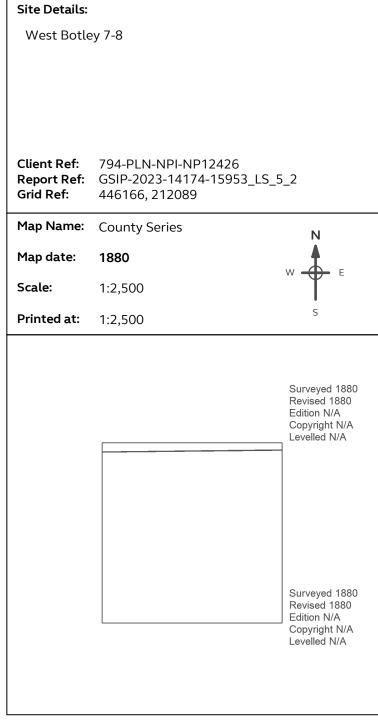
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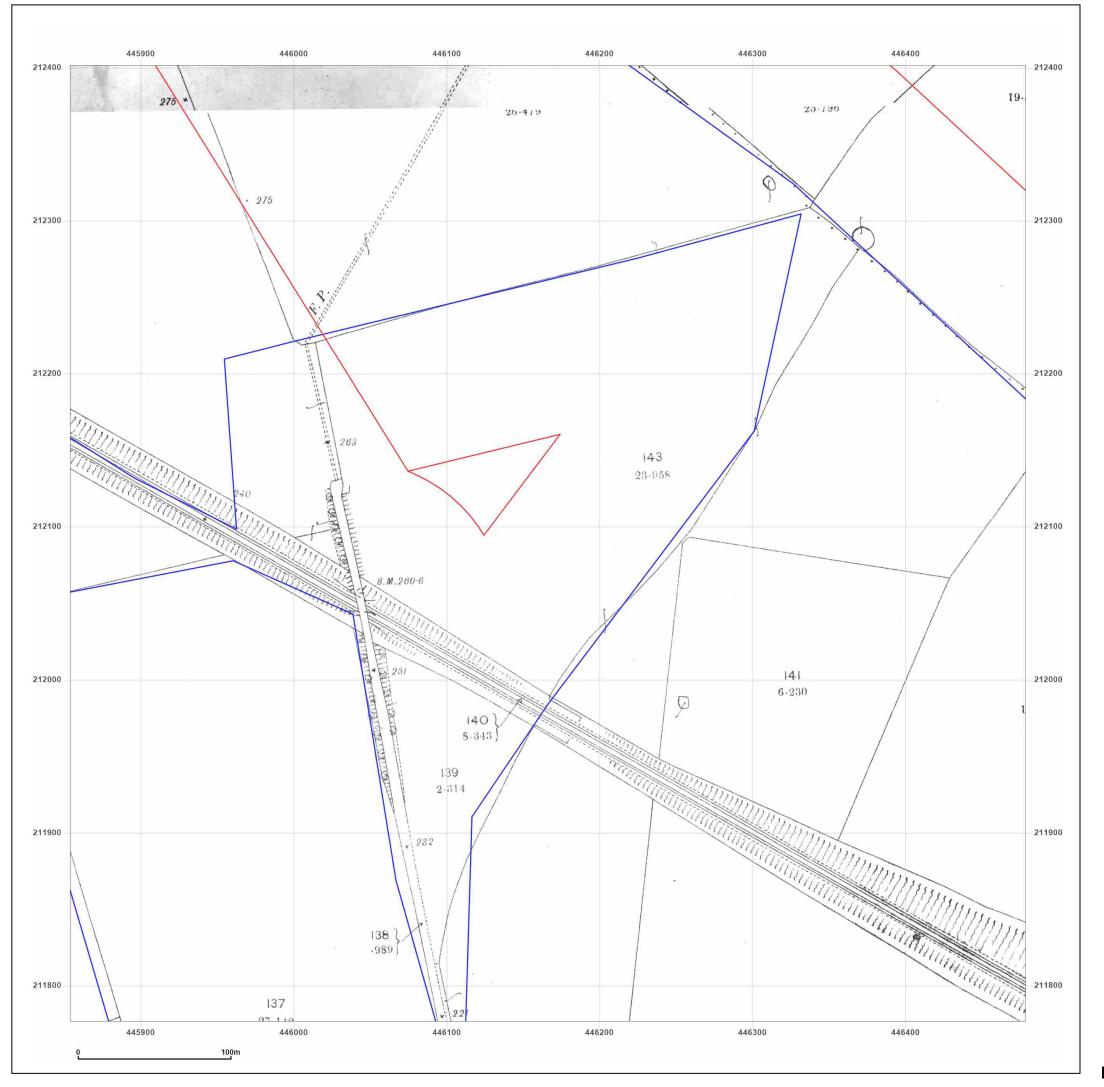




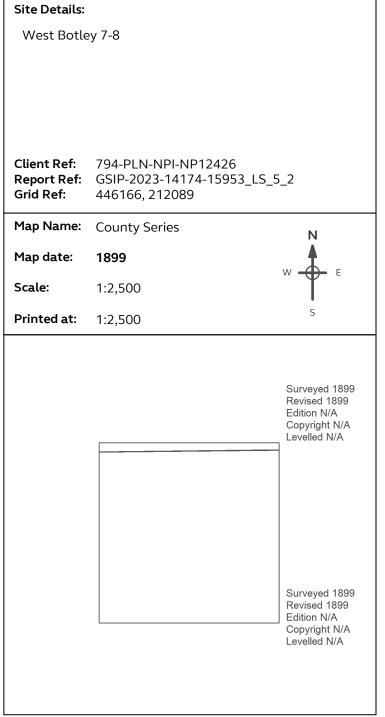


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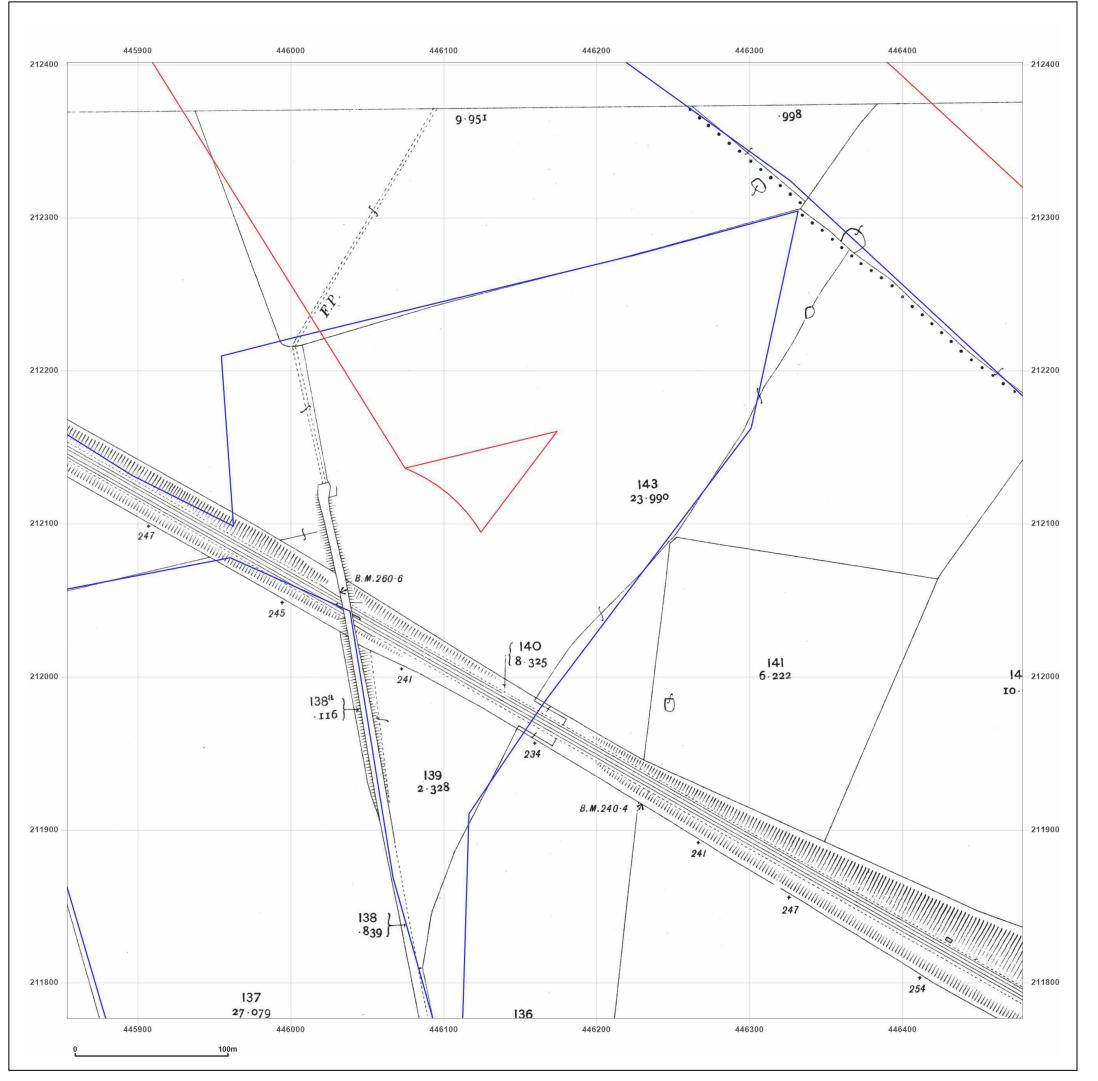




