APPENDIX E

APPLIED GEOLOGY
GROUND INVESTIGATION REPORT
NOVEMBER 2018

APPLiED GEOLOGY

REPORT ON
GROUND INVESTIGATION
AT
THE PROMISED LAND FARM, BICESTER

REPORT STATUS SHEET

Client:	Albion Land Ltd
Report Title:	Report on Ground Investigation at The Promised Land Farm, Bicester
Report Number:	AG2875-18-AF37
Report Status:	Validated Issue 1
Date:	November 2018

		Date	Signed for and on behalf of Applied Geology Limited
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EXECUTIVE SUMMARY

Investigation Objective	Pre-acquisition survey – comprising desk study and trial pitting investigation to assess potential geotechnical hazards and contaminated land issues associated with the site and inform the Client regarding possible liabilities relating to the ownership of the site.
Site Description	Promised Land Farm, located off Wendlebury Road, approximately 1.5km southwest of Bicester town centre. Site covers an area of approximately 15.35ha and comprises three undeveloped fields. Langford Brook bounds the site to the east, Wendlebury Farm to the southwest, Wendlebury Road to the west and an access road leading on to the Severn Trent Sewage works to the north.
Site History	The site has comprised undeveloped fields since 1885. The site was bounded to the east by Langford Brook, the west by Roman Road (now Wendlebury Road) and the north and south by fields, with farm buildings relating to the Promised Land Farm 150m to the southwest and a Sewage Works 200m to the northeast. Two 'old clay pits' were also shown approximately 225m southwest. By 1950, the MOD Bicester, military storage and distribution centre had been developed 400m to the east. By 1967, a drain was shown along the southern boundary of the site. The north of the site was bound by an access road, connecting to the sewage works, which had been redeveloped and expanded to approximately 150m east of the site. By 1983, development of Wendlebury Farm (consistent with the current layout) had taken place adjacent to the southwest of the site. A nursery was located 50m to the north of the site, which was later developed into a garden centre. By 2002, the Bicester Village Retail Park had been developed approximately 725m to the north and a nature reserve was located 150m to the east.
Anticipated Geology	Published information indicates that the majority of the site is initially underlain by Alluvium. The Alluvium is absent in the northwest and southwest of the site, where River Terrace Deposits are shown. Solid geology of the Kellaways Formation is anticipated below, comprising interbedded sandstone and siltstone of the Kellaways Sand Member, underlain by mudstone, interbedded with siltstone and sandstone of the Kellaways Clay Member. Kellaways Sand is shown to be absent in the north of the site. The Kellaways Formation is anticipated to be underlain by limestone of the Cornbrash Formation.
Other Pertinent Desk Study Data	No current or historical records of landfills sites within 250m of the site; One recorded pollution incident within 250m of the site located 160m north east associated with microbiological pollutant (2002); No recorded petrol/fuel sites identified within 250m; Five current industrial land uses, relating to electricity substations and the Sewage Works; Superficial Deposits and Kellaways Sand Member are designated as Secondary A Aquifers. Kellaways Clay Member is designated as Unproductive strata; The site is within a Zone 3 Floodplain, where probability of annual flooding estimated as 1 in 100; No ecologically sensitive areas within 1000m of the site;
Scope of Investigation	Eighteen machine excavated trial and chemical and geotechnical laboratory testing of soils.
Ground Conditions	Made Ground was not encountered. Topsoil and subsoil was encountered at surface across the site and underlain by Superficial Deposits comprising Alluvium and River Terrace Deposits. The Superficial Deposits were underlain by the Kellaways Formation, predominantly comprising clay, with initial horizons of sand in the southeast of the site. Groundwater was recorded as seepages in nearly all of the trial pits, within the River Terrace Deposits from depths of between 0.5m and 1.3m bgl, with a fast inflow noted in the north of the site. Seepages were also noted within the Kellaways Clay in three locations in the east of the site at depths of between 1.3m and 2.7m.
Geo-environmental Assessment	Contamination related risks appear to be negligible. Hence, in this respect, potential liabilities associated with ownership are extremely limited.
Geotechnical Overview	Conventional shallow foundations should be considered for light or moderate loads, although some construction difficulty may arise owing to shallow groundwater. An alternative consideration could be given to a piled foundation. No special concrete design measures are required for shallow foundations placed within the River Terrace Deposits. Deeper foundations placed in the underlying Kellaways Formation, will require sulphate resisting concrete (DS-4/AC-4). Soakaway drainage capacity is likely to be severely restricted by shallow groundwater occurrence.
Further Recommendations	It is understood that the site has now been acquired and further site investigation is recommended to provide sufficient information for design and compliance.

1.0 INTRODUCTION

1.1 Objectives and Scope of Investigation

Applied Geology were instructed in June 2018 by Bailey Johnson Hayes (Engineer to the Client) on behalf of Albion Land Ltd (the Client) to undertake a pre-acquisition ground investigation at an area of land at The Promised Land Farm, Bicester (the site).

The site comprises three unoccupied tree-lined fields, forming part of the Promised Land Farm.

The objectives of this pre-acquisition ground investigation are to provide information to assess geotechnical hazards and potential contaminated land issues associated with the site in order to inform the Client regarding possible liabilities relating to the ownership of the site.

The terms of reference/brief for the works were mutually developed between Bailey Johnson Hayes and Applied Geology in accordance with Bailey Johnson Hayes Scope of Works and Proposed Trial Pit Location Plan, (reference S1358-Ext-01) and Applied Geology's proposal and estimate (reference AG18-6435-01, dated 30th May 2018).

The full scope of works undertaken by Applied Geology comprised:

- A site inspection and walkover survey
- A review of the following desk study sources:
  - GroundSure – GeoInsight & EnviroInsight environmental databases.
  - GroundSure – MapInsight historical maps.
  - British Geological Survey (BGS) - published information & on-line borehole database.
  - Multi-Agency Geographical Information for the Countryside (MAGIC) on-line database.
  - Environment Agency Web Site.
- Ground investigation, comprising trial pitting together with sampling and a programme of geo-environmental and geotechnical laboratory testing.
- Assessment and reporting of the results of the works.

Underground service plans for the site were obtained by Applied Geology in advance of the investigation. At the time of the ground investigation and subsequent reporting a topographic survey was not available.

1.2 Report Layout

This report presents a description of the site, the desk study data and the factual results of the intrusive investigations carried out. An interpretation of the ground conditions and a discussion/assessment of the findings is presented in the later report text sections. The report should be read in conjunction with the general procedures detailed in Appendix E, which provides details of investigation techniques, assessment methodology and standards, health & safety and limitations and exceptions of the report. Drawings and factual data including

exploratory hole records, laboratory testing results and desk study records are presented in the other Appendices.

2.0 SITE DESCRIPTION

The site is located off Wendlebury Road, approximately 1.5km to the southwest of Bicester town centre. The Ordnance Survey grid reference for the centre of the site is 457226 220693 as shown on the Site Location Plan included in Appendix A. Access to the site was gained through a gate off Wendlebury Road in the northwest of the site.

The site is approximately 'L-shaped', tapering slightly towards the eastern boundary with dimensions of approximately 360m from east to west, and between approximately 335m (western boundary) and 430m (eastern boundary) from north to south. The site covers an approximate area of 15.35ha. A topographic survey was not available; however, the site appears to slope gently to the southeast.

At the time of the walkover the site comprised three undeveloped grassed fields, understood to be used as grazing for cattle. The fields were unoccupied at the time of the walkover; however, it is understood that the farmer had relocated the cattle for the duration of the investigation works. With the exception of the northern boundary of the site and the boundary with Wendlebury Farm in the south, the fields were all lined with hedgerows and semi-mature and mature trees. Electricity pylons with associated overhead cables, orientated north-south were located along the west of the site with two sets also located in the east. A pond, which was almost entirely hidden by overgrown vegetation and reeds, was present in the south of the site, covering an area of circa 10m x 20m.

The site was bound to the north by an access road to the Severn Trent sewage works, which was segregated by a post and rail fence line, to the east by Langford Brook, to the south by Wendlebury Farm and further fields belonging to the Promised Land Farm and to the west by Wendlebury Road.

No obvious sources of potential contamination or potentially contaminative activities were observed at the site during the investigation.

	
Gated entrance to the site in the northwest	Pylons with associated overhead cables in the west of the site

	
Pond in the south of the site, facing west towards Wendlebury Farm	Northern boundary of the site, facing east along the access road to the Severn Trent Sewage Works

2.1 Site Proposals

It is understood that the site has now been acquired and it is intended that as much of the site as possible will be developed, together with the adjacent Wendlebury Farm, also under Client ownership. Specific redevelopment purposes are not formulated as yet.

3.0 DESK STUDY INFORMATION

Site History	• **1885** – Site and surrounding area are agricultural fields, the Oxford to Bletchley railway line runs northeast – southwest approximately 105m southeast of the site. Two 'Old Clay Pits' are indicated 225m southwest of the site. Roman Road, orientated north-south bounds the site to the west. Buildings associated with the Promised Land Farm are located approximately 150m southwest. A sewage works is located 200m to the northeast. • **1950** – The A41 is located 55m to the northwest of the site, orientated northeast – southwest. MOD Bicester, military storage and distribution centre has been developed 400m to the east. • **1966** – A drain is shown along the southern boundary of the site. The north of the site is bound by an access road, connecting to the sewage works, which has been redeveloped and expanded to approximately 150m east of the site. • **1983** – Wendlebury Farm is now shown (consistent with the current layout) adjacent to the southwest of the site. A nursery is located 50m to the north of the site. • **1992-95** – The A41 has been widened. • **1995** – The nursery to the north is now a garden centre and has expanded south. • **2002** - Bicester Village Retail Park has been developed approximately 725m to the north and a nature reserve is located 150m to the east. • No further significant changes to present day.
Anticipated Geology and Ground Conditions	• Published BGS Map shows Alluvium across the majority of the site. The Alluvium is absent in the northwest and southwest of the site, where River Terrace Deposits are shown. Solid geology of the Kellaways Formation is anticipated below, comprising interbedded sandstone and siltstone of the Kellaways Sand Member, underlain by mudstone, interbedded with siltstone and sandstone of the Kellaways Clay Member. Kellaways Sand is shown to be absent in the north of the site. The Kellaways Formation is anticipated to be underlain by limestone of the Cornbrash Formation. • Nearest BGS archive borehole, undertaken at Wendlebury Farm (28m to southwest) recorded Alluvium to 1.37m bgl, over Kellaways Clay Member to 5.49m and the Great Oolite Group (Cornbrash Formation) to 15.24m,

	the base of the borehole. Artesian groundwater was encountered within the borehole and was at rest at 0.83m above ground level at the end of boring. There is no record of what depth the artesian groundwater was encountered, however it is likely to be near the base of the borehole, within the Cornbrash Formation. • Site is not in a radon affected area, with <1% of homes above the Action Level. No radon protection measures are therefore considered necessary for new properties.
Mining/Quarrying and Other Geohazards	• Site not indicated to be within area of underground coal or other mining. • Site not in area associated with natural cavity formation. • The BGS have indicated a moderate risk of shrinkable/swelling clay and compressible deposits on the site. • The earliest OS map editions indicate the extraction of clay 225m southwest of the site. • Although archaeological findings are noted within the GroundSure report, the Roman Road (now Wendlebury Road), which bounds the site to the west, is an indication that there may be possible archaeology on the site.
Hydrology	• The nearest surface watercourse is Langford Brook, which bounds the site to the east. • Water quality data, taken from Langford Brook, 45m southeast of the site, indicated a chemical and biological grade of B in 2009. • There are no surface water abstractions within 500m of site. • There are 10 no. licensed discharges within 250m of site, the nearest being located 45m to the southeast of the site and associated with sewage discharges into Langford Brook. This license was revoked on 01/11/1989. • The site is within a Zone 2 and Zone 3 floodplain and the highest RoFRaS flood rating is High.
Hydrogeology	• The superficial deposits underlying the site are a Secondary A Aquifer, The Kellaways Sand Member is a Secondary A Aquifer and the Kellaways Clay Member is listed as unproductive strata. • 4 No. groundwater abstraction licenses are shown within 1000m of the site, with the closest being located at Faccenda Chicken Ltd, 58m west, for general farming and domestic uses. • Most likely groundwater flow direction is to the southeast, following the topography and towards Langford Brook. • The site is not located within a Source Protection Zone.
Other Environmental data	• No landfills or licensed waste sites within 500m. • Five potentially contaminative industries are located within 250m of the site, relating to electricity substations (26m and 169m northeast) and the Sewage Works from 175m east. • No petrol or fuel sites are located within 500m of the site. • One pollution incident was recorded within 500m of the site, located 160m to the northeast, relating to a microbiological pollutant on 09/02/2002 and was assigned a Category 3 (minor) impact to water. • The site is within a Nitrate Vulnerable Zone.

4.0 CONCEPTUAL SITE MODEL

4.1 Diagrammatical Illustration

The Conceptual Model for the site, showing the main elements of the surface and subsurface conditions and including the potential contaminant sources, pathways and receptors identified from the desk study information is presented in Appendix A as Drawing No AG2875-18-03. The potential sources, pathways and receptors are defined in the following sections:

4.2 Sources

- Made Ground soils on site associated with adjacent site development;

- Hydrocarbon leaks from farming vehicles/plant;
- On site ground gases associated with decomposition of organic material in Made Ground or hydrocarbon spillages;
- Sulphates in Made Ground or underlying natural strata;
- Pesticides within the near surface materials.

The substation located 26m to the northeast of the site is not considered to be a viable source, due to the distance from the site and the low mobility of PCBs.

4.3 Pathways

- Human dermal contact;
- Human ingestion via soil directly or via bioavailable contaminants within vegetables grown in contaminated soils;
- Human inhalation of dust or vapours;
- Leaching and/or migration through permeable soils (granular Made Ground, River Terrace Deposits and Kellaways Sand);
- Direct contact with buried concrete/water supply services.

4.4 Receptors

- End user residents, workers and visitors, (Human Health);
- Superficial Deposits and Kellaways Sand Member – Secondary A Aquifer (Controlled Waters);
- Buried foundation/substructure concrete (Building Materials);
- Water supply services (Building Materials).

4.5 Source/Pathway/Receptor Linkage and Assessed Risk

Source-pathway-receptor (SPR) linkages are tabulated below together with the qualitatively assessed risk. The risk to ground workers and construction workers is not included in the table as it is assumed that these risks will be sensibly negated by the adoption of good hygiene practices and the appropriate use of relevant PPE/RPE when exposed to potentially contaminated soils. Comments regarding contamination issues with respect to ground workers and construction workers are included in the health and safety section of the Standard Procedures included as Appendix E.

Source	Pathway	Receptor	Risk*
Potential contaminants within Made Ground or resulting from adjacent site development.	Inhalation, ingestion, dermal contact.	End users, adjacent residents	Low
	Migration and Leaching	Superficial Deposits and Kellaways Sand Member (Secondary A Aquifers)	Negligible
Soil gas from Made Ground – both on site and off site sources (methane, carbon dioxide)	Migration into buildings, service ducts etc.	End users	Low
Elevated sulphates in Made ground or natural	Direct contact, leaching and contact with	Buried concrete	Low-medium (see 7.2)

Source	Pathway	Receptor	Risk*
soils	groundwater		
Hydrocarbon contaminants from vehicle/plant leaks	Inhalation, ingestion, dermal contact.	End users	Low
	Migration/leaching	Superficial Deposits and Kellaways Sand Member (Secondary A Aquifers)	Negligible
	Direct contact	Water supply services	Low

*** Definition of Risk Categories**
Negligible - Contaminants that might have unacceptable impact on key receptors, are unlikely to be present, or, no pathway is envisaged.
Low Risk: Contaminants may be present but are unlikely to be at levels to have unacceptable impact on key receptors, or pathways are likely to be minimal.
Medium Risk: Contaminants are probably present and might have an unacceptable impact on key receptors. Pathways may also be present therefore remedial measures may be necessary to reduce the risks.
High Risk – Contaminants probably or certainly present and pathways are probably also present. Therefore, contaminants are likely to have an unacceptable impact on key receptors and remedial measures are likely to be necessary to reduce the risks to acceptable levels.

5.0 GROUND INVESTIGATION WORKS

5.1 Fieldwork

The following scope of fieldwork was undertaken:

- 18 No Machine excavated trial pits (ref: TP1 to TP18) to depths of between 2.35m and 4.1m below ground level (bgl).

The locations of the exploratory holes were selected in general accordance with the proposed borehole location plan provided by Bailey Johnson Hayes and set out on site by Applied Geology Limited. A number of the positions were constrained by the presence of a sewer, which bisected the site, orientated northeast to southwest and also the pylons and associated overhead cables. The sampling strategy for the exploratory hole locations was to provide best overall coverage. The locations of the trial pits are presented on Drawing No. AG2875-18-02 in Appendix A. The positions are approximated in relation to field boundaries and identifiable features on the site plan.

5.2 Laboratory Testing

Geotechnical laboratory testing was undertaken on selected samples and comprised the following:

- 8 No natural moisture content tests;
- 8 No Atterberg limit tests;
- 5 No particle size distribution tests;
- 5 No BRE SD1 suite tests;
- 4 No BRE SD1 with pyrite suite tests.

Chemical testing was undertaken based upon the desk study, walkover and site observations during the fieldwork. Selected samples were analysed for the following suite of contaminants:

- Selected metals suite [arsenic, beryllium, boron, cadmium, chromium (total), copper, mercury, nickel, lead, zinc, selenium, vanadium] (10 samples);
- Chromium hexavalent and trivalent (2 samples);
- Speciated (16 US EPA) Polycyclic Aromatic Hydrocarbons (PAH) (10 samples);
- Phenols (total) (2 samples);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) (3 samples);
- pH (10 samples);
- Soluble sulphate (10 samples);
- Organic matter (10 samples);
- Asbestos Containing Material (ACM) (5 samples);
- Pesticides (5 samples).

Laboratory test results are included in Appendix D.

6.0 GROUND CONDITIONS

Topsoil and subsoil was encountered at surface across the site and was underlain by Superficial Deposits comprising Alluvium and River Terrace Deposits, which in turn was underlain by the Kellaways Formation, predominantly comprising clay, with initial horizons of sand in the southeast of the site. This is broadly consistent with the published geological records. Full details of the strata encountered are given on the borehole records presented in Appendix C, however, a generalised ground profile is presented below to summarise the information.

Stratum	Depth to Top of Strata (m bgl)	Thickness range (m)	Comments
Topsoil	GL	0.15 – 0.35	Encountered at all locations
Subsoil	0.15 – 0.30	0.10 – 0.45	Encountered in TP1, TP2, TP7-12 and TP14
Alluvium	0.15 – 0.45	0.15 – 1.25	Not encountered in TP1, TP2, TP7 or TP14
River Terrace Deposits	0.35 – 1.20	0.20 – 1.30	Not encountered in TP3, TP11 or TP12
Kellaways Formation	0.60 – 1.80	>2.65	Encountered at all locations, base not proven

6.1 Topsoil and Subsoil

Topsoil was encountered from ground level at all locations, to a depth of between 0.15m and 0.35m bgl and generally comprised firm dark brown slightly sandy friable clay with rootlets and occasional shell fragments.

Underlying subsoil was encountered at around half of the locations to depths of between 0.35m and 0.7m bgl and generally comprised stiff brown friable clay, with

occasional rootlets and occasional fine to coarse subangular to subrounded limestone.

6.2 Alluvium

Strata considered to represent alluvial deposits were encountered at all locations, with the exception of TP1, TP2, TP7 and TP14 (generally absent in the northwest of the site), beneath the Topsoil or Subsoil to depths of between 0.5m and 1.6m bgl. The Alluvium generally comprised soft to firm orangish-brown and light greyish brown mottled slightly sandy silty clay.

The results of two Atterberg limit tests undertaken on the Alluvium have indicated plasticity indices of 20% and 51% (corrected to between 16.8% and 48.96%), indicating these soils to be of moderate to high shrinkability as defined by NHBC Standards. Uncorrected liquid limits of 32% and 73%, plastic limits of 12% and 22% and moisture contents of 17.2% and 26.4% were also recorded. These results indicate the clays to be of medium to high plasticity.

6.3 River Terrace Deposits

River Terrace Deposits were encountered at all locations with the exception of TP3, TP11 and TP12, beneath the Subsoil or Alluvium to depths of between 0.6m and 1.8m, generally shallower in the northwest of the site. The strata generally comprised orangish-brown silty sand and gravel, with the gravel comprising fine to coarse subangular to subrounded limestone.

The results of two particle size distribution tests undertaken on the River Terrace Deposits at depths of 0.6m and 1.2m bgl, have indicated the following proportions: 30 to 40% sand, 47 to 54% gravel and 13 to 16% fines (clay and silt).

6.4 Kellaways Formation

Strata considered to represent the Kellaways Formation were encountered beneath the Superficial Deposits, to depths of between 2.35m and 4.1m bgl. The strata typically comprised firm becoming stiff bluish grey silty clay, occasionally with thin indistinct laminations, occasional fine to coarse subrounded to subangular limestone gravel and with rare fossil shell fragments. Occasional gypsum crystals were noted within the clay within nine of the trial pits (generally absent in the southeast of the site) from depths of between 1.25m and 3.5m bgl. In the southeast of the site, the strata often initially comprised a granular layer, generally comprising bluish grey slightly clayey silty gravelly fine to coarse sand (silt in TP13), with the gravel comprising fine to coarse subangular to subrounded limestone. The granular layer was encountered directly beneath the Superficial Deposits to depths of between 1.75m and 3.3m bgl and underlain by further cohesive deposits of the Kellaways Formation.

Hand shear vane tests undertaken on the cohesive Kellaways Formation, recorded undrained shear strengths of between 35kN/m^2 and 90kN/m^2, generally increasing in strength with depth.

The results of a number of particle size distribution tests undertaken on granular horizons of the Kellaways Formation at depths of between 0.8m and 2.3m bgl, have

indicated the following proportions: 35 to 60% sand, 11 to 44% gravel and 21 to 39% fines (clay and silt).

The results of Atterberg limit tests undertaken on the cohesive Kellaways Formation have indicated plasticity indices of between 10% and 51% (corrected to between 8.1% and 51%), indicating these soils to vary substantially between low and high shrinkability as defined by NHBC Standards. Uncorrected liquid limits of between 26% and 75%, plastic limits of between 13% and 25% and moisture contents of between 14.3% and 38.2% were also recorded. These results indicate the clays to be of low to high plasticity.

6.5 Groundwater

Groundwater was recorded as seepages in all trial pits, with the exception of TP12 (no River Terrace Deposits present) within the River Terrace Deposits at depths of between 0.5m and 1.3m bgl. The groundwater generally occurred as seepages, although fast inflows were noted in TP4 (from 0.8m) and TP5 (from 1.2m). Seepages were also noted within the Kellaways Formation in TP3 from 2.7m, TP11 from 1.3m and TP15 from 1.9m bgl. Details of the groundwater occurrence are summarised in the following table:

Trial Pit	Depth	Behaviour
TP1	0.5m	Seepage
TP2	0.6m	Seepage
TP3	2.7m	Seepage
TP4	0.8m	Fast inflow, causing continual collapse of the long sides of the trial pit.
TP5	1.2m	Fast inflow, causing continual collapse of the long sides of the trial pit.
TP6	0.9m	Seepage
TP7	1.0m	Seepage
TP8	2.9m	Seepage rising from base of trial pit
TP9	1.3m	Seepage
TP10	1.2m	Seepage
TP11	1.3m	Seepage
TP12	Dry	N/A
TP13	0.9m	Medium inflow, causing collapse of trial pit between 0.7m and 1.35m bgl.
TP14	0.7m	Seepage
TP15	1.9m	Seepage

Trial Pit	Depth	Behaviour
TP16	1.2m	Seepage
TP17	0.6m and 3.0m	Seepage
TP18	0.35m	Seepage

6.6 Contamination

No obvious visual or olfactory evidence of potential contamination was observed during the fieldwork undertaken by Applied Geology.

7.0 ASSESSMENT

7.1 Geo-environmental Overview

The results of the chemical testing on soils have been subjected to human health risk assessment as described in Appendix E, with specific details as follows:

- Proposed end-use – not yet known;
- Screening criteria – residential with plan uptake (for a conservative initial assessment), assuming 6% SOM;
- Assuming a single dataset based on the site's history and current land-use.

The spreadsheets summarising the laboratory results and relevant screening values for each dataset are presented in Appendix D. The spreadsheet shows that none of the results of the testing for the proposed development exceed the conservative human health screening criteria.

TPH concentrations were recorded at below the laboratory detection limits.

The Asbestos screening tests did not detect the presence of any ACM.

The pesticides/herbicides screening tests did not detect the presence of any pesticides.

Based on the above assessments, it is considered that the risks to human health at the site are negligible.

The testing has not found concentrations of any determinants within the soils, which would be considered representative of contamination. Given the absence of a significant source and no pollutant linkage to controlled waters, there is considered to be a negligible risk to Controlled Waters.

Furthermore, the TPH results have not given concentrations that would exceed UKWIR limits for the use of polyurethane (PE) or polyvinylchloride (PVC) water supply pipes. Barrier supply pipes are therefore not likely to be required. Further guidance on this subject is included within Appendix E.

In the light of the trial pit investigation findings, the risks relating to contamination issues, as assessed above, have been updated in the following table:

Source	Pathway	Receptor	Notes from Investigation	Updated Risk*
Potential contaminants within Made Ground or resulting from adjacent site development.	Inhalation, ingestion, dermal contact.	End users, adjacent residents	No Made Ground encountered on site. Low concentrations of contaminants identified in near surface soils	Negligible
	Migration and Leaching	Superficial Deposits and Kellaways Sand Member (Secondary A Aquifers)	No Made Ground encountered on site. Low concentrations of contaminants identified in near surface soils	Negligible
Soil gas from Made Ground – both on site and off site sources (methane, carbon dioxide)	Migration into buildings, service ducts etc.	End users	No Made Ground encountered at the site. Ground gases from alluvium or underlying strata has not yet been assessed.	Low
Elevated sulphates in Made ground or natural soils	Direct contact, leaching and contact with groundwater	Buried concrete	River Terrace Deposits	Low
			Kellaways Formation – Granular	Low
			Kellaways Formation - Cohesive	High
Hydrocarbon contaminants from vehicle/plant leaks	Inhalation, ingestion, dermal contact.	End users	Low/trace concentrations of contaminants identified	Negligible
	Migration/leaching	Superficial Deposits and Kellaways Sand Member (Secondary A Aquifers)	Low/trace concentrations of contaminants identified	Negligible
	Direct contact	Water supply services	Low/trace concentrations of contaminants identified	Negligible

7.2 Geotechnical Overview

The dominant factors affecting the design options for any new foundations at the site are the presence of soft Alluvium, which was encountered to depths of up to 1.6m bgl, together with shallow groundwater levels.

