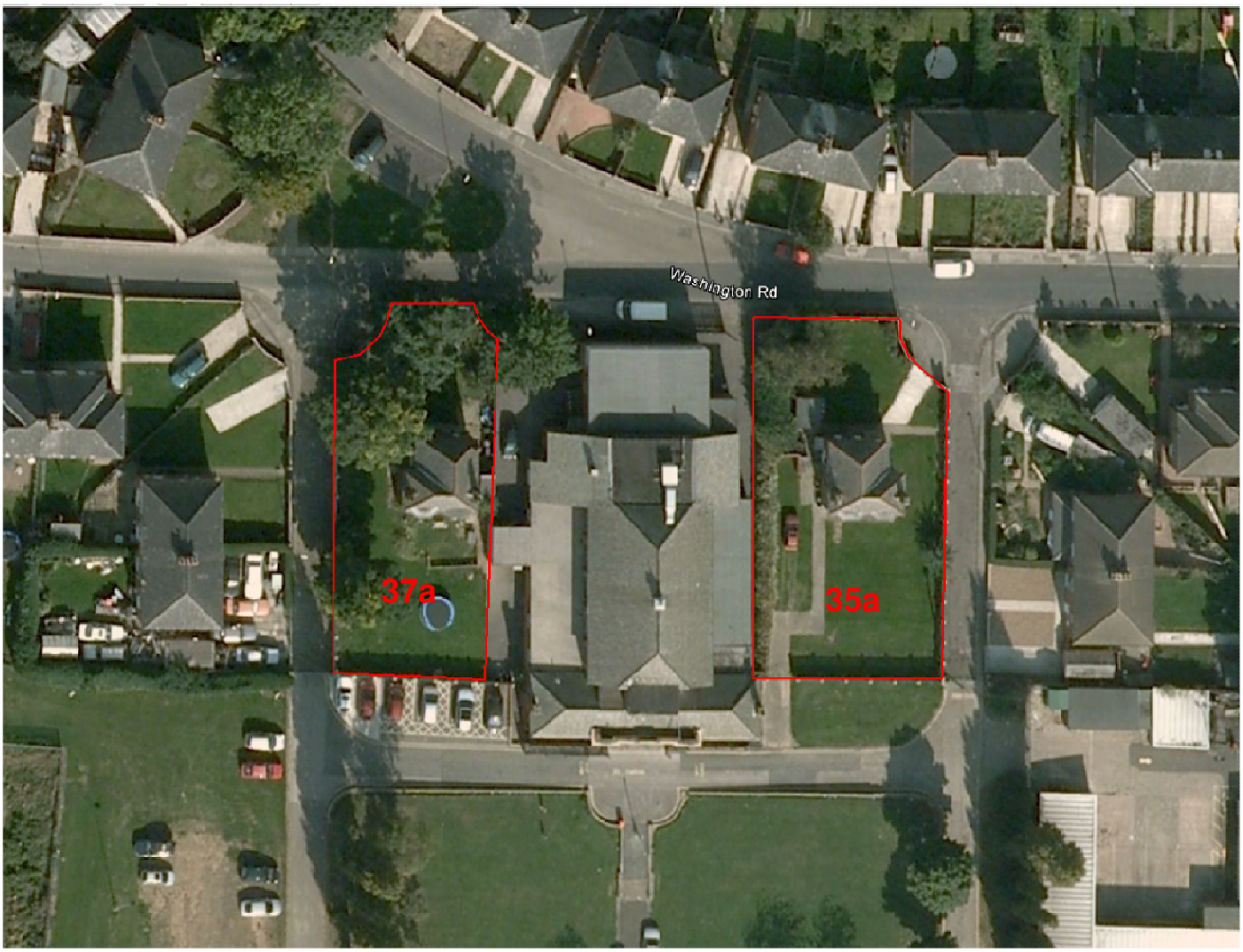
Eastwood & Partners
CONSULTING ENGINEERS

GEOTECHNICAL AND GEO-ENVIRONMENTAL SITE INVESTIGATION

WASHINGTON ROAD, GOLDTHORPE

FOR

THE COALFIELDS REGENERATION TRUST



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ISSUE 1

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1.0 EXECUTIVE SUMMARY

1. This report refers to two small sites (35a and 37a Washington Road) located either side of The Dearne Playhouse, south of Washington Road in Goldthorpe. The Playhouse is centred around grid reference 445830, 403840 and the sites have an area of around 1370 m².

2. Both sites have been occupied by houses since 1930 which are to be demolished. The houses are surrounded by private gardens with tall mature trees and bushes located in the north west corners of both sites. Side roads border the west, east and south sides of the site. Washington Road borders the north side. The sites gently slope to the south.

3. The geological map shows the site to be underlain by mudstone of the Middle Coal Measures. Made ground is expected to be present up to 1.0 m bgl below the existing houses. Elsewhere, topsoil over clayey gravelly sand and stiff clay was encountered. Beneath this mudstone and sandstone bedrock was encountered from 1.0 m to 2.1 m depth, recovered as clayey sandy gravel and cobbles. Coal was encountered in three trial pits from 1.0 m bgl between 50 and 1100 mm thick.

4. Two coal seams may be present at shallow depth below the site and may have been worked. A borehole investigation is recommended to determine either the depth to the seams, or confirm that there is at least the required thickness of competent cover above any workings.

5. Radon precautions are not required on the site. Shallow mine workings may however be present. Therefore Amber 1 gas precautions may be required, although gas monitoring would be required to confirm the gassing regime of the site.

6. Strip or trench fill footings are considered appropriate, taken through any made ground or soft ground and into the natural ground below. Minimum foundation depths should be 750 mm in sand and 900 mm in clay. If shallow coal workings are found, foundations will need to be thickened and reinforced. Reinforcement may also be required within footings where sand and clay are present within the same foundation.

7. Footings within the influence of existing trees (even though they are to be removed) will need to be deepened and constructed in accordance with the NHBC Standards. Precautions against soil heave will be required for all trench fill footings with a calculated founding depth greater than 1.5 m due to the past or present trees. Foundations need not be deepened upon reaching the non shrinkable sandstone.

8. If shallow coal workings are present, gas precaution measures are recommended which will require the installation of a suitably resistant gas membrane, a precast concrete floor and a

minimum 150 mm high ventilated void. If gas measures are not required, and there is less than 600 mm of made ground below ground floor slabs, ground bearing slabs will be appropriate. If more than 600 mm of made ground is present, reinforced suspended slabs or precast concrete floors with a minimum 150 mm high ventilated void (increased to 250 mm where heave precautions are required) should be used.

9. Due to the presence of clayey soils at the likely depth of soakaways, it is considered that soakaways are unlikely to be viable.

10. The test results indicate no sulphate precautions are required for subsurface concrete in contact with the natural ground. It is considered DS-2 AC-2 sulphate precautions are likely to be sufficient where subsurface concrete is in contact with made ground but further testing may be required to confirm this.

11. One sample of topsoil recorded an elevated lead concentration. If the topsoil is to remain on site, further testing of the ground around TP4 is required to delineate the area of contamination. The area of contaminated topsoil may then be excavated and placed underneath a 600 mm permeable capping in gardens or removed from site. The remaining topsoil is considered to be suitable for reuse within gardens and soft landscaped areas.

12. If made ground found below the existing buildings is to remain on site in the area of private gardens or soft landscaped areas, further testing may be required to determine whether any remedial measures such as capping is required.

13. The conclusions made in this report in relation to contamination are subject to agreement by the approving bodies such as the Local Authority and the NHBC, if applicable.

2.0 INTRODUCTION

2.1 Terms of Reference

This report presents the findings of a geotechnical and geo-environmental site investigation carried out by Eastwood & Partners (Consulting Engineers) Ltd for, and on the instructions of The Coalfields Regeneration Trust. Any other parties using the information in this report do so at their own risk and any duty of care is excluded.

2.2 Aims and Objectives

The aims and objectives of this investigation were as follows.

- Assimilate Phase 1 data to derive an outline conceptual model identifying potential contaminants, pathways and receptors, as well as possible linkages between these;
- Obtain information enabling refinement and subsequent testing of the conceptual model;
- Carry out tiered risk assessment to establish the likely risks to future receptors, involving the use of generic assessment criteria and where unacceptable risks are identified, site specific assessment criteria within a detailed quantitative risk assessment;
- Identify feasible remediation options if unacceptable risks are highlighted;
- Develop an appropriate remediation strategy where remediation is required; and
- Detail the ground conditions and their geotechnical properties enabling outline foundation proposals to be made.

2.3 Scope of Investigation

This document is split into two sections. These constitute the findings of the Phase 1 and Phase 2 investigations, consecutively.

2.3.1 Phase 1

The Phase 1 investigation involved a review of information extracted from published documentation. Information regarding the current and former land uses both on and surrounding the site, as well as the environmental sensitivity of the site location as determined by factors including geology, hydrogeology and hydrology has been examined.

Information analysed in this section of the report has been obtained from a variety of sources and includes historical maps, the Environment Agency website, an Envirocheck report, the Coal Authority, geological maps and memoirs, as well as a site walkover.

2.3.2 Phase 2

This part of the investigation consisted of intrusive works and laboratory analysis. The findings were used to test the conceptual model and produce a final risk assessment.

The intrusive works comprised trial pits which were excavated to enable:

- Examination of the upper few metres of ground;
- In situ description of soils, enabling any localised lateral and vertical changes in soil conditions to be logged;
- Assessment of any contamination identified using visual and olfactory methods; and
- Collection of soil samples for geotechnical and chemical testing.

2.4 Limitations of Investigation

This report is based on the assumption that the site will be developed with residential housing of conventional construction and that existing ground levels will not alter significantly. If this is not the case, further advice may be needed.

