



ROBERTS ENVIRONMENTAL LIMITED



Phase 1 Land Quality Assessment
Land Adjacent to Roughbitchworth Lane

March 2014

Yorkshire Land Limited.

Reference: 140314B.R.001

Phase 1 Land Quality Assessment

**Land adjacent to
Roughbitchworth Lane,
Oxspring**

**Client:
Yorkshire Land Ltd.**

Reference: 140314B.R.001

Status: Version 1.0

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EXECUTIVE SUMMARY

SCOPE	
Purpose of the Report	This report has been prepared for the purpose of assisting in the evaluation of potential risk associated with contamination issues at the site which is required as part of the planning application for the development of the site.
Future Site End-use	The redevelopment for residential dwellings with associated areas of gardens and car parking.
SITE INFORMATION	
Grid Reference	427200, 402090
Current Site Status	The site is currently recorded as undeveloped, and comprises an open area of pasture land. It is located on the south bank of the River Don on the north east extents of the village of Oxspring. Oxspring is located approximately 10km to the south west of the centre of Barnsley. Access to the site can be gained on the southern boundary from Roughbitchworth Lane.
History	Historic plans indicate that the site has remained free from development, up until the present day. Pre 1855 a disused quarry is recorded on the adjacent site to the west and Mill Dam and Corn Mill are recorded on the opposite side of the River Don, 50m from the site. Around the middle of the Twentieth Century Mill Farm, including several circular tank features, possibly agricultural silos are recorded on the area formerly occupied by Mill Dam, indicating infilling has occurred. From pre 1931 a Sewage Works is recorded close to the eastern boundary and a small sandstone quarry is recorded 100m to the northwest of the site, this is now recorded as a Local Authority Landfill Site and was infilled with inert excavation waste during 1994. By 1961 the disused quarry to the west appears to have been infilled or possibly re-graded and by 1978 a garage is recorded on the site.
Geology	From a review of the British Geological Survey the geology of the site comprises drift deposits of Alluvium and River Terrace Deposits underlain by bedrock deposits comprising the Grenoside Sandstone Formation and the Pennine Lower Coal Measures.
Coal Mining Risk	The site is in a Coal Mining Reporting Area and a Coal Authority Report has been obtained for the site. The report confirms that the site is not within the zone of likely physical influence on the surface from past underground workings.
Hydrogeology	The drift deposits and the underlying solid geology are classified as Secondary A Aquifers. The site is not positioned on or within 2km of Source Protection Zone. A single abstraction licence is recorded within 1km of the site, listed as a surface abstraction from the River Don, and located 859m to the north west for textile and leather processes.
Hydrology	The River Don is recorded adjacent to the northern boundary of the site, this has attained a GQA Grade B. A portion of the site is located within a Flood Zone 1 and a Flood Zone II and is deemed to be at risk from flooding.

RISK ASSESSMENT

Hazard Identification	Source	A Landfill is recorded as encroaching onto the north edge, possibly associated with the Millstones residential development on the opposite bank of the River Don. The material used is, at this stage of an unknown source and may potentially represent a risk to the end users. No other activities of potential concern have been associated with this site.
	Pathway	Inhalation and ingestion of contaminated material (if present) during future development works and by the future residents.
	Receptor	Construction and maintenance workers, future site users and properties.

CONCLUSIONS

Conclusions	Based on our review of information available, we are of the opinion a plausible pollutant linkage has not been identified at the site for the continued current use. However, in the event of development the potential for a pollution linkage should be further assessed. This report complies with guidance given in the National Planning Policy Framework and Paragraph 24 of PPS23 and in our view the issues identified should not preclude the future redevelopment.
Risk Estimation	Based on the information obtained during the desk study it is concluded that the environmental risk arising from the ground condition at the subject site is Low .
Recommendations	The following is recommended; Phase 2 ground investigation to confirm geotechnical parameters and to determine foundation design for the future development. In addition, to undertake a human health risk assessment to confirm that there is not a risk to the future end users on this site. A Flood Risk Assessment is may also be required as part of the planning process.

1. Instructions

Instructions were received dated 17 March 2014 from Sharpe Topping, consulting structural engineers, to undertake a Phase 1 Environmental Report of the subject site.

From a review of the 'Barnsley Metropolitan Borough Council Validation Check-List' document, we understand that where the development site is known or suspected to be affected by land contamination an assessment should be carried out. Our approach is compliant with the National Planning Policy Framework but in the absence of further detailed guidance we have continued to maintain an approach in accordance with Planning Policy Statement 23: Annex 2, "Development on Land Affected by Contamination", (Office of the Deputy Prime Minister, 2004) for robustness. Therefore, we have provided this desk based assessment of the likelihood of the presence of land contamination, its nature and potential risk to the proposed development, and what further measures are required to ensure the site is 'suitable for use'. This report is provided as supporting environmental information to the planning application.

Our report has been undertaken in accordance with the proposal and terms and conditions agreed between Roberts Environmental Ltd and Yorkshire Land Ltd. on 14 March 2014.

Report Reliance

This report has been prepared in accordance with the scope of the Roberts Environmental Ltd appointment with the client and is subject to the terms of that appointment. It is addressed to and for the sole use and reliance of Yorkshire Land Ltd. We accept no liability for any use of this report other than by our client. No person other than Yorkshire Land Ltd. may copy, use or rely on the contents of this report.

Data Sources & Inspection

The findings of this report are based upon information provided by the client and database information obtained from regulatory bodies (the Environment Agency, Coal Authority and Local Authority, etc) as contained in the Envirocheck Report (Ref. 54535817_1_1) purchased from Landmark.

2. Location

The subject site is located on the south bank of the River Don on the north east extents of the village of Oxspring. Oxspring is located approximately 10km to the south west of the centre of Barnsley. Site Location and Layout Plans are presented below.

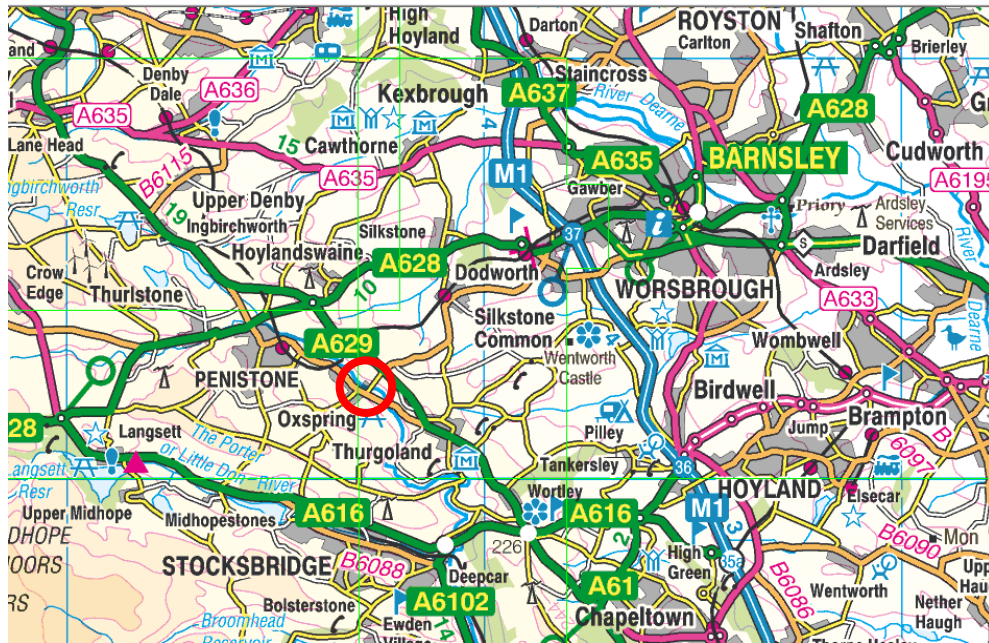


Figure 1: Site Location Plan (boundaries shown are indicative only)

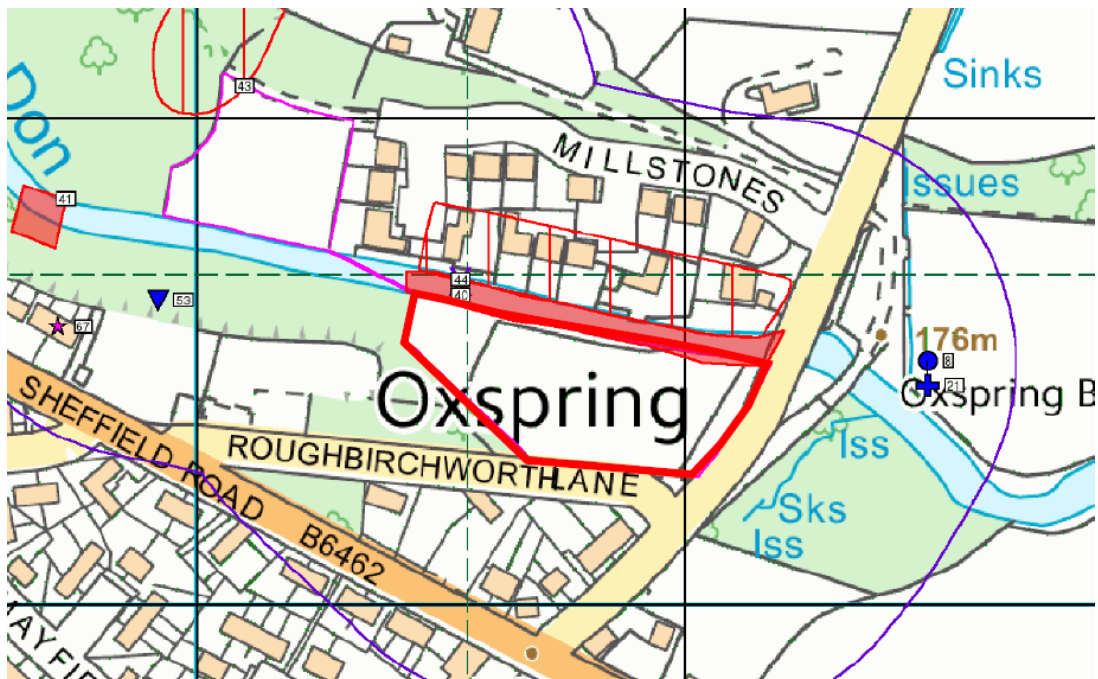


Figure 2: Site Layout Plan (boundaries shown are indicative only)

3. Description

The following table provides a summary of site conditions.