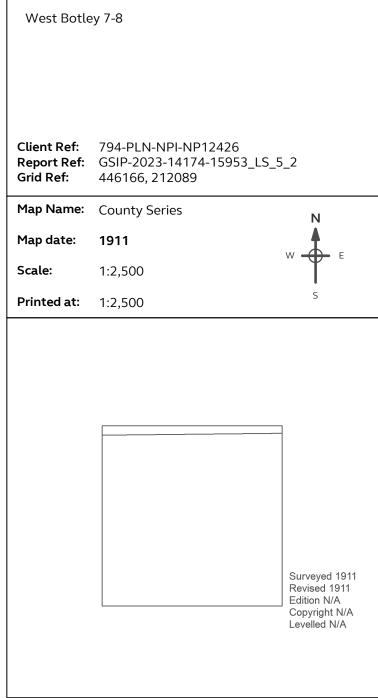


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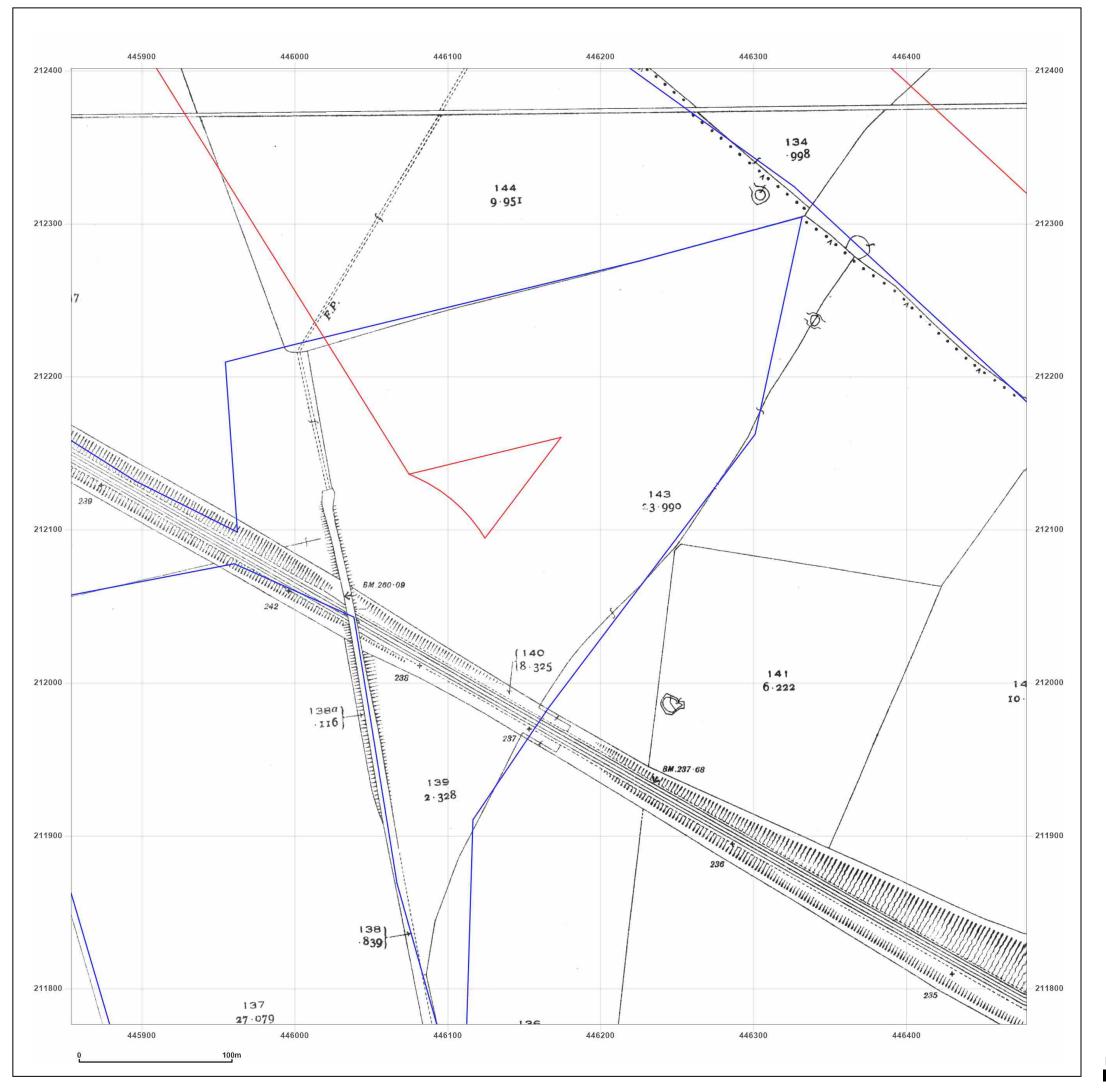




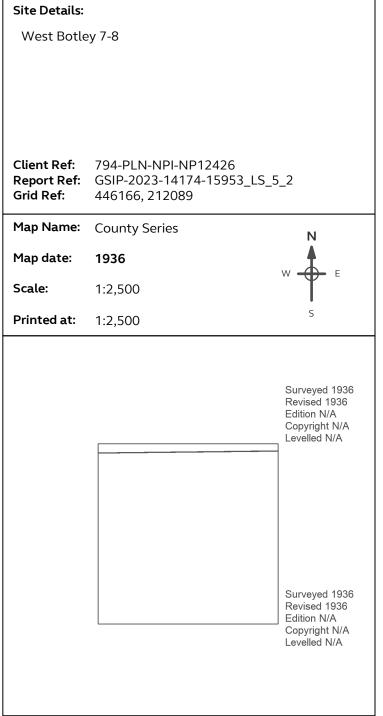
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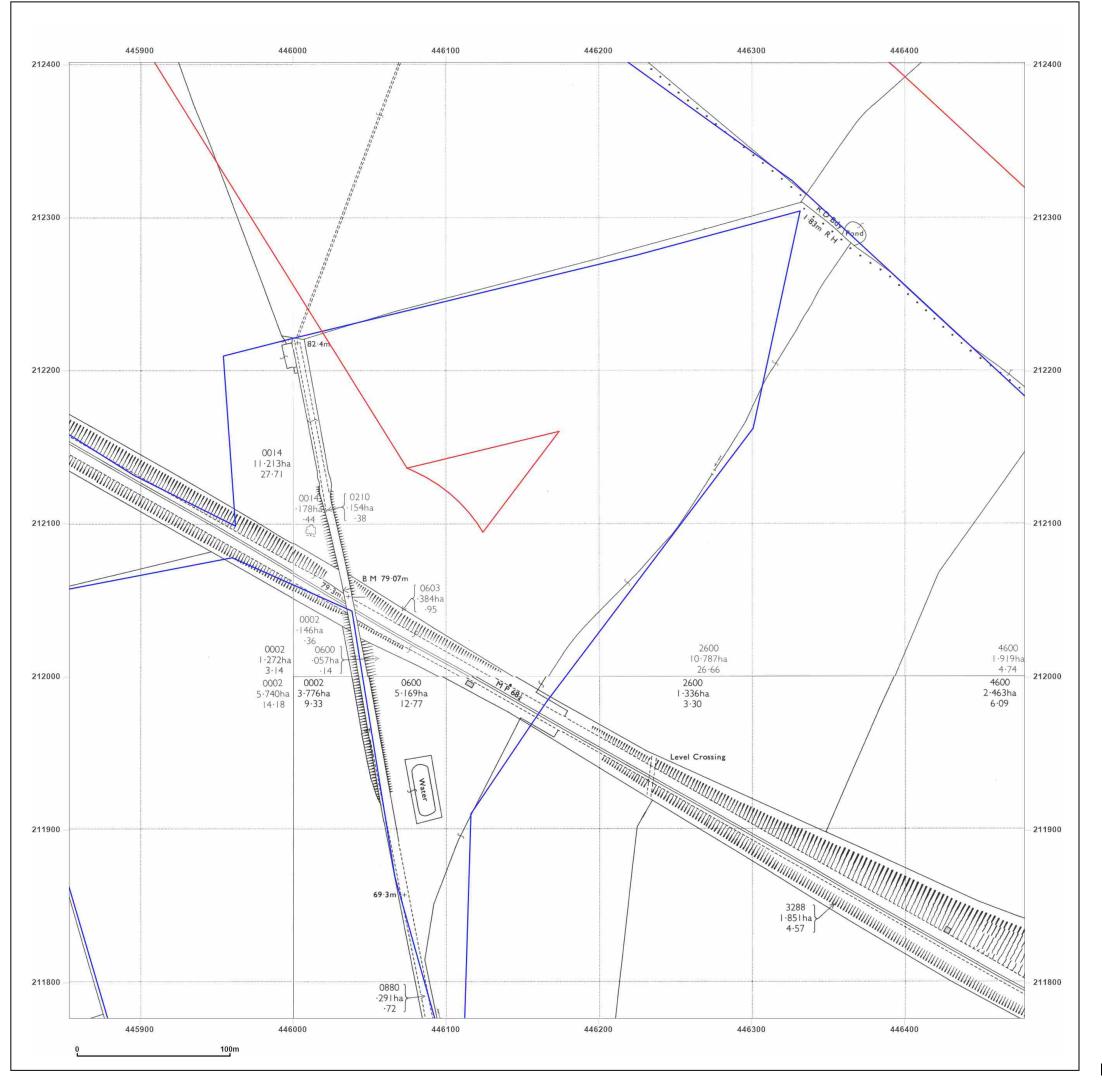