Where assessments of site areas affected in particular ways are given, these are approximate. All information, comments and opinions given in this report are based on the ground conditions encountered during the site work, on the results of laboratory testing carried out as part of the investigation and information gained from a geological and historical desk study. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata and water conditions between or below investigation points. It should be noted that groundwater and gas levels vary due to seasonal or other effects, and may at times differ from those measured during the investigation.

This report considers the ground and groundwater and does not cover any buildings or their fabric. Generally, testing has only been carried out for contaminants identified as potentially present with no assessment made of biological contamination. Risks to ecological receptors, such as bats, have not been considered.

3.0 THE SITE

3.1 Description

This report refers to two small sites (35a and 37a Washington Road) located either side of The Dearne Playhouse, south of Washington Road in Goldthorpe. The Playhouse is centred around grid reference 445830, 403840 and the sites have an area of around 1370 m².

Both sites have been occupied by houses since 1930 which are to be demolished. The houses are surrounded by private gardens with tall mature trees and bushes located in the north west corners of both sites. Side roads border the west, east and south sides of the site. Washington Road borders the north side. The sites gently slope to the south.

The 'Exploratory Hole Location Plan', drawing reference 38885/001A, included in Appendix 1, shows the site's main features.

3.2 History

Historical Ordnance Survey maps within the Envirocheck report have been reviewed to assess the previous use of the site and surrounding area. Copies of the maps are presented in Appendix 2.

3.2.1 The Site

The first edition Ordnance Survey map, dated 1851 to 1855, shows the site to be part of an open field. The site remains the same up till 1930 when two houses have been built, one each on 35a and 37a Washington Road respectively. A rectangular greenhouse is also shown along the western boundary of 35a. By 1961, a small rectangular building (possibly a garage) was built to the north east of 37a, and thin rectangular building within the south of 35a.

The site remains the same up until 1993. Today, the houses are still present, although the garage in 37a and the greenhouse and rectangular building in 35a have since been removed.

3.2.2 The Surrounding Area

The first edition Ordnance Survey map, from 1851 to 1855, shows the surrounding area to comprise open fields. Goldthorpe is present around 200 m north west of the site and a road runs through it generally from north to south, approximately 200 m east of the site. By 1892 a railway line has been built, running from north to south, 200 m west of the site. A second branch line is shown crossing over the first one from south west to north by 1903. Houses have also been built along a road around 200 m south of site.

By 1906, Bolton on Dearne Brick Works is shown around 240 m south of the site. An engine house is shown adjacent to the works, indicating underground mining may have also taken place from here.

Over the next 30 years, Goldthorpe expands westwards with housing now shown to the north, west and east of the sites. Dearne Welfare Hall has been built between the houses on the site by this time. The same map shows a band stand, bowling green, tennis courts and sports ground with a running and cycling track to occupy land to the south.

Further development has occurred in the surrounding area by 1961, including a football pitch around 50 m south west of the site, further bowling greens, a social club and a playground to the south. The bandstand is replaced with a council office building. Spoil heaps and ponds are shown at the position of the brick works, and the area to the south east of the works, which is then shown as parkland in the 1980s.

No further significant changes are noted on any of the historical maps.

3.3 Geology

The geological map 275SE (1:10,560) shows the site to be underlain by mudstone of the Middle Coal Measures. The strata are dipping at around 5° to the north.

No faults or superficial deposits are indicated on the site.

3.4 Hydrogeology & Hydrology

The Envirocheck report records the strata beneath the site to comprise a Secondary A aquifer. These are defined as 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 does not lie within a Groundwater Source Protection Zone.

The Envirocheck report indicates that there are no groundwater abstraction licenses within 250 m of the site.

The nearest surface water feature is a drain around 180 m west of the site. It is unlikely to be affected by the activities on site.

3.5 Coal Mining

No coal seams are shown to outcrop on the site on the geological map. However, the Shafton Coal seam outcrops approximately 425 m south west of the site. Assuming a dip of 5°, the seam is expected to lie around 35 m below the site.

From investigations carried out on a site around 750 m east of this site, the Shafton coal seam was found from between 12 and 19 m depth, around 1.8 m thick and worked.

Workings within the Shafton coal seam would need ten times seam thickness in overlying competent cover for drilling and grouting to not be considered necessary. Although the information on the geological map indicates the seam should lie around 35 m depth, a borehole investigation is recommended to determine either the depth to the seam, or confirm that there is at least the required thickness of competent cover.

The geological memoir for Barnsley indicates that locally a 0.45 m thick coal seam known as the Highgate Coal has been worked at Highgate Colliery and Goldthorpe Colliery, located approximately 0.95 km north and 1.15 km north-east of the site respectively. The memoir states the Highgate seam, which was worked up until 1917, is located around 30 m above the Shafton coal. This Highgate seam could therefore be present in the upper 10 m of the site.

The investigation recommended for the Shafton coal seam will therefore be able to investigate the Highgate seam as well.

A Coal Authority report has been obtained for the site. A copy is included in Appendix 2. This states that the site is within the likely zone of influence from workings in four seams of coal at 240 m to 640 m depth below the site and last worked in 1978. Any ground movement from these coal workings should have stopped by now. The Coal Authority believe there is coal at or close to the surface which may have been worked in the past. This could refer to the Highgate coal.

The report also indicates there are no recorded mine entries shown on or within 20 m of the site. However, the Coal Authority records may not be complete. The site is not within an area where current workings are being undertaken, or where future underground workings are currently proposed. The report states that reserves of coal are present in the area which could be worked in the future. The site is also within an area for which notice of entitlement to withdraw support was published in 1983. This has not yet been revoked. Future coal mining is however considered unlikely due to the decline to the UK's coal mining industry and the site's location within an urban area.

There is no record of mine gas emission requiring action by the Coal Authority within the boundary of the site. No claims for alleged coal mining related subsidence have been made on the site or on any property within 50 m.

3.6 Ground Gas

According to the Envirocheck report, there are no licensed operational or historical landfill sites within 250 m of the site.

The historical maps indicate a brick works was present around 240 m south of the site, backfilled and levelled into parkland by the 1960s. Due to the distance from site and since the backfill is expected to have been in place for 50 years, the backfilled brick works are not expected to pose a risk to the proposed development.

According to the Envirocheck report, the site lies in an area where basic radon precautions are not required in the construction of new dwellings.

The presence of shallow coal seams below the site which may have been worked however indicates mine gas may be able to migrate onto site.

3.7 Pollution Incidents

The Envirocheck report does not identify any pollution incidents within 250 m of the site.

3.8 Discharge Consents

The Envirocheck report indicates that there are no discharge consents within 250 m of the site.

3.9 Flooding

The site does not lie within an indicative flood plain.

4.0 OUTLINE CONCEPTUAL MODEL

Historically, houses have been present on both sites since 1930. Therefore other than made ground associated with these buildings, significant contamination is not expected but some localised contamination could be encountered.

Any made ground which is present could potentially contain elevated concentrations of heavy metals/metalloids, polycyclic aromatic hydrocarbon (PAH) compounds, such as benzo(a)pyrene, as well as sulphates, particularly if the material is ashy in nature. Asbestos fibres may also be present.

The natural ground is not expected to be particularly contaminated, although some naturally elevated concentrations of metals/metalloids and sulphates may be recorded.

No radon gas precautions are required. Deep made ground is not expected to underlie the site. Shallow mine workings may however be present. Therefore, ground gas precautions may be required.

The following table details the possible sources and associated contaminants of concern, pathways and receptors, highlighted by the Phase 1 investigation as potentially present:

Potential Contaminants	**Pathway**	**Receptor**
Heavy metals/metalloids, PAHs, asbestos, in the made ground Naturally elevated levels of heavy metals/metalloids in the natural ground	Ingestion, inhalation, direct contact.	Future residents & visitors. Site workers. Plants.
	Migration through ground.	Secondary A aquifer. Water supply pipes
Sulphates	Direct contact.	Below ground concrete.
Mine gas	Inhalation	Future residents & visitors.

5.0 GROUND INVESTIGATION

5.1 Site Works

Eastwood & Partners attended site on 20 August 2015 and excavated six trial pits. The trial pits were referenced TP1 to TP6 and reached depths of between 1.7 m and 2.8 m bgl.

Copies of the exploratory hole logs are presented in Appendix 3, and their locations are shown on the Exploratory Hole Location Plan, Drawing number 38885/001A in Appendix 1.

5.2 Laboratory Testing

Four samples of topsoil and four of natural ground were despatched for chemical testing. Soil samples were taken in 500 g plastic tubs and 250 ml amber glass jars and analysed at Chemtech Environmental, Durham, using MCERTs accredited methodologies where available. The laboratory testing results are presented in Appendix 4 and discussed further in Section 8.

Three samples of natural clay were also sent for plasticity testing to Chemtech. The test results are presented in Appendix 4 and discussed further in Section 7.

6.0 GROUND CONDITIONS

6.1 Surface Covering & Made Ground

The site is covered by topsoil comprising brown gravelly sand or dark brown very clayey sand up to 0.5 m depth. Made ground is expected to be present in the areas of the houses once they are demolished. No air bricks were noted around the base of the walls to the properties, therefore it is not likely that they have basements. On this basis the made ground is not expected to be deeper than 1.0 m bgl.

6.2 Natural Ground

The natural ground generally comprised clayey gravelly sand to between 0.7 and 1.0 m bgl. In four of the six trial pits, stiff clay was found below to between 1.3 and 1.9 m bgl.

Bedrock comprising mudstone or sandstone recovered as clayey sandy gravel and cobbles was encountered in all of the trial pits from around 1.0 to 2.1 m bgl. Some ironstone nodules were also noted within the mudstone.

Three trial pits recorded coal. TP1 and TP6 recorded the coal to be 50 to 100 mm thick at around 1.2 and 0.95 m depth respectively. In TP4, the coal was found to be 1.1 m thick from 1.0 m depth.

6.3 Obstructions

No significant obstructions were encountered within the trial pits, except for strong bedrock.