Issue	Description
Site Name	Land adjacent to Roughbitchworth Lane.
Address	Land adjacent to Roughbitchworth Lane, Oxspring, Sheffield, S36 8WZ.
National Grid Reference	427200, 402090
Site Areas*	0.64 hectares, 1.58 acres
Tenure	Freehold ☒ Leasehold ☐
Occupancy*	Operational ☐ Development ☐ Derelict ☐ Vacant ☒
Site Description and Activities	The site comprises a vacant plot of grassed pasture land, on the south bank of the River Don. It is situated adjacent and to the west of Millstones, a residential development west of Oxspring Bridge, in Oxspring. The site is accessible from the southern boundary from Roughbitchworth Lane. Surrounding areas remain undeveloped with several small isolated areas of residential development.
Site Gradient	Site levels fall from the southwest corner to the north and northeast corner of the site, generally towards the River Don
Development Proposals	The proposed redevelopment comprises a number of residential dwellings with associated gardens and car parking.

4. Operational Issues

Deleterious Materials

The Control of Asbestos Regulations 2012 came into effect in April 2012. These repeal earlier asbestos legislation. Owners, occupiers, managers and/or those who have responsibilities for premises have a legal duty to either manage the risk of asbestos or a duty to co-operate with whoever manages that risk.

The responsible party has to identify the existence of asbestos containing materials, record their location and condition, set out a plan to manage the risk from the material and take the necessary steps to put this plan into action.

An appropriately licensed asbestos contractor should remove asbestos material that is likely to be disturbed and cannot be easily protected. Reviews of this plan will have to be undertaken on an on-going basis. Details as to the location and condition of the materials must be provided to anyone who is liable to work on or disturb it.

Asbestos Survey

No buildings are, or have been recorded on the subject site and as such no asbestos survey reports are available for review. Asbestos containing materials (ACMs) are not anticipated on this site. However, it would be prudent to maintain a watching brief during future ground works.

Site Services

The condition or capacity of the power, drainage and communication infrastructure serving the site is not known. Live services are not anticipated however, they can't be discounted and may be present associated with the adjacent developments. It would be prudent confirm to obtain service information prior to undertaking and ground investigation works.

Above and Below Ground Structures, including Storage Tanks

No above or below ground storage tanks are anticipated on this site.

Chemical Storage

No bulk storage of chemicals is undertaken on the site.

Waste Management Practices

The site is vacant and no waste is produced at the site.

Invasive Plants

The Wildlife and Countryside Act 1981 (as amended) is the principal legislation which regulates the release of non-native species. Section 14(2) prohibits the release of certain invasive non-native plants into the wild in Great Britain; it is an offence under Section 14(2) to "plant or otherwise cause to grow in the wild" any plants listed on Part II of Schedule 9.

The most common plant species found on brownfield and urban sites include Japanese Knotweed, Giant Hogweed and Himalayan Balsam. Although we are not qualified to undertake ecological surveys, none of these plants are known to present on the subject site.

5. Historical Development

A review of historical maps obtained from Landmark and publically available data sources has been undertaken. A summary of relevant information, within 250m (i.e. in the planning consultation zone), is shown in chronological order in the table below with relevant maps in **Appendix I**.

Source	Site	Surroundings
Pre 1855- pre 1960	The site is recorded as undeveloped.	A disused quarry is recorded on the adjacent site to the west and Mill Dam and Corn Mill are recorded on the opposite side of the River Don, 50m from the site. A disused Corn Mill is recorded 20m to the south of the site. By 1931 a Sewage Works is recorded close to the eastern boundary of the site and a small sandstone quarry is recorded 100m to the northwest of the site, this is now recorded as a Local Authority Landfill Site and was infilled with inert excavation waste during 1994.
Pre 1960- pre 2006	The site remains unchanged, and is undeveloped.	Mill Farm, including several circular tank features, possibly agricultural silos are recorded on the area formerly occupied by Mill Dam, indicating infilling has occurred, 50m to the north. Anecdotal evidence indicates this was infilled with foundry waste, which was subsequently re-engineered as part of the Millstones development. The disused quarry, adjacent to the west, appears to have been infilled or possibly re-graded and by 1978 a garage is recorded on this site, 150m from the site.
2006- Present	The site remains unchanged, and is undeveloped.	Millstones Road and residential development are recorded on the area to the north on the opposite side of the River Don. Residential development associated with Oxspring is recorded to the south and west of the site. Plans dated 2013 indicate that the quarry, feature 100m to the north west of the site has been partially infilled.

* Potentially contaminative uses are shown in bold italics.

Potential for Historical Contamination

The historical map assessment of the site uses has not identified any potential significant sources. However, historical activities on adjacent sites may have affected this site. However,

at this stage these potential sources are not considered to represent a significant environmental concern within the boundaries of the subject site, and until proven otherwise, the risk to human health associated is not considered to be significant.

6. Previous Reports

No previous reports have been provided for review as part of this assessment.

7. Geological setting

The geology beneath the site, summarised below, has been established from the British Geological Survey (BGS) 1: 50,000 scale Provisional series, England and Wales, Sheet 21 (Sunderland), Solid and Drift Edition together with information from Landmark and the BGS website.

Site geology

Stratum	Description	Approx. Thickness
Alluvium (northern portion) (Drift)	Sand, silt and clay	Not known
Grenoside Sandstone (Solid) (southern portion of site)	Sandstone and mudstone.	30m-60m
Pennine Lower Coal Measures (Solid) (northern portion of site)	Mudstone Siltstone & Sandstone	

Borehole Logs

From a review of the Borehole Index held by the British Geological Survey, no relevant records are held for the property or the immediate surrounding area

8. Coal Mining Risk Assessment

Coal Authority Consultation

A review of the Coal Authority database has identified that the potential development site is within a 'Coal Mining Reporting Area'. The Coal Mining Reporting Area, also known as CON29M Coal and Brine Consultation Areas, is the known extent of coal mining activity and is used to determine whether a coal mining report is required.

Coal Authority Report

A Coal Authority Report (Reference: 51000502807001) was obtained for the site (**Appendix II**). The report states:

- According to the available Coal Authority records, the property is not within the zone of likely physical influence on the surface from past underground workings.
- The report does not make any reference to any potential unrecorded shallow workings in the area.
- The site is not in the likely zone of influence of any present underground coal workings.
- There are no known coal mine entries within, or within 20 metres of, the boundary of the property.
- The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.
- The site does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.
- The site is not within 800 metres of a site where the Coal Authority has granted, or is determining whether to grant, a licence to remove coal by opencast methods.
- There is no record of mine gas emission requiring action by the Coal Authority within the site boundary.
- The site has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

Based upon the available data the site is not considered to be at risk from coal mining activity, and no further investigation works are deemed to be necessary.

9. Hydrogeology

According to the Groundwater Vulnerability map for South Pennines (Sheet 11) and the Environment Agency website the bedrock underlying the site is classified as a **Secondary-A Aquifer**.

Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The site is not located in an area designated as a Groundwater Source Protection Zone.

10. Hydrology

Surface Watercourses

The following surface watercourses have been identified within 500m.

Watercourse	GQA Classification	Distance & Direction
River Don	River Quality B	Adjacent to northern boundary of the site.

Note: Chemical / biological water quality as classified under EA's River Quality Classification.

Culverted Watercourses

We are unaware of any culverted watercourses being present at the property, there is no evidence on historic plans to suggest a culverted water course is present below the site. . Should clarification on this point be required, it would be necessary to undertake an intrusive drainage survey to trace the location of the drainage infrastructure.

Flood Risk

According to the Environment Agency's website, the majority of the site is located outside the area at risk from flooding from rivers and sea. This area is designated as being within a Flood Zone 1, Low Probability, and comprises land assessed as having a less than 1 in 1000 annual probability of river flooding (<0.1%).