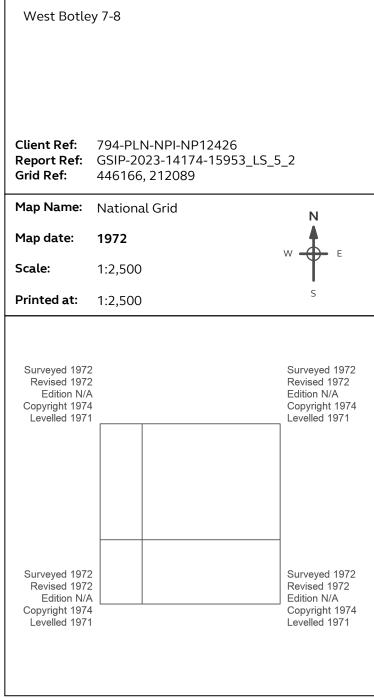


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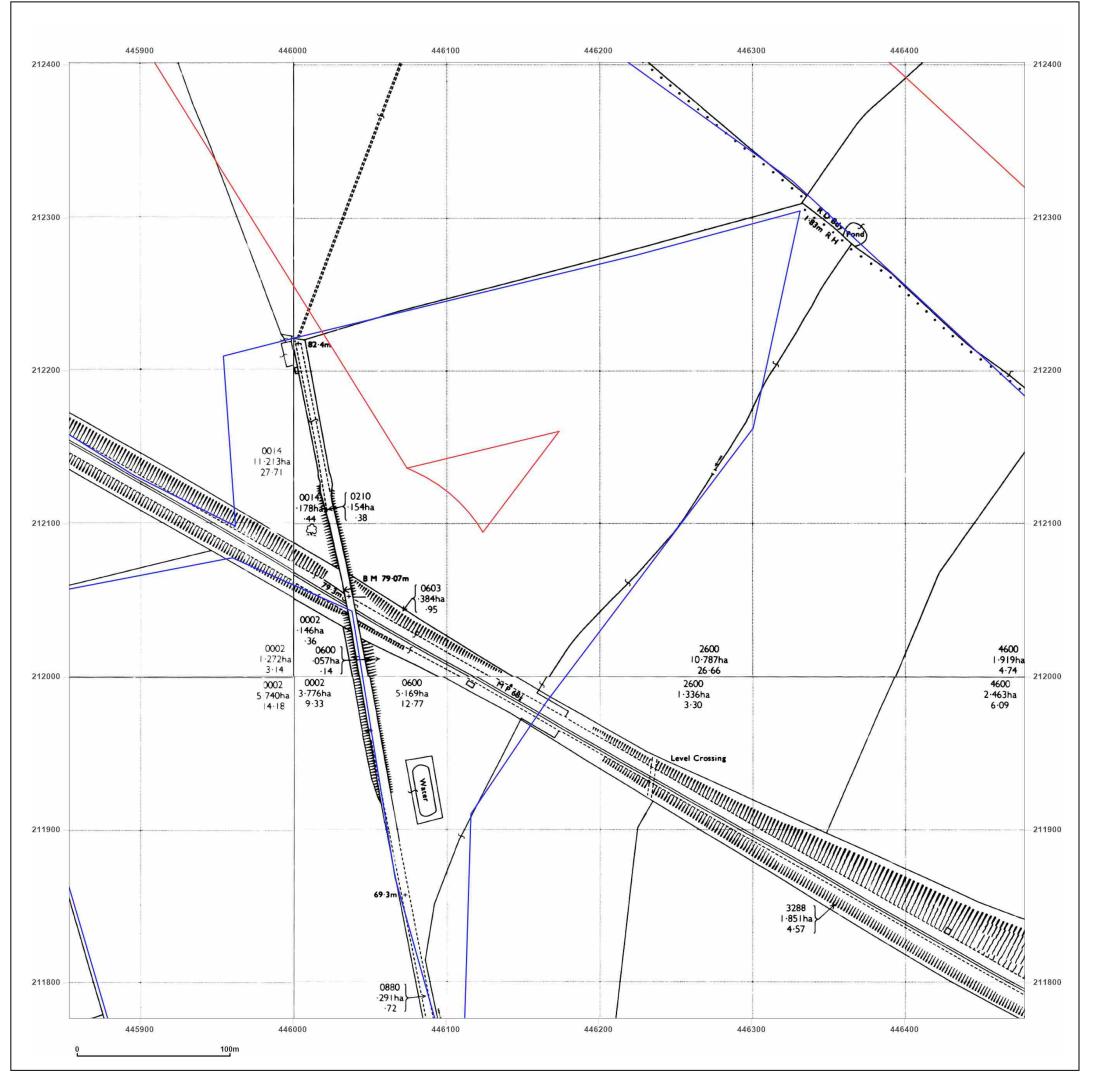




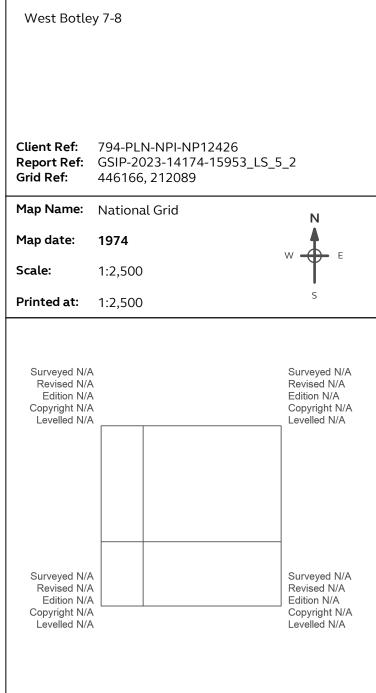
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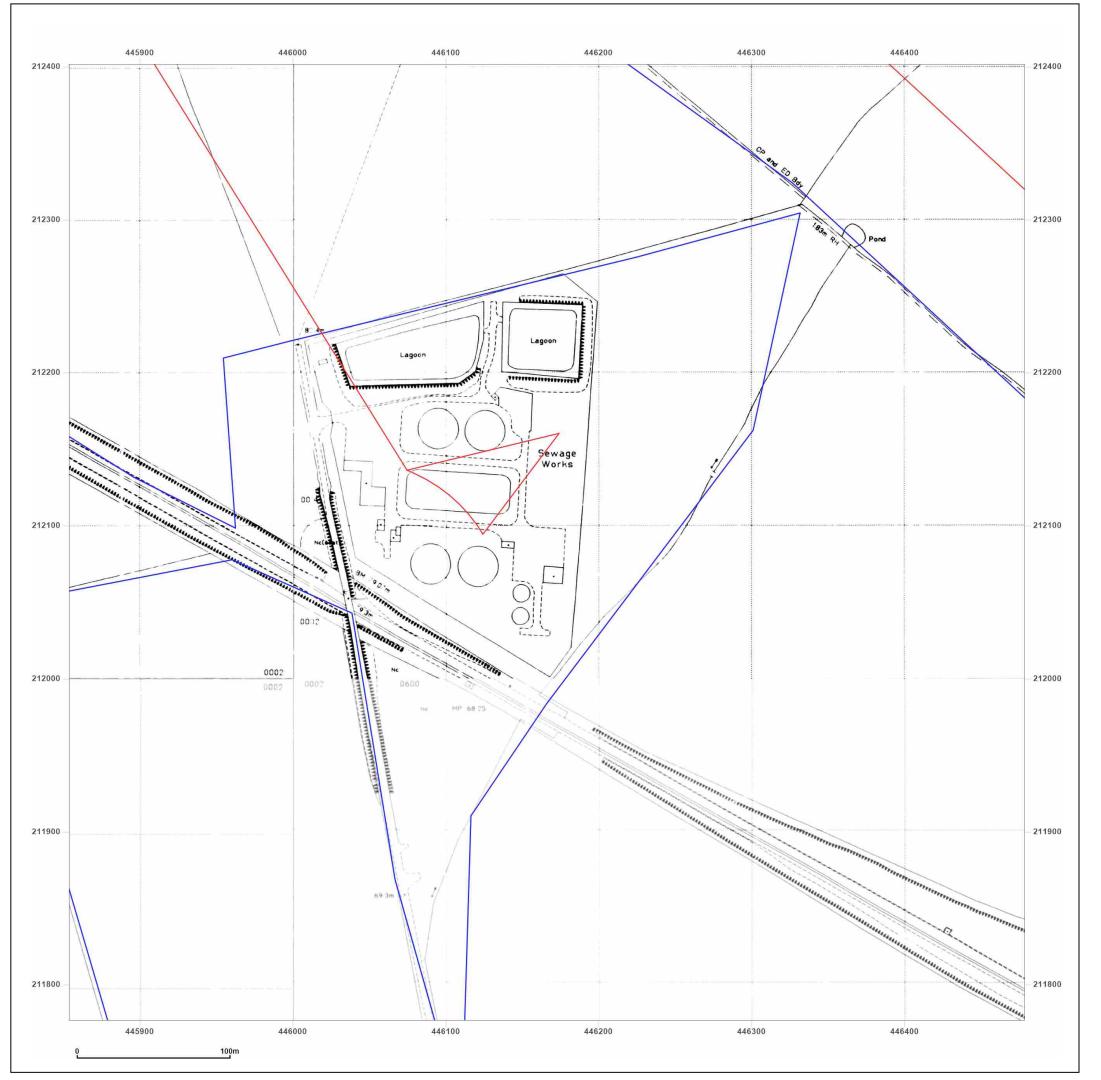