For typical light to moderate loads, conventional pads or strips/trenchfill foundations could be considered, taken down below any Topsoil/Subsoil, Alluvium or loose/soft zones and placed within the underlying competent River Terrace Deposits or Kellaways Formation.

A minimum founding depth of 0.75m is likely generally for foundations placed within the granular River Terrace Deposits. For foundations placed within the Kellaways Formation, a minimum founding depth of 1.0m is likely to be needed to cater for seasonal effects. Further deepening with be required in the influencing zone of existing, recently felled or proposed trees, in line with requirements for soils up to

high shrinkage potential. We understand that conventional foundations are preferred and hence, comments on potential construction difficulties are provided as follows.

Groundwater occurrence appears to be associated predominantly with the variations in the depths and thickness of the granular River Terrace Deposits across the site. In the northwest, the groundwater appears to be perched within shallow River Terrace Deposits and separated from areas to the east by a thicker wedge of cohesive alluvium (TP3). Hence, in the northwest, the groundwater should be relatively easily sealed off, such that foundations can be placed into the underlying Kellaways Clay. Progressing southeast through the site, the granular deposits generally become thicker and are more saturated. A faster inflow was noted in the northeast of the site (TP4 and TP5) and this, together with an increased depth to the underlying Kellaways Clay, may result in greater difficulties in sealing off the groundwater. In central and southern areas, the ground appears to be generally less saturated. Here, it is likely to be possible to place some foundations within the granular River Terrace Deposits above the groundwater. In other areas, excavations may need to involve cutting off the groundwater by sealing into the underlying clay.

Owing to the potential for construction difficulties to arise locally, alternative foundation solutions, such as ground improvement or piles could be considered in those areas. If this is to be further considered, it would be prudent to seek the advice of an appropriate specialist contractor.

It is understood that ground bearing floor slabs will be required. Owing to the presence of shrinkable subsoil generally underlying the site, there will be a need to ensure that any soft, loose or potentially desiccated materials are removed and replaced with compacted granular material. In areas where the River Terrace Deposits are present with reasonable thickness, the need for excavation and treatment is unlikely. The floor slab should be constructed on a compacted granular mattress of appropriately designed thickness.

Excavations of typical dimensions for foundations and service trenches should generally be achievable using conventional hydraulic plant. As discussed above, the groundwater occurrence will lead to a requirement for control measures, depending upon depth and location. Appropriate trench supports/cut offs are likely to be required to achieve stability together with sump pumping to maintain dry excavations.

For foundations placed in the River Terrace Deposits, testing suggests that DS-1 conditions will apply, which no special measures are required. For foundations placed in the cohesive Kellaways Formation, sulphate resisting concrete appropriate to DS-4/AC-4 is likely to be required.

The capacity for soakaway drainage is likely to be severely restricted on the site, owing to the generally shallow groundwater levels. It would therefore be prudent to seek an offsite source for drainage.

7.3 Conclusions and Recommendations

Based on the pre-acquisition investigation, contamination related to risks to human health and Controlled Water receptors appear to be negligible. It is considered that

remedial measures in this regard, are very unlikely and hence, associated potential liability is extremely limited.

Conventional shallow foundations should be considered for light to moderate loads, but some construction difficulties may arise, associated with shallow groundwater. The trial pits suggest that these risks may be greatest in the northeast of the site, although localised difficulties could be experienced in the central and southern parts of the site. To avoid such difficulties, a piled foundation could be considered.

No special measures relating to buried concrete are required for foundations placed in the River Terrace Deposits, although foundations placed in the Kellaways Formation are likely to require sulphate resisting concrete appropriate to DS-4/AC-4 conditions.

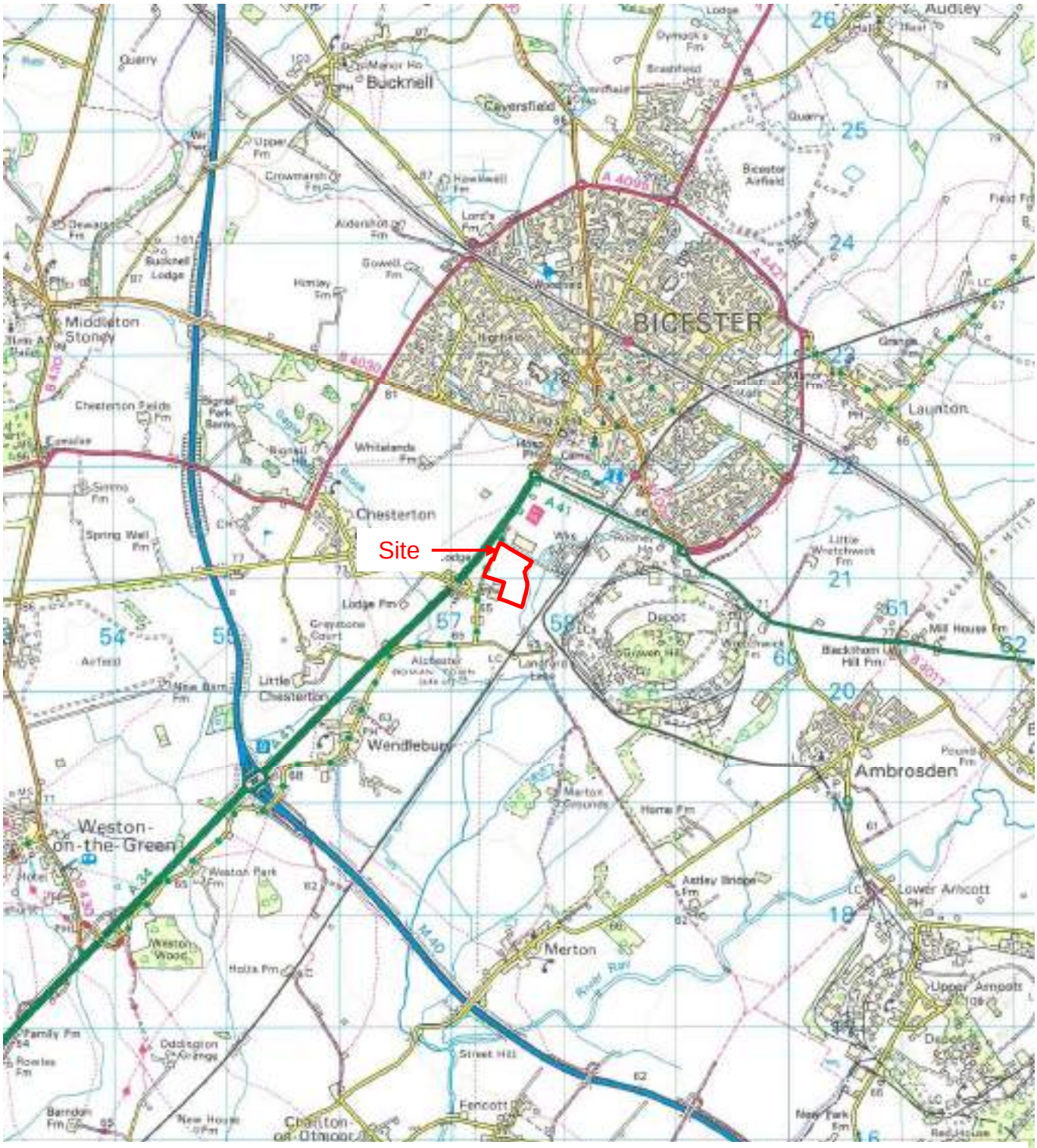
It is recommended that an offsite source of drainage is sought for the site.

It is understood that the site has now been acquired and further site investigation will be required based on the proposed development layout. This should include a number of boreholes, geared towards the proposed site layout, with a programme of groundwater and groundgas monitoring to provide sufficient information for final engineering designs. Some further contamination testing should be included to ensure appropriate coverage for compliance and audit trail.

Applied Geology Limited
Unit 23
Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Tel: 02476 511822

APPENDIX A



APPLiED GEOLOGY
Unit 23
Abbey Park
Stareton
Kenilworth
CV8 2LY
Tel: 02476 511822
email: admin@appliedgeology.co.uk

Client: ALBION LAND LTD

Project: THE PROMISED LAND FARM, BICESTER

Drawn By:	Checked By:	Paper Size:
JS	FHJ	A4

Scale:	Date:	NGR:
1:50,000	06.09.2018	457226 220693

Title: SITE LOCATION PLAN

Drawing No:	Revision:
AG2875-18-01	0

KEY:

TP1 Trial Pit

Drawing based on StreetMap image dated 24/07/2018.

APPLiED GEOLOGY

Unit 23
Abbey Park
Stareton
Kenilworth
CV8 2LY

Tel: 02476 511822
email: admin@appliedgeology.co.uk

Client: ALBION LAND LTD

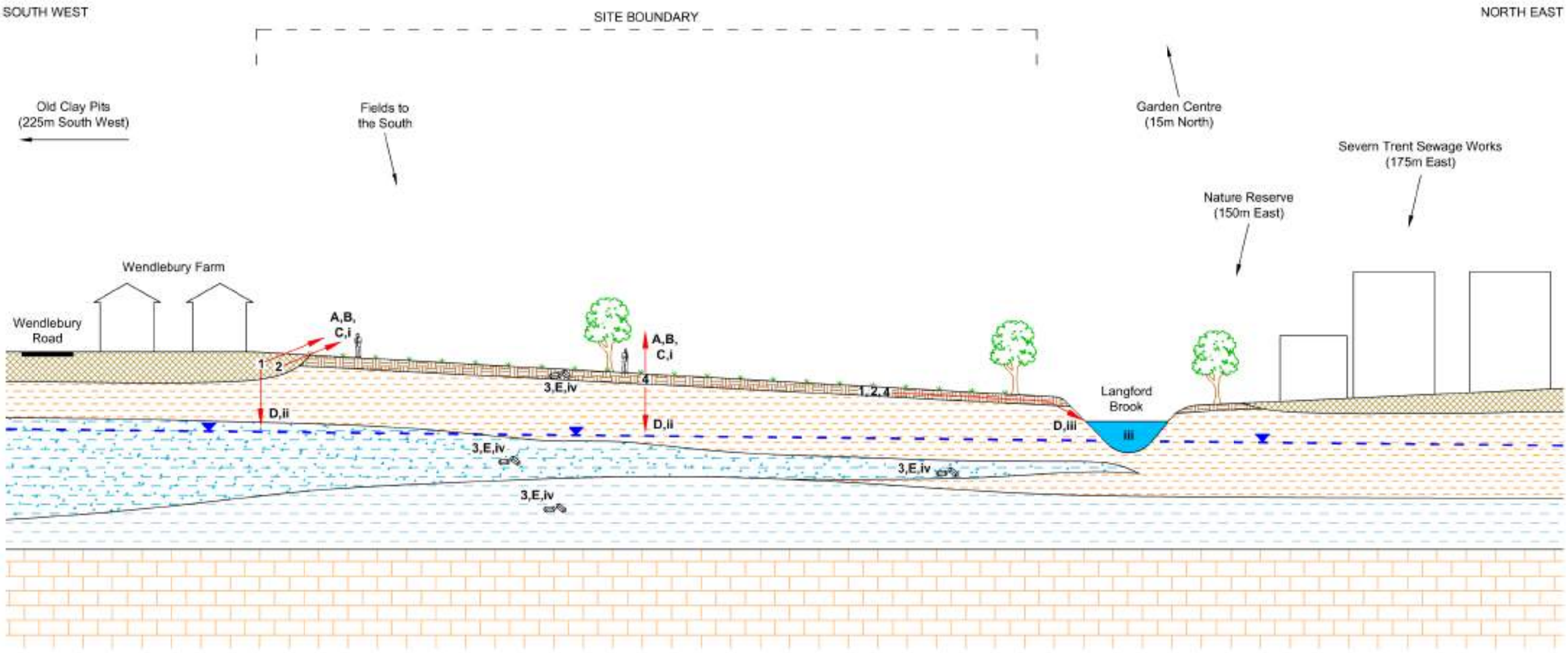
Project: THE PROMISED LAND FARM, BICESTER

Title: EXPLORATORY HOLE LOCATION PLAN

Drawn By:	Checked By:	Paper Size:
JS	FHJ	A3

Scale:	Date:
NTS	24.07.2018

Drawing No:	Revision:
AG2875-18-02	0



SOURCES

1. Made Ground/Topsoil
2. Soil gas
3. Elevated sulphates
4. Hydrocarbons(spillages / leaks from former vehicles / plant)

PATHWAYS

A. Inhalation
B. Ingestion
C. Dermal contact
D. Leaching/migration
E. Direct contact

RECEPTORS

i. End users
ii. Aquifer
iii. Watercourse
iv. Buried concrete

Key:

- Topsoil
- Made Ground
- Alluvium (Secondary A Aquifer)
- River Terrace Deposits (Secondary A Aquifer)
- Kellaways Formation (Secondary A Aquifer)
- Cornbrash Formation (Principal Aquifer)
- Groundwater

APPLiED GEOLOGY
Unit 23
Abbey Park
Stareton
Kenilworth
CV8 2LY
Tel: 02476 511822
email:
admin@appliedgeology.co.uk

Client: ALBION LAND LTD

Project: THE PROMISED LAND FARM, BICESTER

Title: CONCEPTUAL SITE MODEL

Drawn By:	Checked By:	Paper Size:
JS	FHJ	A3

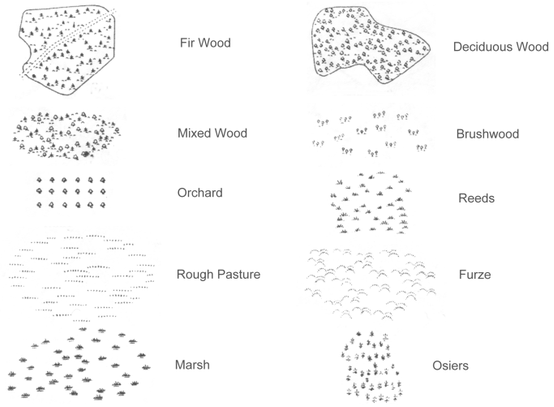
Scale:	Date:
NTS	17.09.2018

Drawing No:	Revision:
AG2875-18-03	0

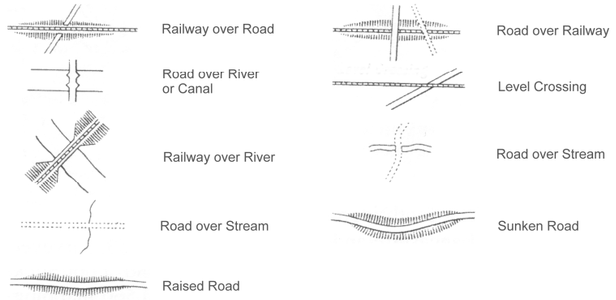
APPENDIX B

County Series 1:10,560 scale

VEGETATION

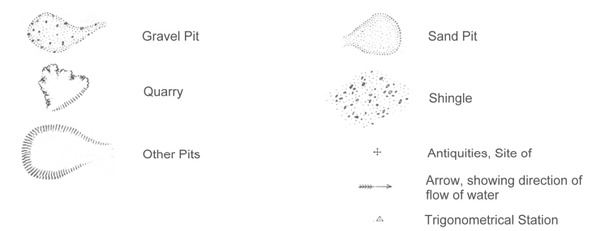


ROADS



RAILWAYS

GENERAL FEATURES



BOUNDARIES

National Grid 1:10,000 scale

HEIGHTS (METRES)

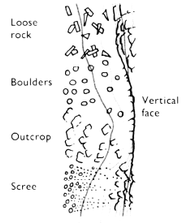
Values are given in metres above mean sea level at Newlyn.

Surface heights determined by: ground survey • 163m; air survey

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

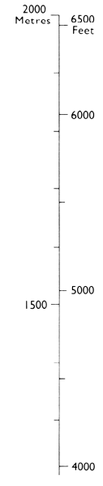
Contours are at 5 metres vertical interval.

ROCK FEATURES



CONVERSION SCALE

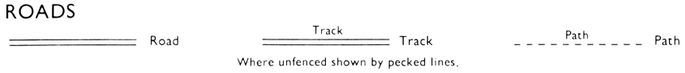
Metres - Feet



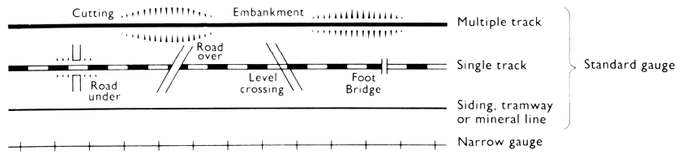
ABBREVIATIONS

BP,BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP,MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Pol Sta	Police Station	Y	Youth hostel

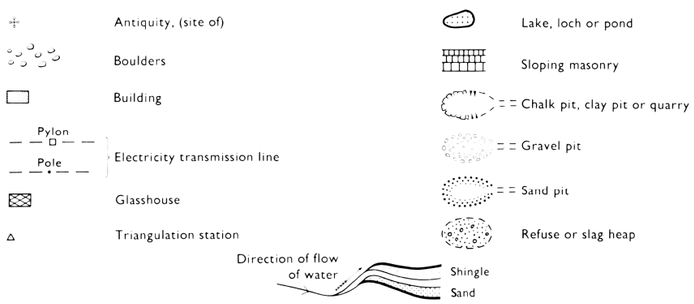
ROADS



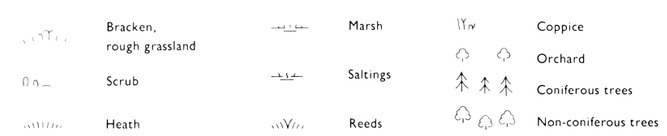
RAILWAYS



GENERAL FEATURES



VEGETATION



In some areas bracken ( ) and rough grassland ( ) are shown separately.

GroundSure

Historical Map Pack Legend

County Series & National Grid

1:10,560 scale

Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

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Technical Helpline

Tel 08444159000

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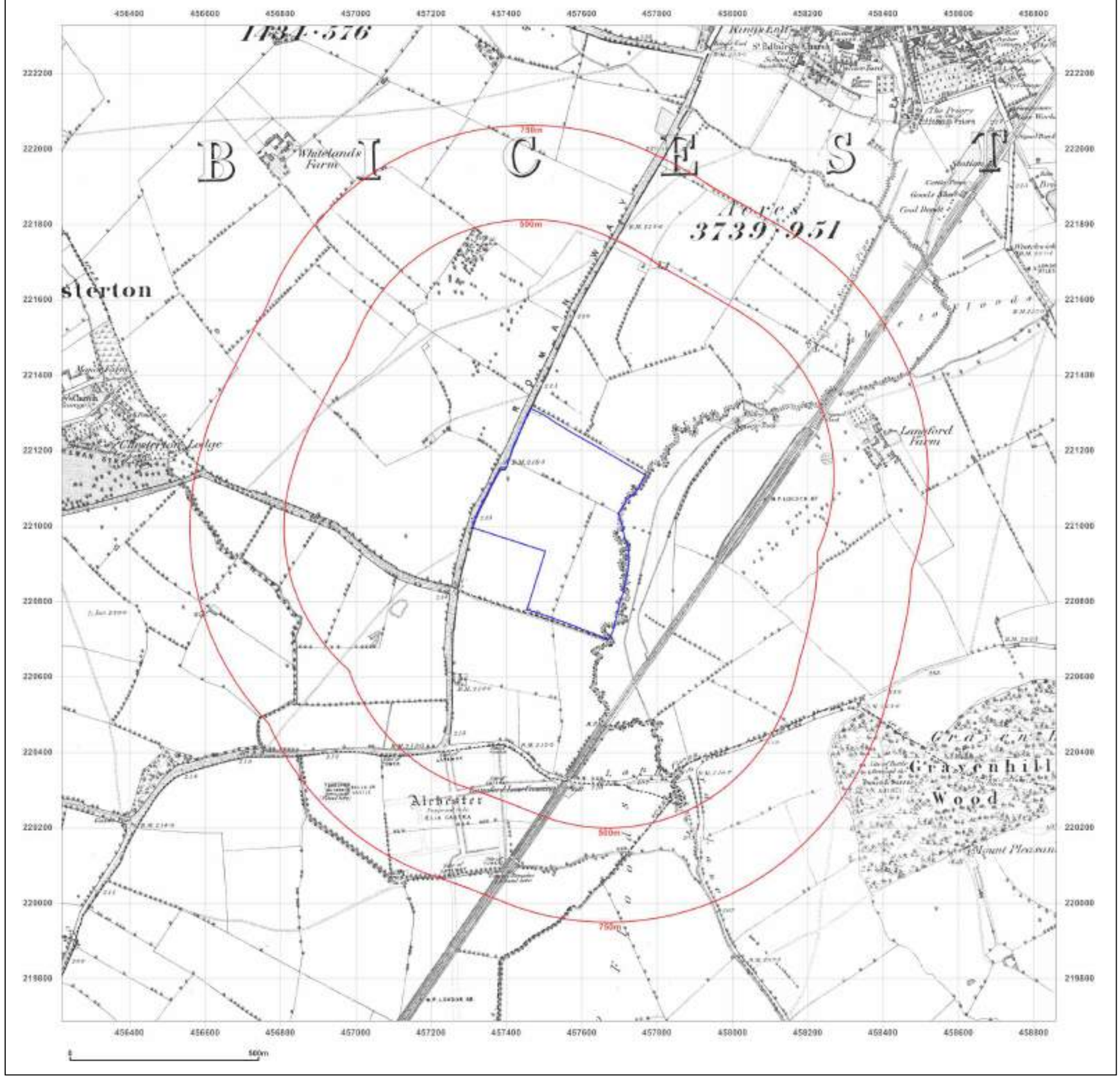

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Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: County Series

Map date: **1880**

Scale: 1:10,560

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Revised 1880
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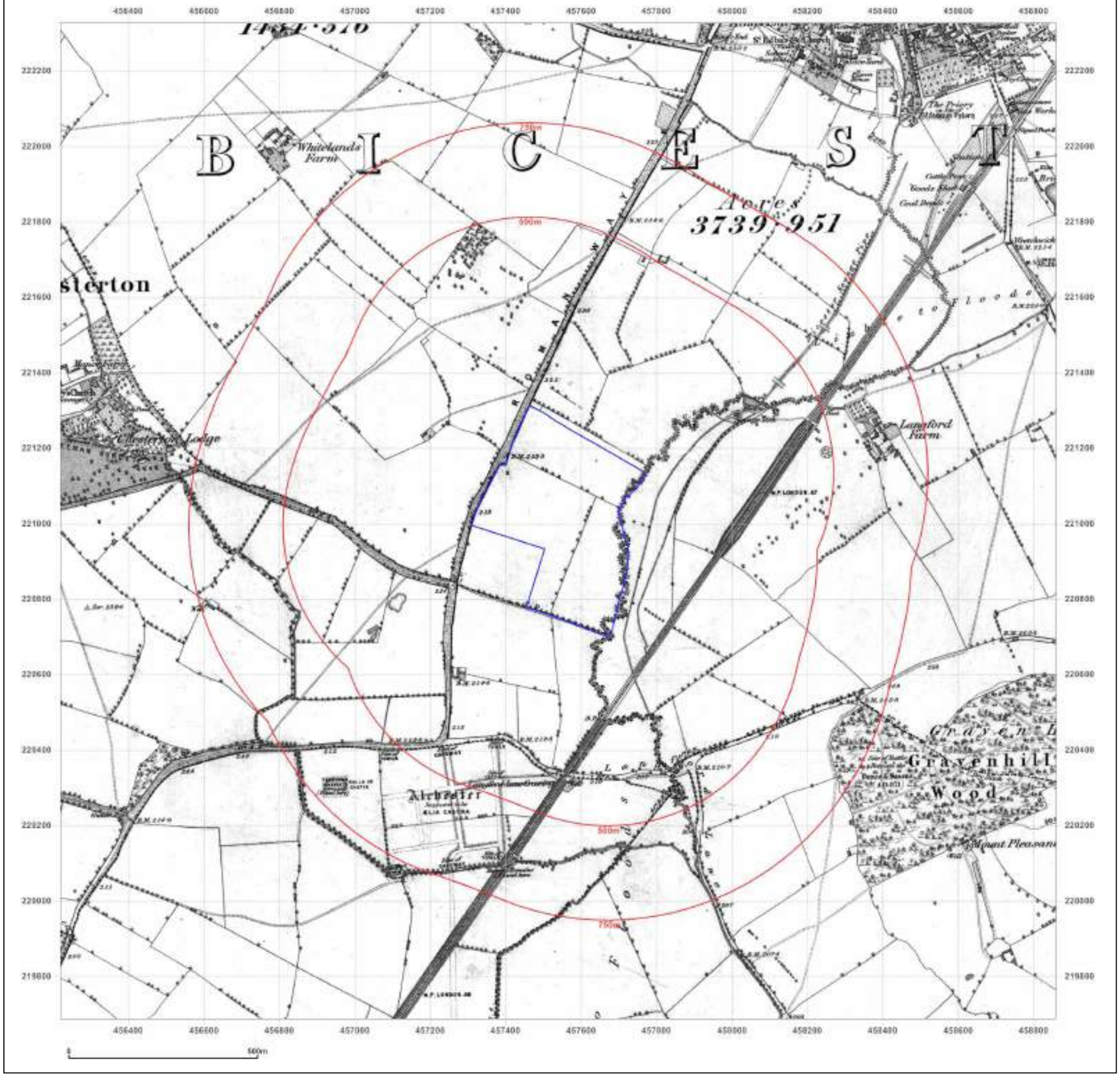

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: County Series
Map date: **1885**
Scale: 1:10,560
Printed at: 1:10,560