However, a portion of the northern side of the site, adjacent to the River Done, encroaches into an area deemed to be at risk from flooding and extreme flooding from rivers, designated as a Flood Zone I & II respectively. A Flood Zone I comprises land assessed as having a 1 per

cent (1 in 100) or greater chance of flooding each year and a Flood Zone II is land likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year. Therefore a site specific flood risk assessment may be required for this site.

It is understood that any future development on this site will be required to be on land above the 176m AOD contour line, and not within 8m of the river bank.

11. Environmental sensitivity

The site is considered to be of **Low Environmental Sensitivity** due to the lack of significant historic activity on the site, the underlying Secondary-A Aquifer and the overall site setting.

12. Regulatory databases

From a review of Envirocheck Report (54290914_1_1) presented in **Appendix II**, the following regulatory authorisations, consents and permits have been identified within 250m (i.e. in the planning consultation zone):

Groundwater Abstractions

The Report does not identify any groundwater abstractions on site, or within 1km.

Surface Water Abstractions

A single abstraction licence is recorded within 1km of the site, a surface abstraction from the River Don, and located 859m to the north west for textile and leather processes.

Discharge Consents

A single Discharge Consent was operated between 1998 and 1999 by David Wilson Homes for a sewage pumping plant. The licence has been revoked and is not considered to be of consequence to the site or the proposed development.

Pollution Incidents

The Envirocheck Report has identified a single pollution incident within 250m of the subject site. Positioned to the north at Sew Works, Oxspring Bridge, listed as a Category 3 – Minor Incident and dated May 1992. It is not attributable to the site and it is not likely to have any ongoing effect on the site and as such is not of significant environmental concern.

Pollution Prevention and Control (IPC, IPPC, LAPPC)

The Report has not identified any IPC, IPPC or LAPPC licenses within 250m of the site.

Hazardous Substances (CoMAH, RSA etc.)

The Report does not identify any hazardous substance authorisations/consents on site or within 1km.

Waste Management Sites / Landfills

The Envirocheck Report has identified the following landfill and waste management entries for this site;

- A Historical Landfill site is recorded as encroaching on to the northern boundary of the site, named Bower Hill, the landfill is recorded as a linear feature along a section of The River Don's Channel, west of Oxspring Bridge this feature is peculiar as it is situated within the river channel, consultation with the Local Authority did not provide any additional information about this feature.
- Two further Historic Landfills are recorded within 250m of the site, the first is named, Land North of Sheffield Road, and is a small square parcel of land 140m to the west of the site. The third, named Oxspring Recreation Ground, is located 150m to the southeast on the area recorded as recreational ground.
- Three Local Authority Recorded Landfills are recorded within 250m of the site, one is positioned on the Millstone housing development to the north, associated with the excavation, screening, regrading and emplacement of materials to create a development platform. The second is located 100m south of the site on an area recorded as recreational ground. The third is an infilled sandstone quarry positioned 120m to the northwest. Consultation with Bradford Metropolitan Borough Council has established this was infilled with inert excavation waste as is not deemed as a potential source of ground gas.

There are no other landfill or waste management sites listed within 250m of the site. Anecdotal evidence indicates that the materials utilised within the landfills is unlikely to produce significant quantities of landfill gas.

Although unlikely it is felt that the risk from ground gas cannot be wholly discounted at this site when considering other potential sources including the possible presence of naturally occurring organic deposits within the alluvium.

13. Preliminary Conceptual Ground Model

A conceptual model of the site has been developed based on the information described in the previous sections. Pollutant linkages to be assessed include current and historical sources of contamination and their potential impact on current and future receptors at the site and its surrounds.

Ground Conditions / Contamination Sources

The historical maps and the site walkover information has identified that the site has not been subjected to any significant uses of a contaminative nature.

Although unlikely, at this stage some made ground may be present on site associated historic activities and development on adjacent and nearby sites. However, based upon the findings of this report, significant quantities of contaminated material are not anticipated.

There are several potential significant sources of ground gas within a plausible migration distance of the site. Including several landfill sites. However, anecdotal evidence indicates these features have been infilled with generally inert material. In addition, there is the potential for naturally occurring organic materials, possibly peat, to be present within the alluvial deposits, below the site. It would therefore be considered prudent to incorporate a period of gas monitoring into the scope of any future ground investigation works to determine the gas regime for this site.

Pathways

The site currently comprises grassed pasture and the proposed development is for residential dwellings with private gardens with areas of soft landscaping. Therefore there are a number of potential direct contact or inhalation pathways and indirect pathways.

Receptors

The key receptors at the site have been identified as being the future end users, the redevelopment workers and the future properties on site. In addition, should significant sources of contamination be identified Controlled Waters, could potentially be at risk, in particular the River Don.

Potentially Significant Pollution Linkages

The principal receptor to potential ground contamination at the sites is the future redevelopment of the site for residential properties. During the future redevelopment, ground workers could be exposed to ground contaminants via direct contact, ingestion and/or inhalation pathways, depending on the location and nature of contaminants. Likewise, future residents could also be exposed to any potential contaminants, particularly in any areas of

soft landscaping. At this stage no significant sources of contamination have been confirmed no viable pathways have been identified and therefore no pollution linkage are present at this time. However, as part of the proposed development, ground investigation works should be carried out, including a Human Health and Controlled Waters risk assessment to confirm that there is not future risk to the identified receptors.

14. Environmental Risk Assessment

Regulatory Regime

In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors need to be established and evaluated. This is in accordance with Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused;
- Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential receptors which could be harmed or polluted, and the potential pathways between them. A contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part2A, including evidence of the actual presence of contaminants.

Risk Exposure

The risk of significant harm to human health or of pollution of controlled waters given the current and proposed future site uses has been assessed qualitatively as low, medium or high, see **Appendix III**. A risk estimation matrix for all pollutant linkages identified is shown in the below.

Estimation of environmental risks associated with the subject site

Receptor	Potential sources	Pathways	Risk	Justification
Human Health				
Future site users & Construction workers	Made Ground of an unknown nature.	Direct contact, ingestion, migration of vapours and inhalation. Mine and Landfill gases.	Low	Potential sources of made ground include infilled quarry (landfill site) and landscaped mound to the north and west of the site and re-graded materials on the eastern side of the site. Acute harm is not considered likely at this time. However, construction and maintenance work should be subject to risk assessment. Workers should use appropriate procedures to manage risk from exposure to materials on site. PPE should be utilised as a minimum.
Future Property				
Site structures susceptible to attack by contaminants	Potential soil, groundwater and ground gas contamination.	Direct contact and migration of vapours and groundwater Risk of damage to property – ground movements and instability triggered by ground disturbance	Low to Medium	No significant sources of contamination have been identified. No shallow voids or workings are considered to be present within an influencing depth below the site. Several potential sources of ground gas have been identified within a plausible distance of the site.
Plants /Landscaping	Potential soil, groundwater and ground gas contamination.	Direct contact with plant roots	Low	Areas of soft landscaping on and adjacent to the site appeared to be in good condition with no visual evidence of vegetation die-back.
Nearby Land Uses				
Residential Properties,	Potential soil and groundwater contamination.	Migration via groundwater	Low	Contamination sources may be present on site, however, risk of migration to the residential properties is considered low at this stage.
Controlled Waters				
Surface water bodies	Potential soil and groundwater contamination.	Migration via groundwater	Low	Contamination sources may be present on site and could theoretically migrate to the adjacent surface water, if present.
Secondary A-Aquifer	Potential soil and groundwater contamination.	Migration of soil contaminants into groundwater	Low	The aquifer is not considered to be significant risk at this stage. The presence and movement of shallow ground water associated with the adjacent River Don would dilute and disperse and contaminants, if present.

15. Conclusions

The site currently forms an undeveloped parcel of land, with surfacing comprising grassed pasture. No significant sources of contamination were identified associated with the sites current use.

During the review of historical maps it has been identified that the subject site remained undeveloped. Significant potential historical sources of contamination are unlikely to be present on this site. However, they cannot be wholly discounted and some made ground may be present, associated with the infilled quarry and adjacent development to the west and north respectively.

From a review of the British Geological Survey the geology of the subject site comprises drift deposits of Alluvium and River Terrace Deposits underlain by Grenoside Sandstone and Pennine Lower Coal Measures, classified as a Secondary-A Aquifer. There are no shallow coal seams within this rock formation and the site is not at risk from shallow coal mining activity.

An assessment of the risk from ground gas has identified a number of potential sources within a plausible migration distance including landfill sites, (although anecdotal evidence indicates infilling occurred with inert material), and the potential presence of naturally occurring organic material within the alluvial deposits below the site. Therefore, the site may be at risk from ground gas and it would be considered prudent to incorporate gas monitoring within the scope of future ground investigation works.

Reference has been made to the Environment Agency's indicative floodplain map which shows that the majority of the site is situated in Flood Zone 1. However, the northern edge of the site, adjacent to the River Don is situated within a Flood Zone II and III and are at risk from flooding. It is anticipated that a site specific flood risk assessment may be required for this site as part of the planning process. However, it is understood that there are some restrictions with respect to the development area and site levels and distance from the river bank.

Based on our review of information available, we are of the opinion a plausible pollutant linkage has not been identified at the site for the continued current use. However, in the event of development the potential for a pollution linkage should be further assessed.