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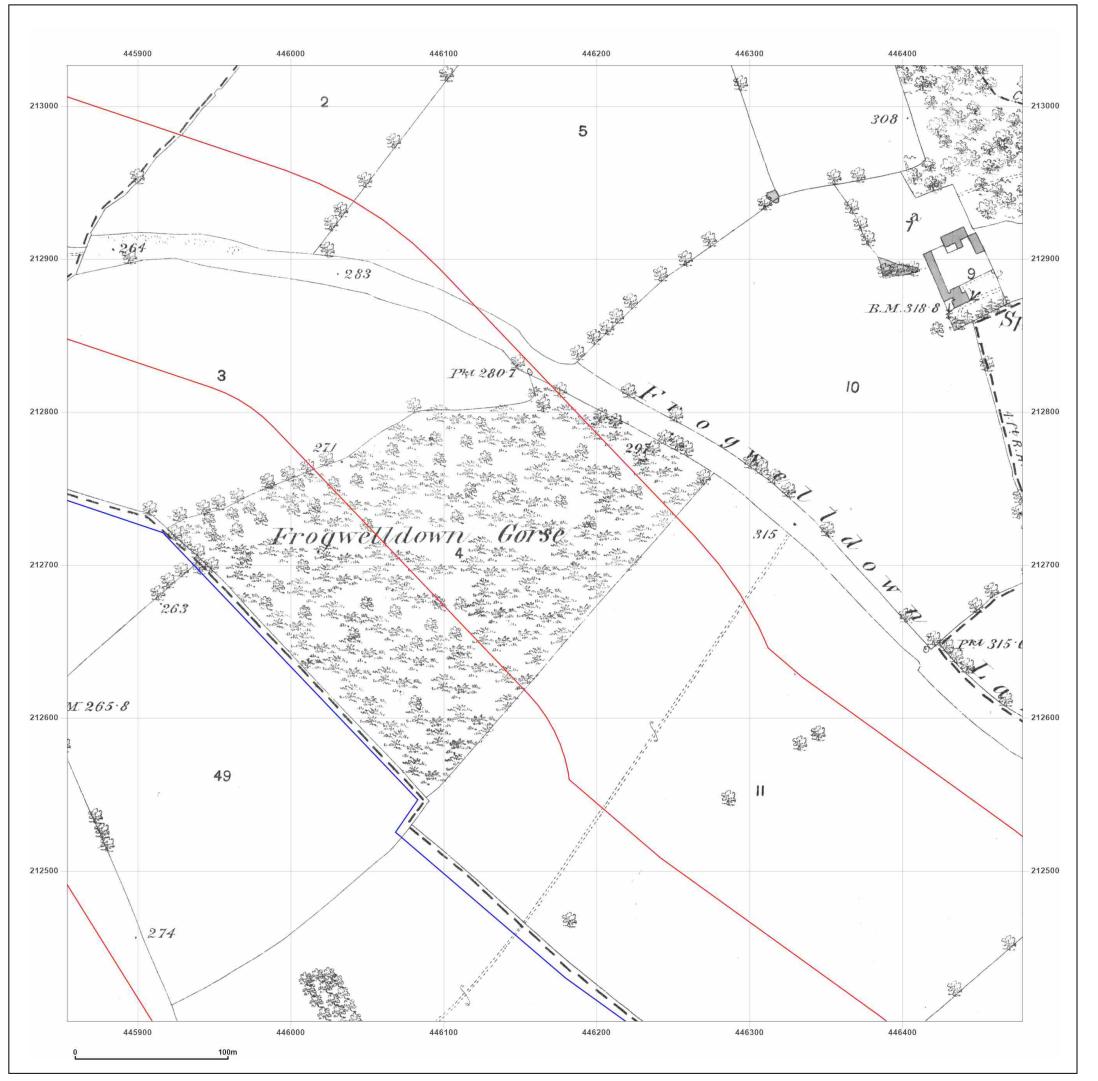
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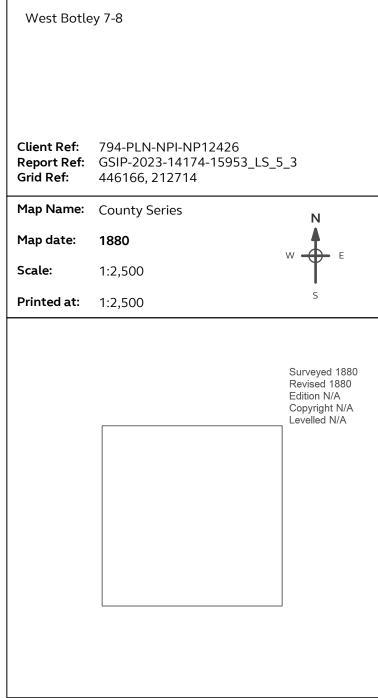
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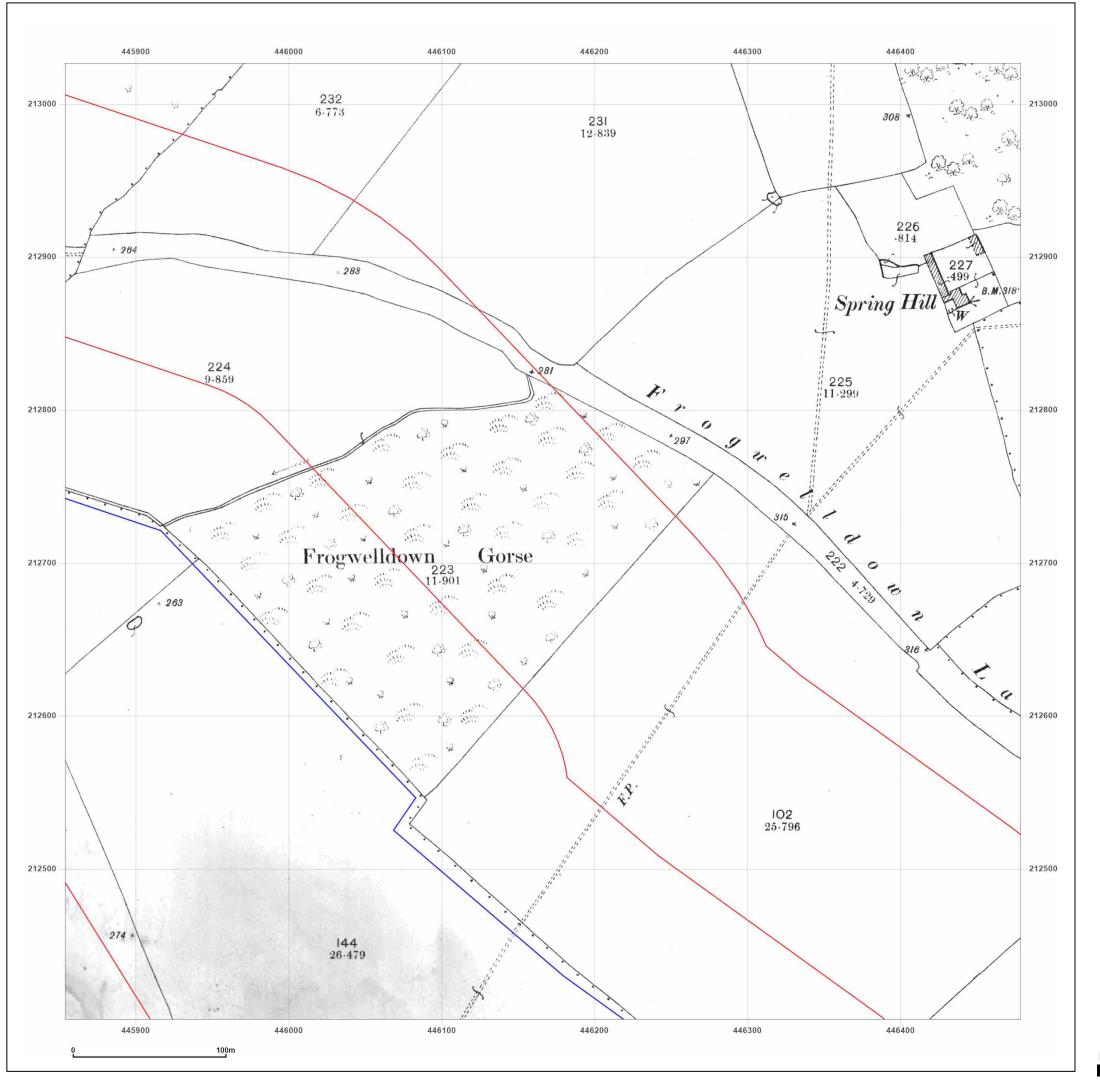




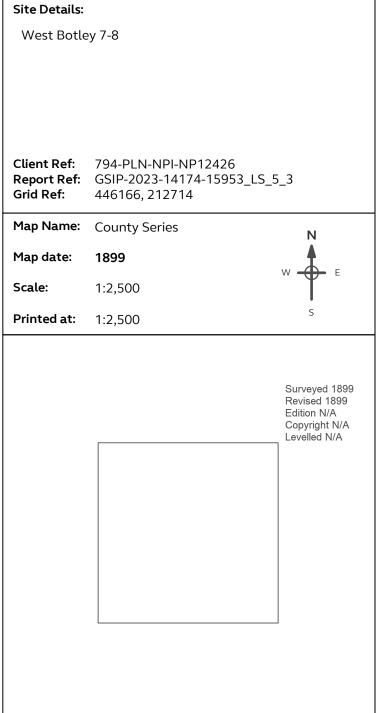
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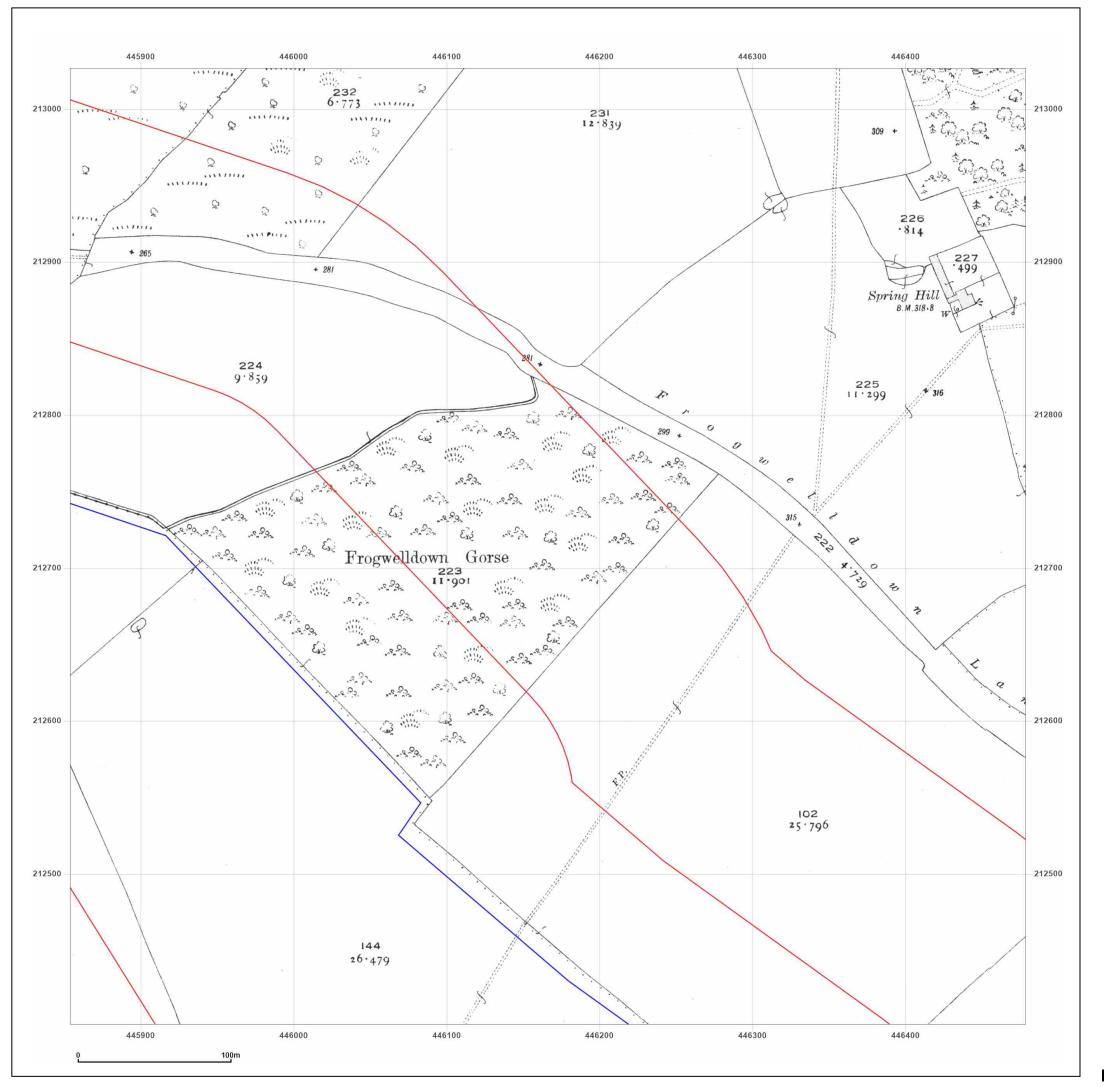