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Edition 1885
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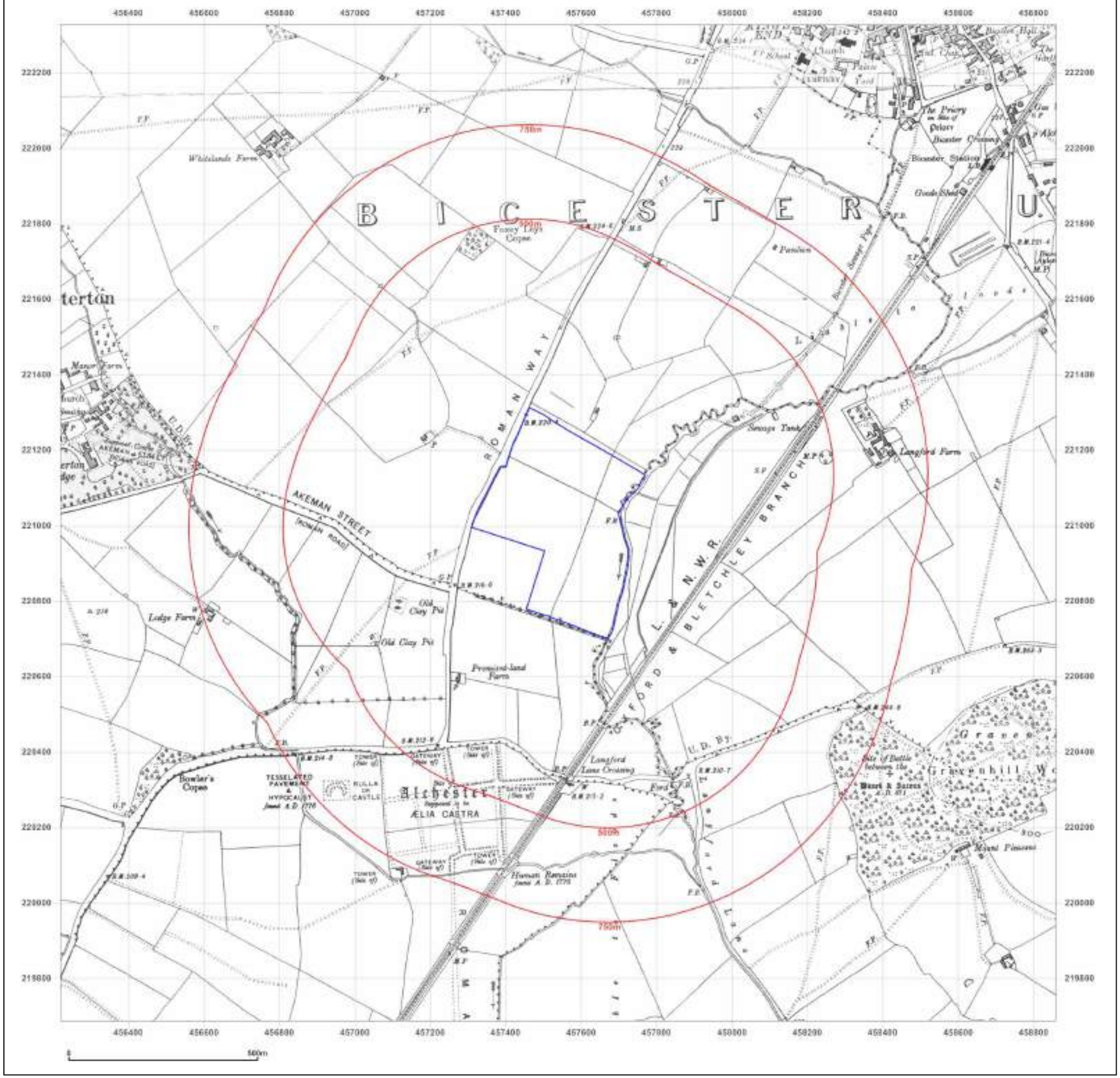

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Client Ref: EMS_482678_647813
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Grid Ref: 457539, 221007

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

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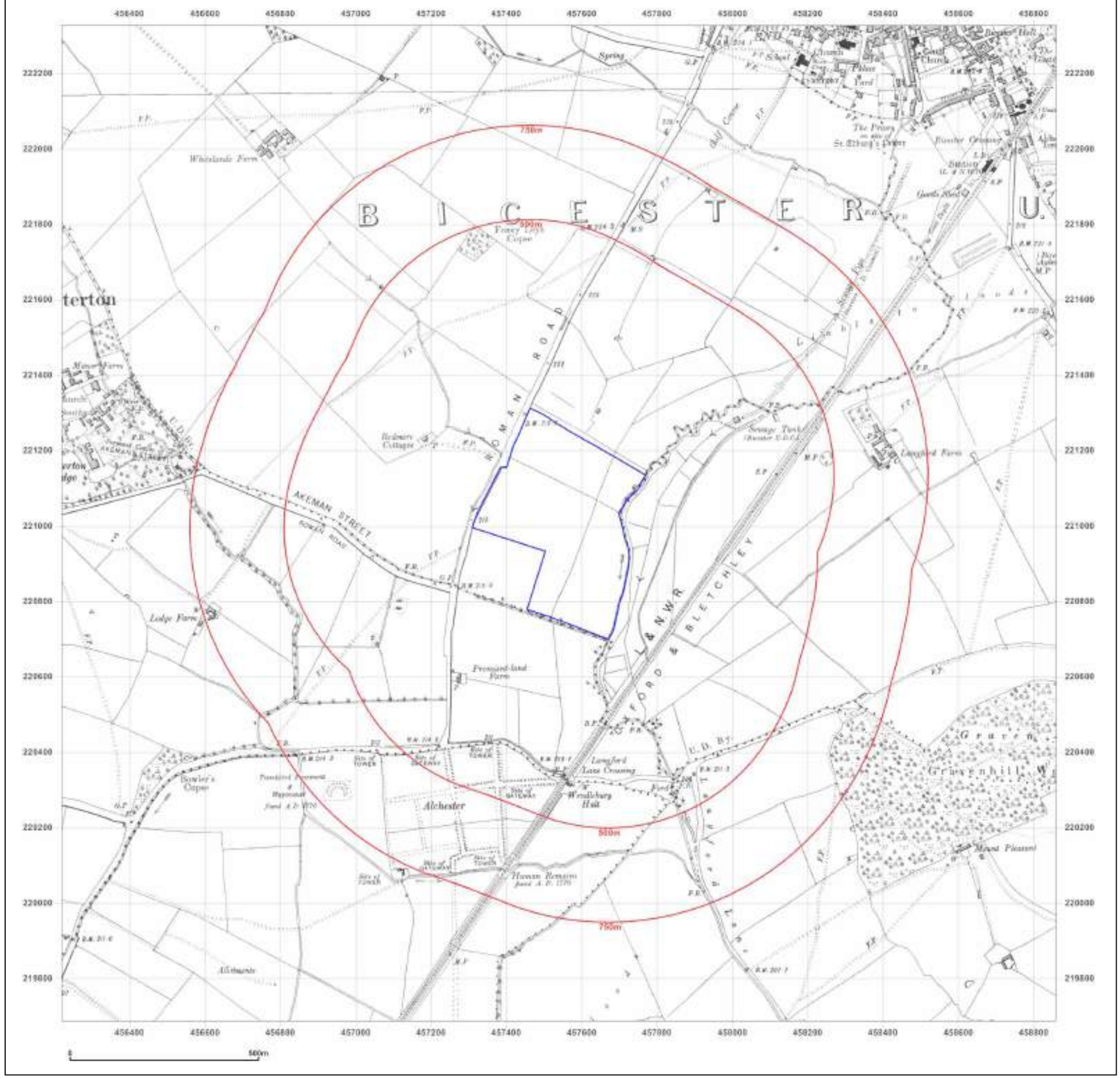

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Client Ref: EMS_482678_647813
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Grid Ref: 457539, 221007

Map Name: County Series

Map date: **1919-1920**

Scale: 1:10,560

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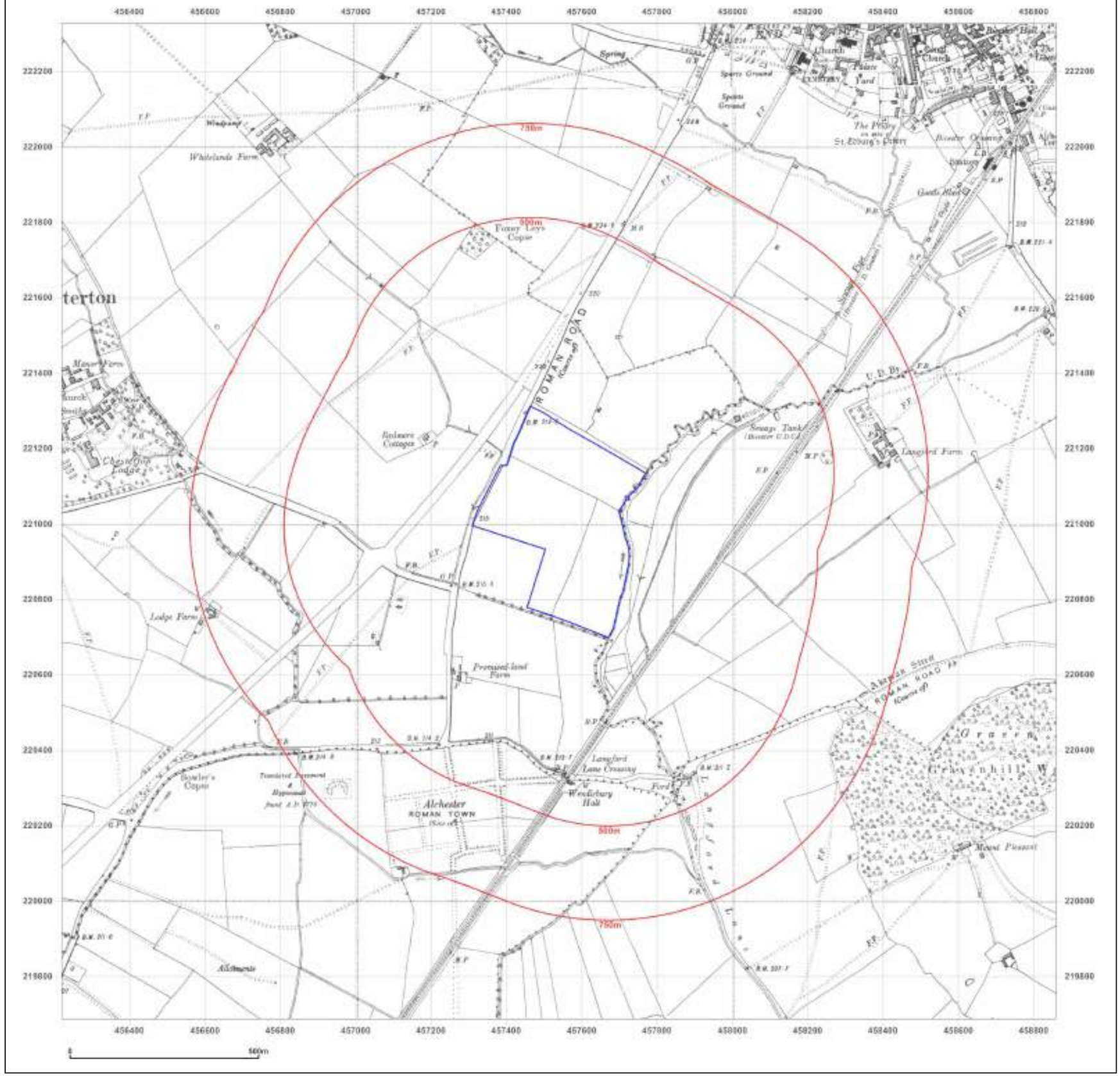

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Client Ref: EMS_482678_647813
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Map Name: County Series

Map date: **1950**

Scale: 1:10,560

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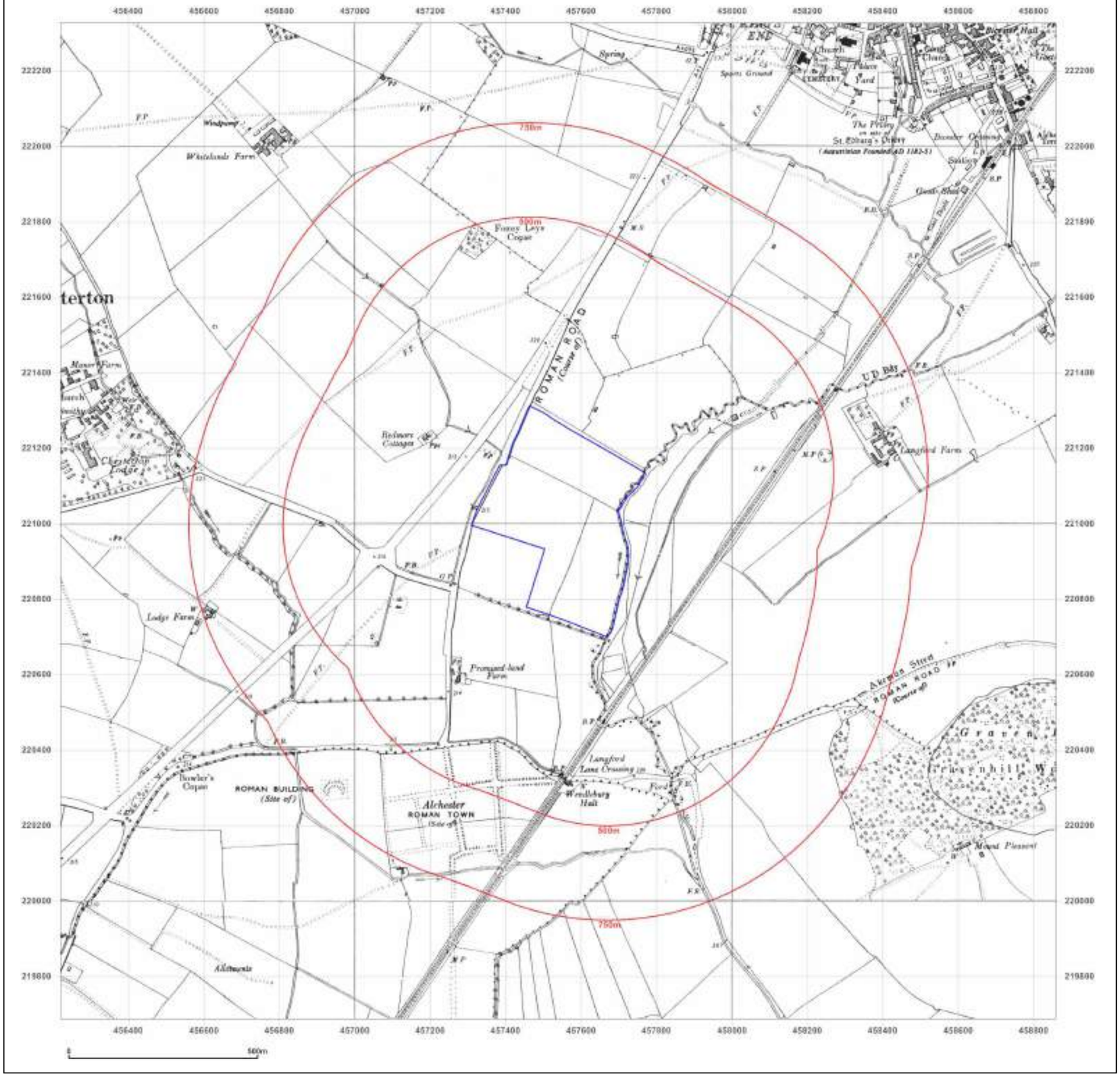

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: Provisional

Map date: **1955**

Scale: 1:10,560

Printed at: 1:10,560

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Revised 1954
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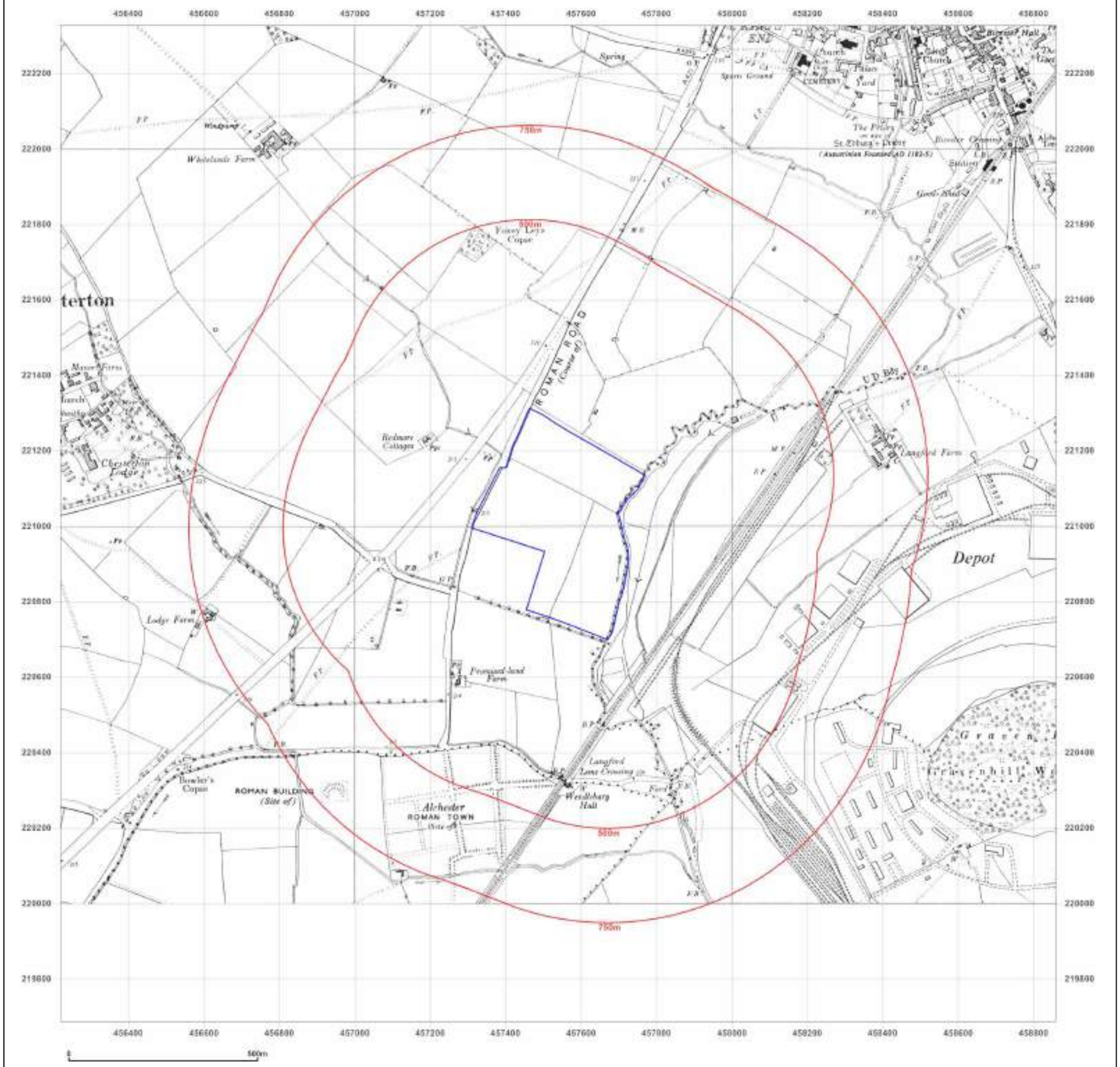

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Client Ref:	EMS_482678_647813
Report Ref:	EMS-482678_647813
Grid Ref:	457539, 221007

Map Name:	Provisional
Map date:	**1966**
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Printed at:	1:10,560

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Revised 1968
Edition N/A
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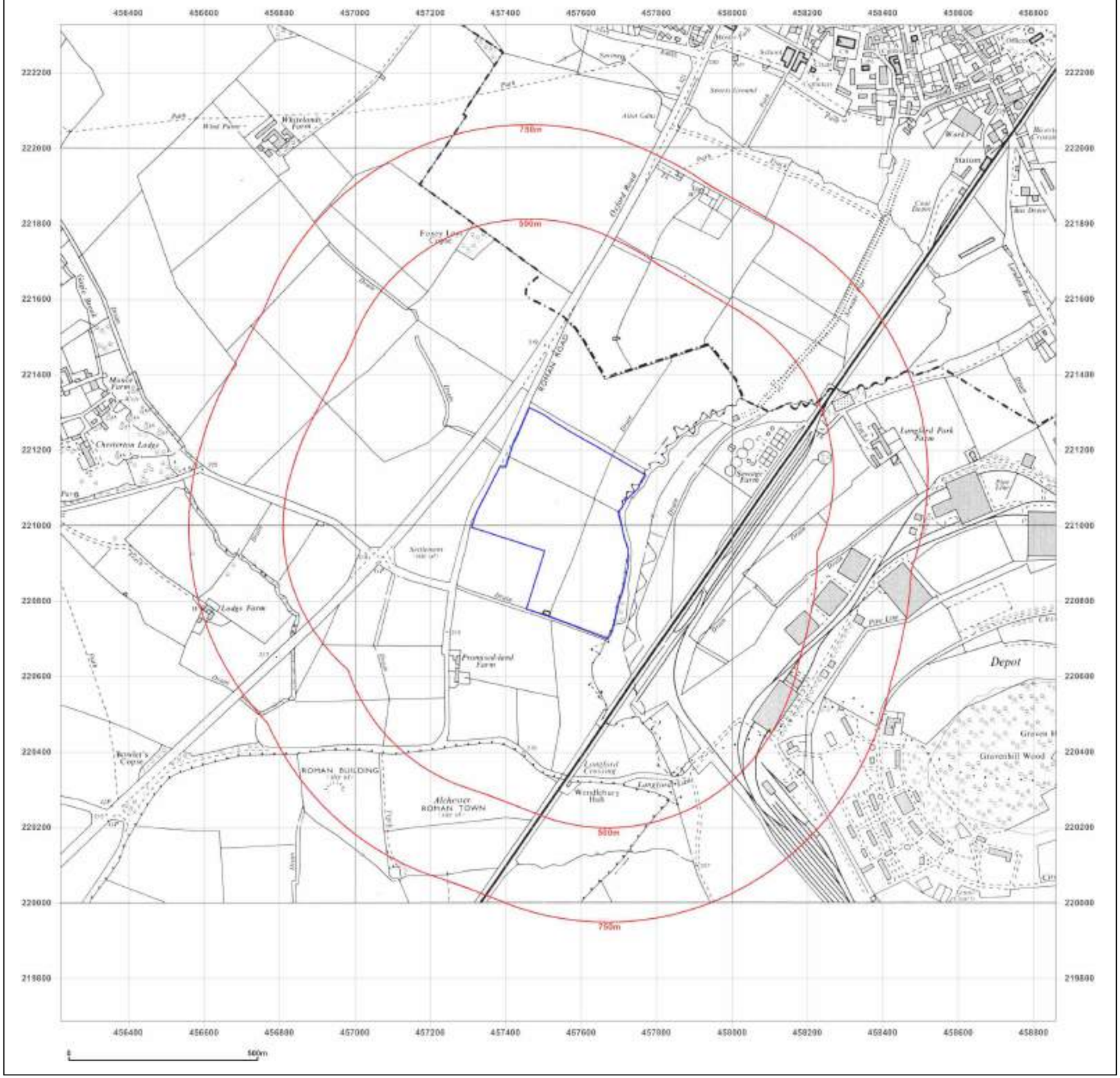

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: Provisional

Map date: **1970**

Scale: 1:10,560

Printed at: 1:10,560

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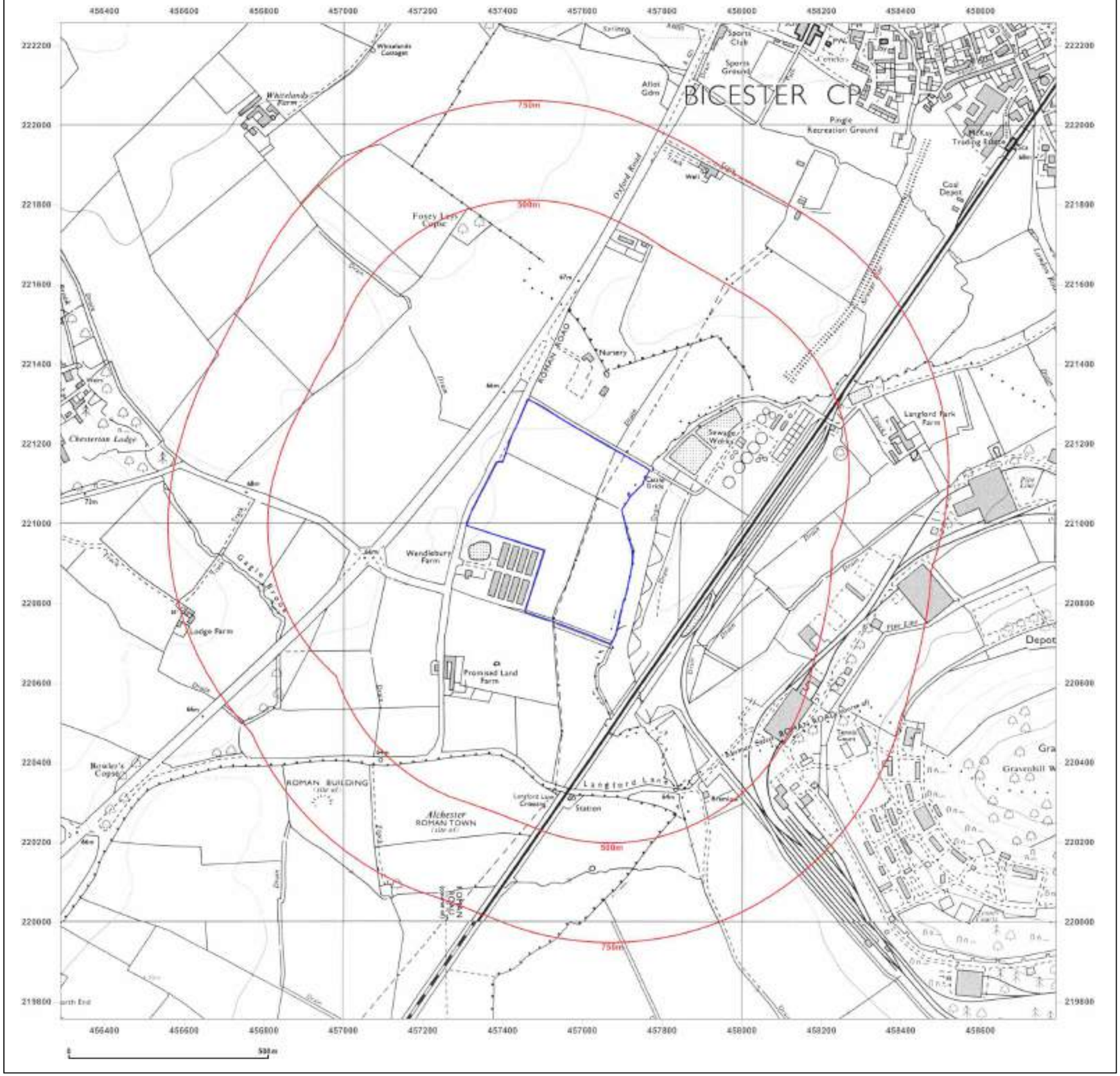

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Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: National Grid