This report complies with guidance given in the National Planning Policy Framework and Paragraph 24 of PPS23 and in our view **the issues identified should not preclude the future redevelopment**. Based on the information obtained during the desk study it is concluded that the environmental risk arising from the ground condition at the subject site is **Low**.

Summary of Geotechnical Considerations

Made Ground: Some made ground may be present on site associated with the infilling of the adjacent quarry and nearby development. However, significant quantities are not anticipated at this stage.

Natural Drift Deposits: Alluvial and River Terrace deposits are recorded below the site and may comprise geotechnically less competent deposits, in conjunction with areas of compressible organic deposits of peat. Depending on depth and extent of these deposits conventional foundations may not be a suitable option and an alternative may need to be considered.

Groundwater: Shallow groundwater should be anticipated below the site and groundwater control measures are likely to be required during any future ground works.

Shallow Coal Mining: According to the available data, the site is not at risk from shallow coal mining activity.

Summary of Contamination Considerations

Sources of Ground Contamination: Potential sources of made ground from an unknown source have been identified and could potentially represent significant sources of contamination on this site. Not considered to be a significant issue at this time.

Controlled Waters: Controlled Waters in the vicinity of the site are not considered to represent a source of contamination to this site. However, if significant quantities of contamination are present on site, then there is the potential for contamination to migrate to the adjacent surface water (River Don). However, this is considered unlikely at this stage.

Ground Gas: Potential sources have been identified and if significant quantities of ground gas are present appropriate protection measures will need to be incorporated in to the building fabric.

Radon Gas: In accordance with information provided by the British Geological Survey and National Geoscience Information Service; a portion of the site is located within an intermediate probability radon area, as between 1 and 3% of homes are above the action level. In accordance BRE 211 basic radon protection may need to be incorporated into new dwellings.

16. Recommendations

Following the completion of this report, we recommend that the client undertakes the following action:

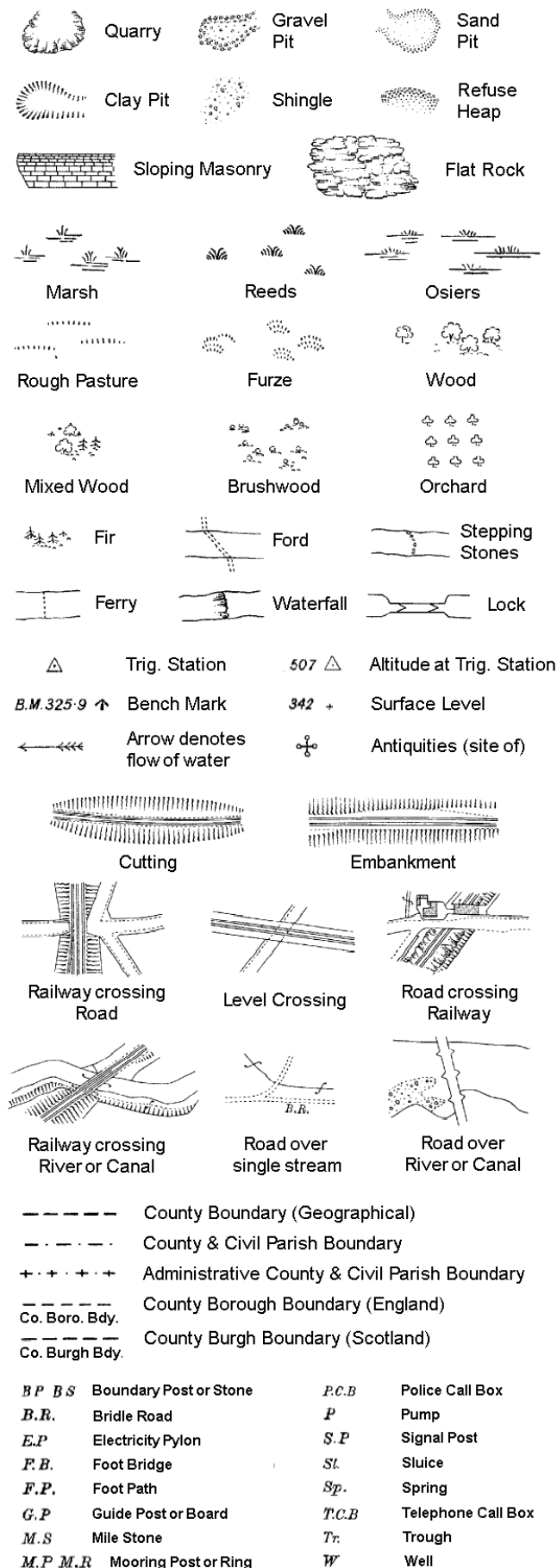
Development Scenario	Recommendation	Justification
Redevelopment	Phase 2 ground investigation to confirm geotechnical parameters, depth and extent of made ground and drift deposits to determine foundation design for the future development. In addition, collect samples for a human health risk assessment including installation of ground gas and groundwater monitoring installations. A site specific Flood Risk Assessment may be required by the regulatory authorities as part of the planning application.	Structural design requirements & Human Health Risk Assessment

Definitions and Reservations used in this report are presented in **Appendix III**.