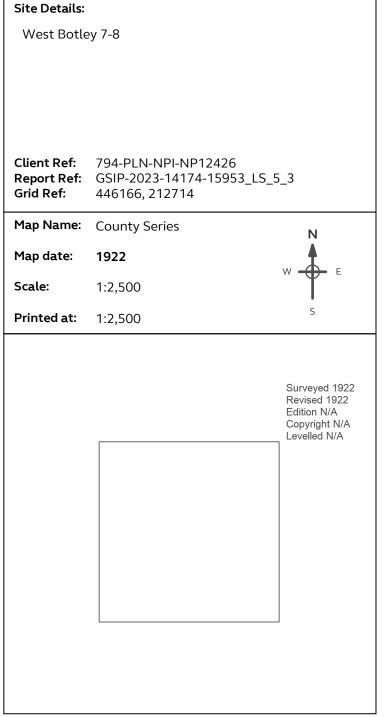


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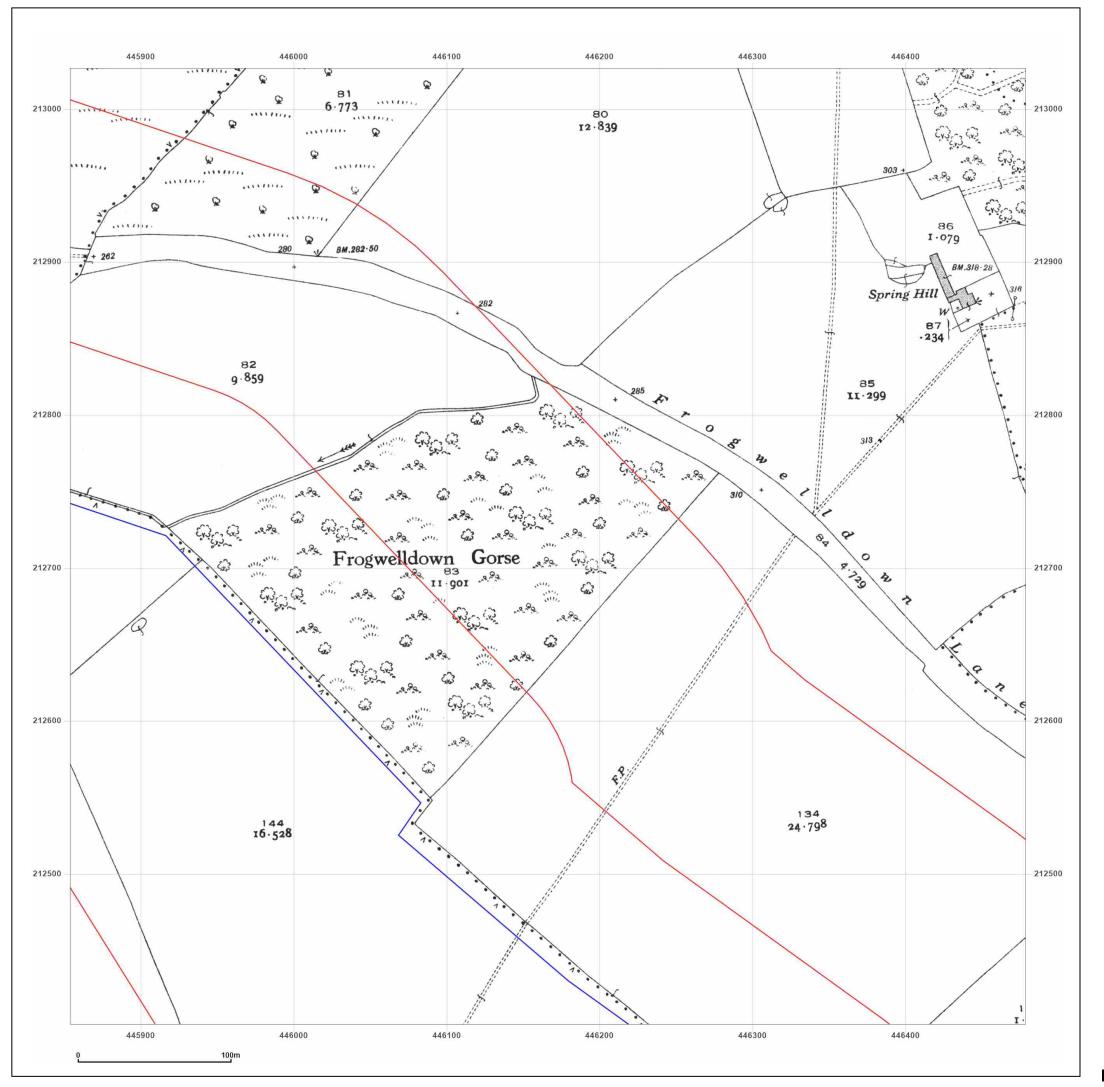






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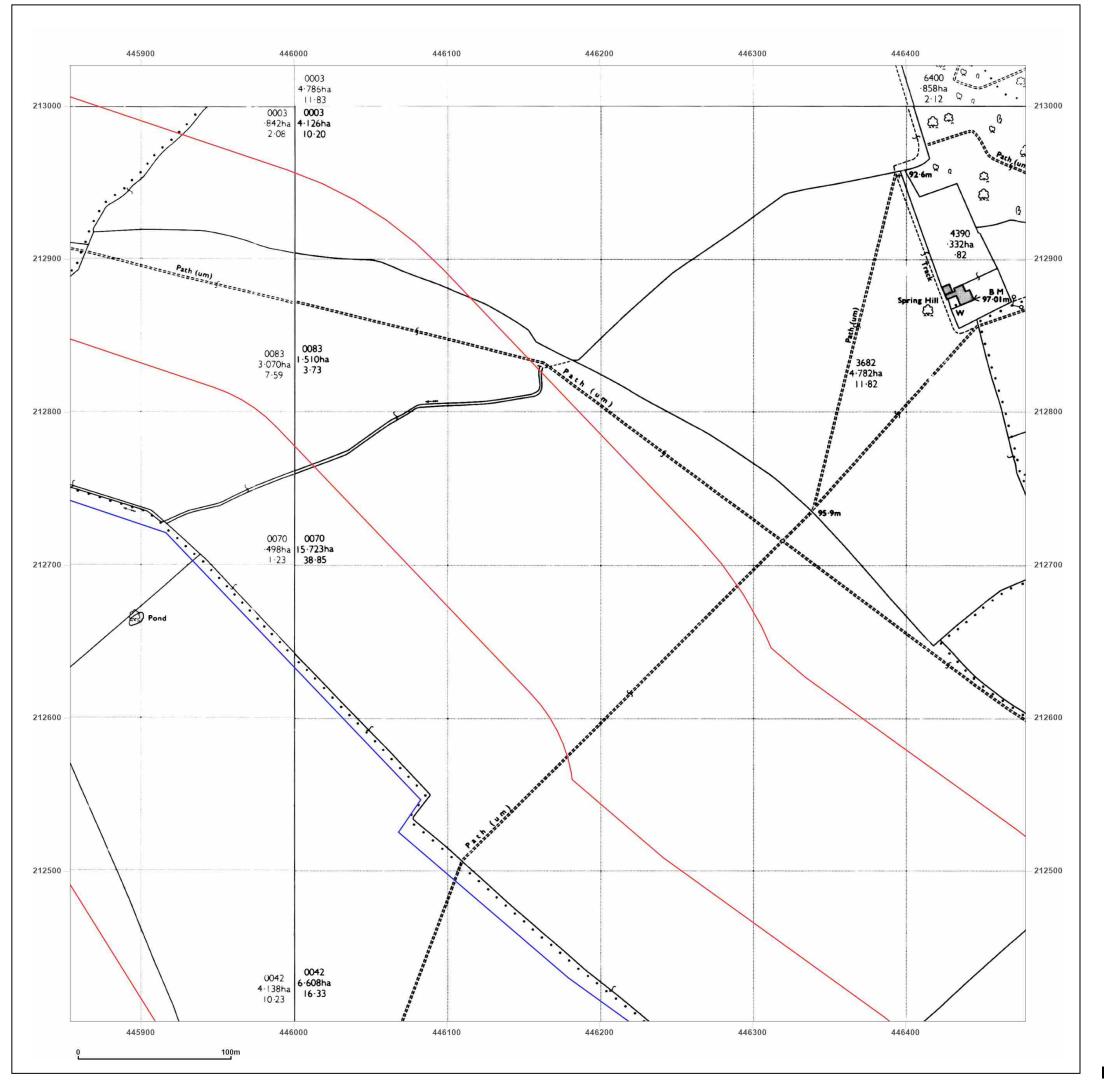