6.4 Groundwater

Minor water seepages were noted in TP4 (at 2.1 m bgl) and TP5 (at 2.2 m bgl). Groundwater was not observed elsewhere during excavation of the trial pits.

6.5 Evidence of Contamination

Visual or olfactory evidence of possible contamination was not identified in any of the exploratory holes. In addition, no evidence of any organic matter was identified in the exploratory holes.

7.0 GEOTECHNICAL APPRAISAL

7.1 General

Made ground is expected to be present up to 1.0 m bgl below the existing houses. Elsewhere, topsoil over clayey gravelly sand and stiff clay was encountered. Beneath this mudstone and sandstone bedrock was encountered from 1.0 m to 2.1 m depth, recovered as clayey sandy gravel and cobbles. Coal was encountered in three trial pits from 1.0 m bgl between 50 and 1100 mm thick.

Three samples of the natural clay were sent for geotechnical testing. The samples were taken from TP1, TP3 and TP5 from depths of between 1.0 m and 1.5 m bgl. The samples were calculated to have modified plasticity indices of 31%, 20.8% and 17.1% which correspond to low (less than 20%) and medium (between 20% and 40%) volume change potential in accordance with the NHBC Chapter 4.2 standards. It is considered prudent to classify the clay on site as of medium volume change potential. A copy of the geotechnical test results is included in Appendix 4.

Penetrometer readings within the clay indicate a safe bearing capacity of 125 kN/m^2 will be appropriate. The natural sand can also be considered to have a similar safe bearing capacity.

A borehole investigation will be required to determine if shallow coal workings are present. If workings are present and there is less than ten times seam thickness in overlying competent cover, drilling and grouting will be required.

7.2 Foundations

Strip or trench fill footings are considered appropriate, taken through any made ground or soft ground and into the natural ground below. Minimum foundation depths should be 750 mm in sand and 900 mm in clay.

If shallow coal workings are found, foundations will need to be thickened and reinforced. Reinforcement may also be required within footings where sand and clay are present within the same foundation.

Footings within the influence of existing trees will need to be deepened and constructed in accordance with the NHBC Standards. Precautions against soil heave will be required for all trench fill footings with a calculated founding depth greater than 1.5 m due to the past or present trees.

Foundations need not be deepened upon reaching the non shrinkable sandstone.

7.3 Ground Floors

If shallow coal workings are present, gas precaution measures are recommended which will require the installation of a suitably resistant gas membrane, a precast concrete floor and a minimum 150 mm high ventilated void.

If gas measures are not required, and there is less than 600 mm of made ground below ground floor slabs, ground bearing slabs will be appropriate. If more than 600 mm of made ground is present, reinforced suspended slabs or precast concrete floors with a minimum 150 mm high ventilated void (increased to 250 mm where heave precautions are required) should be used.

7.4 Superstructure Precautions

If shallow coal workings are present, additional superstructure precautions may be required.

7.5 Excavation Problems & Obstructions

The sides of the trial pits were found to be stable in natural ground during excavation. Support will be required in accordance with current Health & Safety Regulations wherever access is required to trenches deeper than 1.2 m, or less where there is risk of collapse.

Strong bedrock is expected in the upper 2 m which may require breaking out for deeper excavations.

The foundations for the existing buildings are expected to be present below the surface on the site. These will need to be removed where new foundations are to be constructed.

7.6 Surface Water Drainage

Due to the presence of clayey soils at the likely depth of soakaways, it is considered that soakaways are unlikely to be viable. It is recommended surface water drainage is taken to a piped drainage system. There may be existing connections into the local sewer network from the existing buildings, which could be re-used, subject to approval by the regulators.

8.0 REFINEMENT OF OUTLINE CONCEPTUAL MODEL

8.1 Source Characterisation

An outline conceptual model, detailing the possible sources and associated contaminants of concern, potential pathways and receptors identified in the Phase 1 study was detailed in Section 4. This section of the report documents the works undertaken to obtain information to test and refine this model enabling a risk assessment to be produced and, where significant risks are expected, remediation recommendations.

8.2 Ground Conditions

There is no reason to suspect that the materials recorded on site will contain any specific contaminants, although may contain elevated concentrations of common contaminants such as arsenic and sulphates. Polycyclic aromatic hydrocarbons (PAHs), such as benzo(a)pyrene, may also be elevated.

8.3 Gas Precautions

The Phase 1 investigation indicates there is the potential for shallow coal mining. Deep made ground was not encountered, and there are no landfill sites within 250 m of the site. Radon precautions are not required. At this stage, it would be prudent to allow for Amber 1 gas precautions if shallow workings are encountered, although gas monitoring would be required to confirm the gassing regime of the site.

8.4 Chemical Testing

Four samples of topsoil and four samples of the natural ground were sent for chemical testing. Each of the samples was analysed for the suite of contaminants listed below:

Contaminant Type	Actual Contaminants
Metals/Metalloids	Arsenic, cadmium, chromium (III and VI), lead, mercury, nickel, selenium copper and zinc
PAHs	Speciated PAH
Sulphates	pH, water soluble sulphate, acid soluble sulphate and sulphur

An asbestos screen was also carried out on the four samples of topsoil. Testing was undertaken by Chemtech Environmental, using MCERTs accredited methodologies, where available. A copy of the test results is included in Appendix 4.

8.5 Assessment Criteria

The proposed development of the site is to be residential with private gardens. Therefore the assessment criteria relating to a residential with homegrown produce end use have been used. Tables detailing the relevant assessment concentrations used are included in Appendix 4.

8.6 Chemical Test Results

8.6.1 Topsoil

The topsoil sample from TP4 at 0.2 m bgl recorded a lead concentration of 257 mg/kg. The assessment value for lead is 200 mg/kg. Four additional subsamples were tested from this sample and recorded lead concentrations of 228, 249, 236 and 246 mg/kg, creating a sample average of 243.2 mg/kg. Based on the results, the corrected mean for lead using all 4 topsoil samples is calculated to be 235 mg/kg. No other metals, metalloids or PAHs were recorded at concentrations exceeding their respective assessment values in any of the samples of topsoil.

8.6.2 Natural Ground

None of the samples of natural ground recorded any contaminants with concentrations exceeding their assessment concentrations.

8.6.3 Sulphates

The site has been taken as a brownfield location in relation to the Aggressive Chemical Environment for Concrete classifications in accordance with BRE Special Digest 1. Groundwater is expected to be mobile through near surface soils.

The results indicate the total potential sulphate concentrations to be between 0.03% and 0.06%.

The water soluble sulphate concentrations were between 12 mg/l and 109 mg/l. T

he pH was recorded to be between 7.6 and 7.8.

8.6.4 Asbestos

Asbestos fibres were not recorded.

8.7 Significant Pollutant Linkages

Contaminants	Pathway	Receptor
Lead in topsoil.	Direct contact, ingestion and inhalation	Future residents or visitors Construction workers
	Migration through ground	Secondary A aquifer
Mine gas.	Inhalation	Future residents or visitors

9.0 RISK ASSESSMENT

9.1 Human Health – Future Residents and Visitors

A sample of topsoil taken from TP4 recorded a slightly elevated concentration of lead at 257 mg/kg, compared to the assessment value of 200 mg/kg. Subsamples were tested and still recorded slightly elevated lead concentrations. The three other samples tested recorded lead concentrations of between 55 and 115 mg/kg, much lower than the 200 mg/kg assessment value.

If the topsoil is to remain on site further testing of the ground around TP4 will be required to delineate lead hotspot. The area of contaminated topsoil may then be excavated and placed underneath a 600 mm permeable capping in gardens or removed from site. The remaining topsoil is considered to be suitable for reuse within gardens and soft landscaped areas.

If made ground found below the existing buildings is to remain on site in the area of private gardens or soft landscaped areas, further testing may be required to determine whether any remedial measures such as capping is required.

9.2 Human Health – Construction Workers

Groundworkers employed during the construction phase of the development are most at risk of harm due to them having direct contact with the affected soils. However, the contact is generally of short duration, and all competent ground workers will be aware of the potential risks associated with soils of this nature. Therefore, the overall risk to the health of construction workers is considered to be low.

All ground workers employed on the site should be made aware that slightly elevated concentrations of lead are present within the topsoil and normal site procedures such as the wearing of gloves when handling soils, and the washing of hands prior to eating should be implemented.

Any unusual, brightly coloured, ashy or odorous material encountered during construction should be brought to the attention of the site staff and investigated.

9.3 Construction Materials

The results of testing indicate that a Design Sulphate Class of DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) class of AC-1 will be required for all subsurface concrete in contact within the natural ground.

Sulphate precautions may be required where made ground is encountered in the area of the existing properties. It is considered that DS-2 AC-2 sulphate precautions are likely to be sufficient

where subsurface concrete is in contact with made ground. Further testing may be required to confirm this.

The chemical test results should be submitted to the water supply company to determine the appropriate type of supply pipe.

9.4 Plants

None of the tests results indicate there is a significant risk to plants from materials on site.

9.5 Controlled Waters

The site overlies a Secondary A aquifer and the nearest surface water feature is a drain around 180 m west of the site. The site does not lie within a Groundwater Source Protection Zone.

Although an elevated lead concentration was noted within one sample of topsoil, it is not expected to be particularly leachable, as indicated by the lack of elevated concentrations in the underlying natural ground. Materials on site are therefore not considered to pose a significant risk to controlled waters.

9.6 Ground Gas

Shallow mine workings may be present below the site. At this stage, it would be prudent to allow for Amber 1 gas precautions if shallow workings are encountered, although gas monitoring would be required to confirm the gassing regime of the site.

10.0 CONTAMINATION - RECOMMENDATIONS AND APPROVALS

1. One sample of topsoil recorded an elevated lead concentration. If the topsoil is to remain on site, further testing of the ground around TP4 is required to delineate the area of contamination. The area of contaminated topsoil may then be excavated and placed underneath a 600 mm permeable capping in gardens or removed from site. The remaining topsoil is considered to be suitable for reuse within gardens and soft landscaped areas.