Map date: **1980-1985**

Scale: 1:10,000

Printed at: 1:10,000

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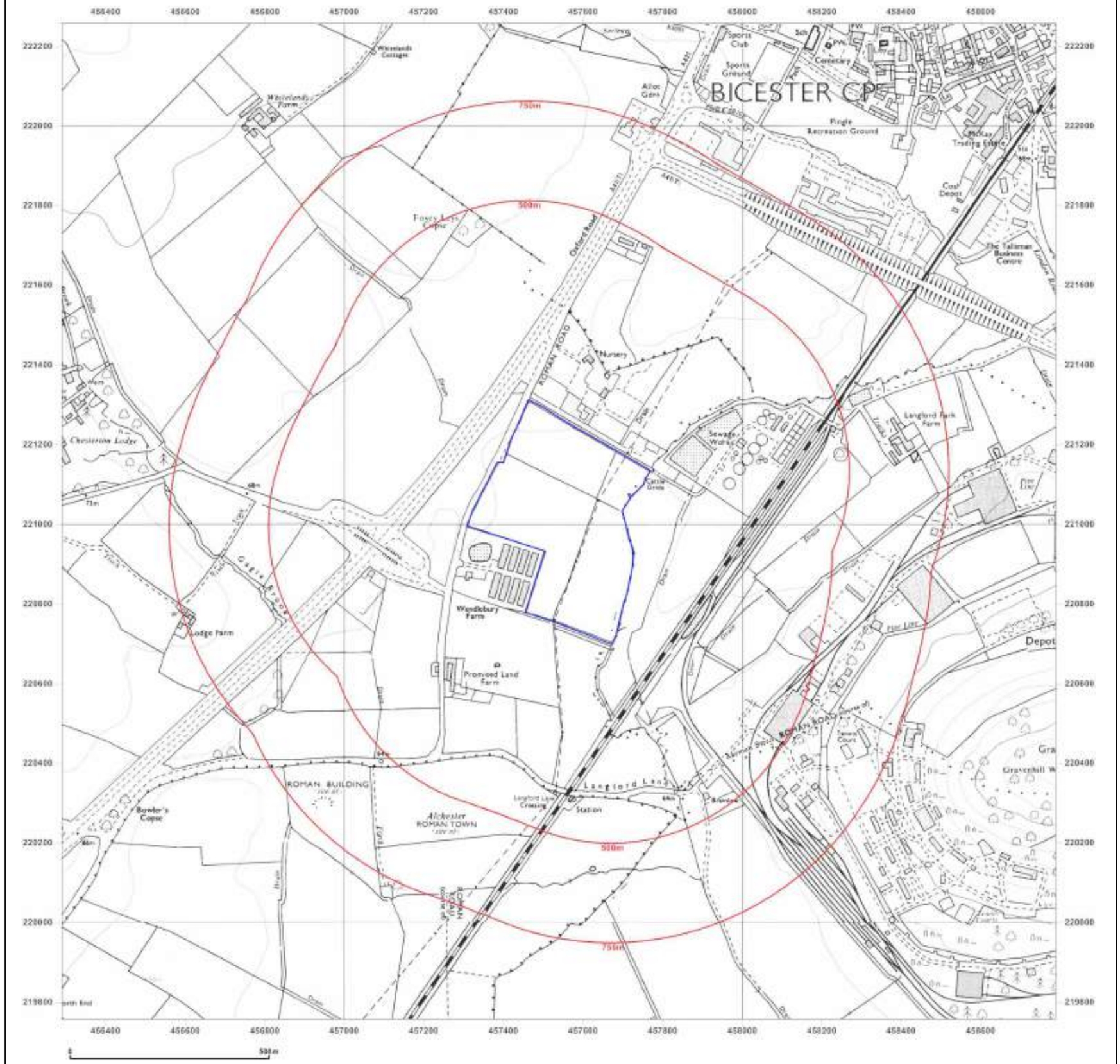

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Site Details:

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:10,000

Printed at: 1:10,000

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Revised 1995
Edition N/A
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Surveyed 1977
~~Revised 1992~~
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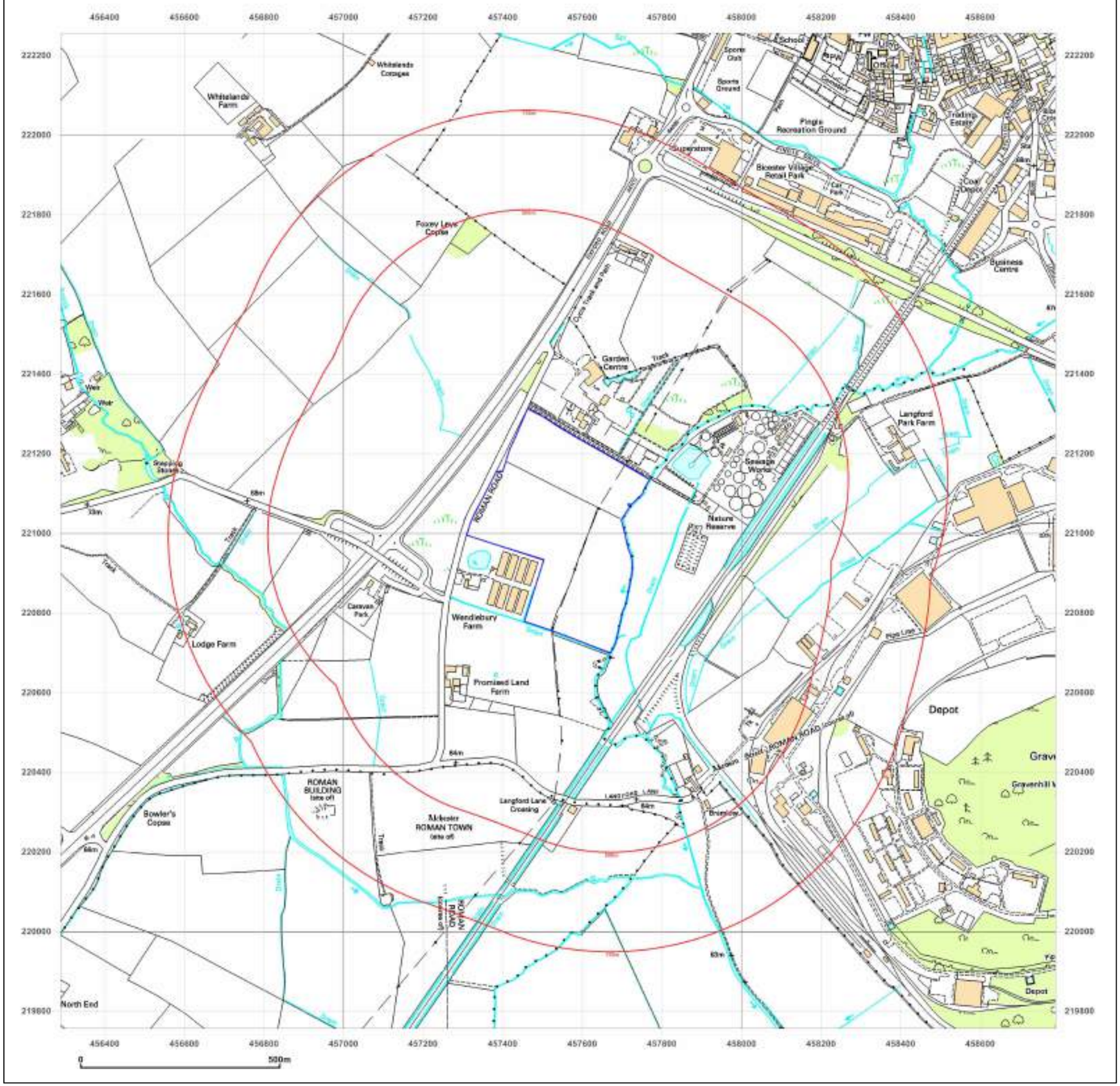

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Site Details:

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

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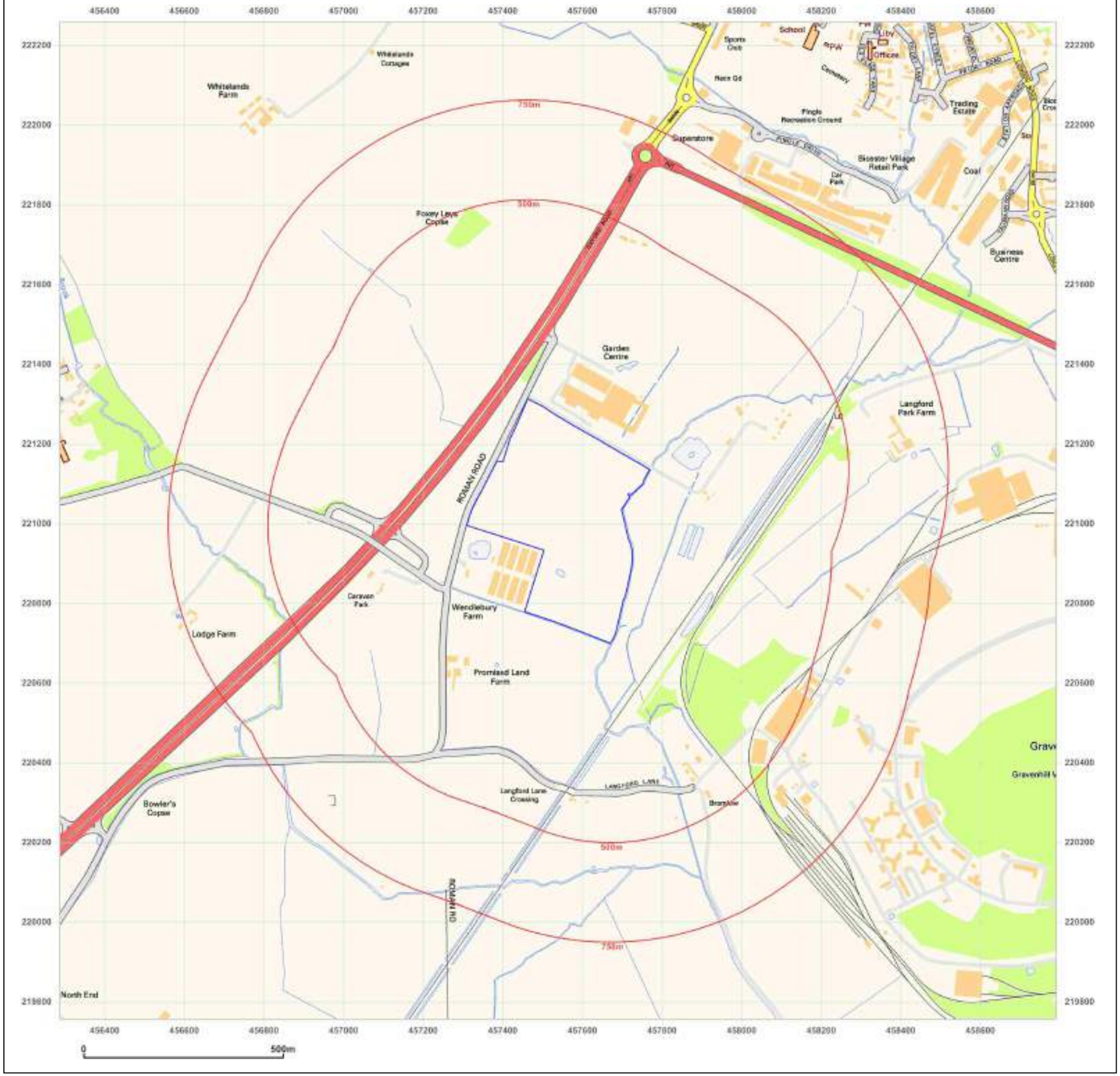

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

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

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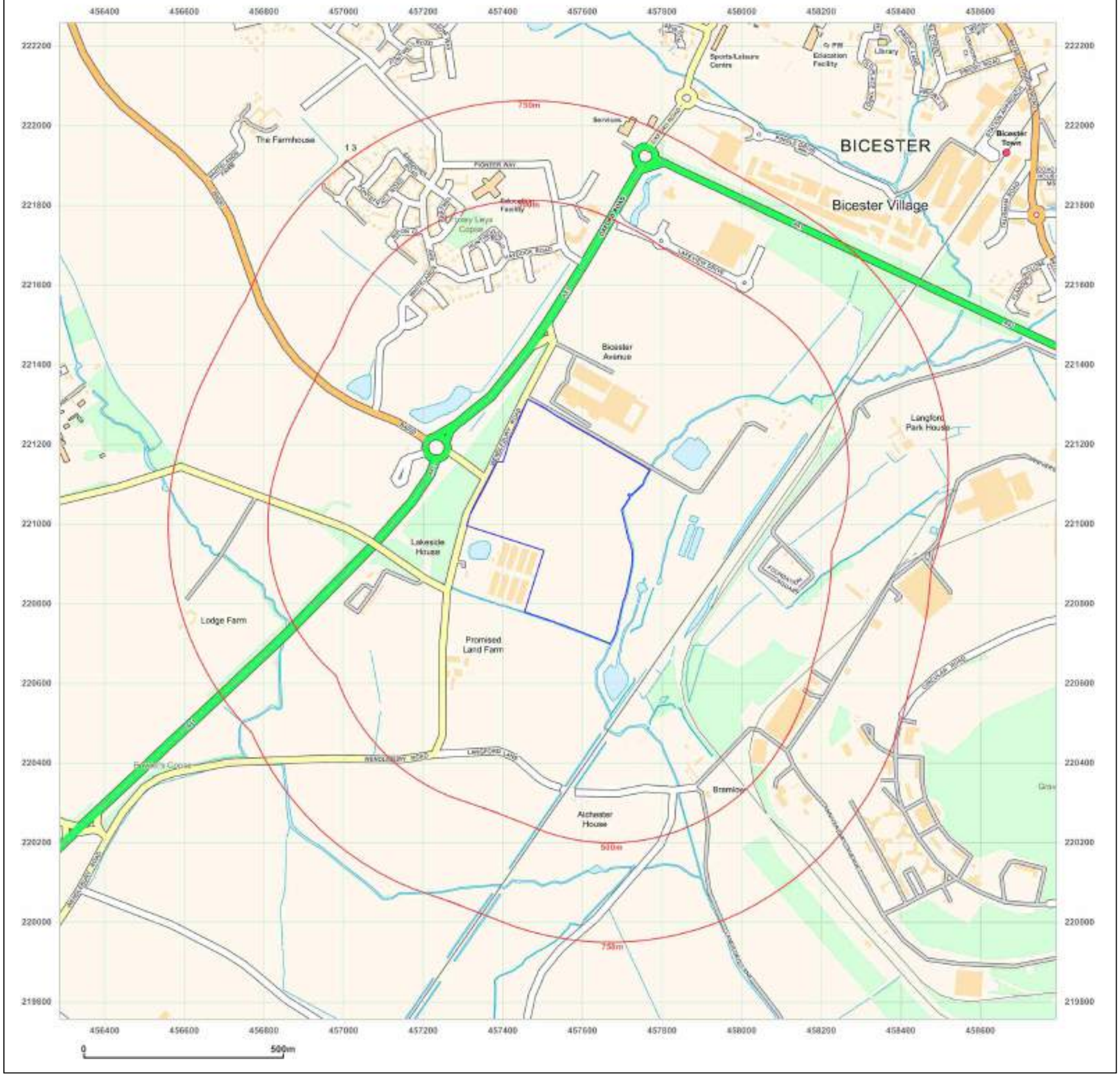

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813
Grid Ref: 457539, 221007

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2014

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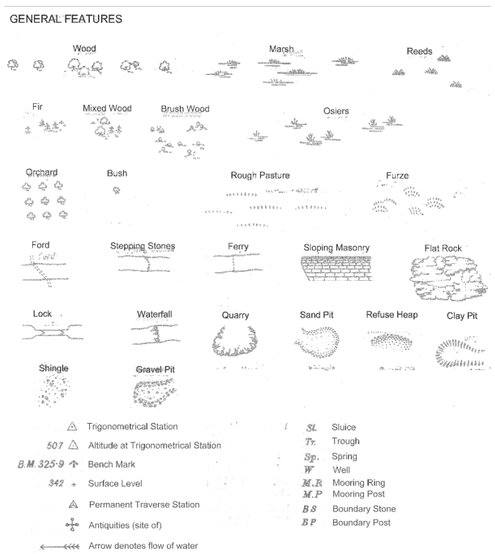
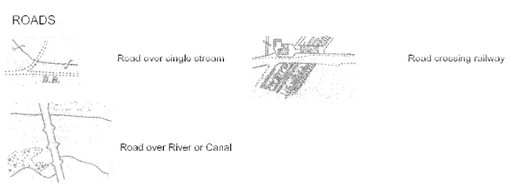
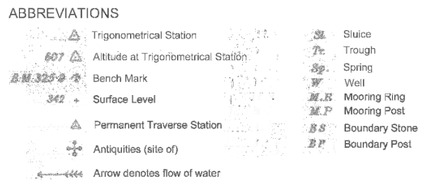
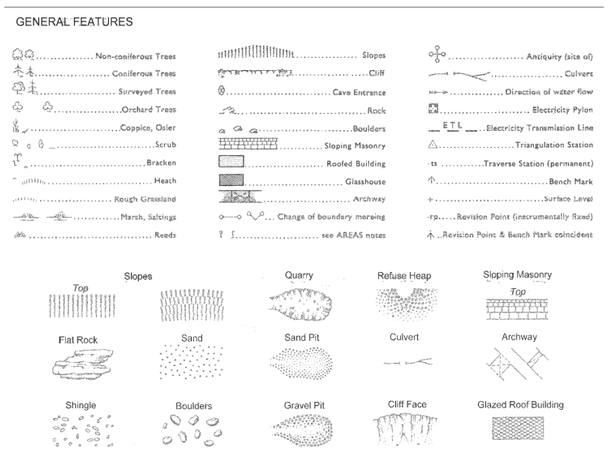
County Series 1:2,500 scale

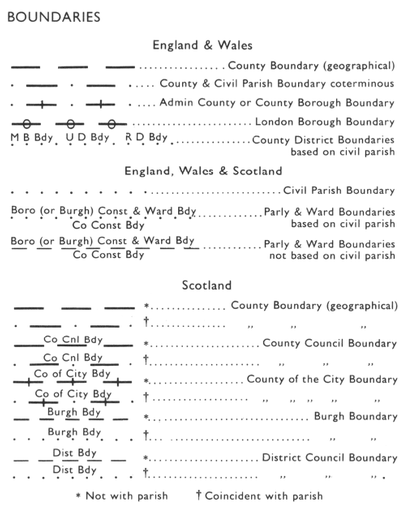


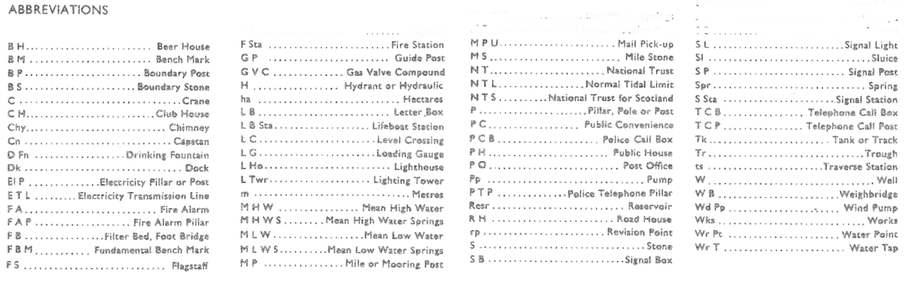




National Grid 1:2,500 / 1:1,250 scale







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Historical Map Pack Legend

County Series

1:1,250 scale

~

County Series & National Grid

1:2,500 scale

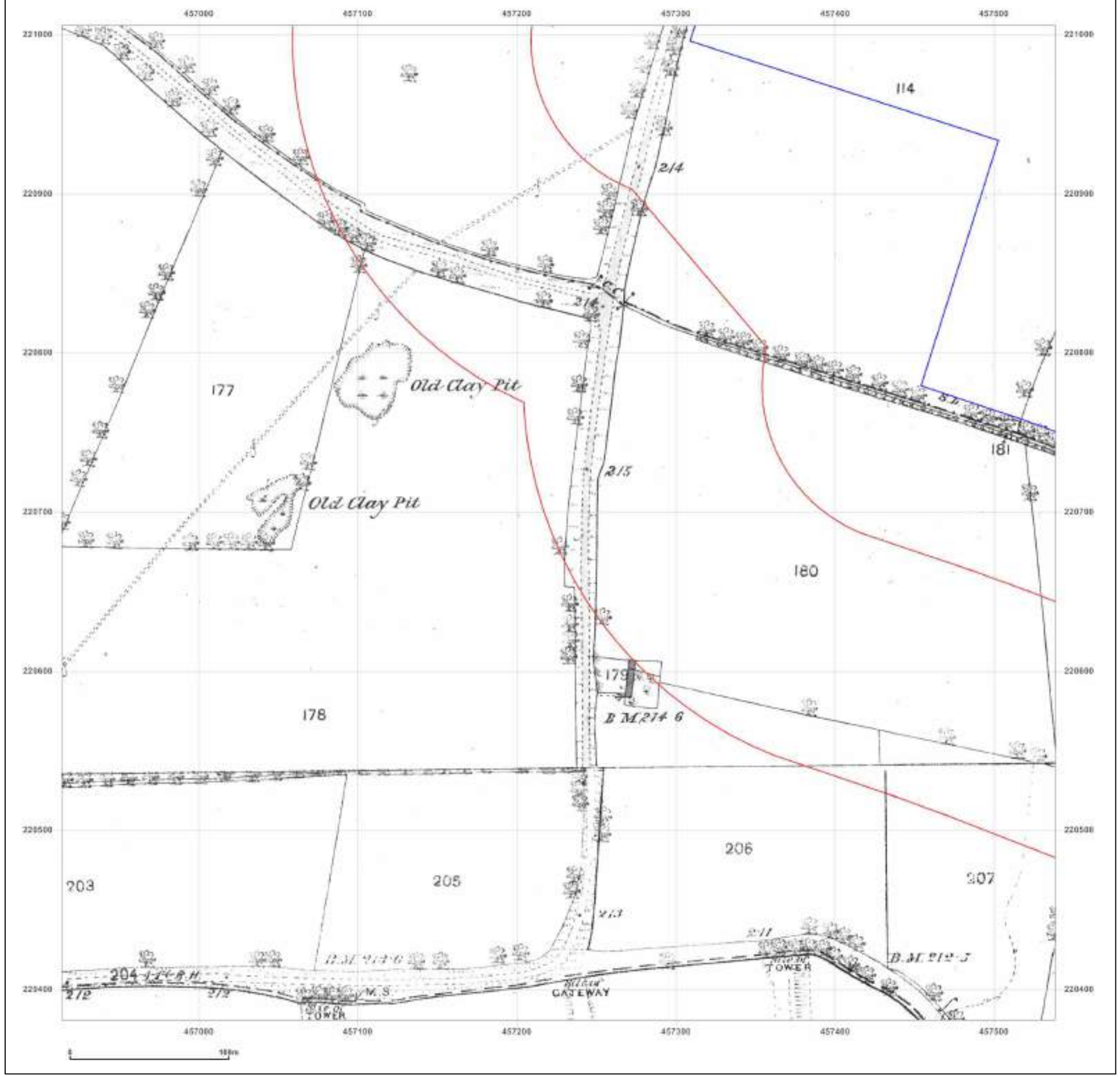
Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

If you have a query regarding any of the maps provided within this map pack, please contact GroundSure's technical helpline. We will endeavour to answer any queries you may have.

Technical Helpline:

Tel 08444159000

groundsureinsight@groundsure.com
www.groundsure.com



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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: County Series

Map date: **1875-1877**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised N/A
Edition N/A
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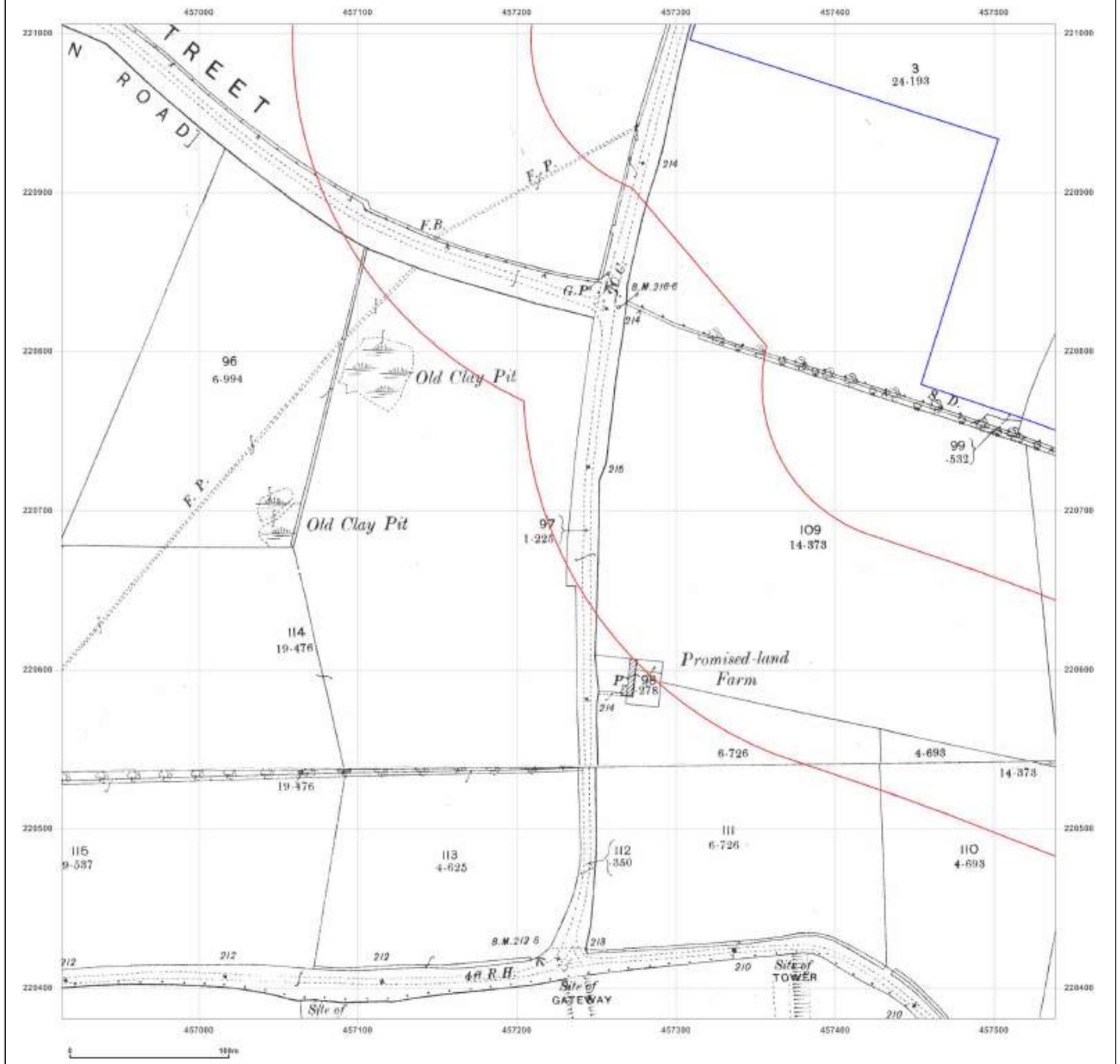