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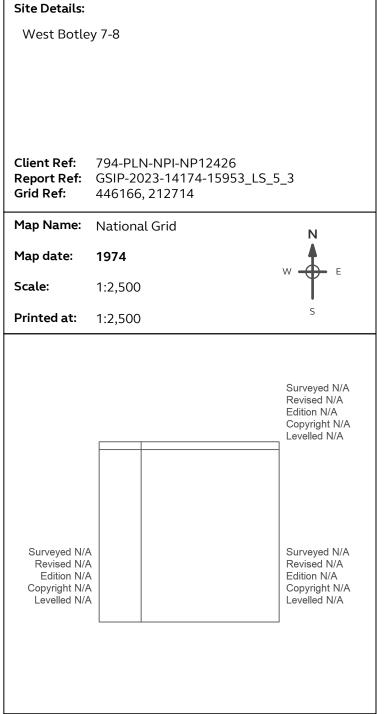


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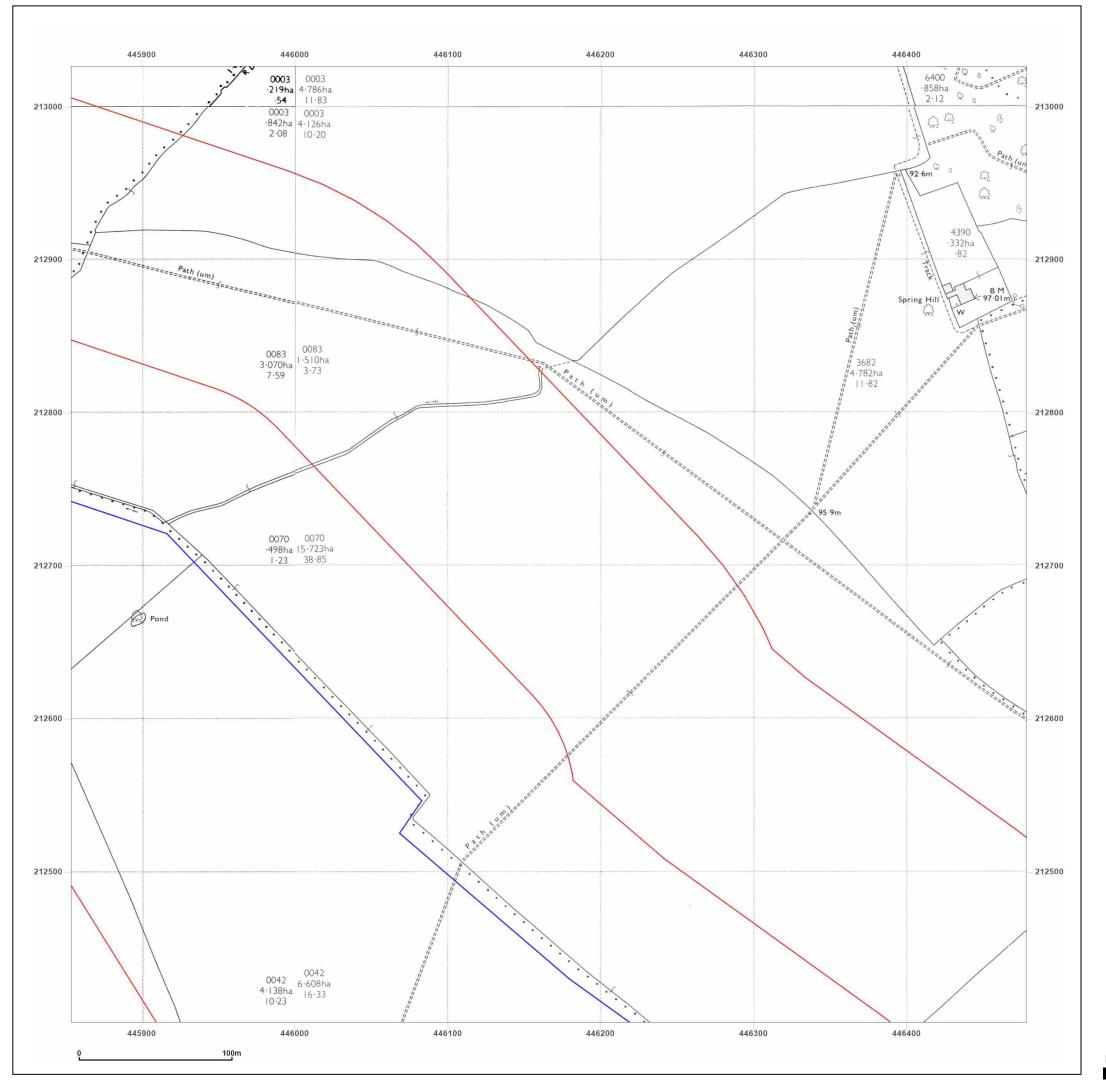




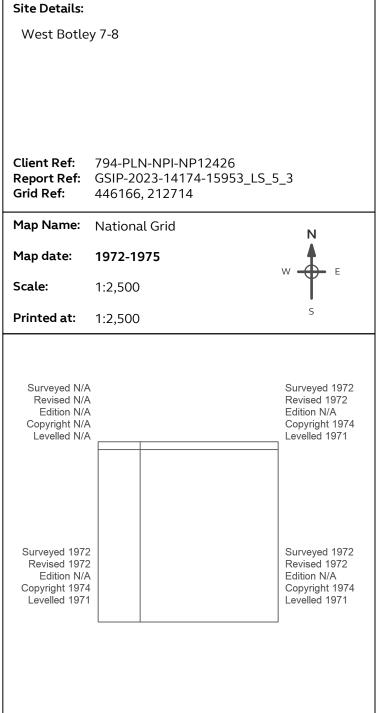


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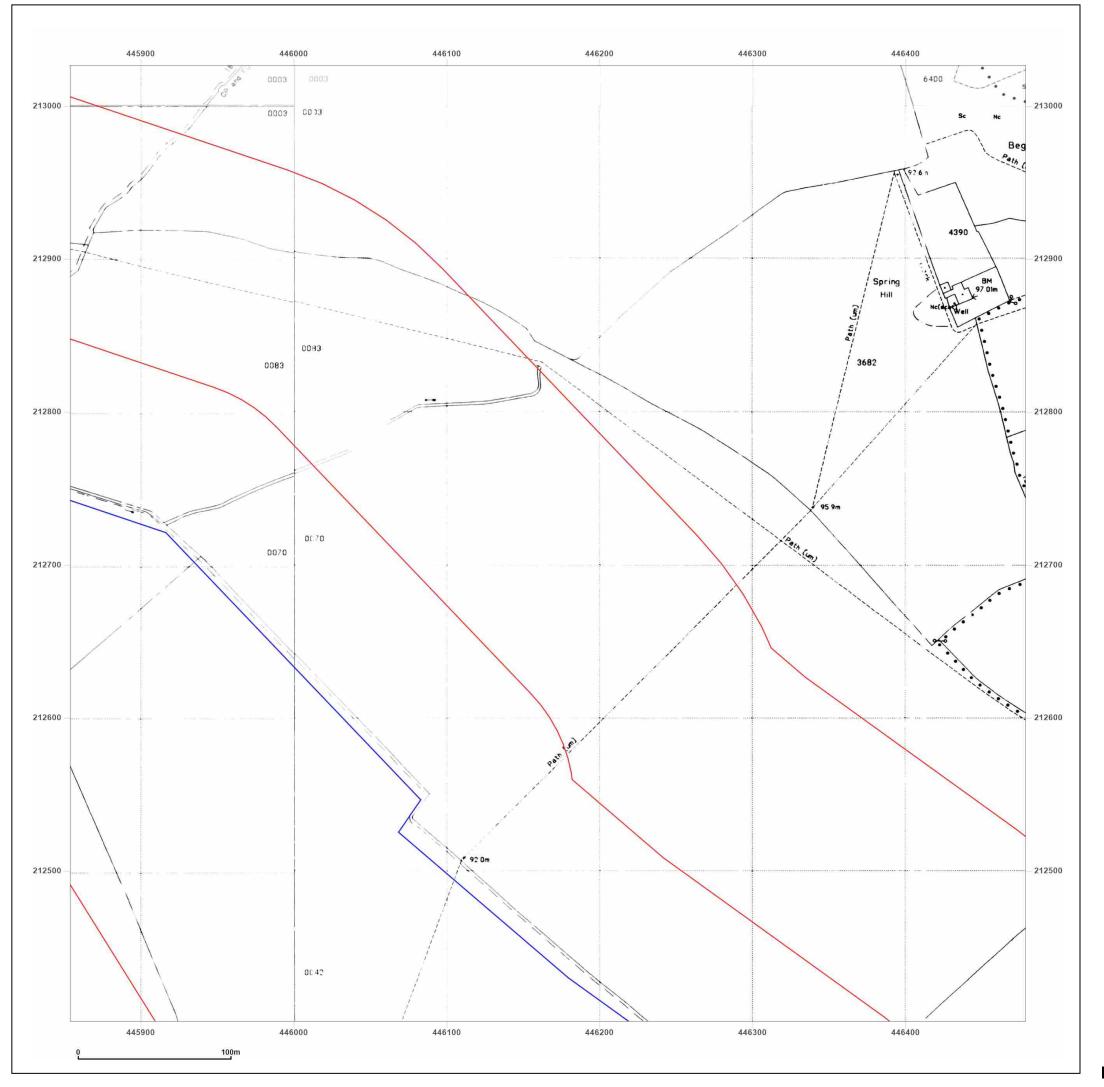