2. If made ground found below the existing buildings is to remain on site in the area of private gardens or soft landscaped areas, further testing may be required to determine whether any remedial measures such as capping is required.

3. The test results indicate no sulphate precautions are required for subsurface concrete in contact with the natural ground. It is considered DS-2 AC-2 sulphate precautions are likely to be sufficient where subsurface concrete is in contact with made ground but further testing may be required to confirm this.

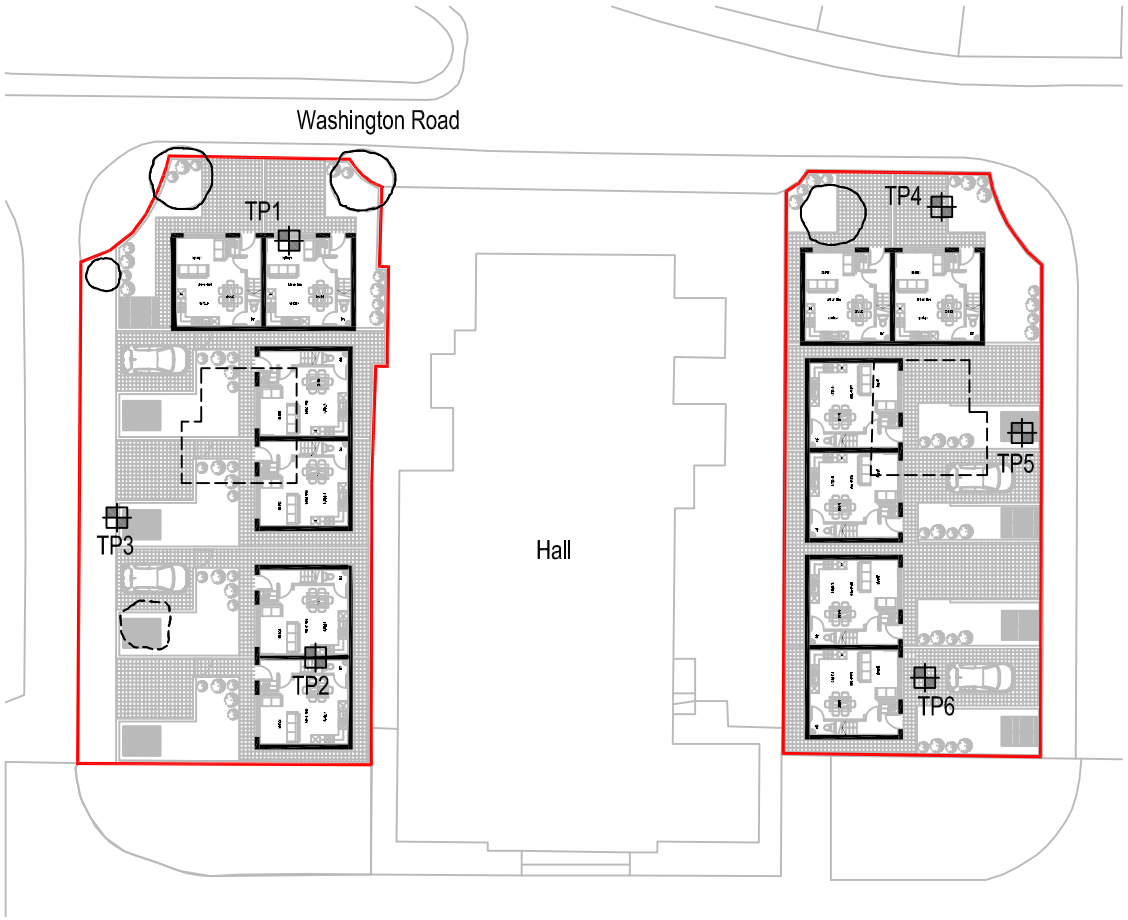
4. A copy of this report should also be sent to the relevant water supplier.

5. No radon precautions are required. If shallow coal workings are found, Amber 1 gas precautions may be required, although gas monitoring would be required to confirm the gassing regime of the site.

6. The conclusions made in this report in relation to contamination are subject to agreement by the approving bodies such as the Local Authority and the NHBC, if applicable.

Appendix 1

Exploratory Hole Location Plan, drawing 38885/001A



Key:

- Site boundary.
- Position of proposed houses.
- Position of existing houses to be demolished.
- Approximate position of trial pit, excavated by Eastwood & Partners on 20.08.15.
- Approximate position of trees.
- Approximate position of removed tree.

A	First Issue.				

Eastwood & Partners
CONSULTING ENGINEERS
St. Andrew's House
23 Kingfield Road
Sheffield
S11 9AS
Tel 0114 255 4554
Fax 0114 255 4330

WASHINGTON ROAD GOLDTHORPE
THE COALFIELDS REGENERATION TRUST
EXPLORATORY HOLES PLAN

CHECKED	SCALE AT A4	DRAWING STATUS	
EM	1:500	INFORMATION	
DRAWN	DATE	DRAWING NUMBER	REV
SA	03.09.15	38885/001	A

Appendix 2

Envirocheck Report

Coal Authority Mining Report

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
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
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
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. 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
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
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
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Mud
Sand
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
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m 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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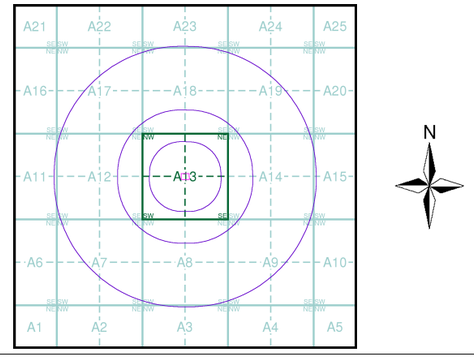
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1851 - 1855	2
Yorkshire	1:10,560	1893	3
Yorkshire	1:10,560	1894	4
Yorkshire	1:10,560	1903 - 1907	5
Yorkshire	1:10,560	1931 - 1932	6
Yorkshire	1:10,560	1938 - 1948	7
Yorkshire	1:10,560	1948 - 1950	8
Ordnance Survey Plan	1:10,000	1955 - 1956	9
Ordnance Survey Plan	1:10,000	1966 - 1967	10
Ordnance Survey Plan	1:10,000	1976	11
Ordnance Survey Plan	1:10,000	1980 - 1988	12
Ordnance Survey Plan	1:10,000	1989	13
Ordnance Survey Plan	1:10,000	1991	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2015	16

Historical Map - Slice A



Order Details

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Customer Ref: 38885
National Grid Reference: 445830, 403840
Slice: A
Site Area (Ha): 0.31
Search Buffer (m): 1000

Site Details

Site at 445810, 403850

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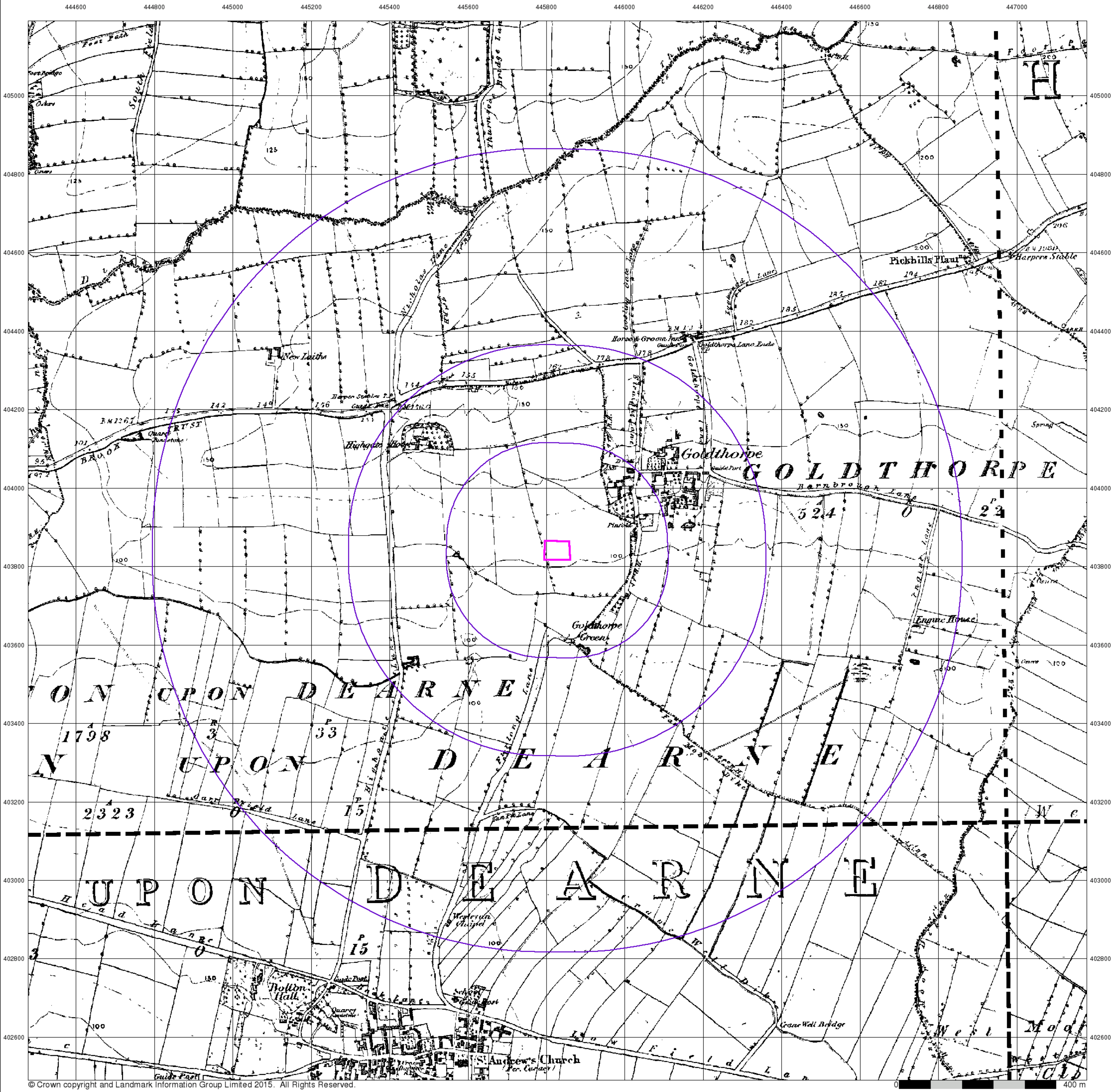
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Yorkshire