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: County Series

Map date: **1899-1900**

Scale: 1:2,500

Printed at: 1:2,500

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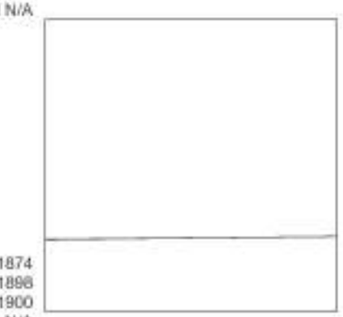
Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1874
Revised 1898
Edition 1900
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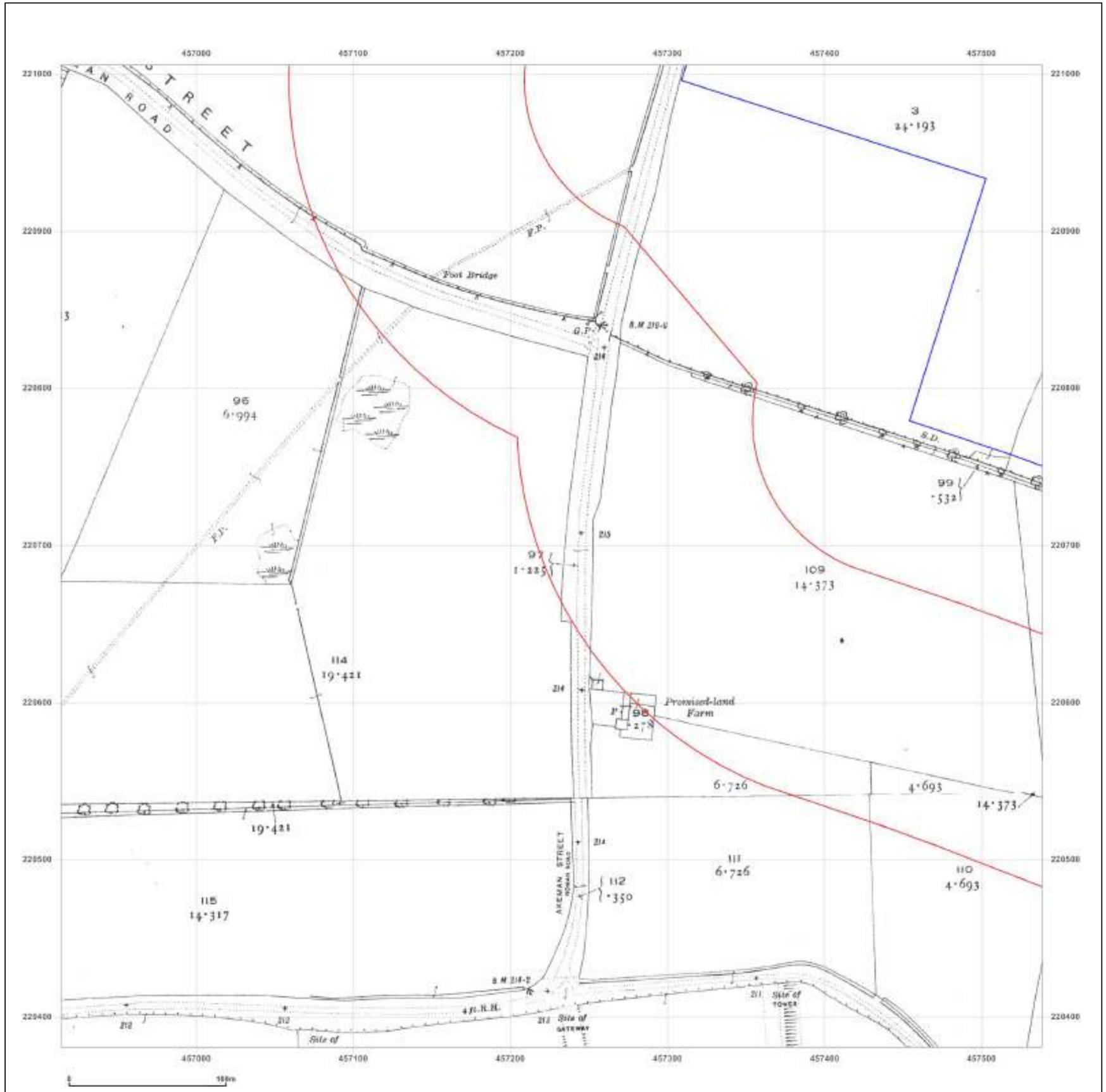

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: County Series
Map date: **1922**
Scale: 1:2,500
Printed at: 1:2,500

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

Surveyed 1922
Revised 1922
Edition N/A
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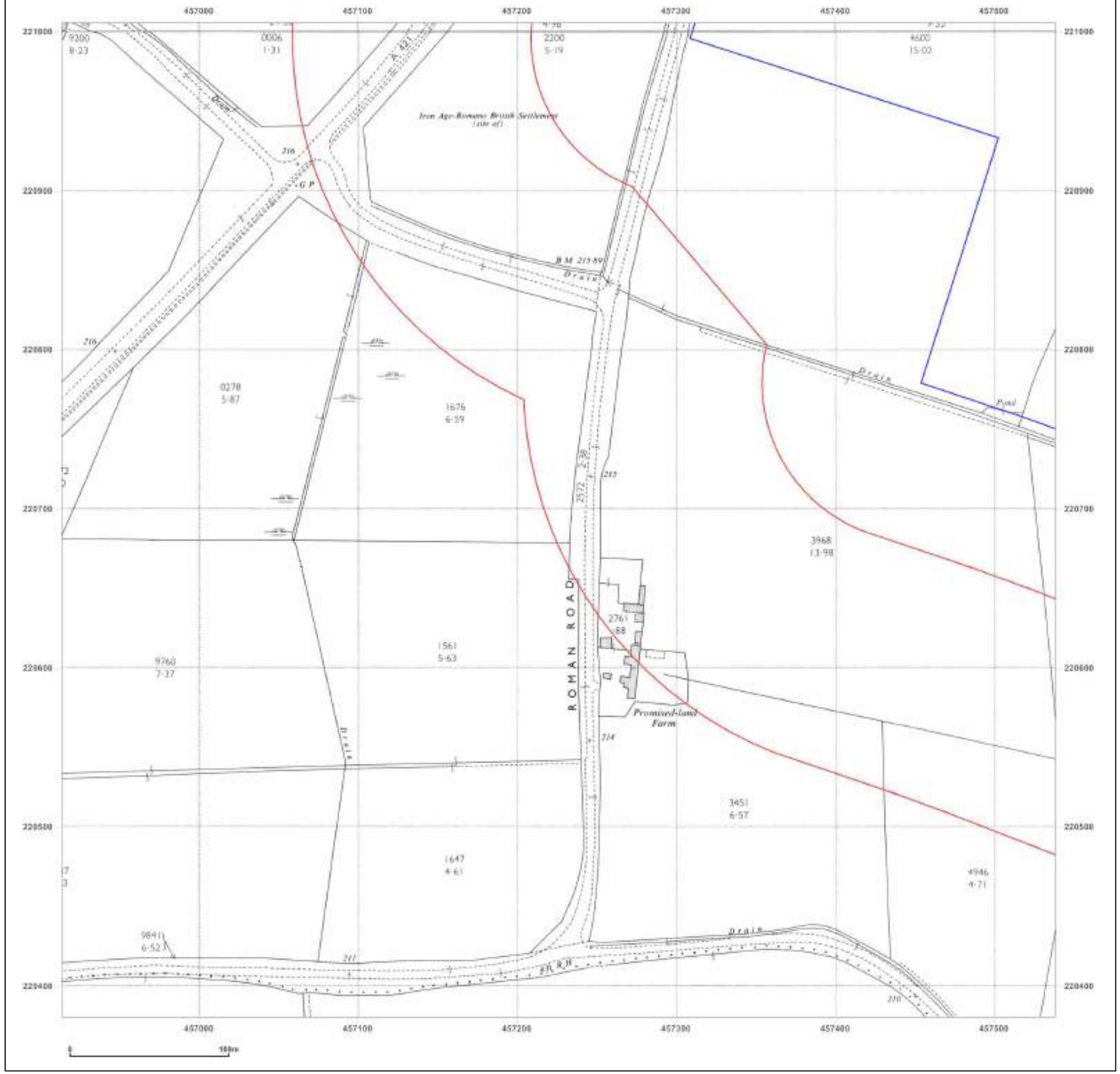

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

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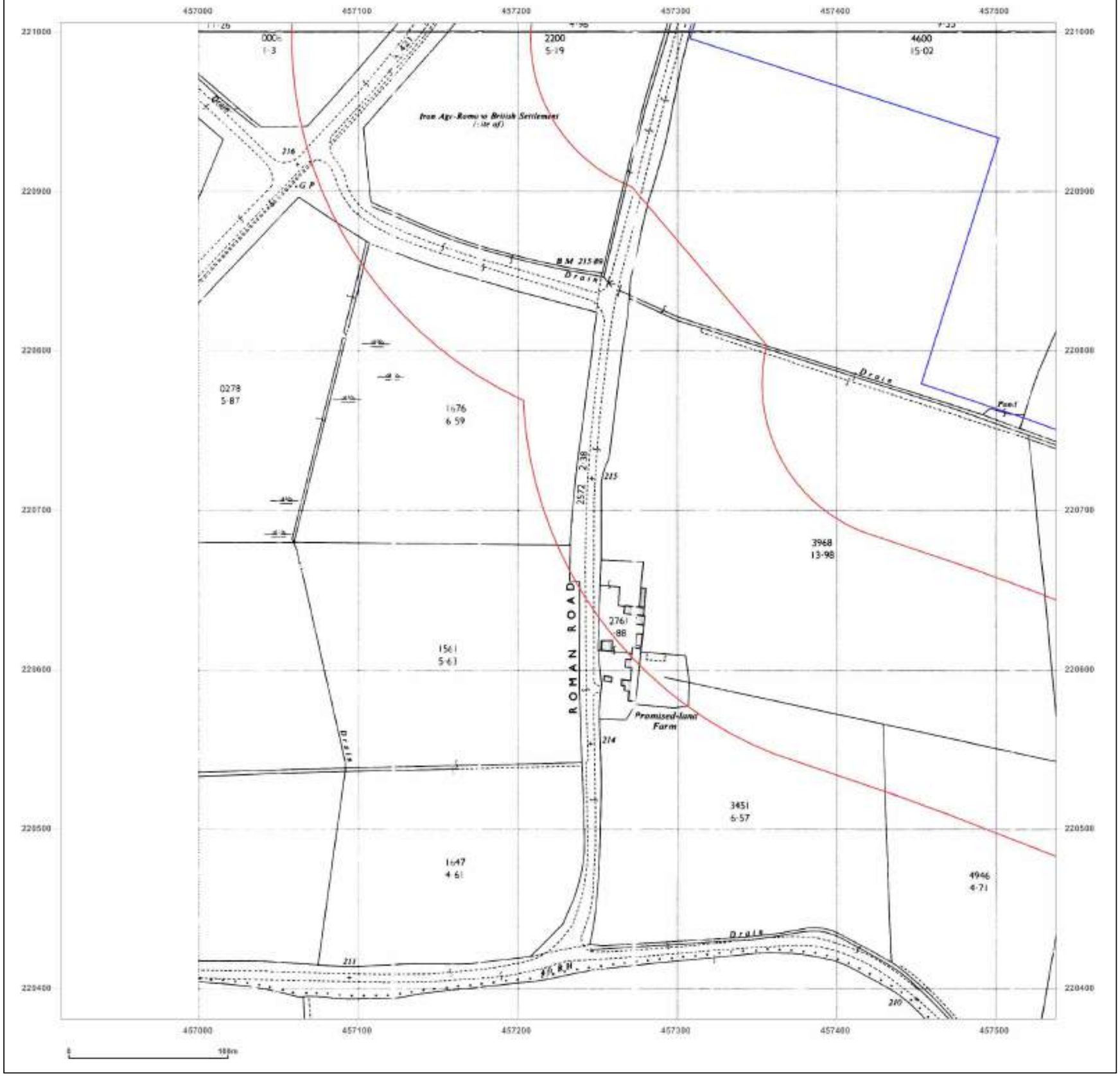

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

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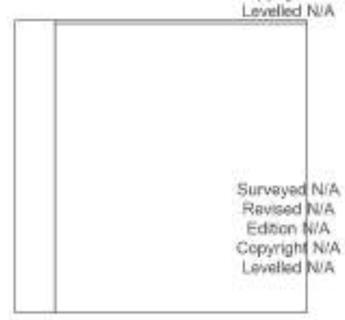
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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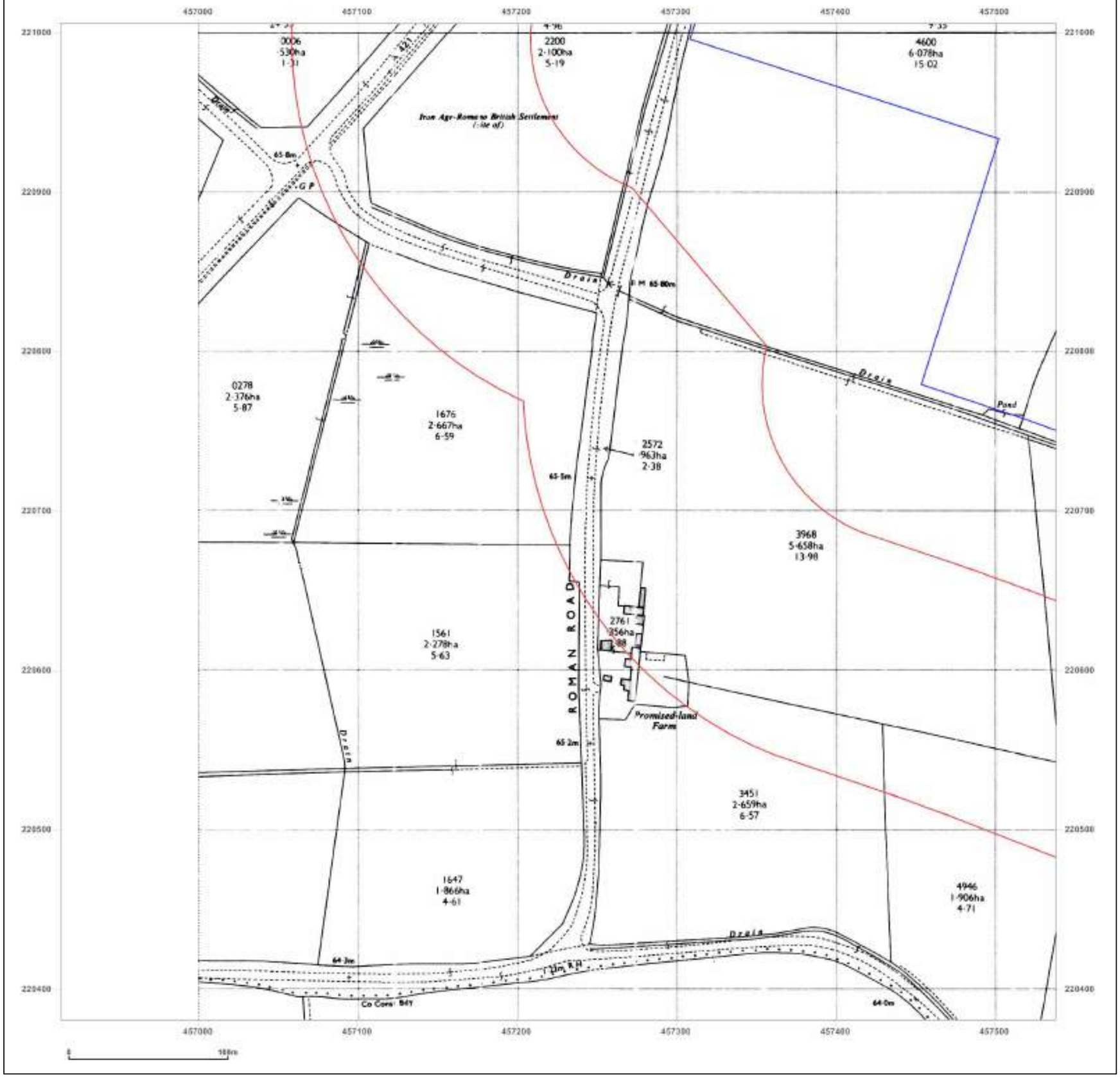

Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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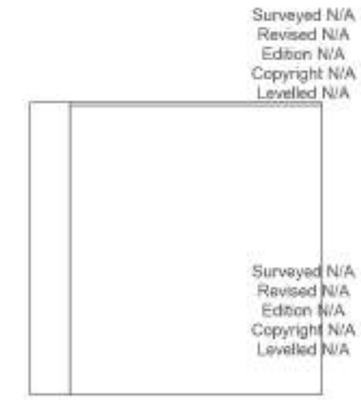

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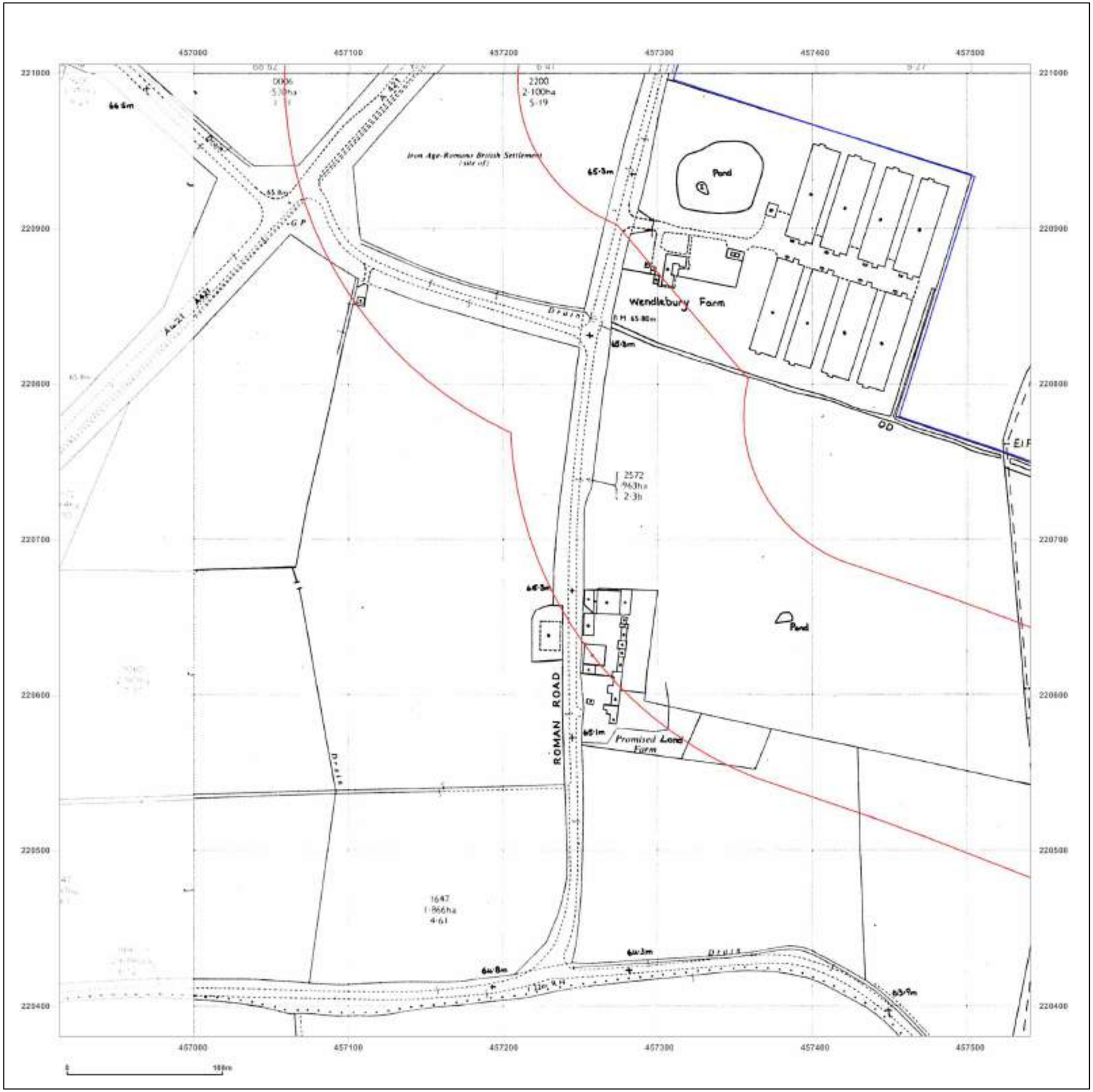

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid
Map date: **1983-1986**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1983
Revised 1983
Edition N/A
Copyright 1984
Levelled 1971

Surveyed 1972
Revised 1985
Edition N/A
Copyright 1985
Levelled 1972

Surveyed 1971
Revised 1986
Edition N/A
Copyright 1986
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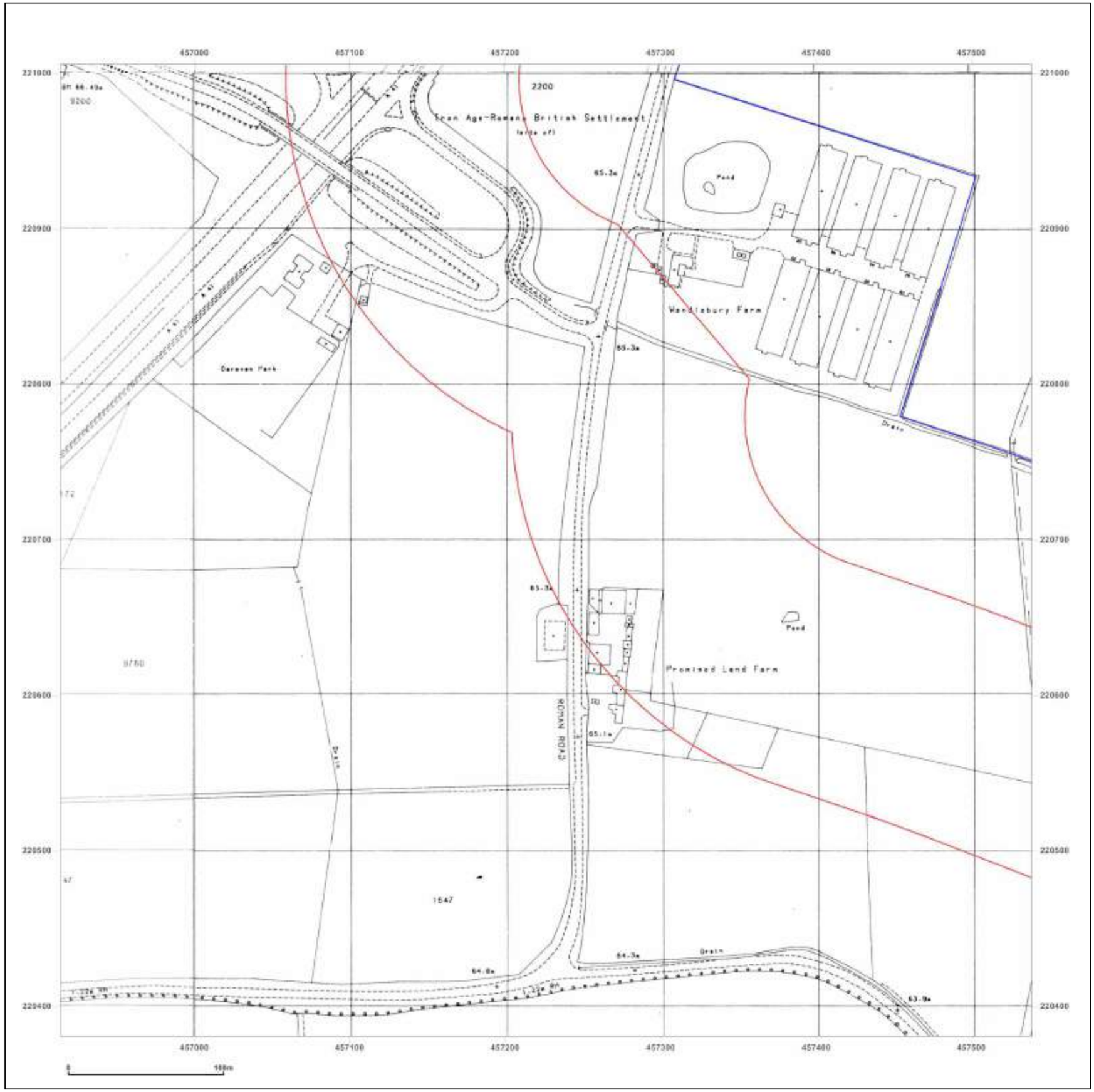

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

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

Surveyed 1993
Revised 1993
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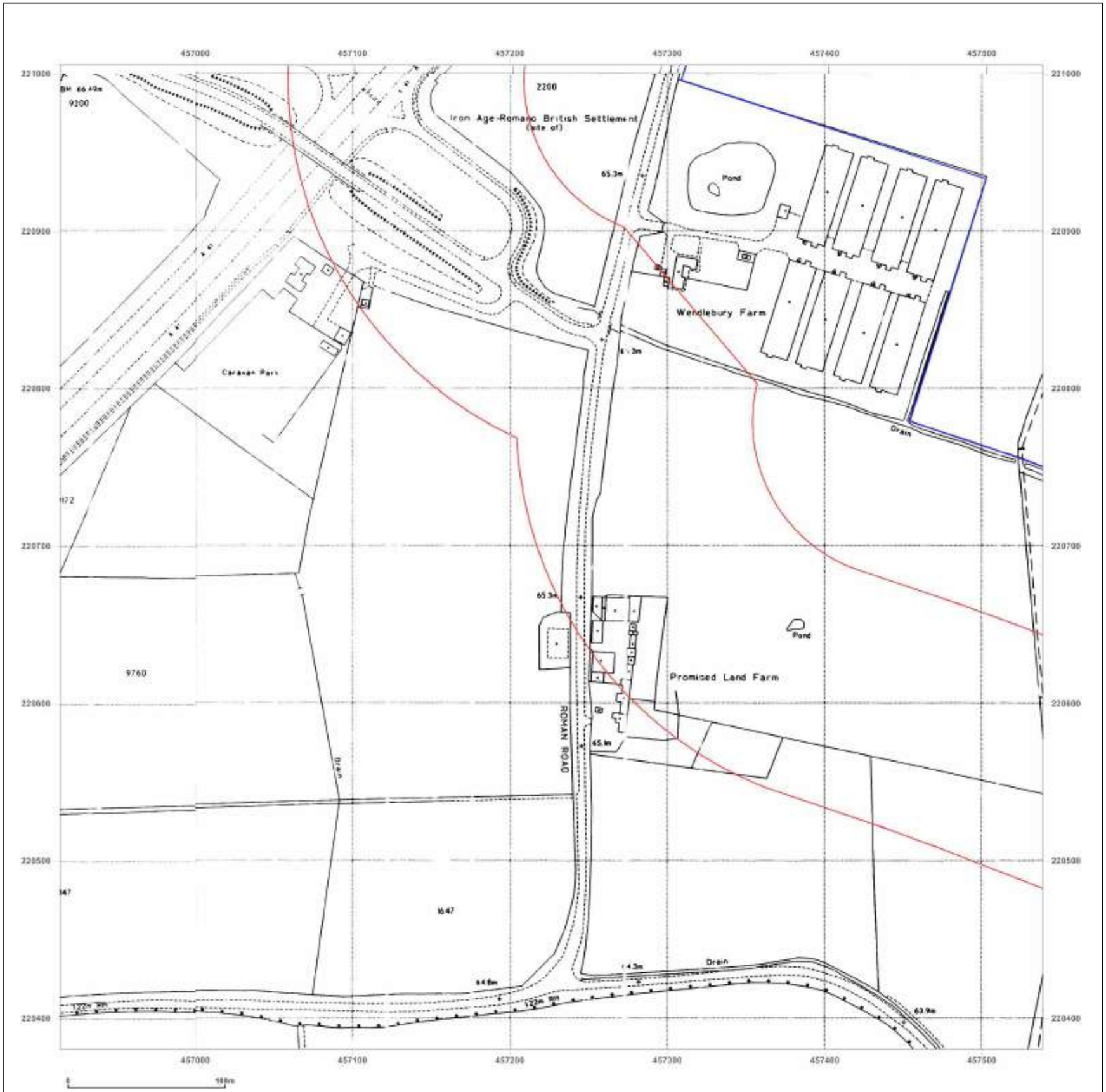