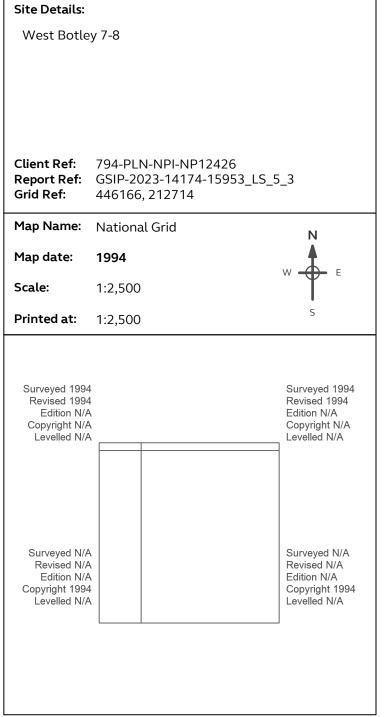


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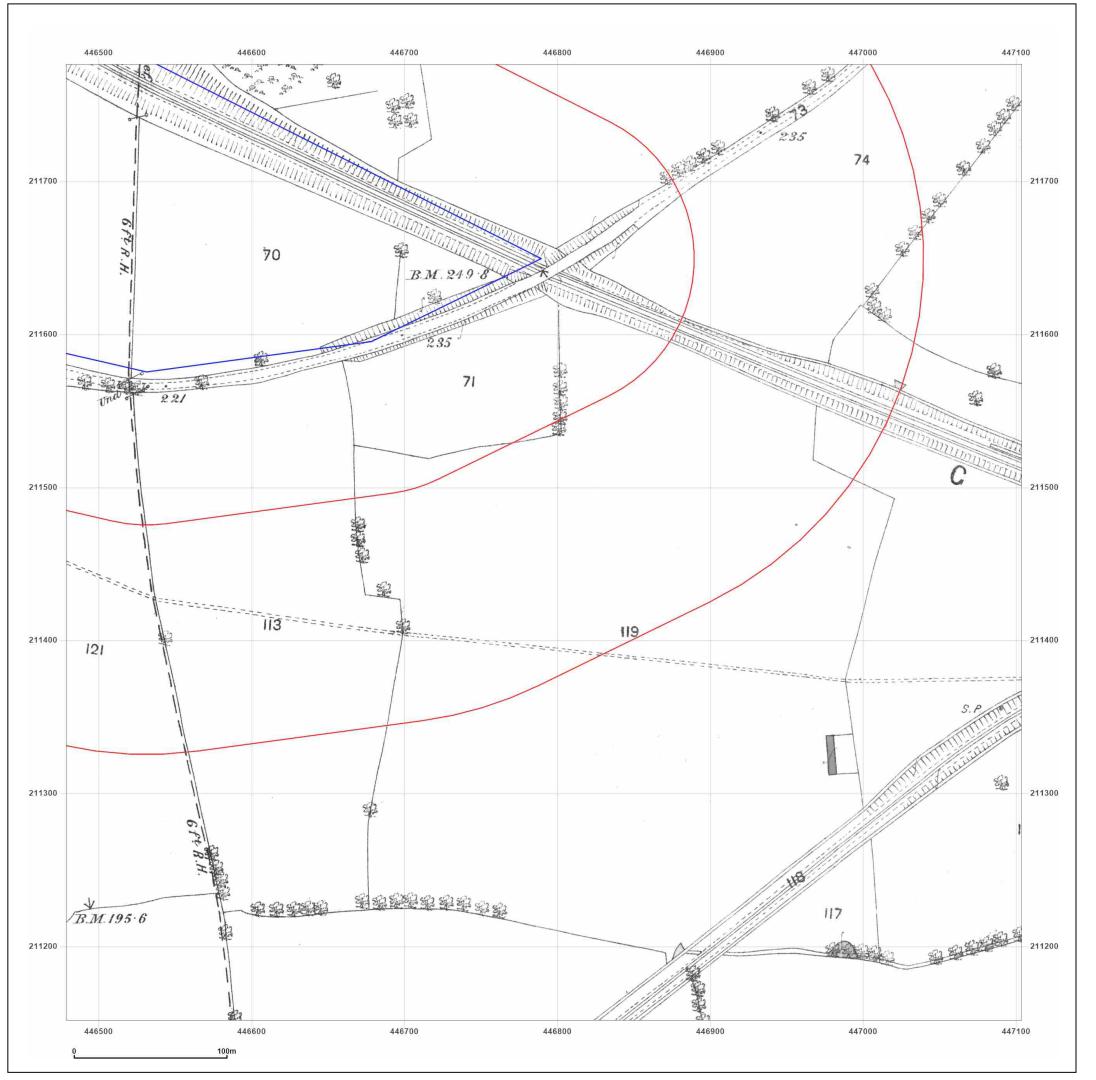




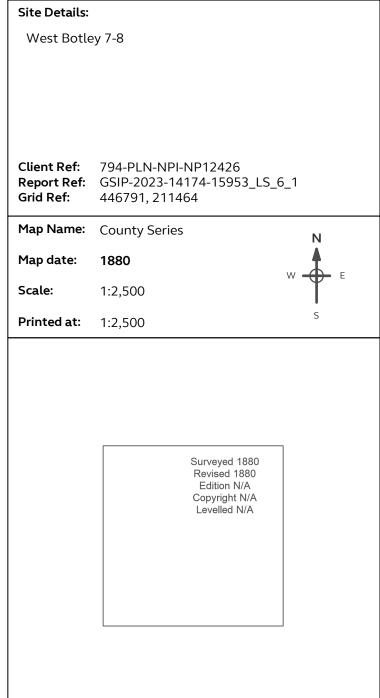


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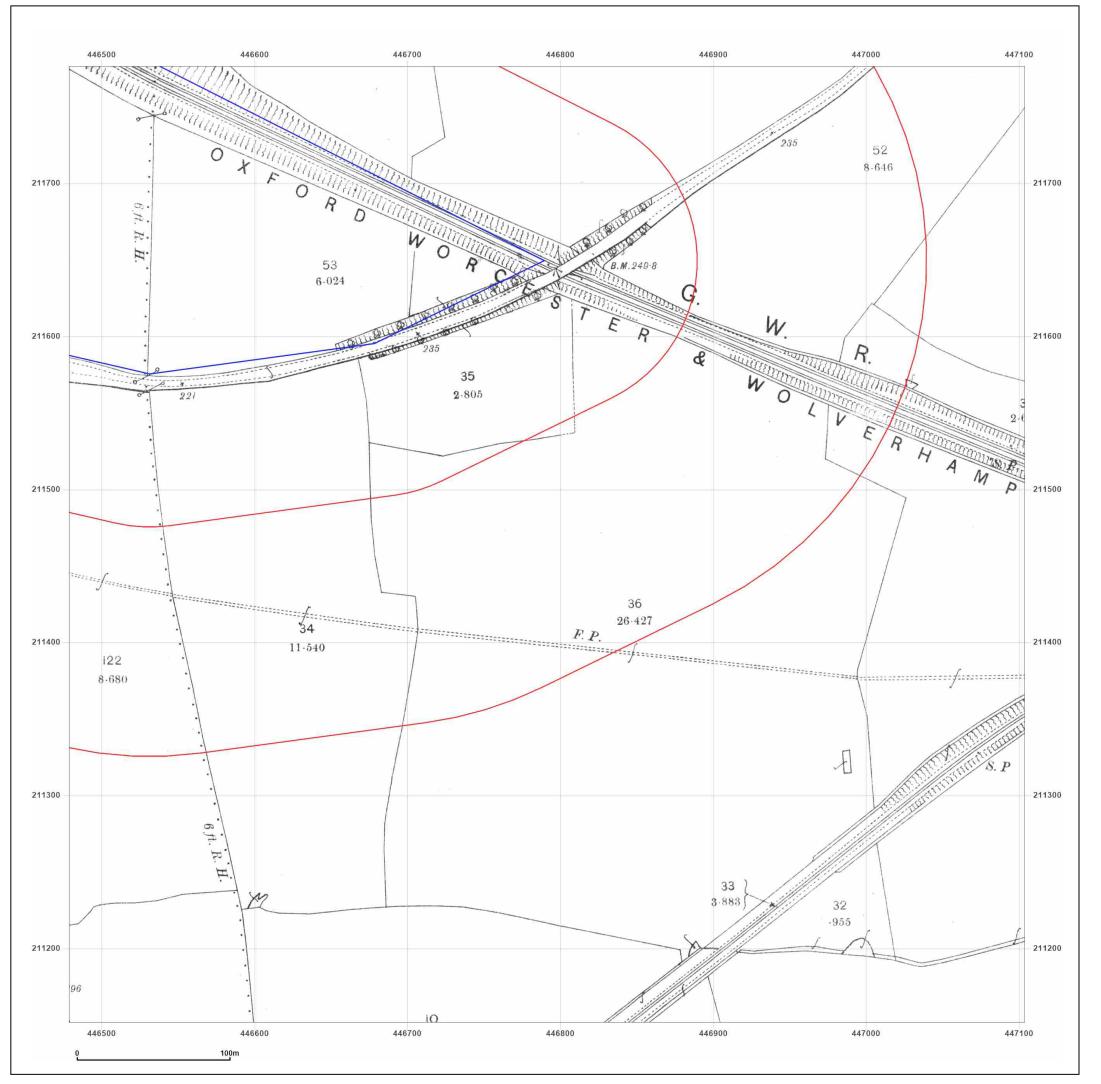