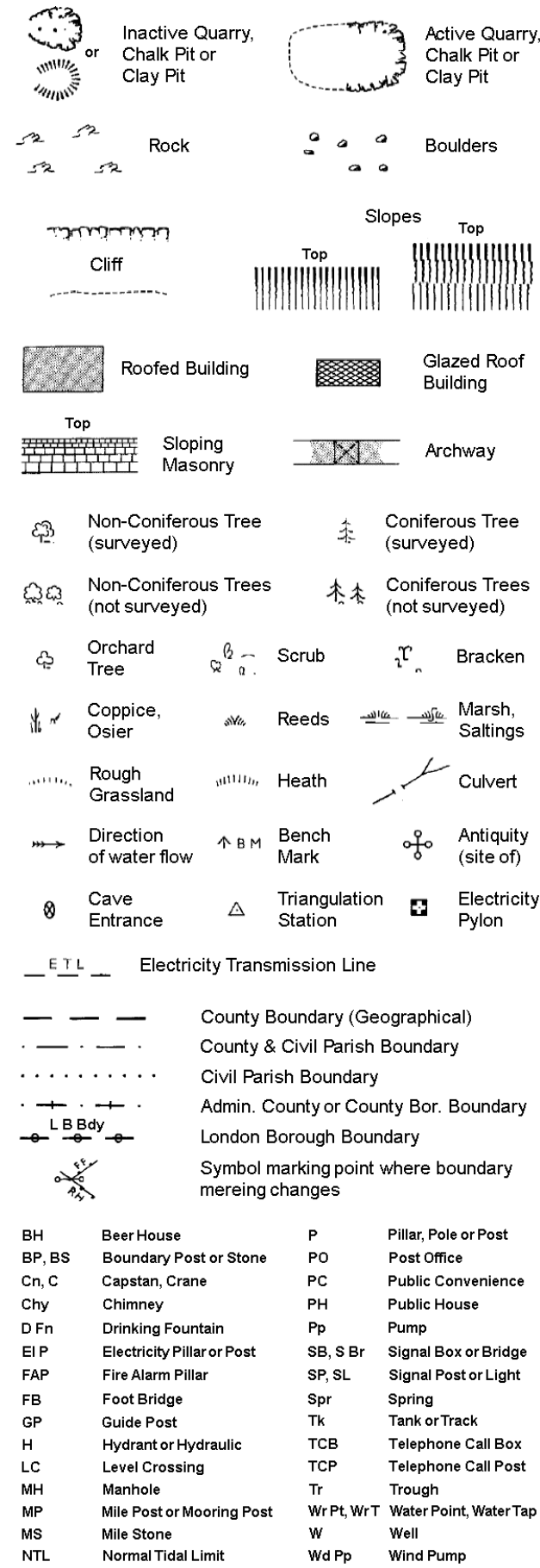
APPENDIX I HISTORICAL MAPPING

Historical Mapping Legends

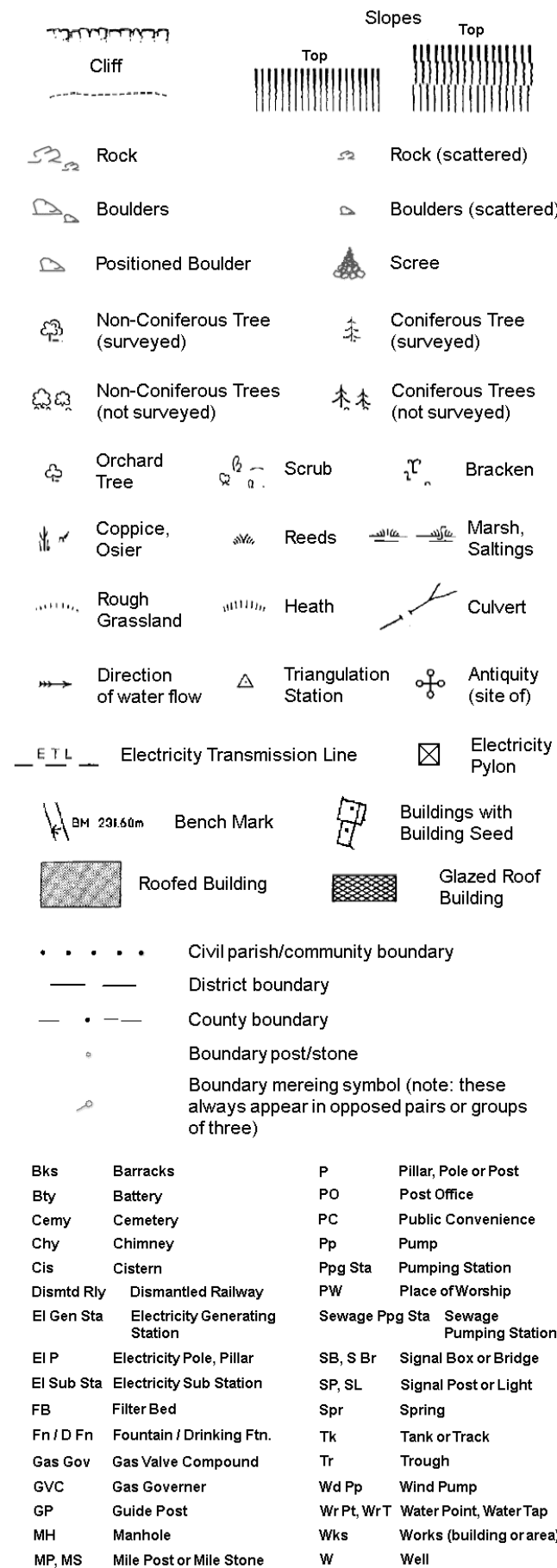
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



Large-Scale National Grid Data 1:2,500 and 1:1,250

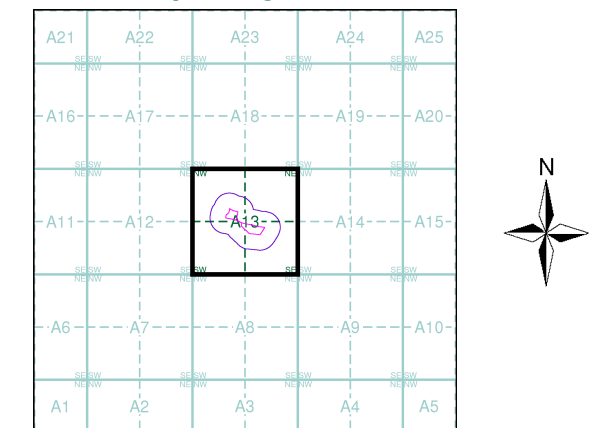


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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:2,500	1893	2
Yorkshire	1:2,500	1905	3
Yorkshire	1:2,500	1931	4
Ordnance Survey Plan	1:2,500	1960 - 1961	5
Additional SIMs	1:2,500	1960 - 1991	6
Supply of Unpublished Survey Information	1:2,500	1976	7
Ordnance Survey Plan	1:2,500	1979 - 1984	8
Ordnance Survey Plan	1:2,500	1984	9
Additional SIMs	1:2,500	1984 - 1988	10
Large-Scale National Grid Data	1:2,500	1993	11

Historical Map - Segment A13



Order Details

Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

Site Details

Land between Millstones & Roughburchworth Lane, Oxspring, SHEFFIELD, S36 8WZ



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Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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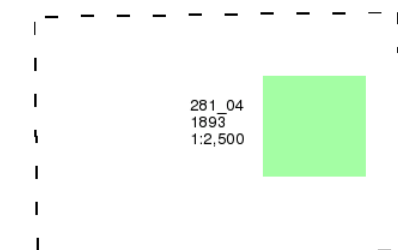
Yorkshire

Published 1893

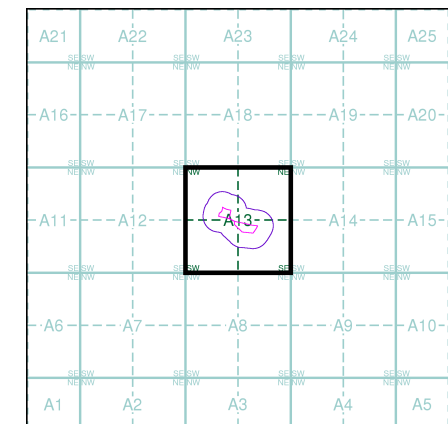
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

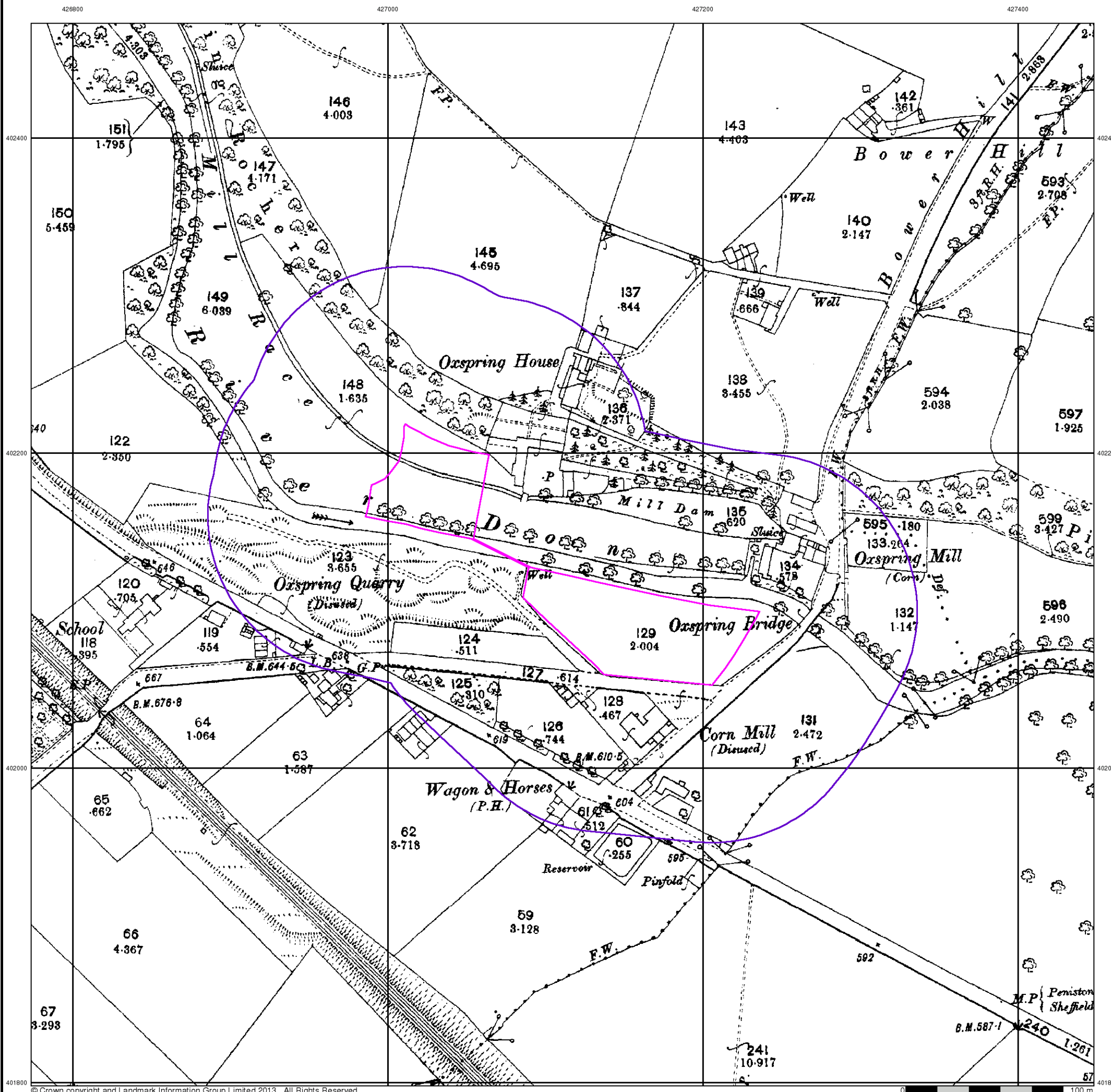
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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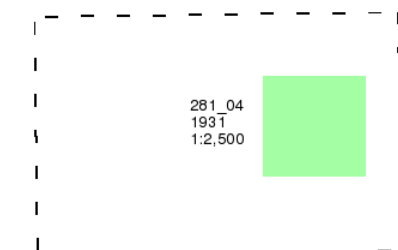
Yorkshire

Published 1931

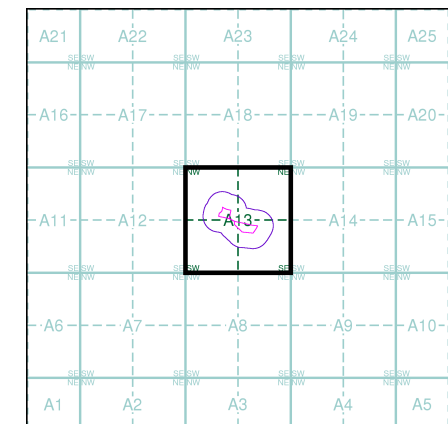
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