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Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_1
Grid Ref: 457226, 220693

Map Name: National Grid
Map date: **1993-1994**
Scale: 1:2,500
Printed at: 1:2,500

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

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

Surveyed N/A
Revised N/A
Edition N/A
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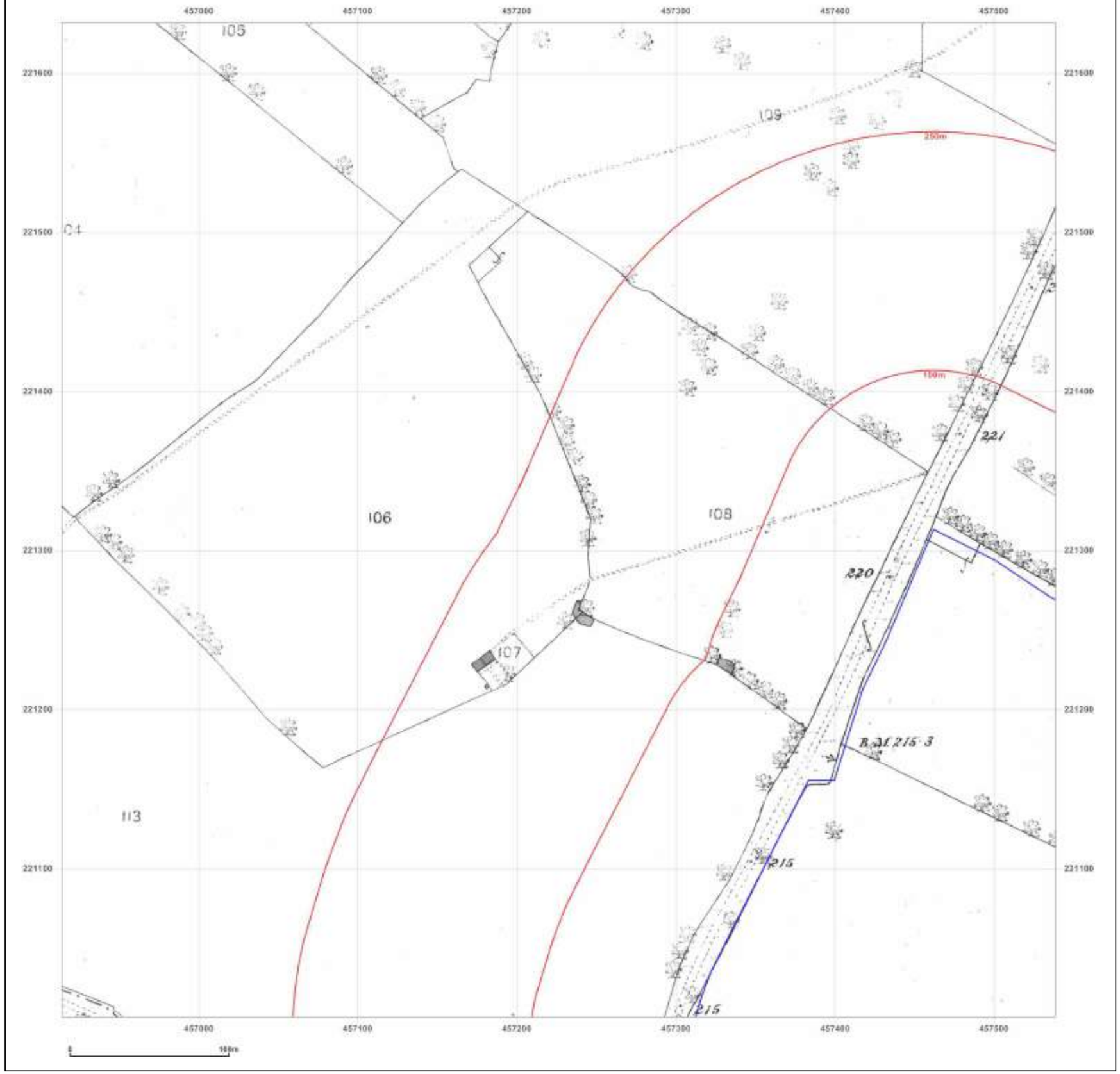

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The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: County Series

Map date: **1877**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

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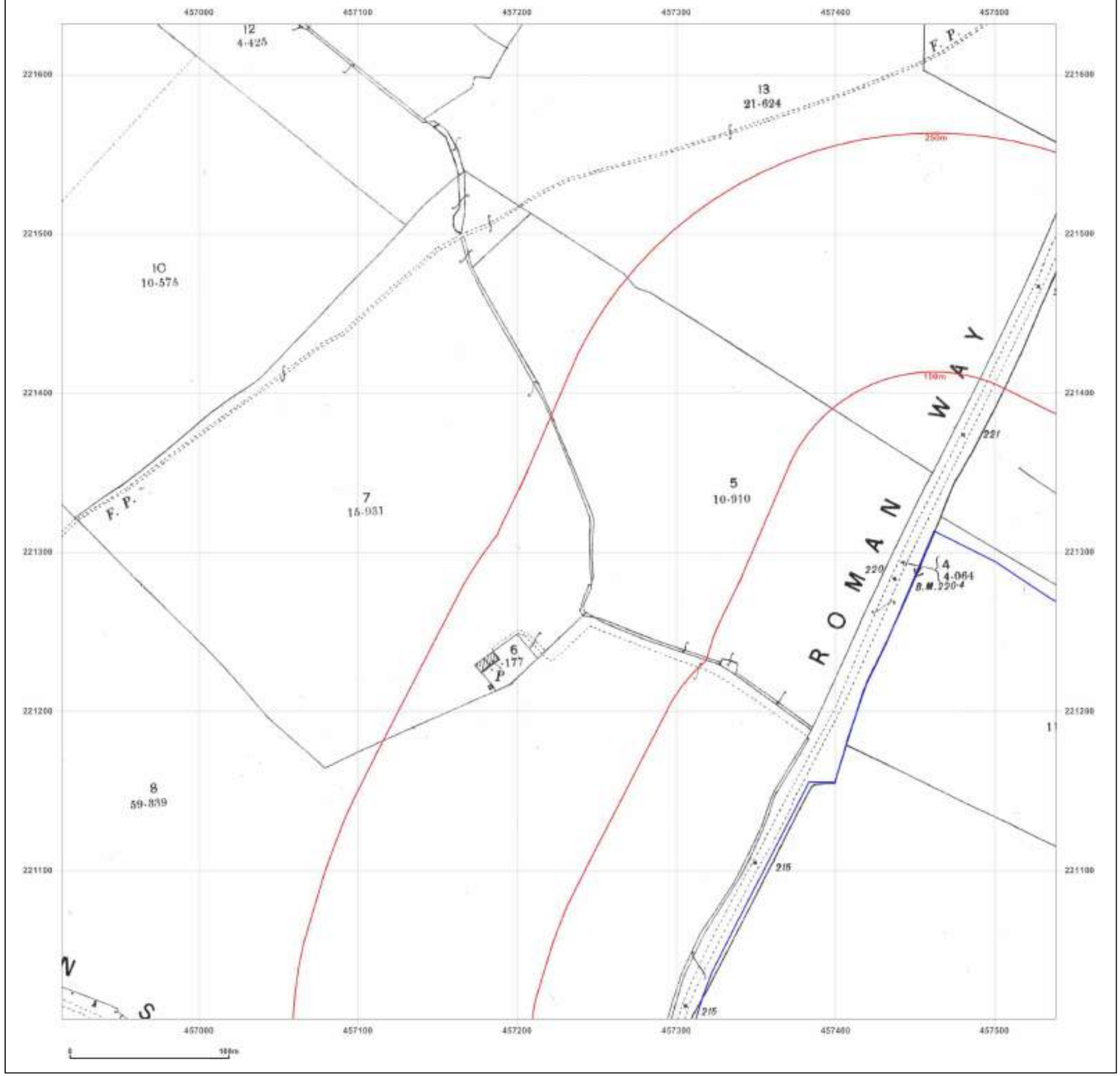

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: County Series
Map date: **1899**
Scale: 1:2,500
Printed at: 1:2,500

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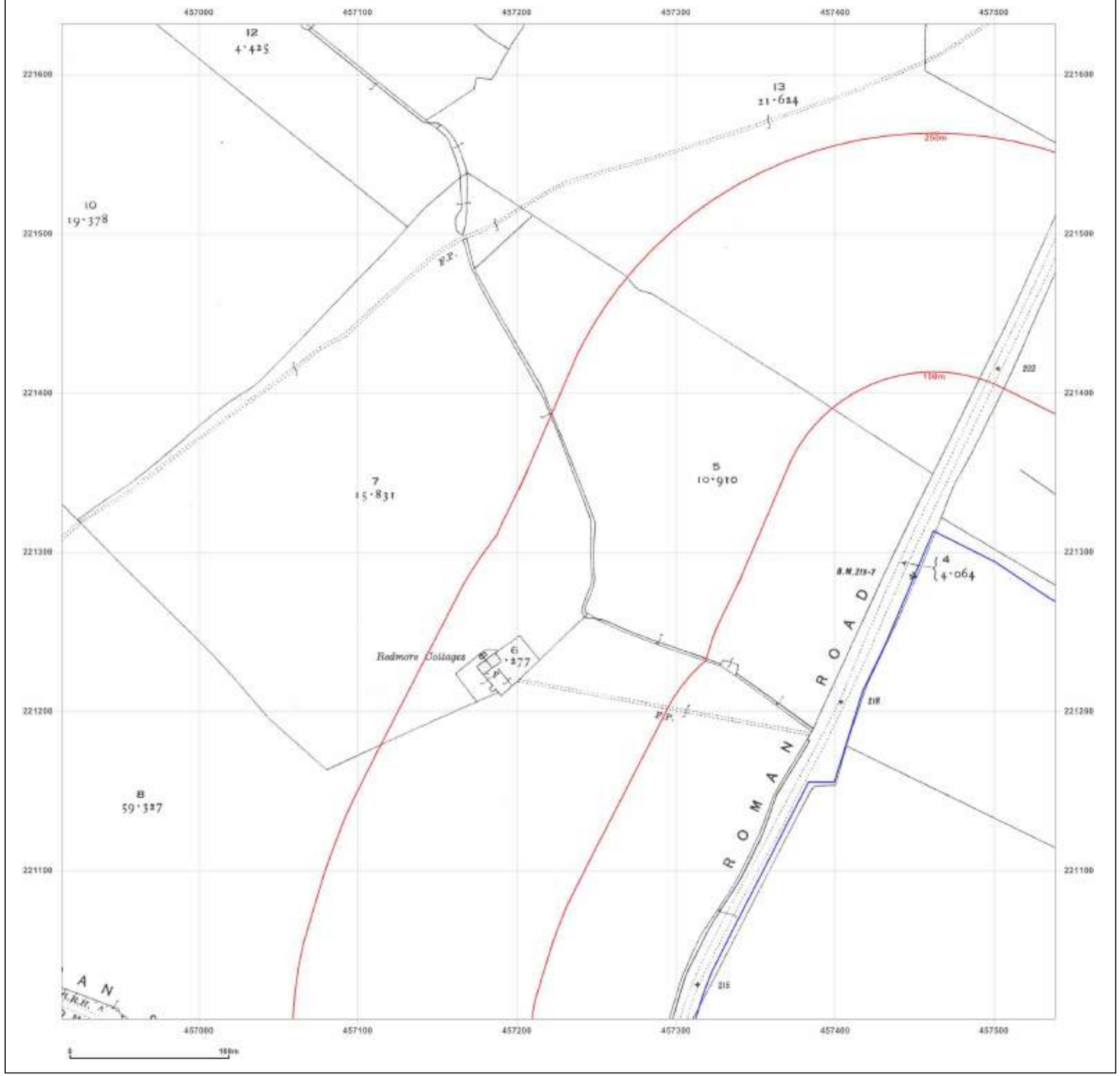

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: County Series

Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

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

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

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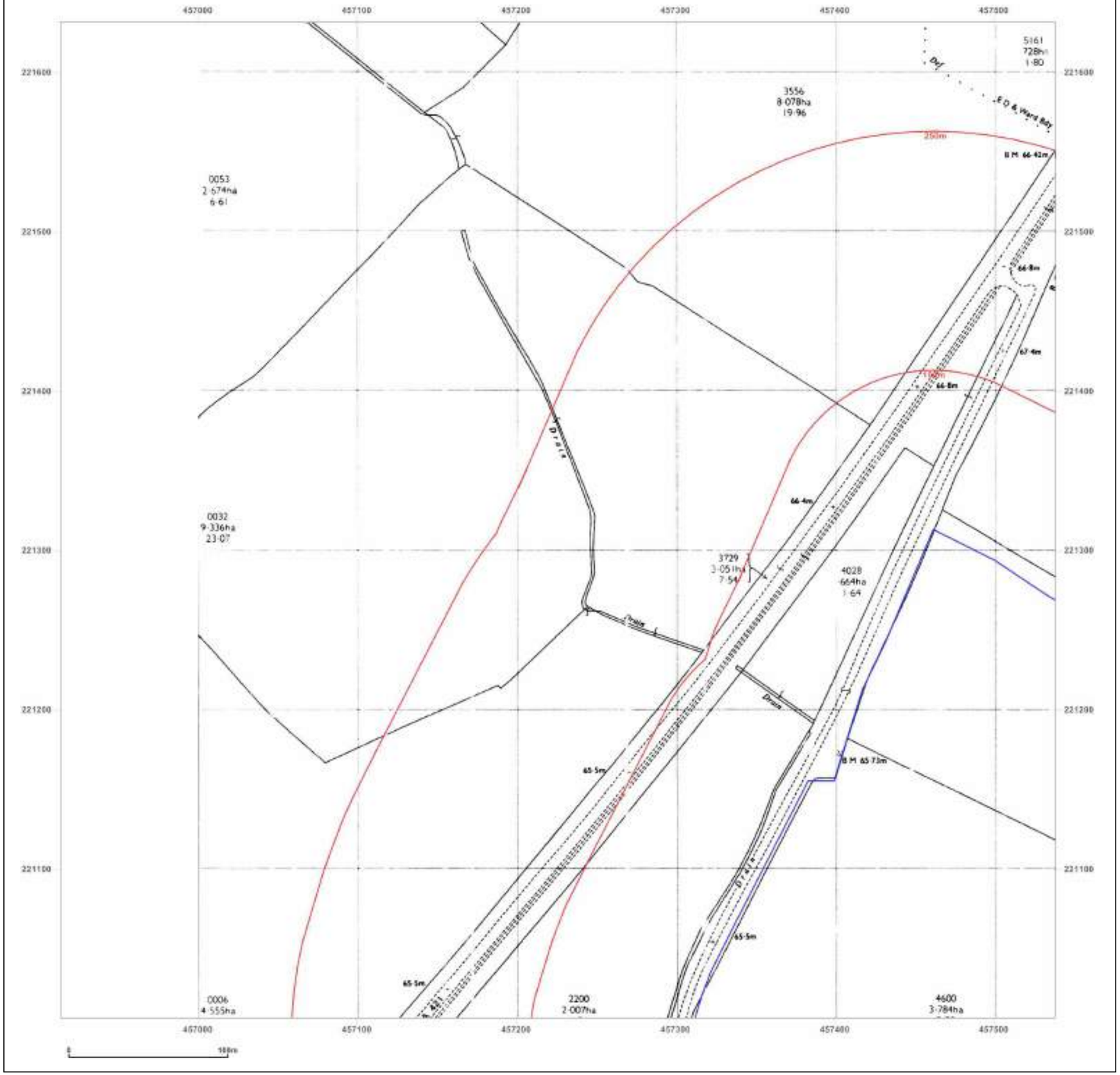

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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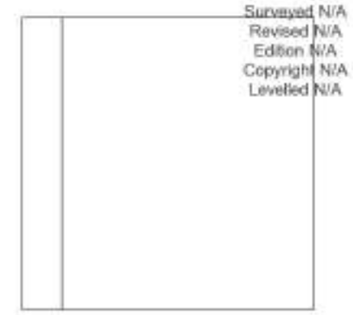

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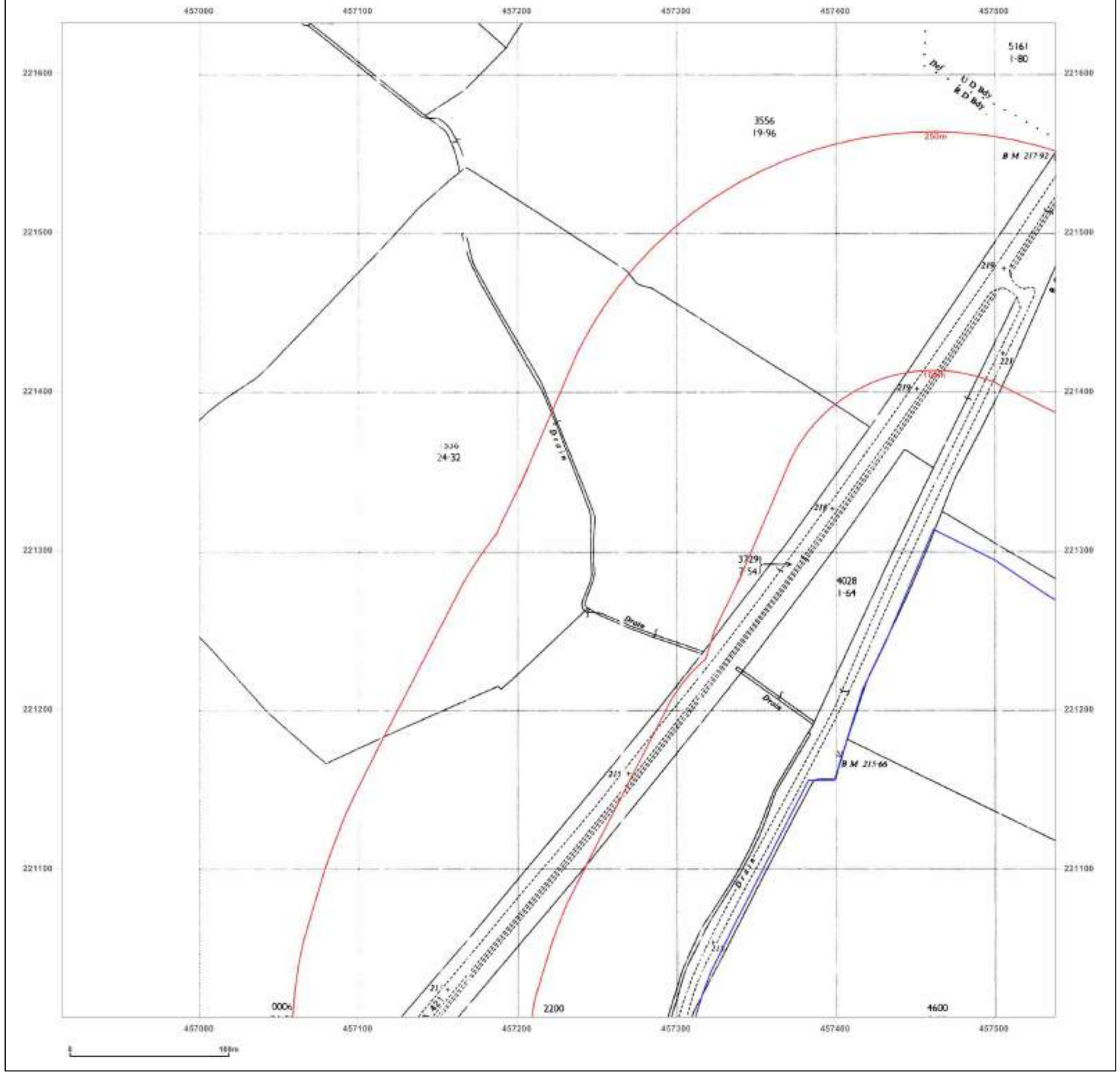

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

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

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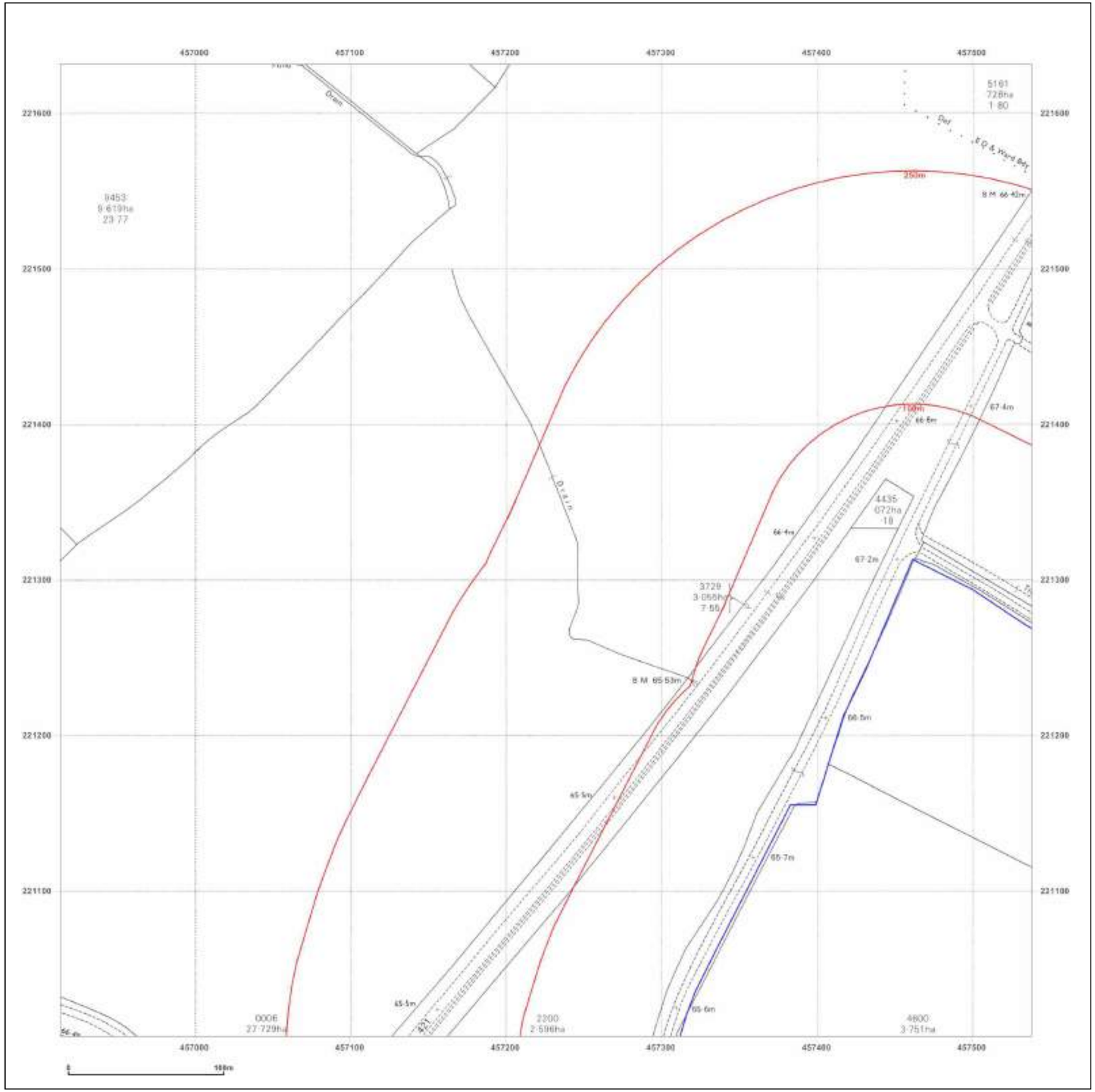

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1983**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1983
Revised 1983
Edition N/A
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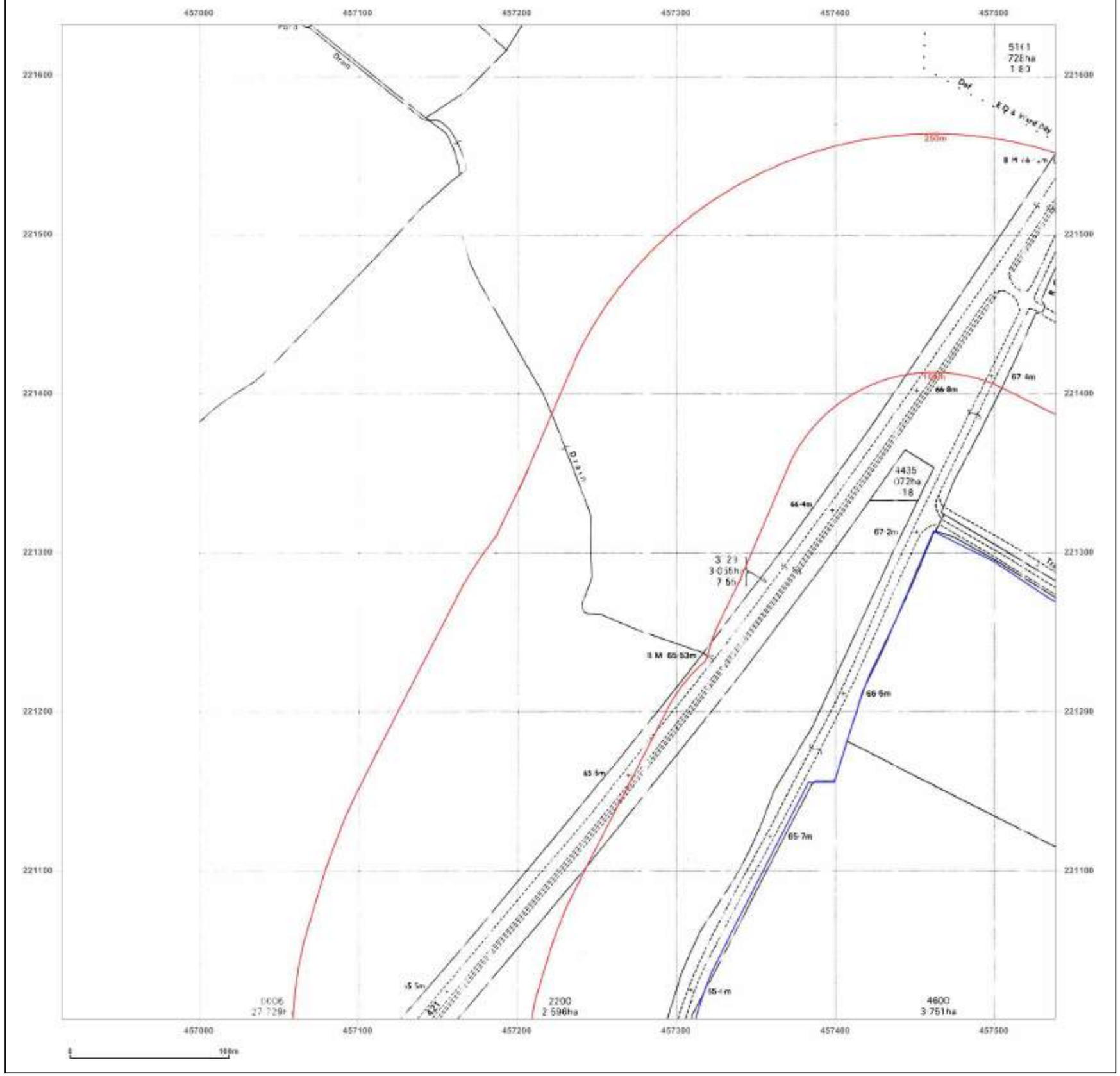