Published 1851 - 1855

Source map scale - 1:10,560

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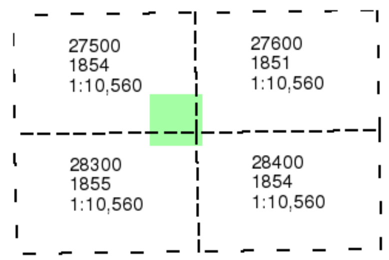
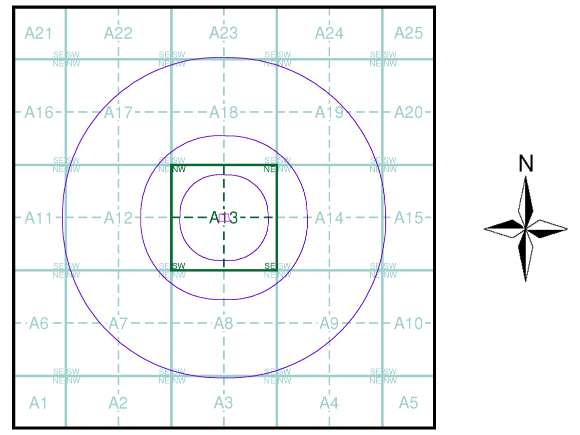
Map Name(s) and Date(s)



Historical Map - Slice A



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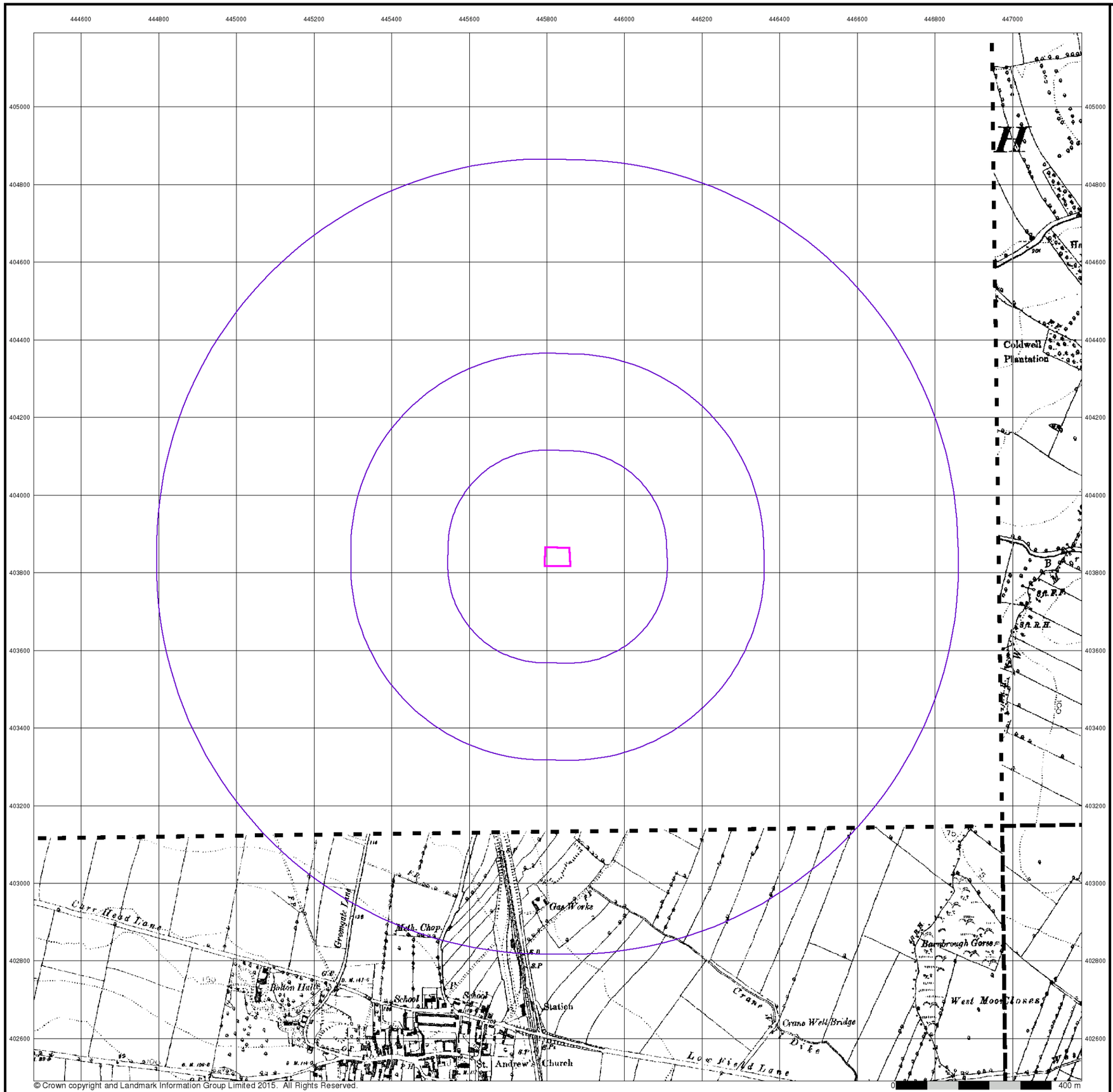

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Yorkshire

Published 1893

Source map scale - 1:10,560

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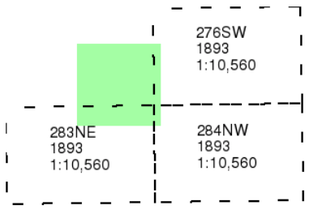
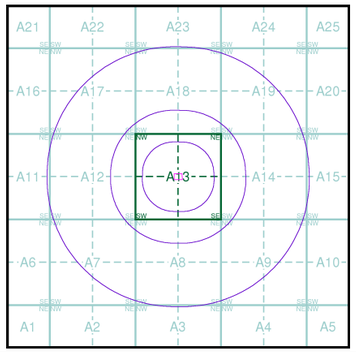
Map Name(s) and Date(s)



Historical Map - Slice A



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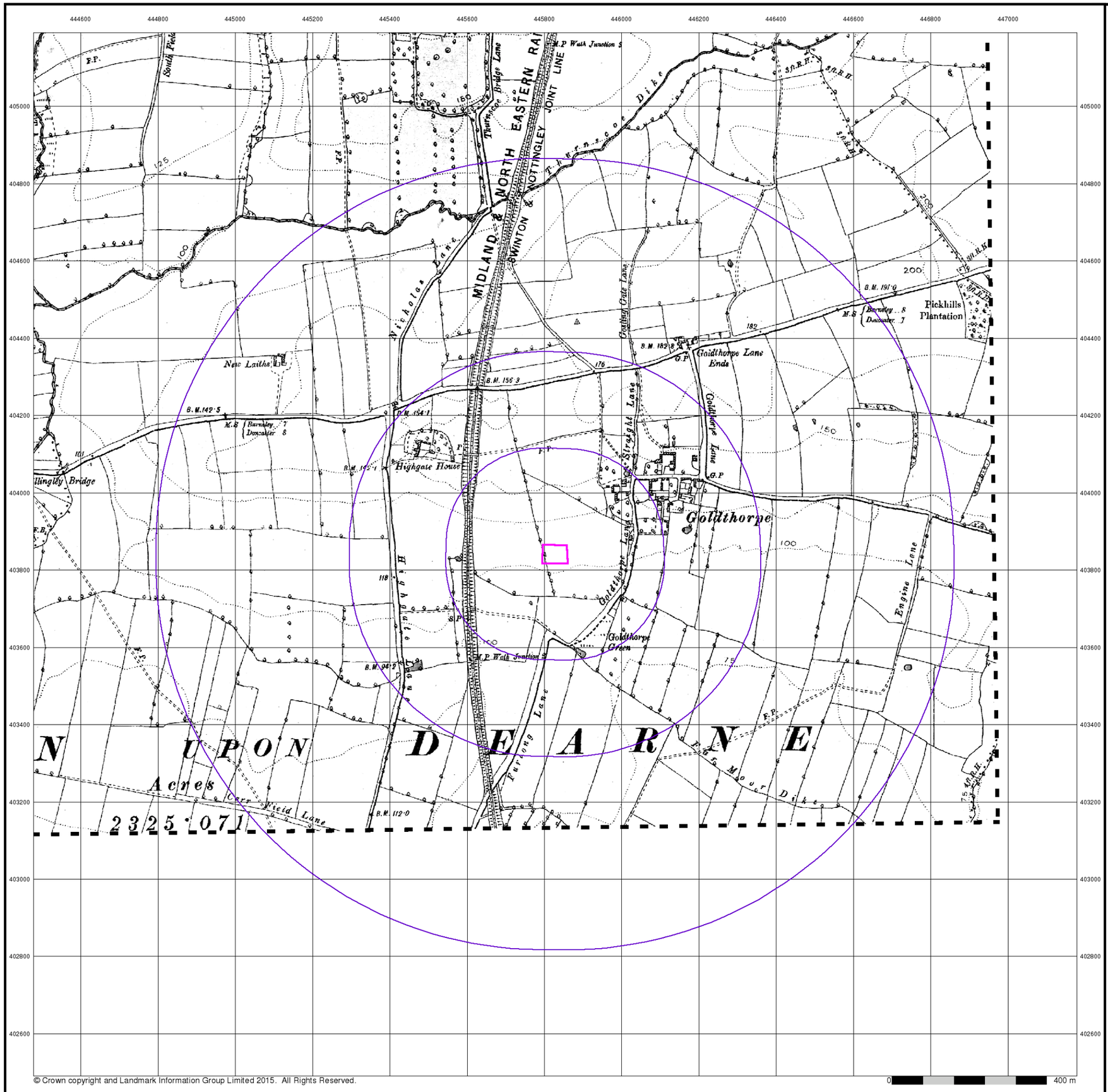