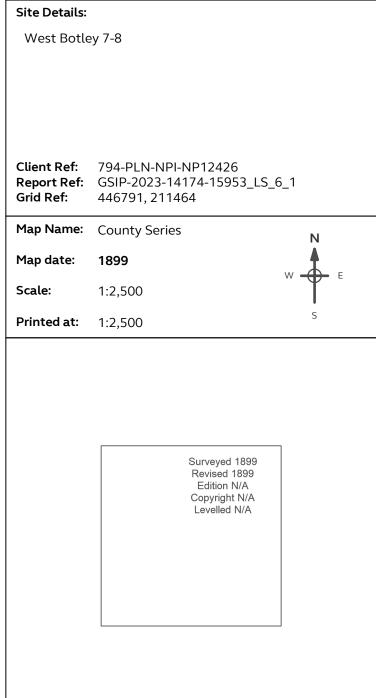


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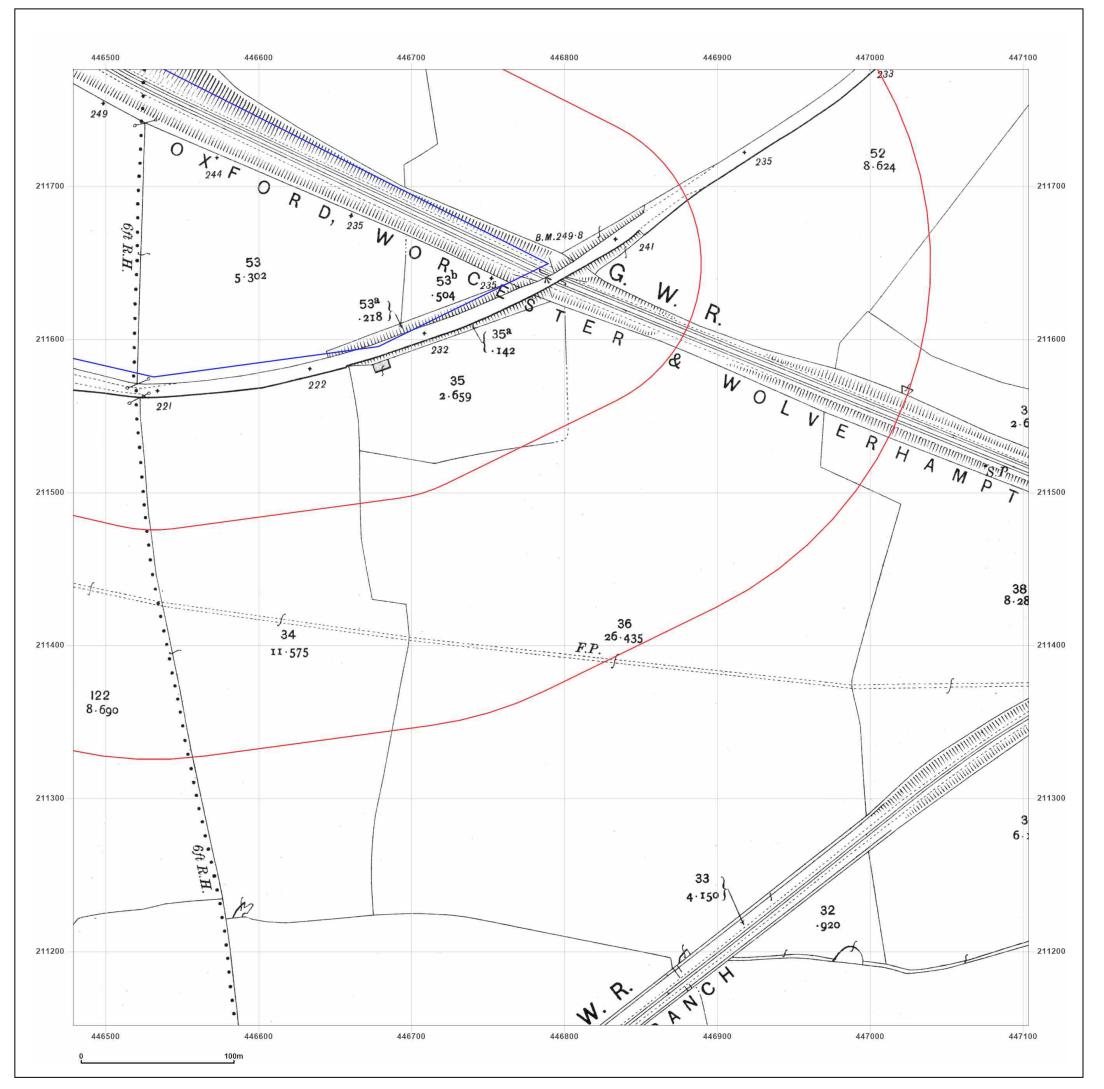




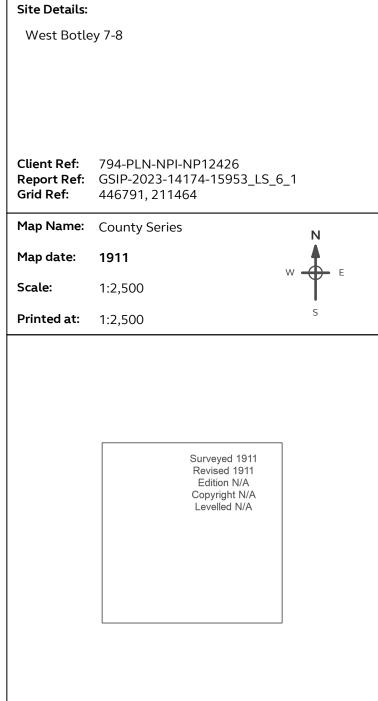


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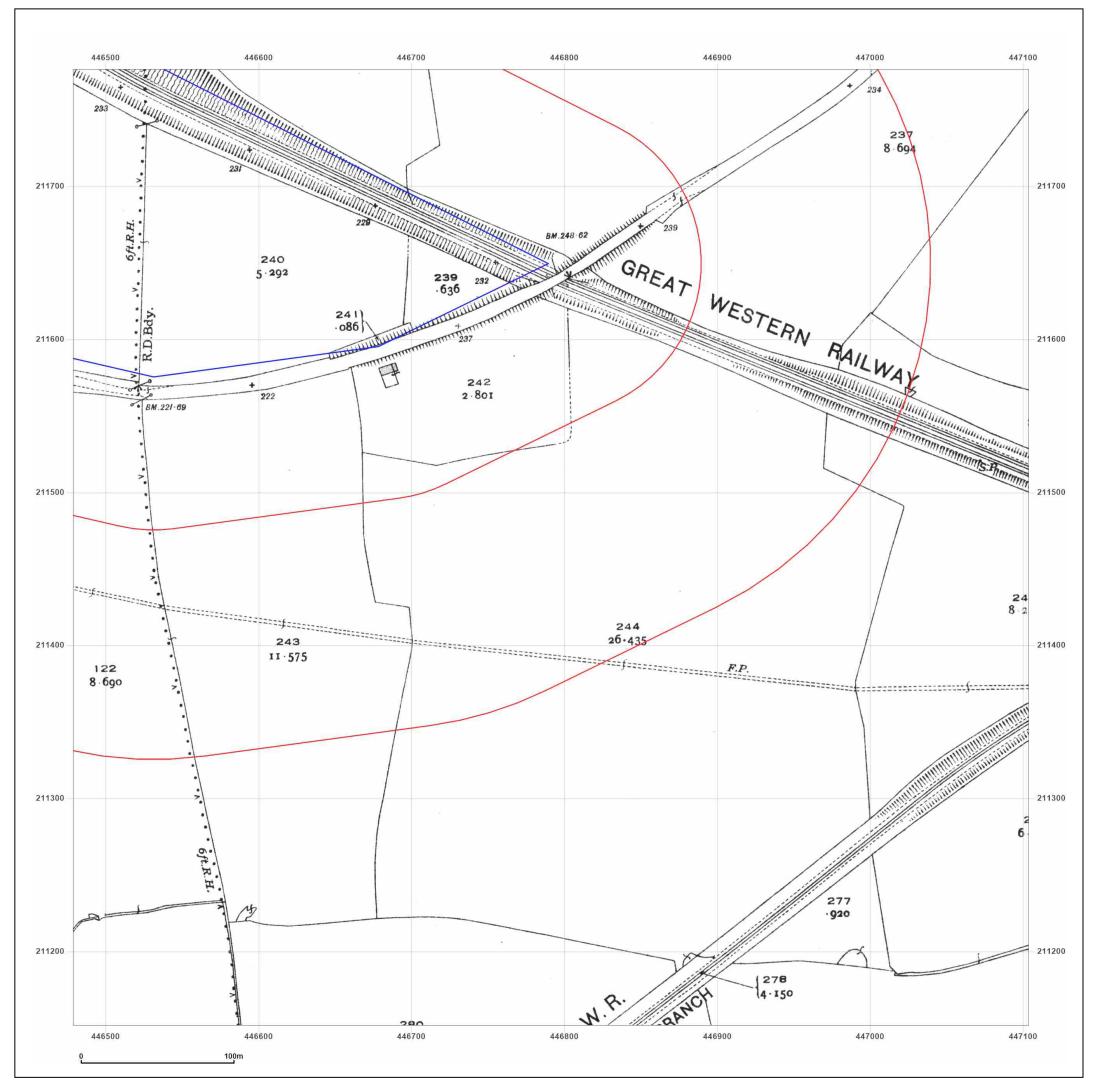




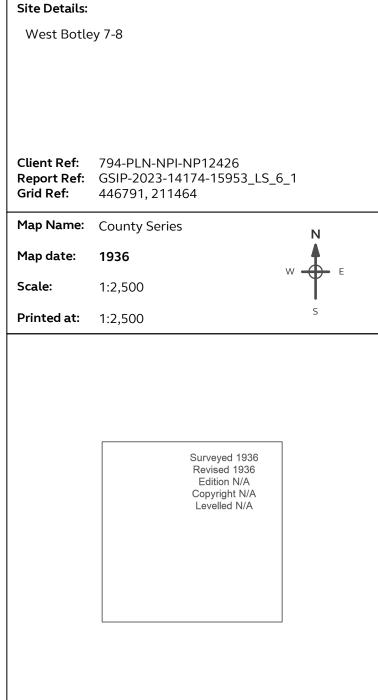


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