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1984**

Scale: 1:2,500

Printed at: 1:2,500

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

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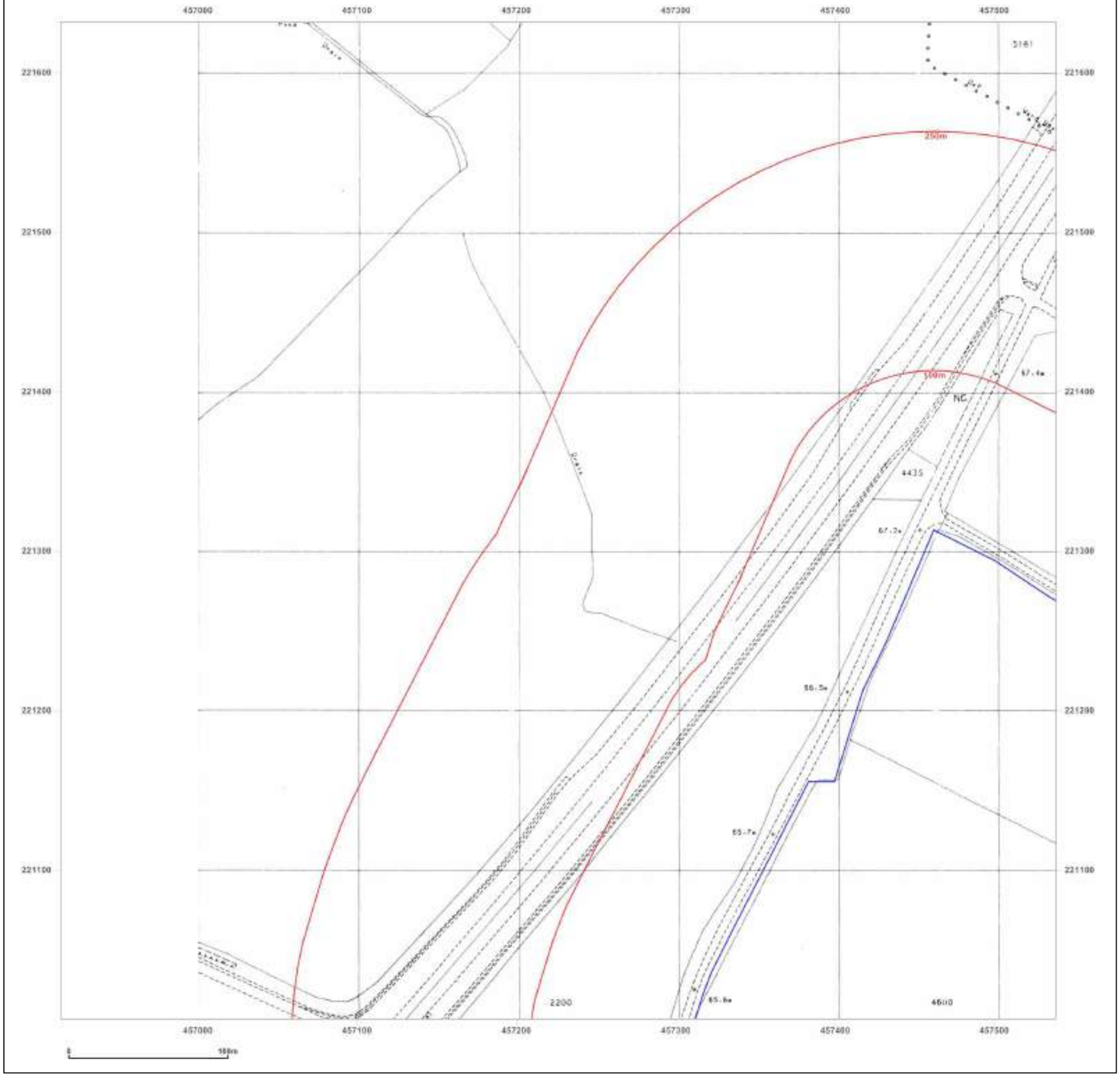

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

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

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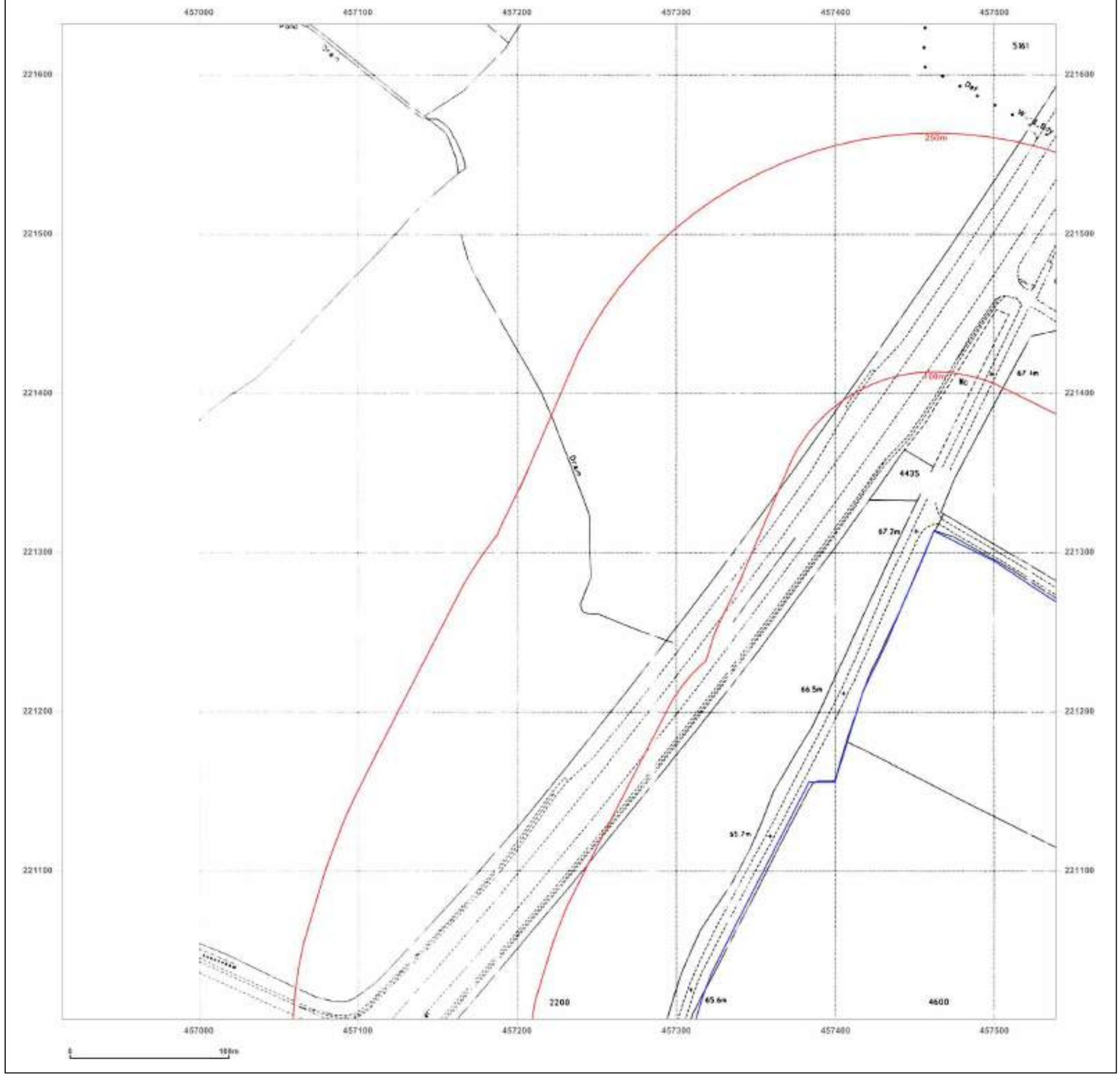

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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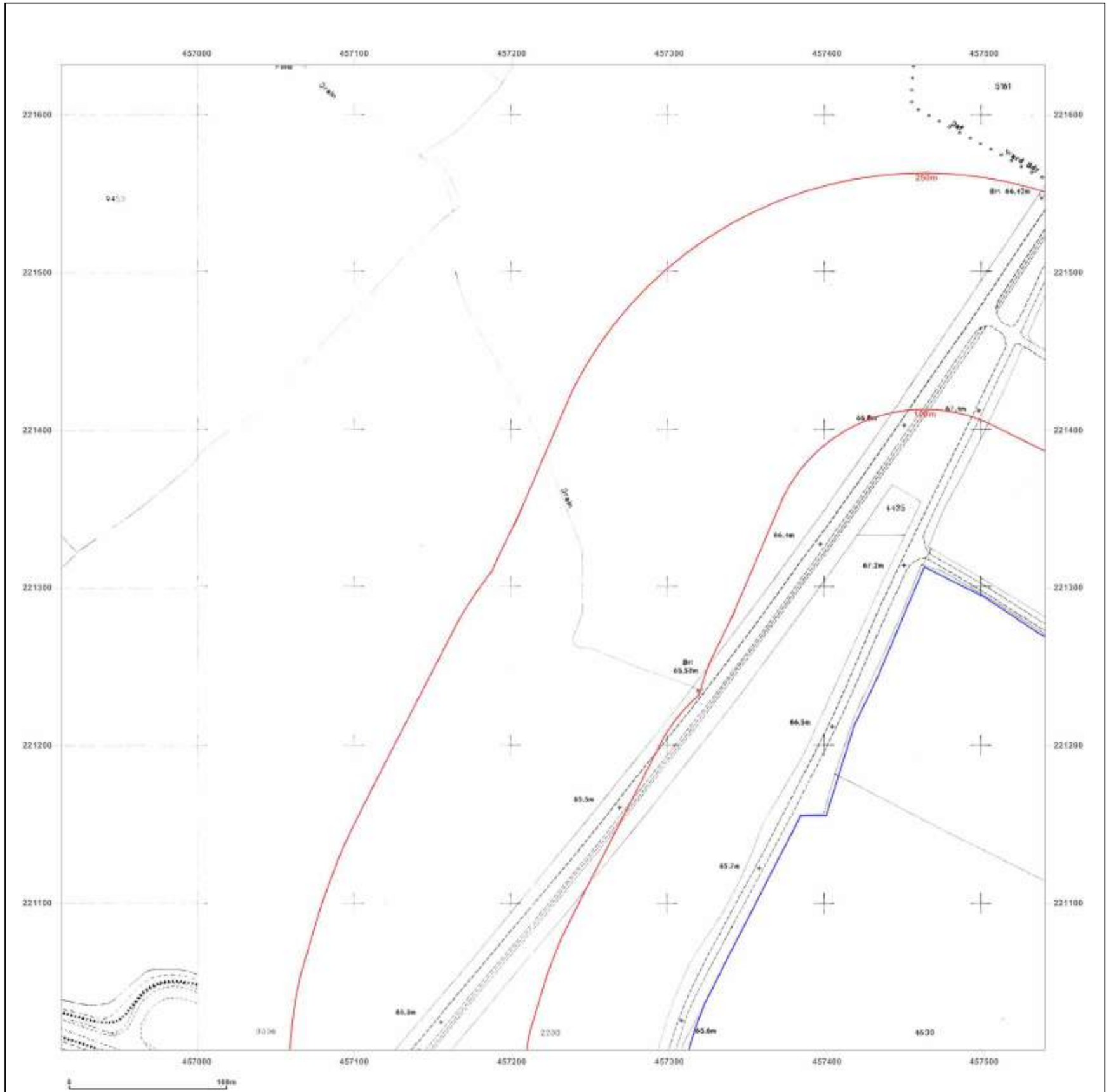

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

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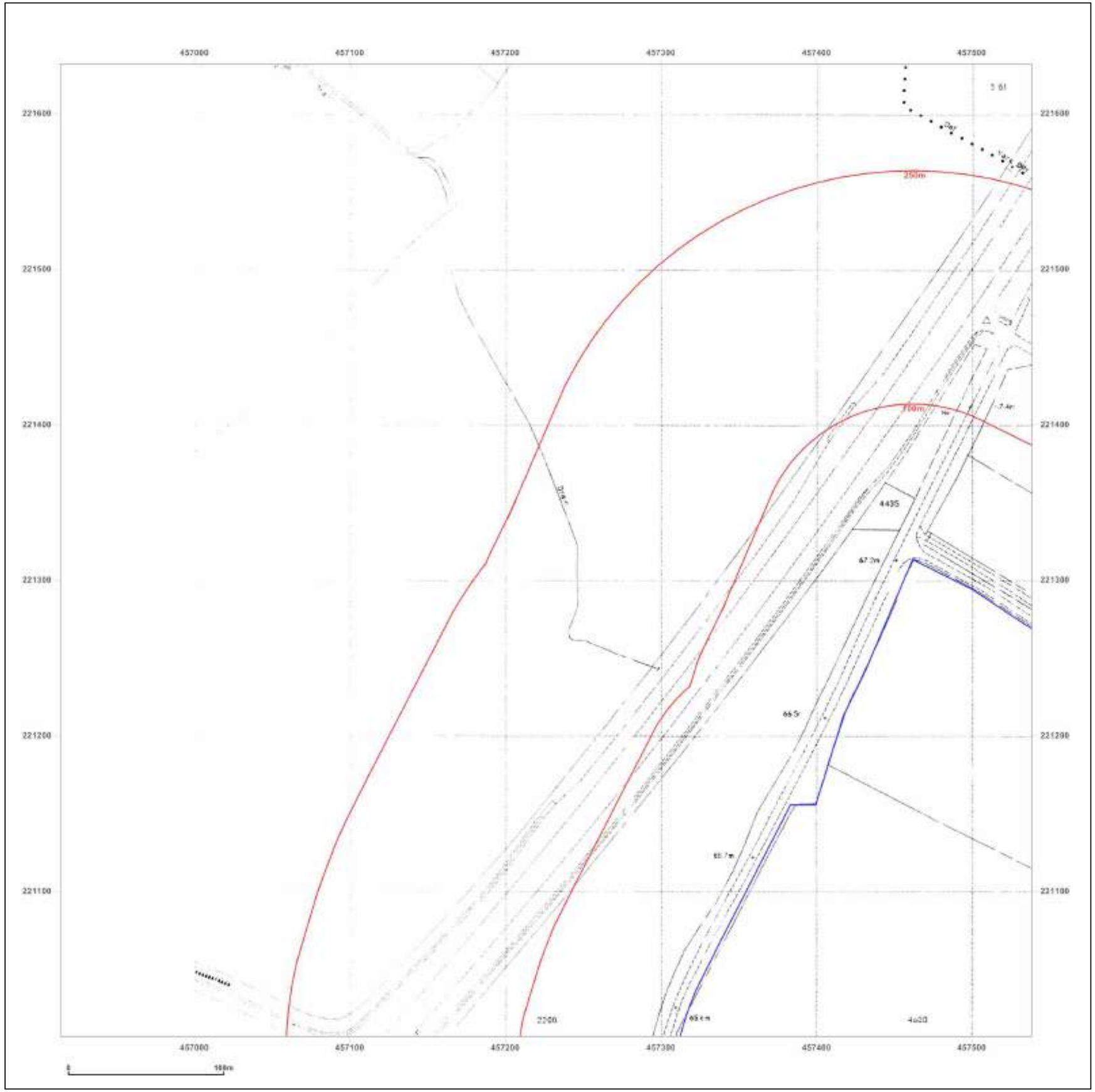

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

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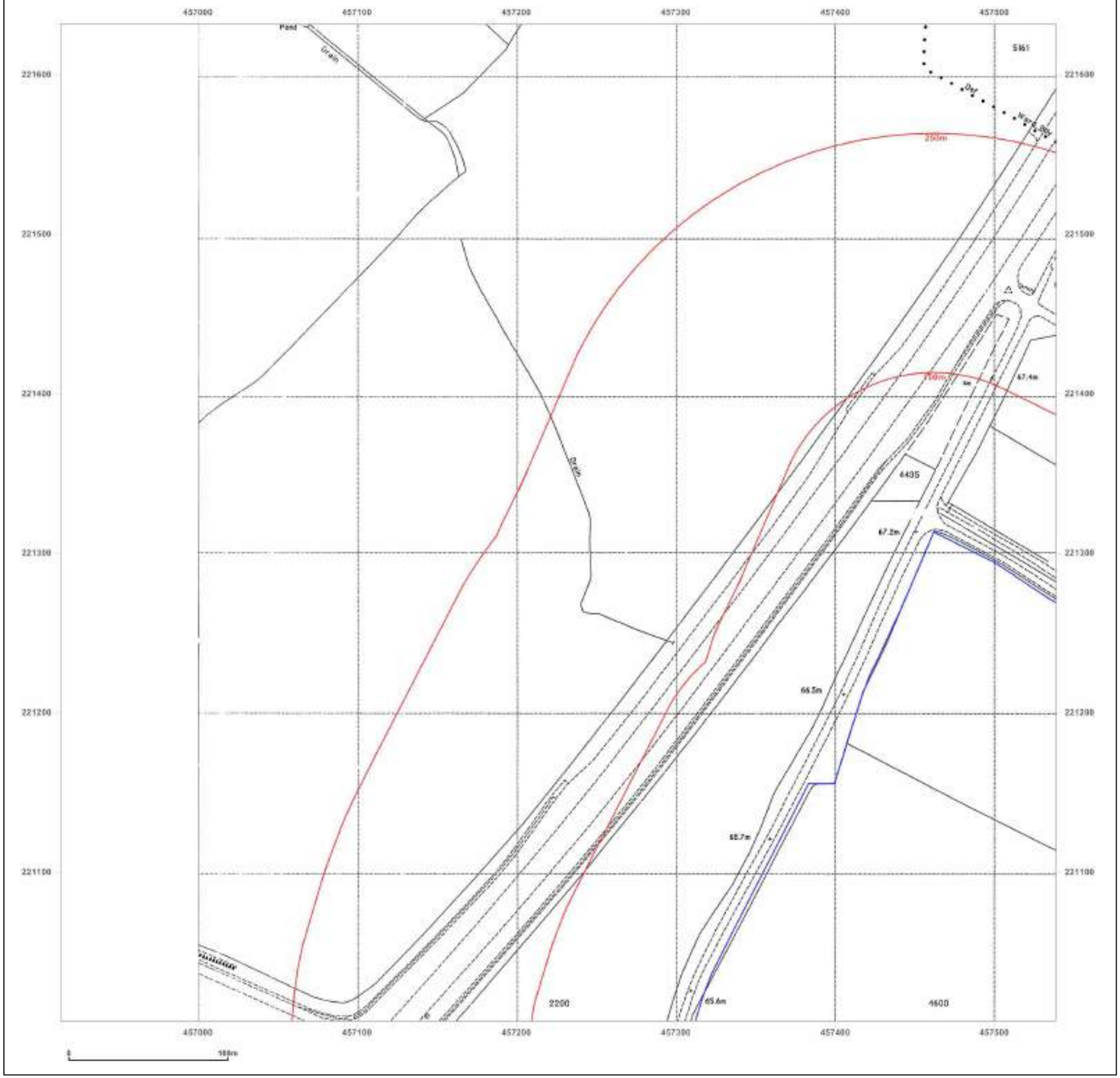

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_1_2
Grid Ref: 457226, 221319

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

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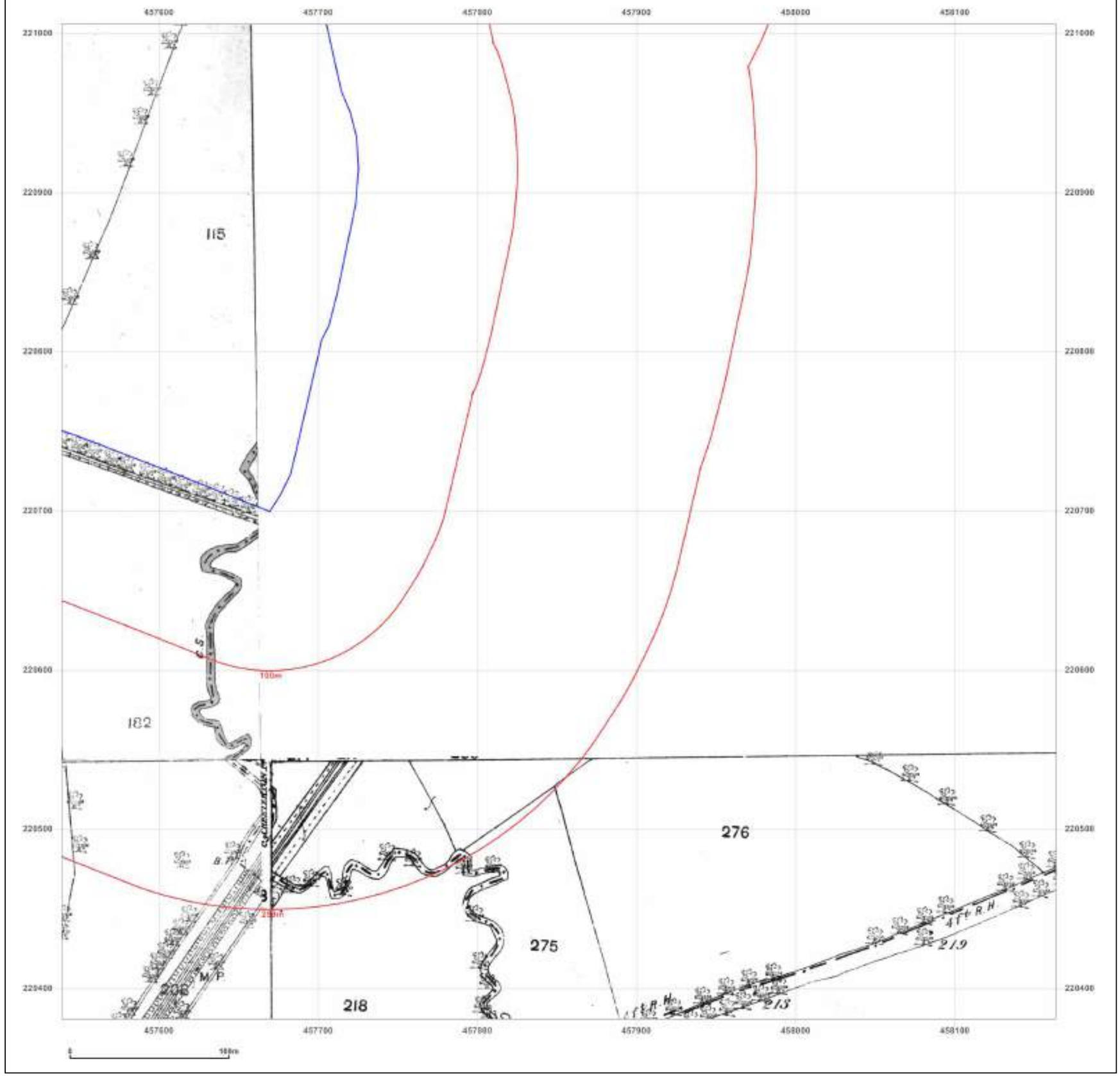

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: County Series
Map date: **1875-1877**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised 1875
Edition N/A
Copyright N/A
Levelled N/A

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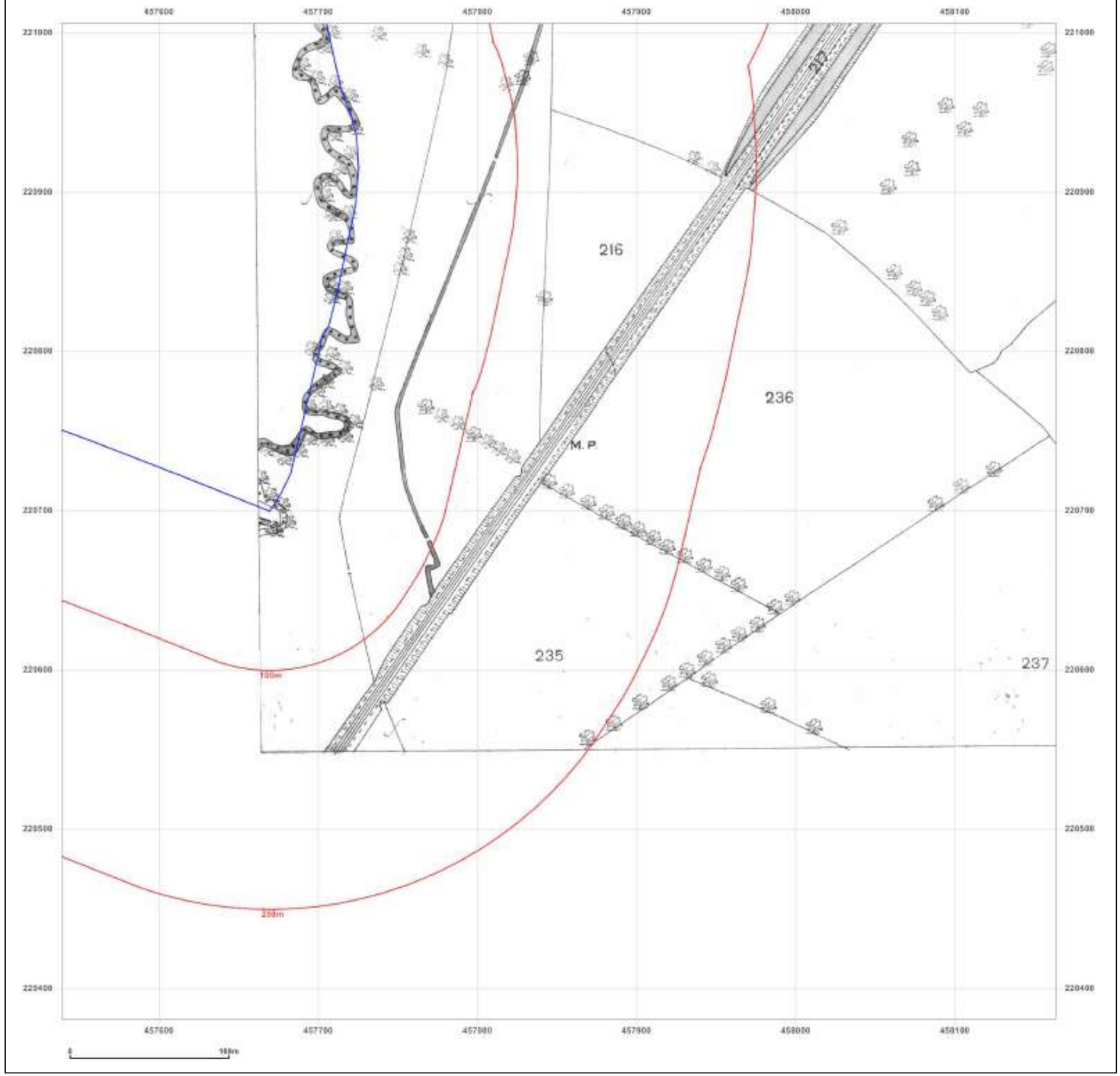