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Yorkshire

Published 1894

Source map scale - 1:10,560

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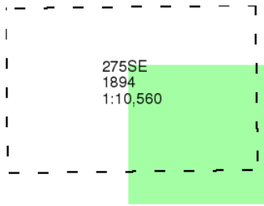
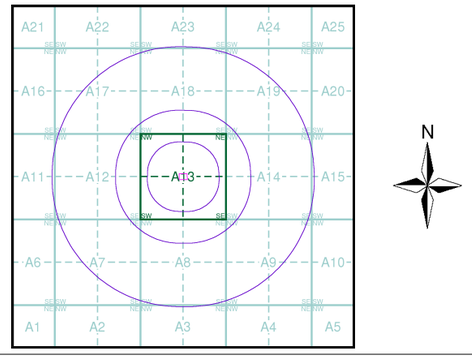


Historical Map - Slice A



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Customer Ref:	38885
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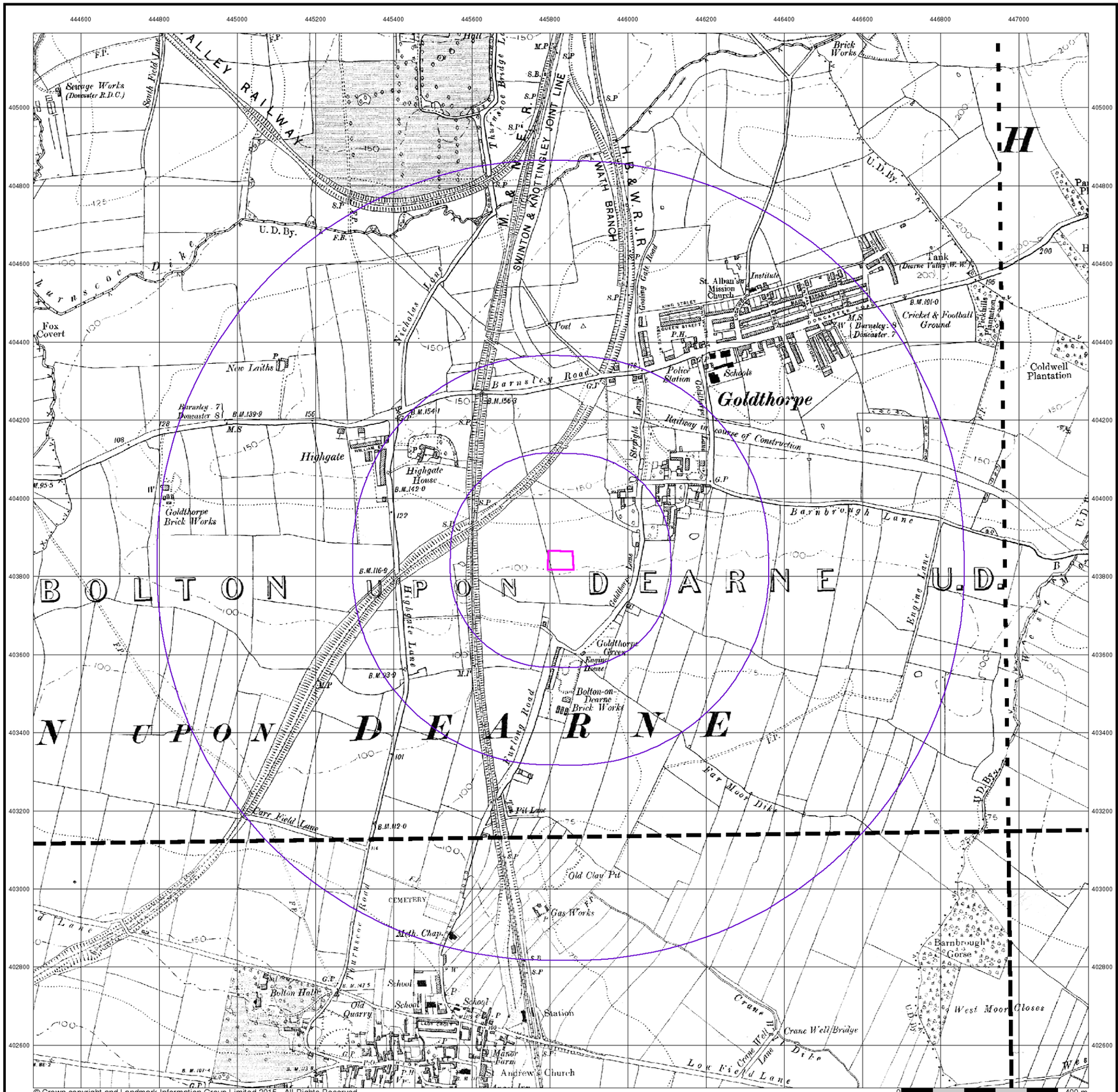

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Yorkshire

Published 1903 - 1907

Source map scale - 1:10,560

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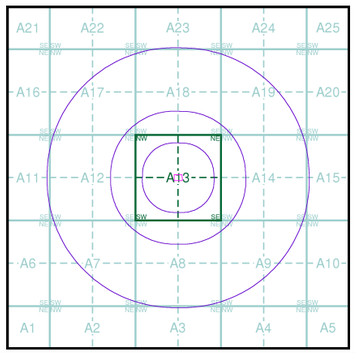
Map Name(s) and Date(s)

275SE 1906 1:10,560	276SW 1907 1:10,560
283NE 1905 1:10,560	284NW 1903 1:10,560

Historical Map - Slice A



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Site Details

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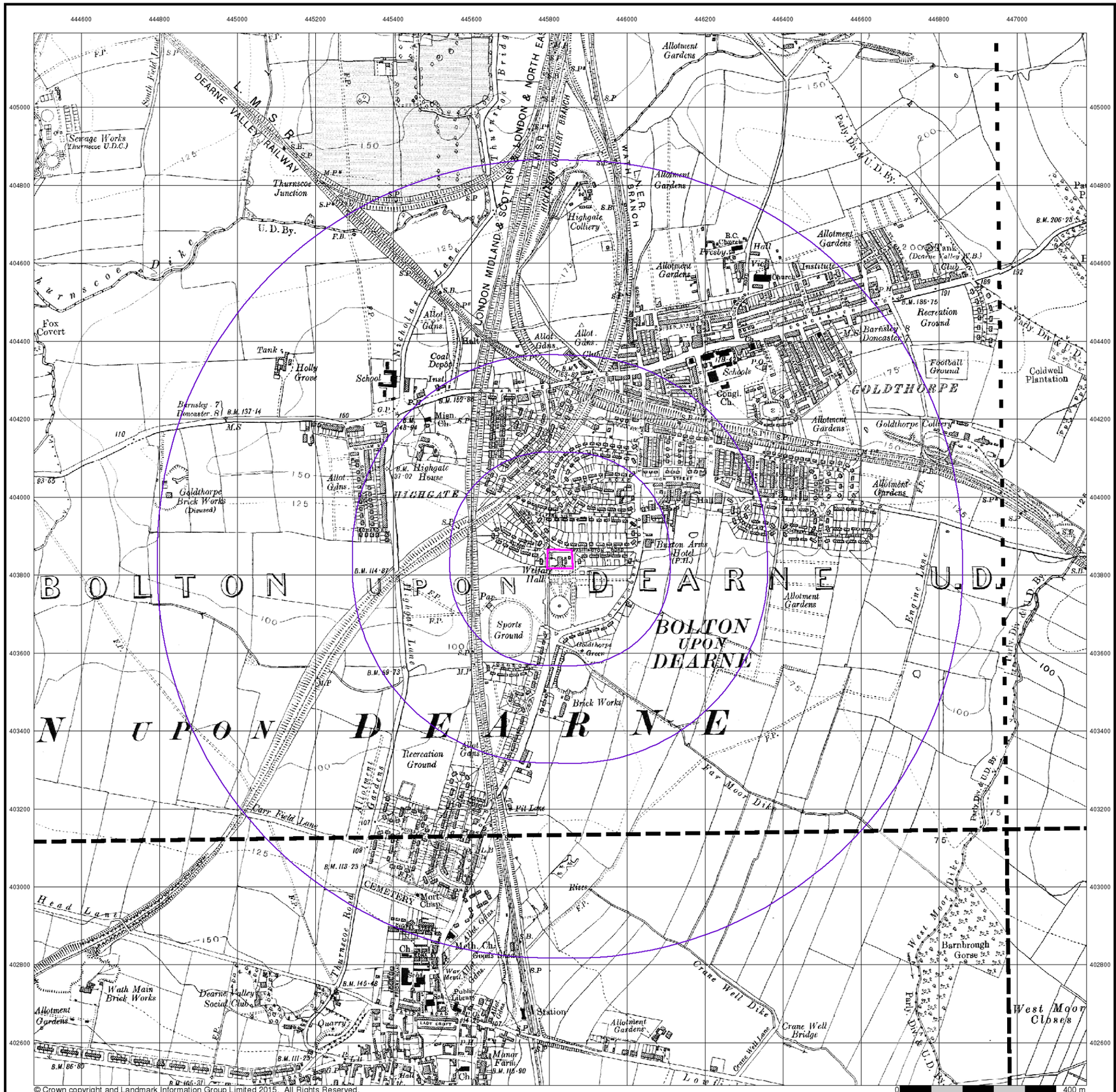