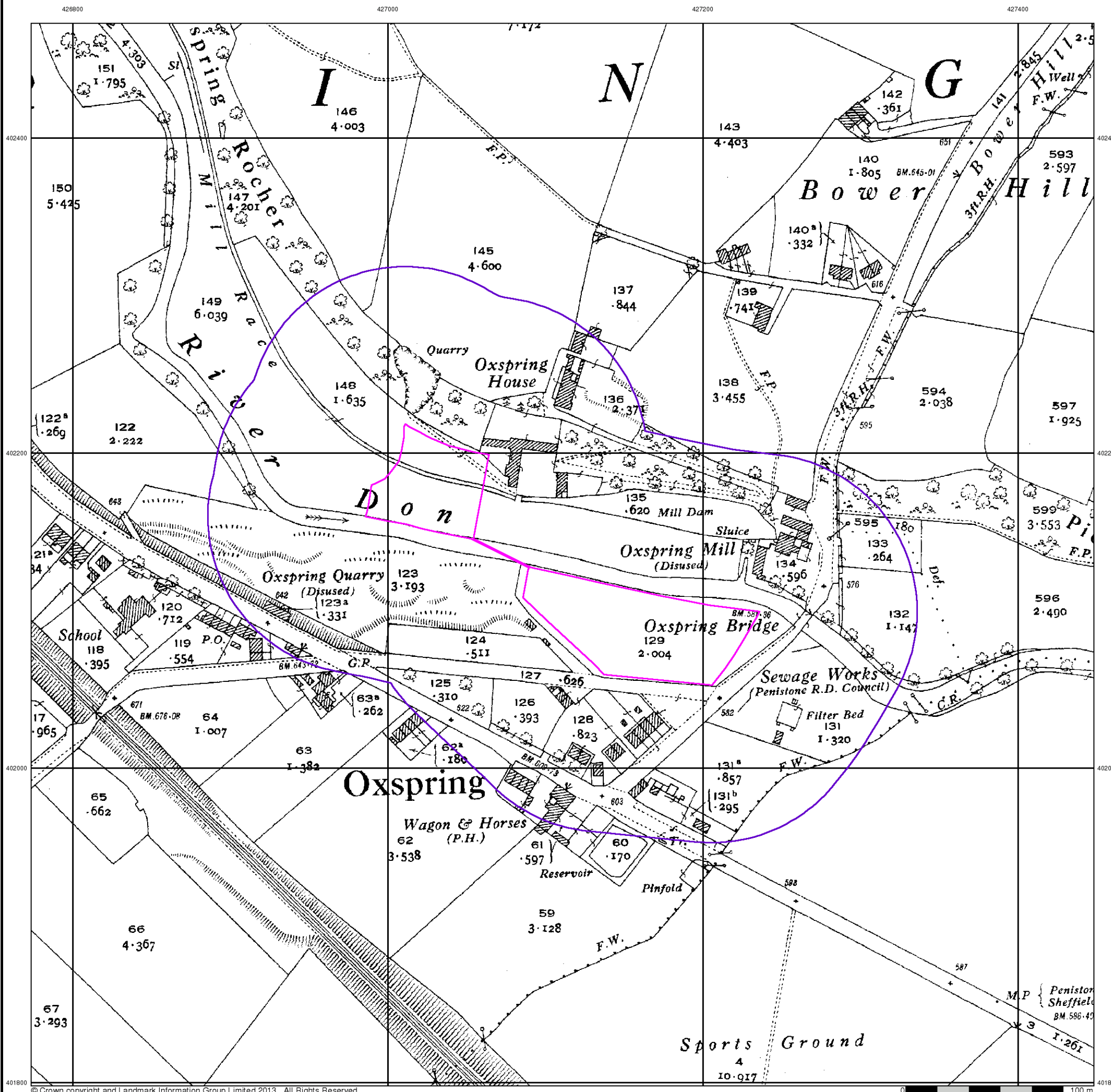
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
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Ordnance Survey Plan

Published 1960 - 1961

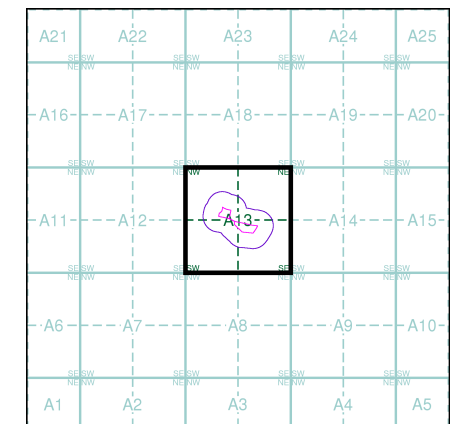
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SE2602 1960 1:2,500	SE2702 1960 1:2,500
SE2601 1961 1:2,500	SE2701 1961 1:2,500

Historical Map - Segment A13



Order Details

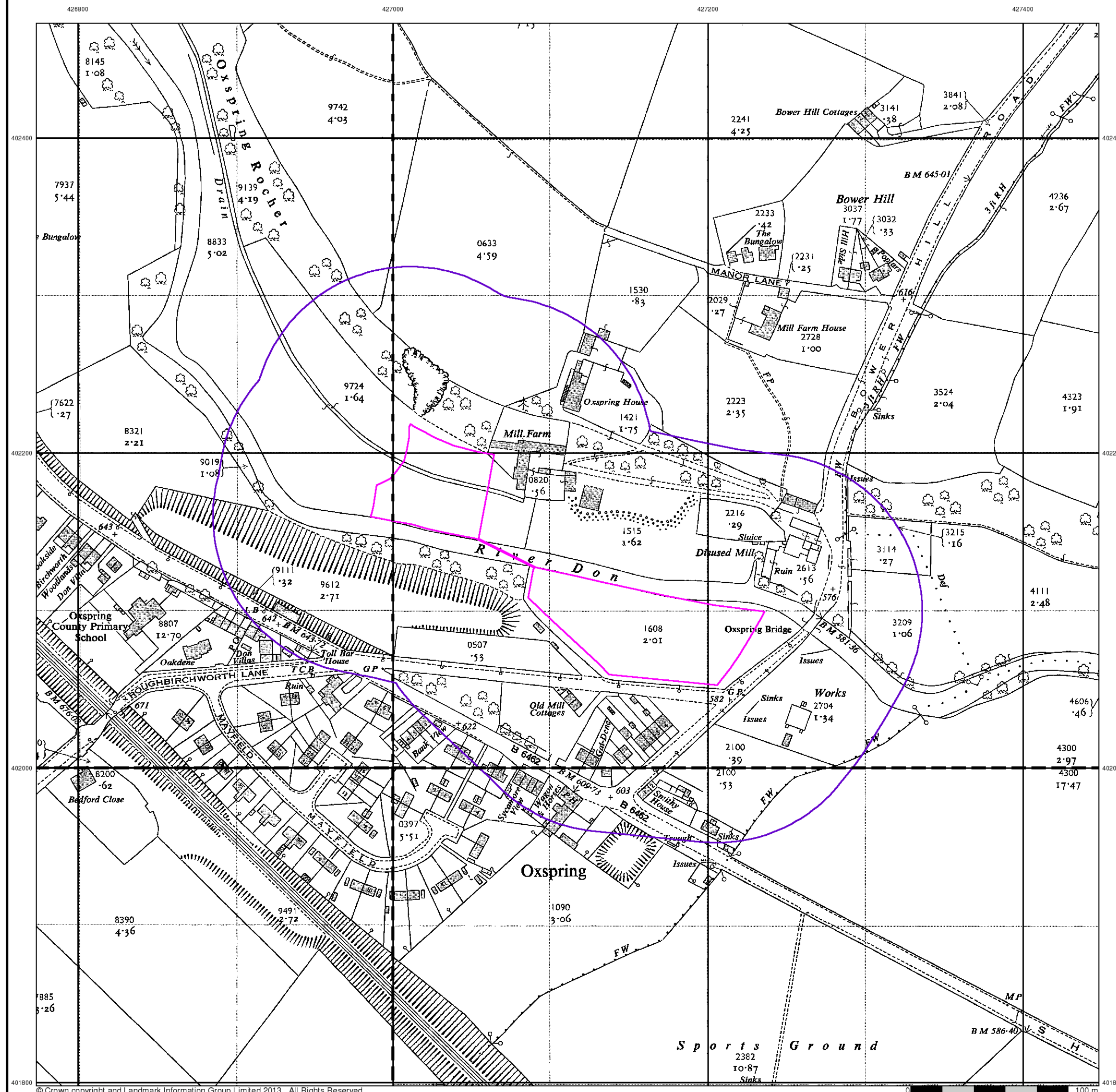
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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Additional SIMs

Published 1960 - 1991

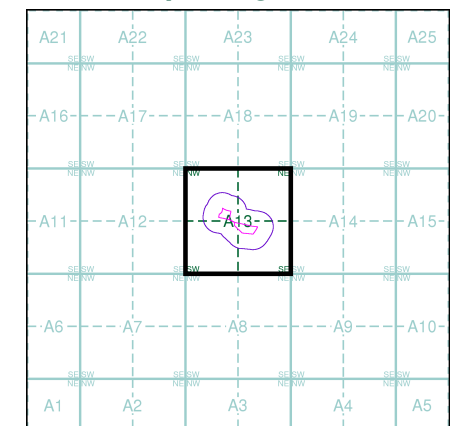
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SE2602 1978 12,500	SE2702 1960 12,500
SE2601 1978 12,500	SE2701 1991 12,500