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Yorkshire

Published 1931 - 1932

Source map scale - 1:10,560

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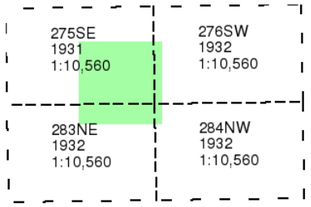
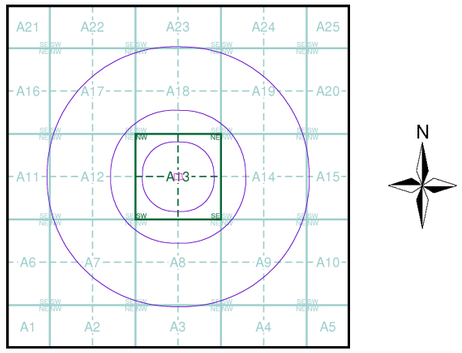
Map Name(s) and Date(s)



Historical Map - Slice A



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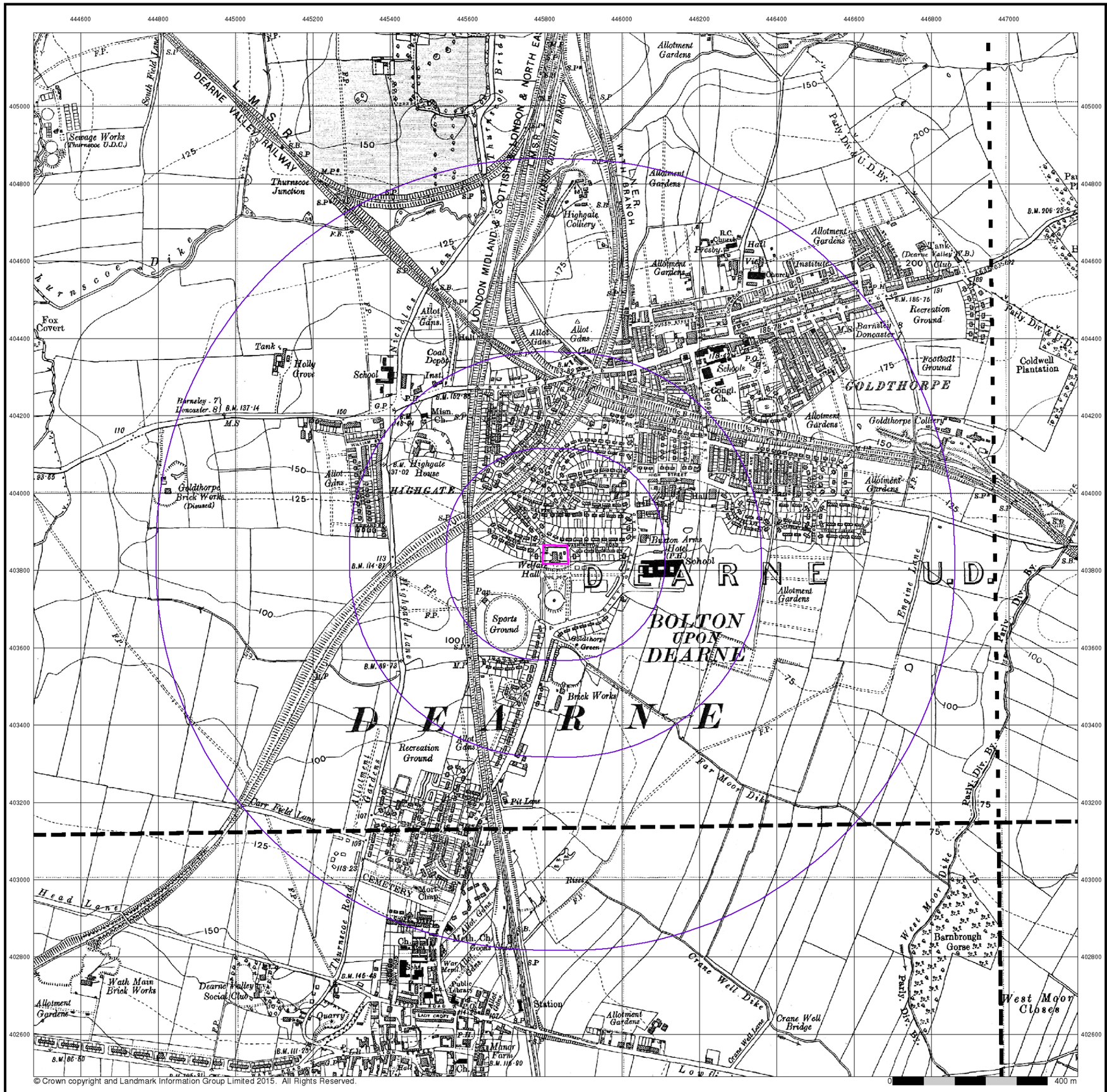

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Yorkshire

Published 1938 - 1948

Source map scale - 1:10,560

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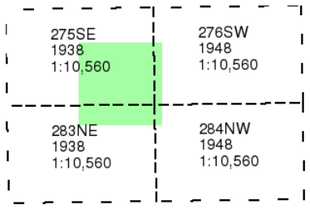
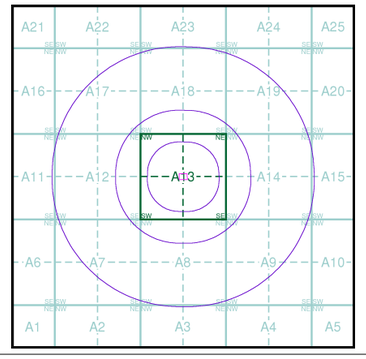
Map Name(s) and Date(s)



Historical Map - Slice A



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Site Details

Site at 445810, 403850

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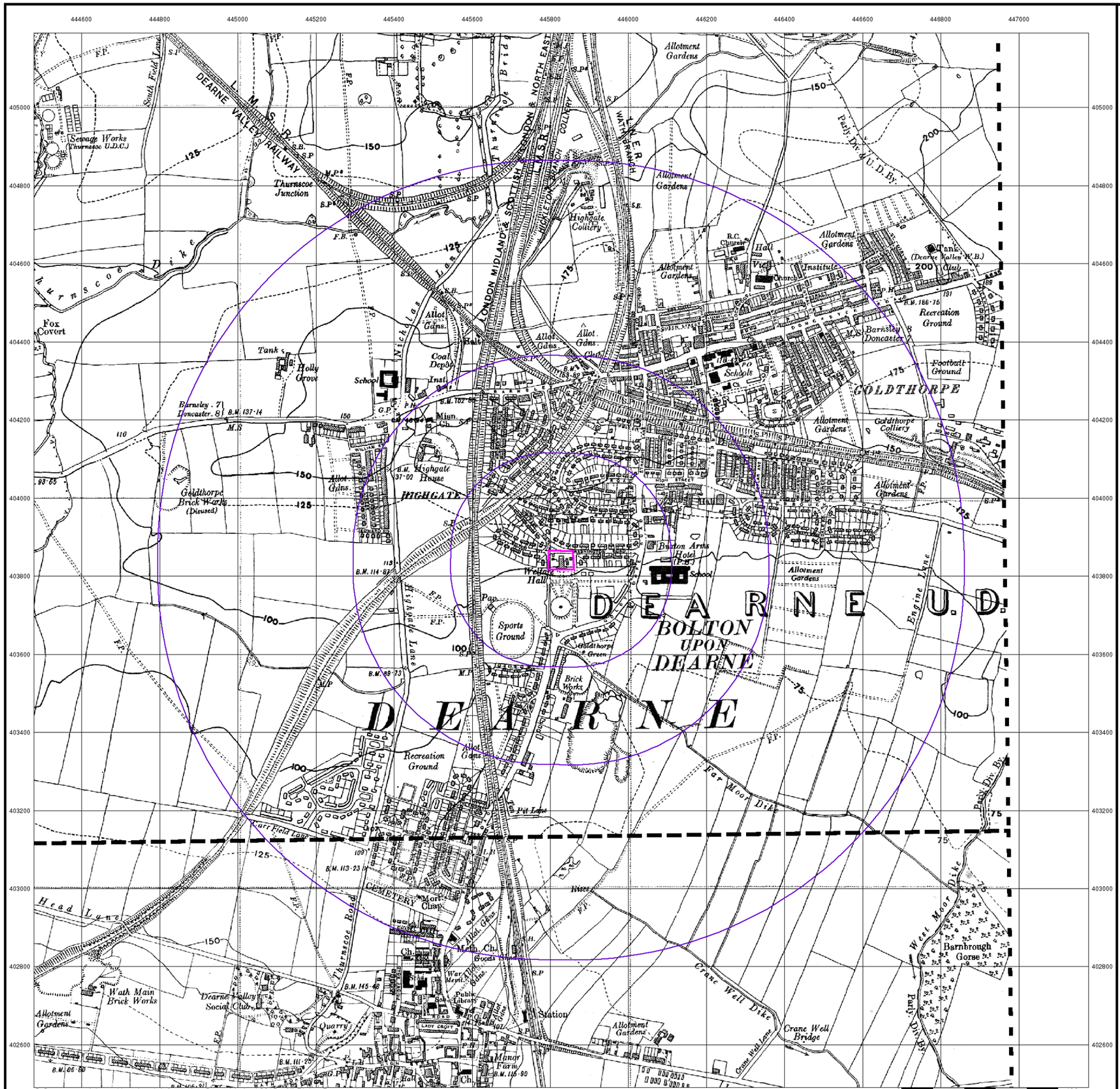

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Yorkshire

Published 1948 - 1950

Source map scale - 1:10,560

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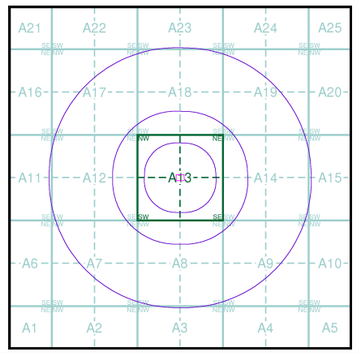
Map Name(s) and Date(s)

275SE
1948
1:10,560

283NE
1950
1:10,560

Historical Map - Slice A



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Search Buffer (m):	1000

Site Details

Site at 445810, 403850

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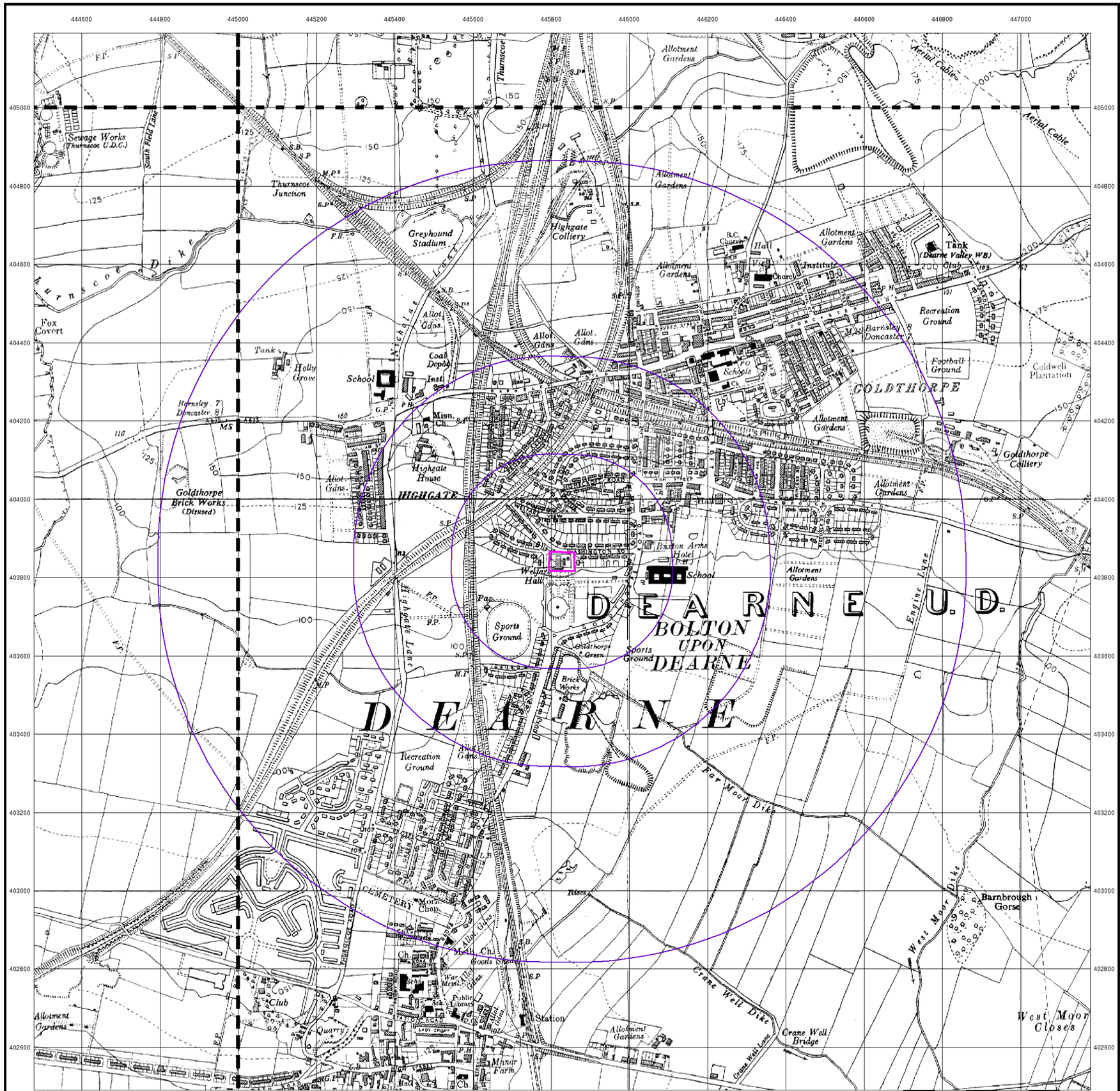

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Ordnance Survey Plan

Published 1955 - 1956

Source map scale - 1:10,000

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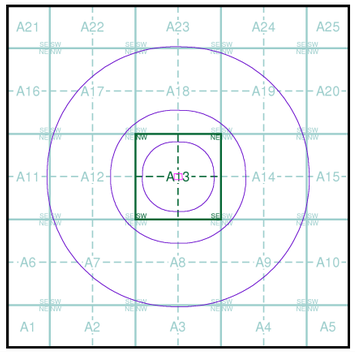
Map Name(s) and Date(s)

SE40NW 1955 1:10,560	SE40NE 1956 1:10,560
SE40SW 1956 1:10,560	SE40SE 1956 1:10,560

Historical Map - Slice A



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Site Area (Ha):	0.31
Search Buffer (m):	1000

Site Details

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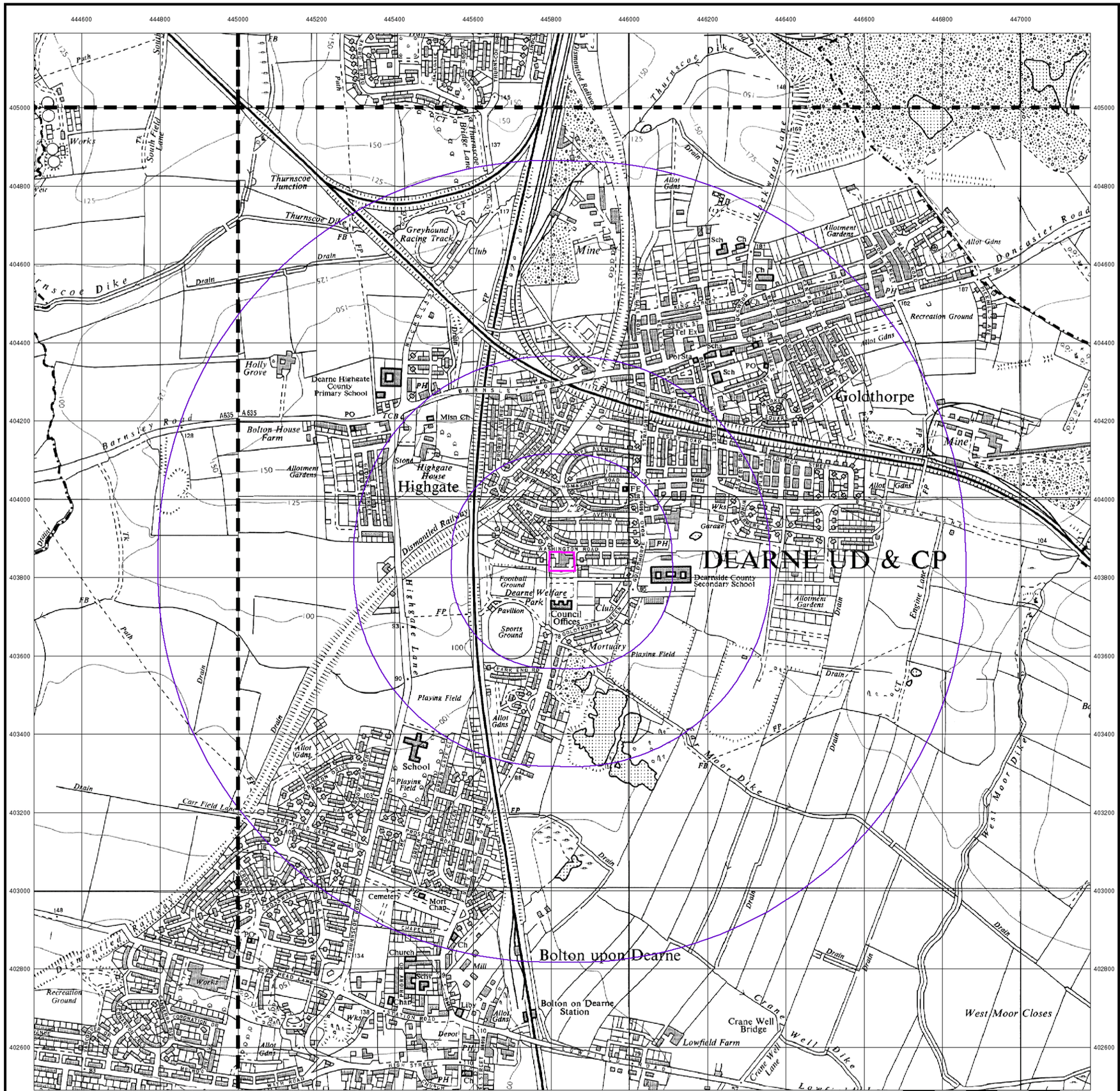

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Ordnance Survey Plan

Published 1966 - 1967

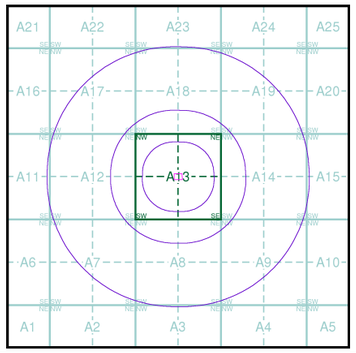
Source map scale - 1:10,000

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)

SE40NW 1967 1:10,560	SE40NE 1966 1:10,560
SE40SW 1967 1:10,560	SE40SE 1966 1:10,560

Historical Map - Slice A



Order Details

Order Number:	71025784_1_1
Customer Ref:	38885
National Grid Reference:	445830, 403840
Slice:	A
Site Area (Ha):	0.31
Search Buffer (m):	1000

Site Details

Site at 445810, 403850

Landmark Information Group

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