Historical Map - Segment A13



Order Details

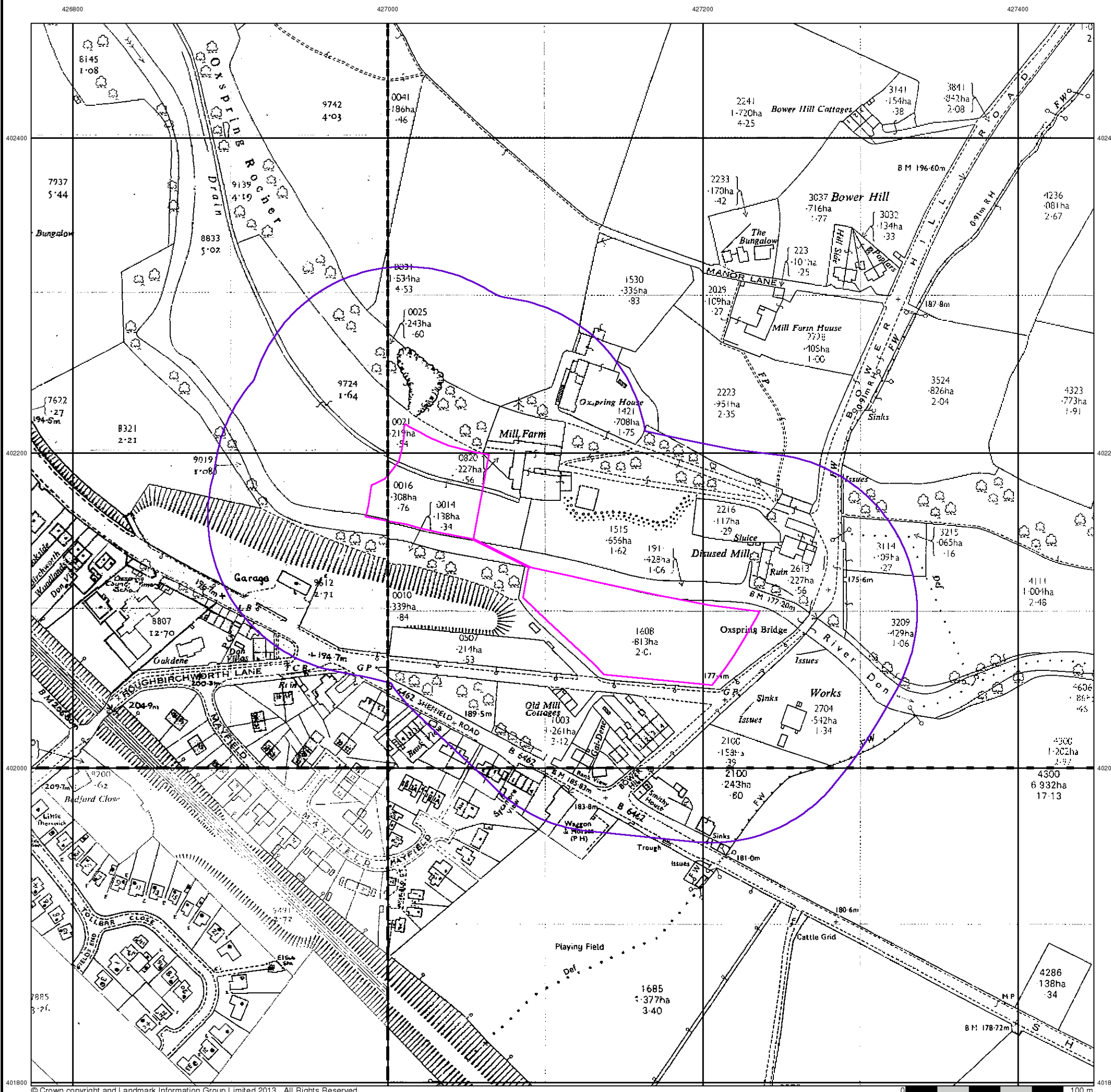
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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Supply of Unpublished Survey Information

Published 1976

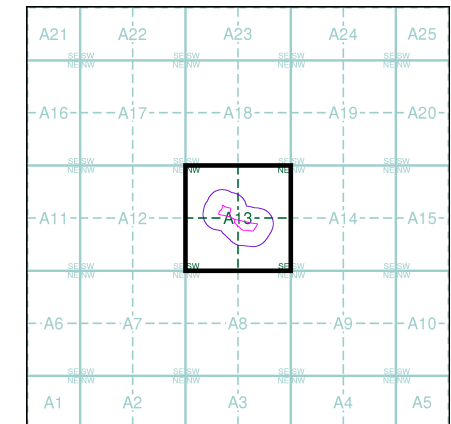
Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SE2602 1976 1:2,500	SE2702 1976 1:2,500
SE2601 1976 1:2,500	

Historical Map - Segment A13



Order Details

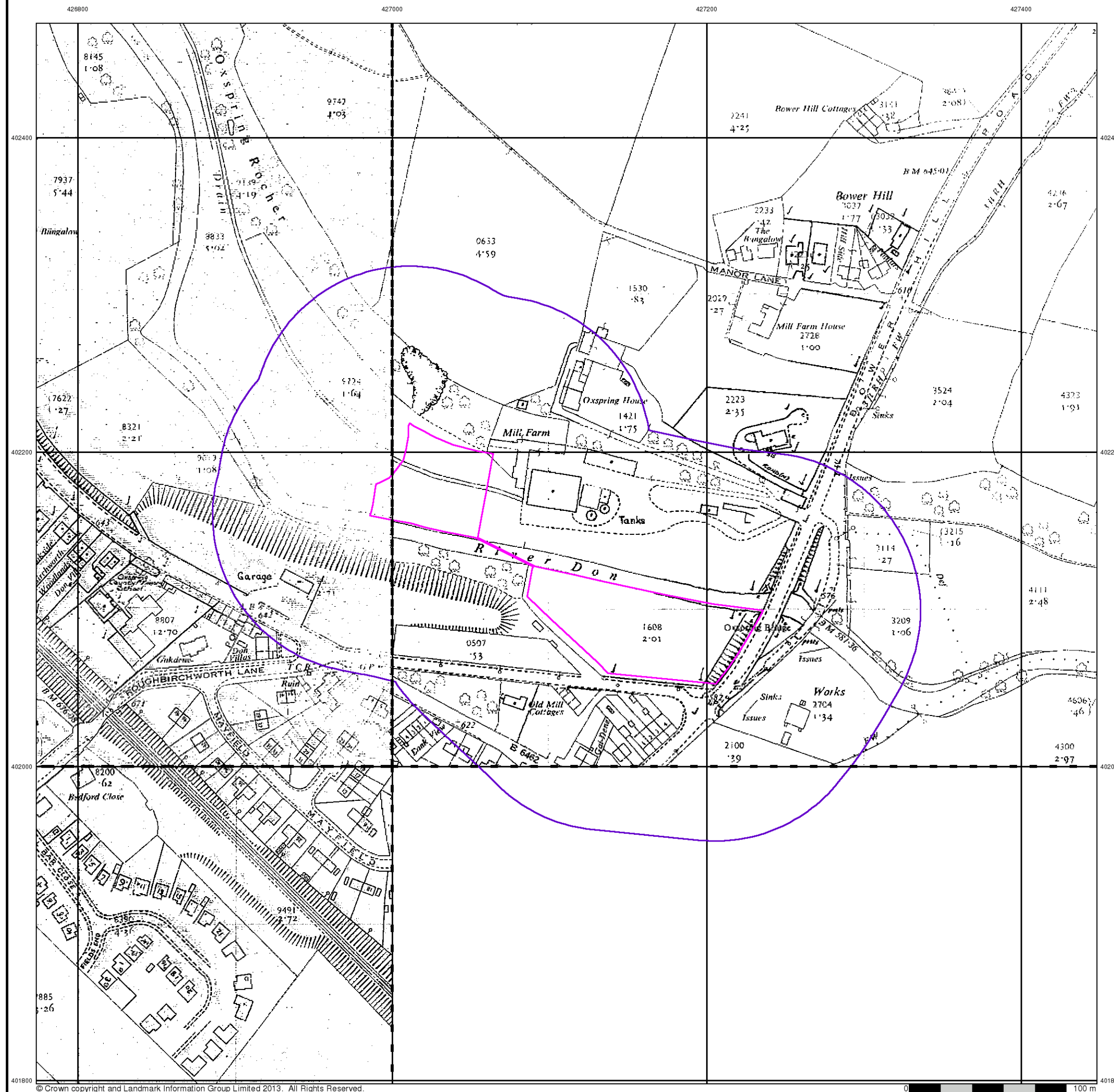
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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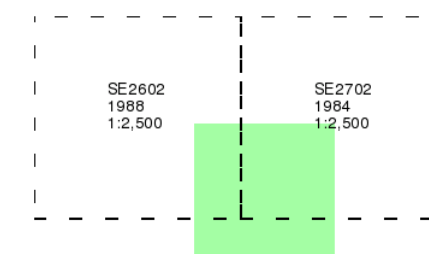
Additional SIMs

Published 1984 - 1988

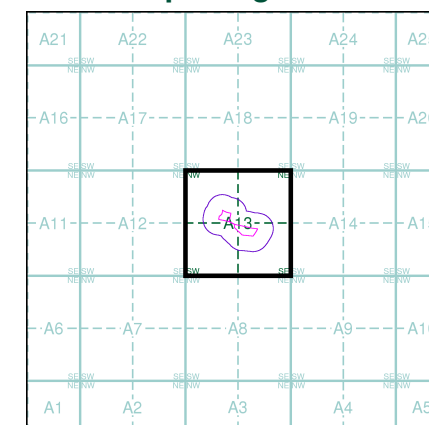
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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Large-Scale National Grid Data

Published 1993

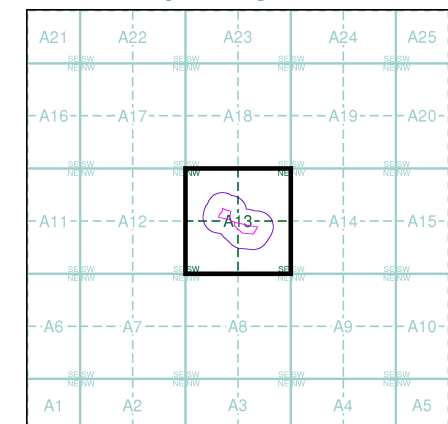
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SE2602 1993 12,500	SE2702 1993 12,500
SE2601 1993 12,500	SE2701 1993 12,500

Historical Map - Segment A13



Order Details

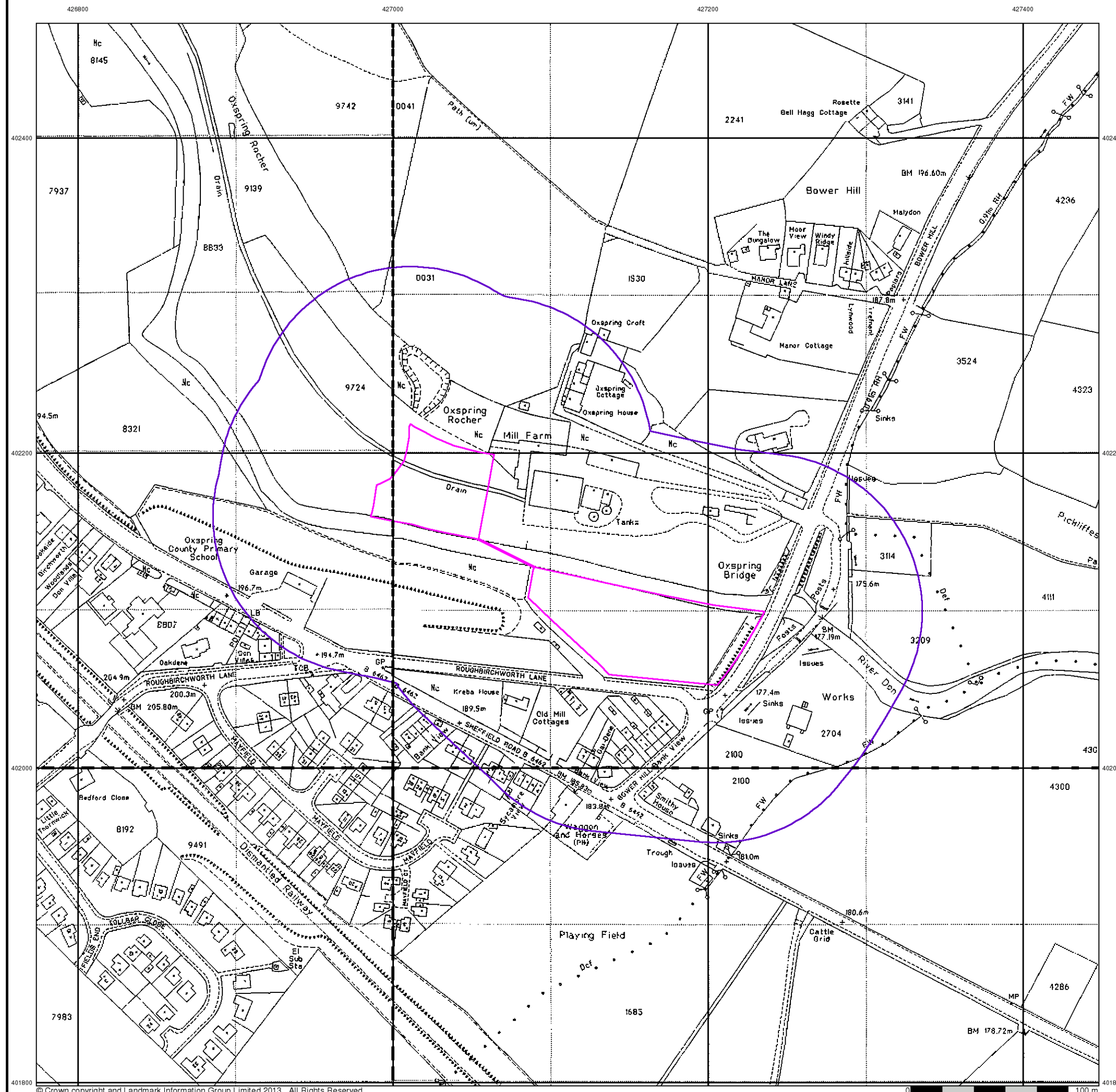
Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 100

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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	BP, BS		Ch
	CH		F E Sta
	FB		Fn
	GP		MP
	MS		Pol Sta
	PO		PC
	PH		SB
	Spr		TCB
	TCP		W

1:10,000 Raster Mapping

	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building

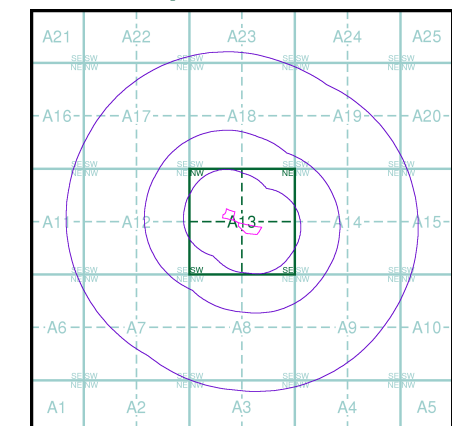


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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1851 - 1855	2
Yorkshire	1:10,560	1894	3
Yorkshire	1:10,560	1906 - 1907	4
Yorkshire	1:10,560	1931 - 1933	5
Yorkshire	1:10,560	1938	6
Yorkshire	1:10,560	1938 - 1948	7
Yorkshire	1:10,560	1948	8
Ordnance Survey Plan	1:10,000	1955	9
Ordnance Survey Plan	1:10,000	1965	10
Ordnance Survey Plan	1:10,000	1989	11
10K Raster Mapping	1:10,000	2006	12
VectorMap Local	1:10,000	2013	13

Historical Map - Slice A



Order Details

Order Number: 54535817_1_1
Customer Ref: 140314
National Grid Reference: 427110, 402130
Slice: A
Site Area (Ha): 1.01
Search Buffer (m): 1000

Site Details

Land between Millstones & Roughbircworth Lane, Oxspring, SHEFFIELD, S36 8WZ



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Yorkshire

Published 1851 - 1855

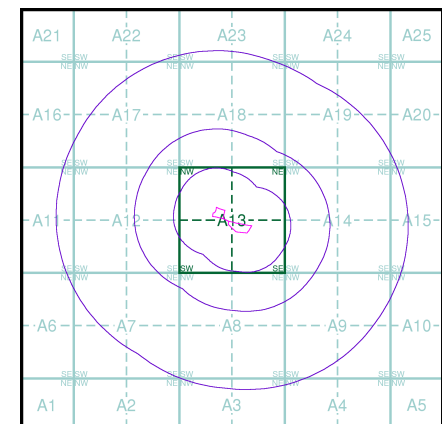
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

27300 1851 1:10,560	27400 1855 1:10,560
28100 1855 1:10,560	28200 1855 1:10,560

Historical Map - Slice A



Order Details

Order Number: 54535817_1_1
Customer Ref: 140314
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Site Area (Ha): 1.01
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ROBERTS ENVIRONMENTAL LIMITED

Yorkshire

Published 1894

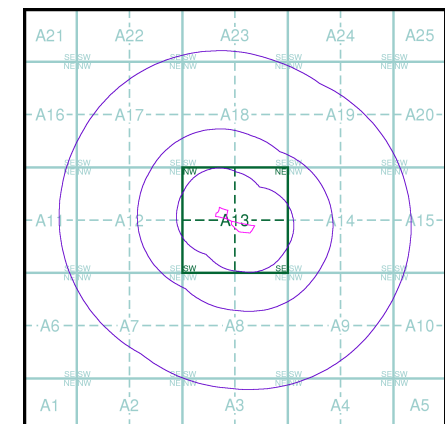
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

273SE 1894 1:10,560	274SW 1894 1:10,560
281NE 1894 1:10,560	282NW 1894 1:10,560

Historical Map - Slice A



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