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: County Series

Map date: **1881**

Scale: 1:2,500

Printed at: 1:2,500

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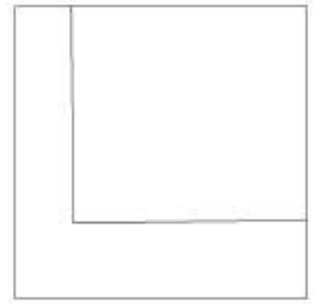
Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A



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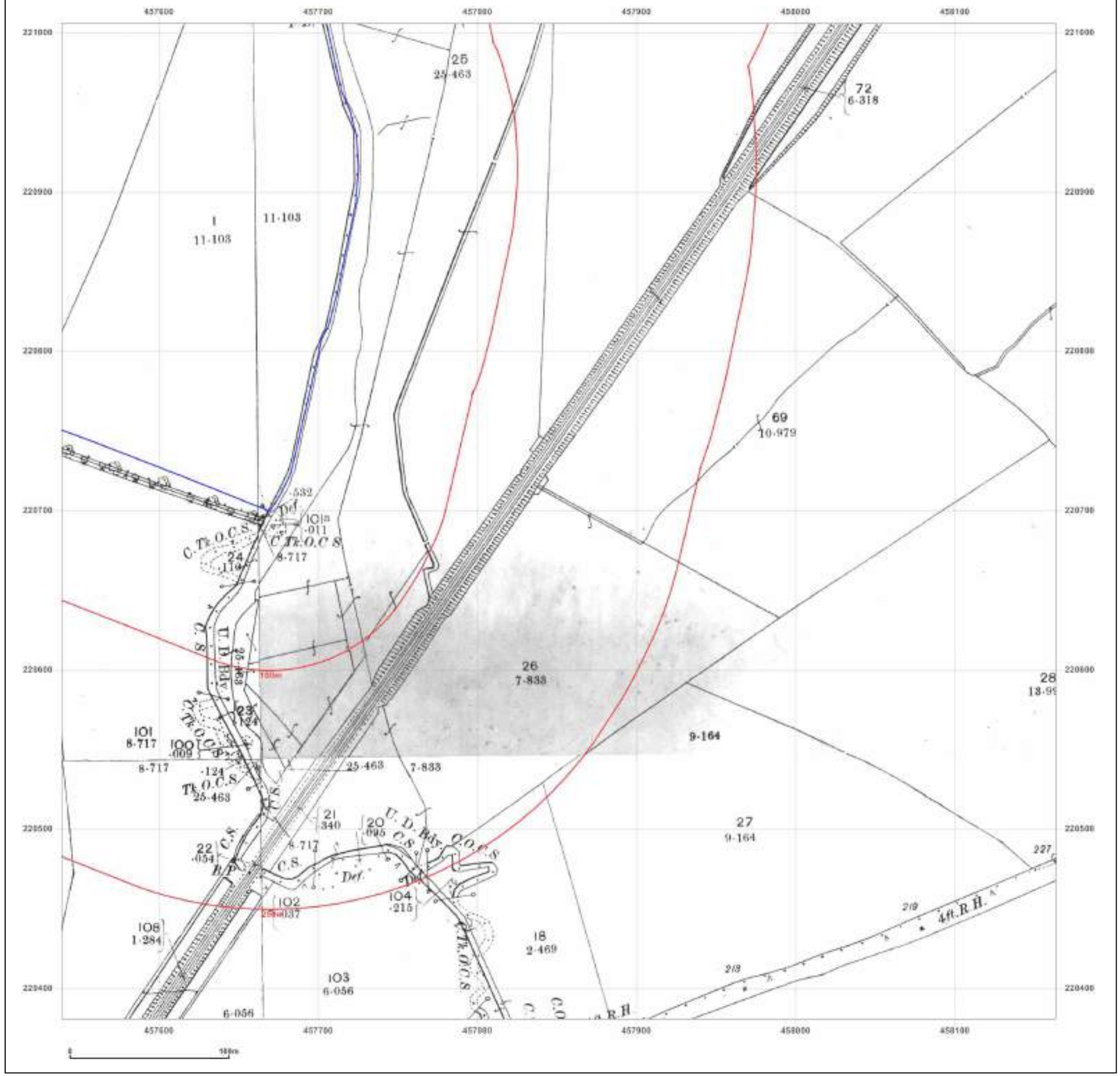

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: County Series

Map date: **1899-1900**

Scale: 1:2,500

Printed at: 1:2,500

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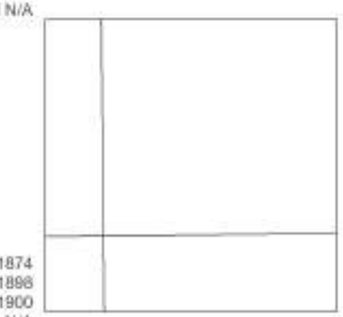
Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

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



Surveyed 1874
Revised 1898
Edition 1900
Copyright N/A
Levelled N/A

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

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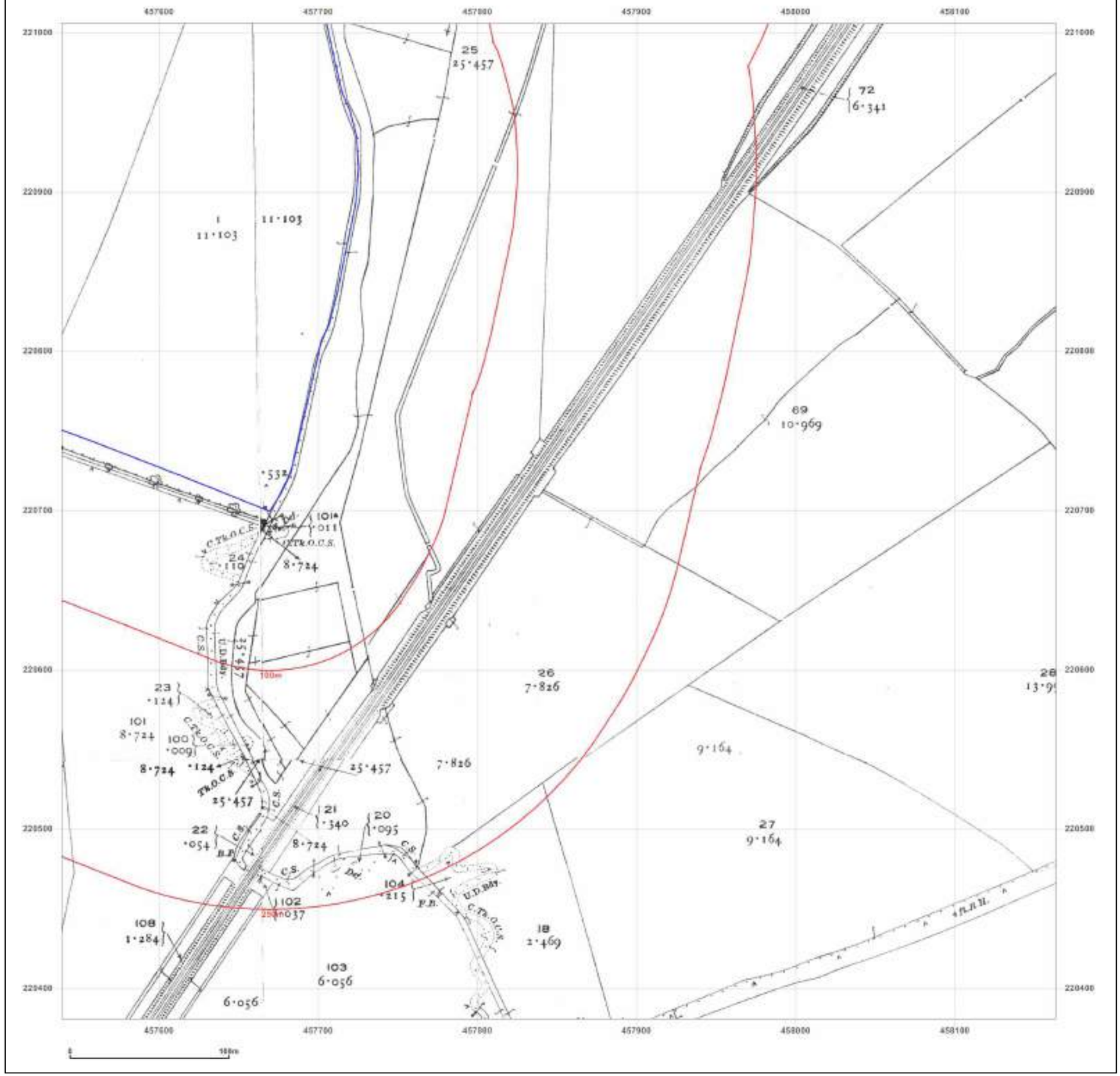

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: County Series

Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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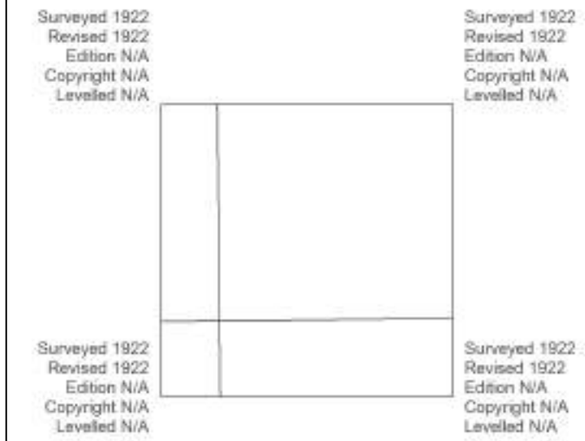

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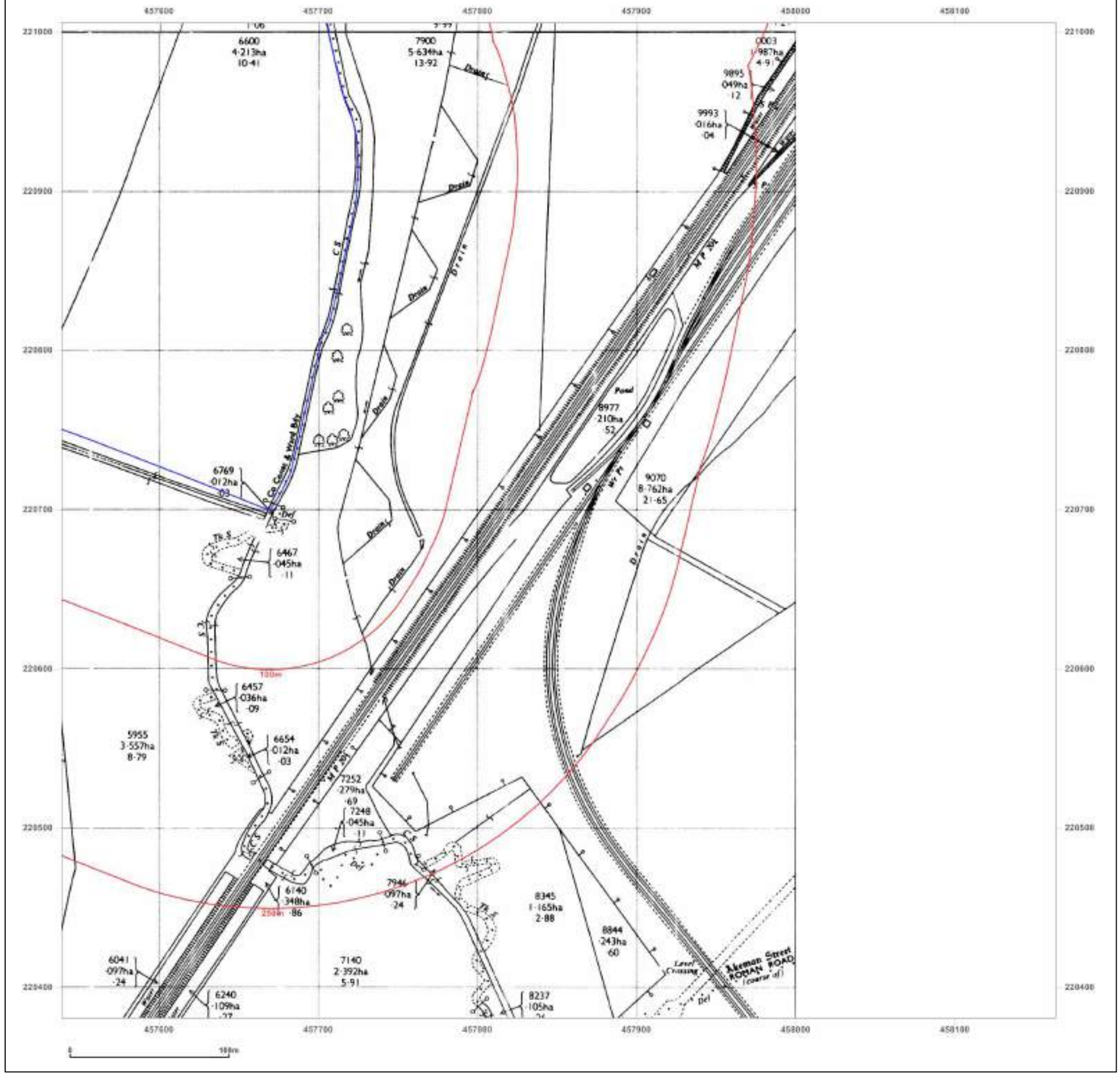

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid
Map date: **1967**
Scale: 1:2,500
Printed at: 1:2,500

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

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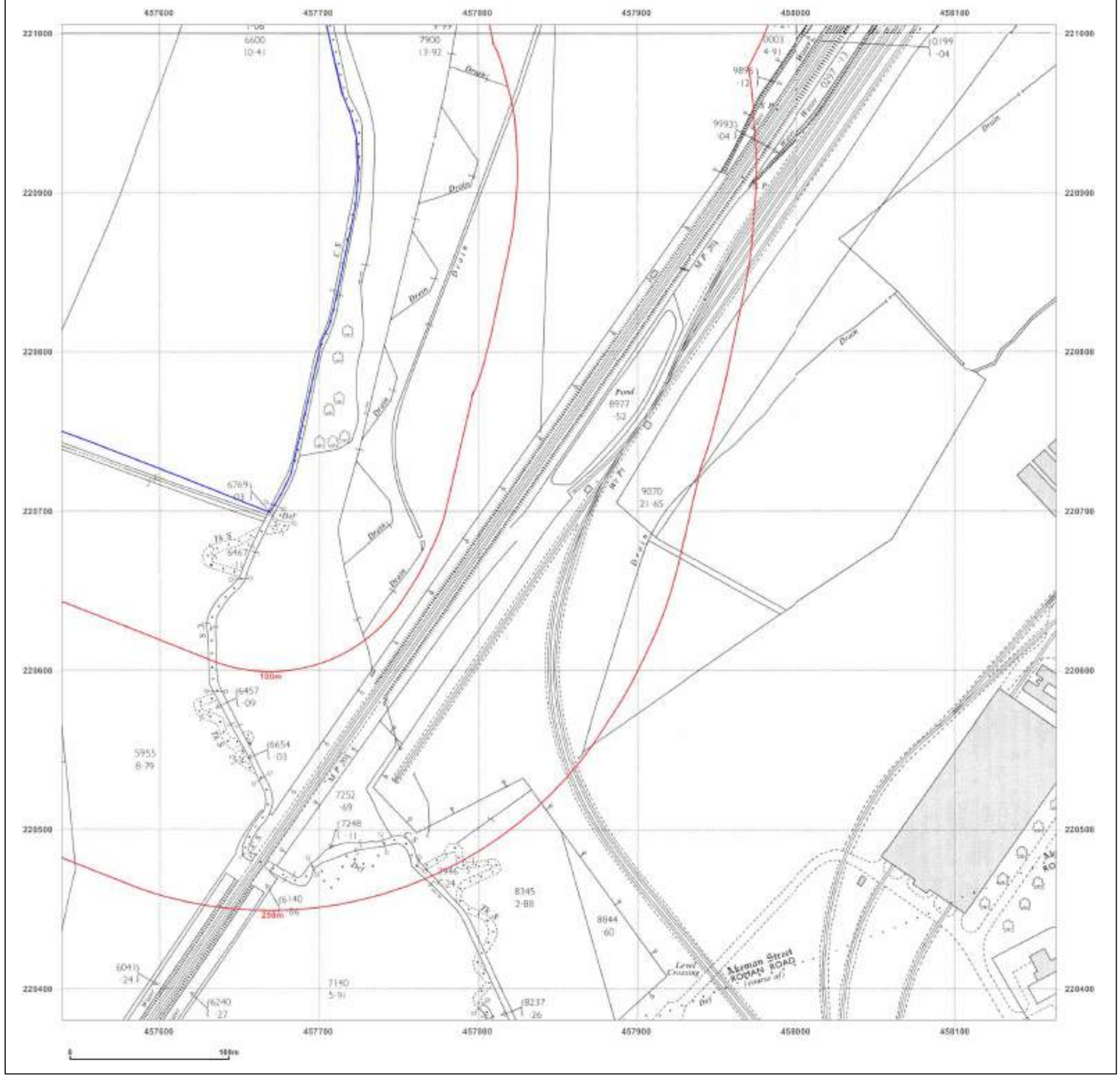

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1966-1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

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

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

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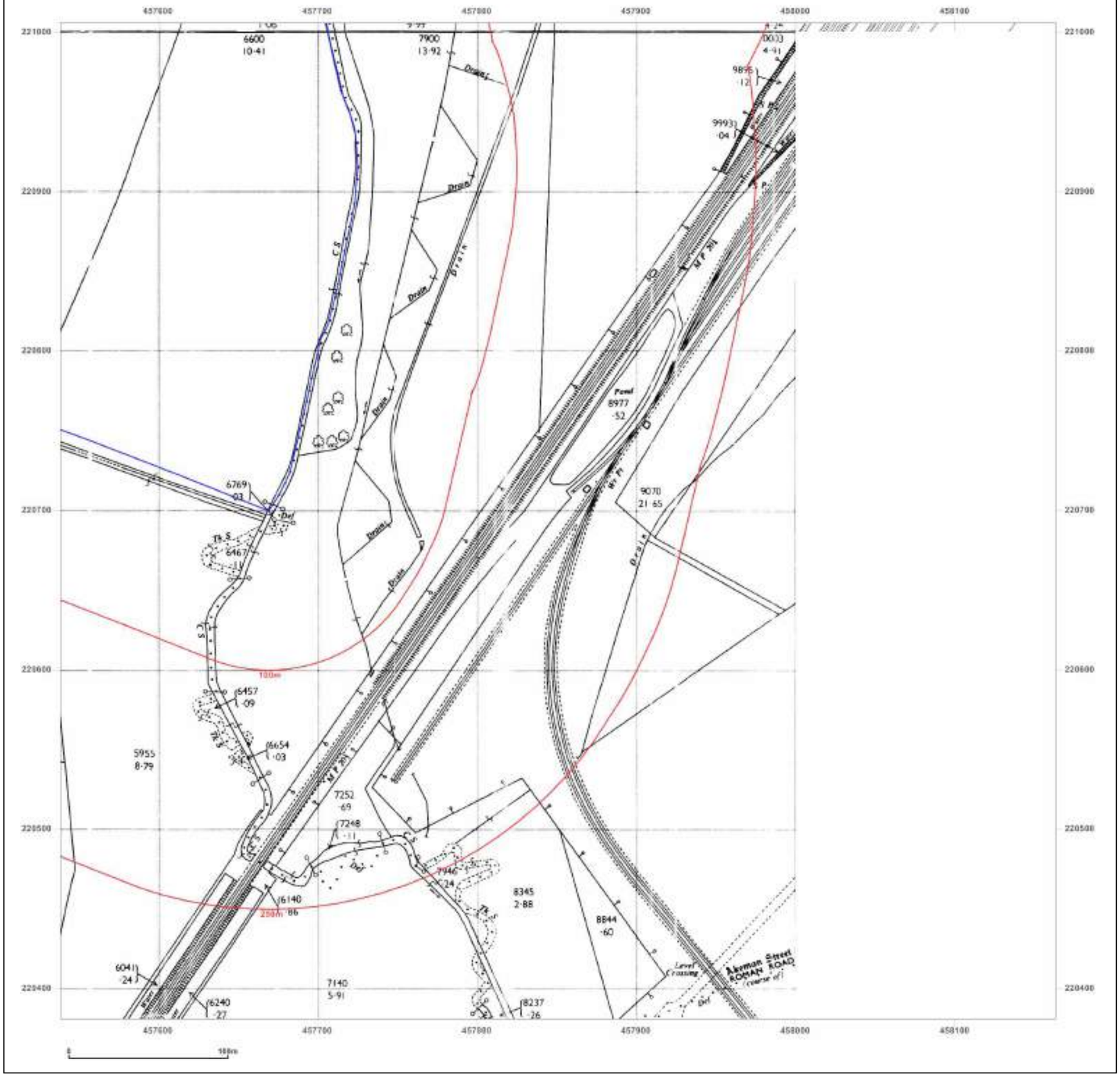

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1967-1968**

Scale: 1:2,500

Printed at: 1:2,500

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

Surveyed N/A
Revised 1986
Edition N/A
Copyright 1968
Levelled 1962

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

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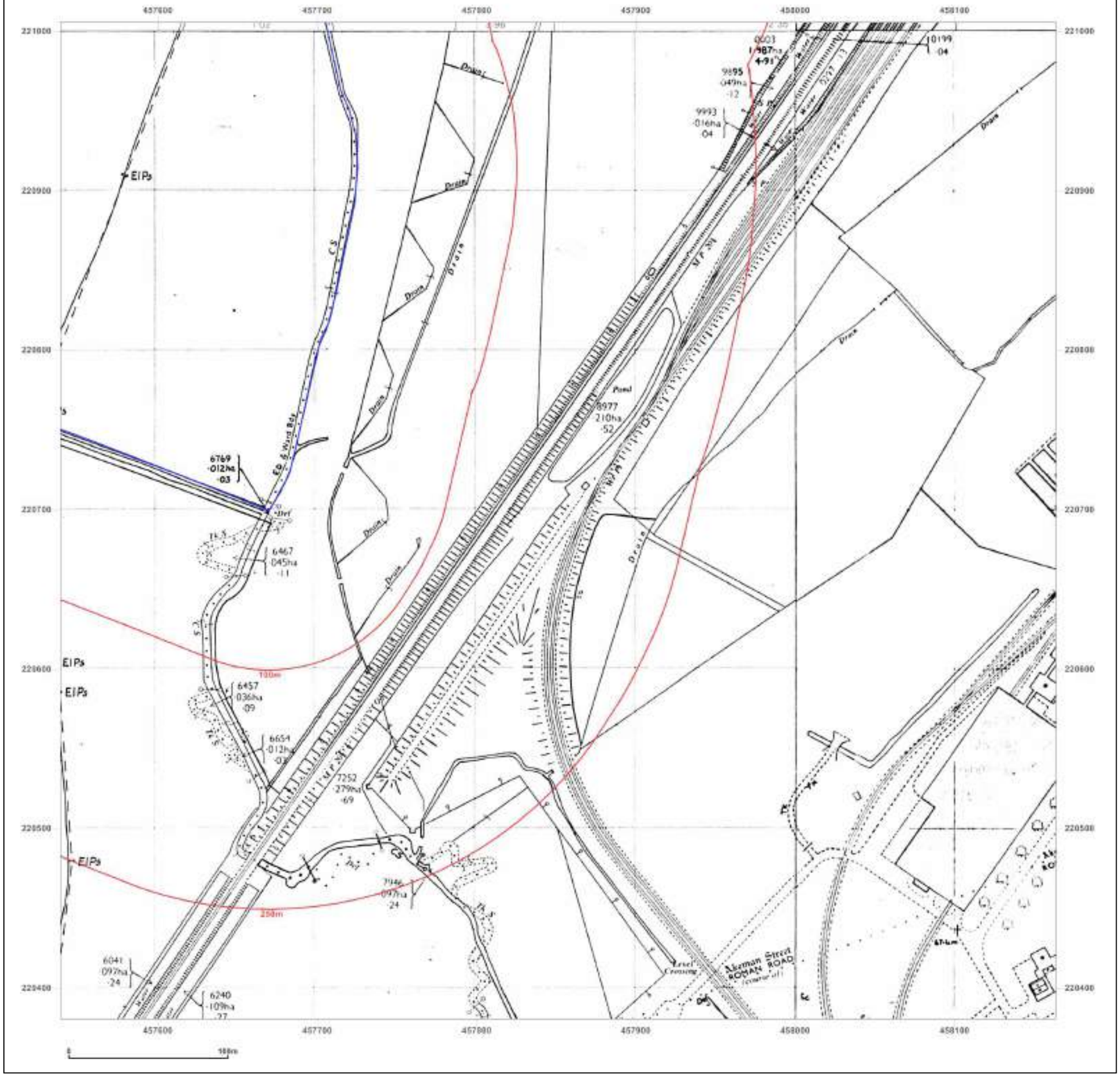

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1983-1986**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1983
Revised 1983
Edition N/A
Copyright 1984
Levelled 1971

Surveyed 1968
Revised 1988
Edition N/A
Copyright 1986
Levelled 1968

Surveyed 1971
Revised 1986
Edition N/A
Copyright 1986
Levelled 1971

Surveyed 1971
Revised 1986
Edition N/A
Copyright 1986
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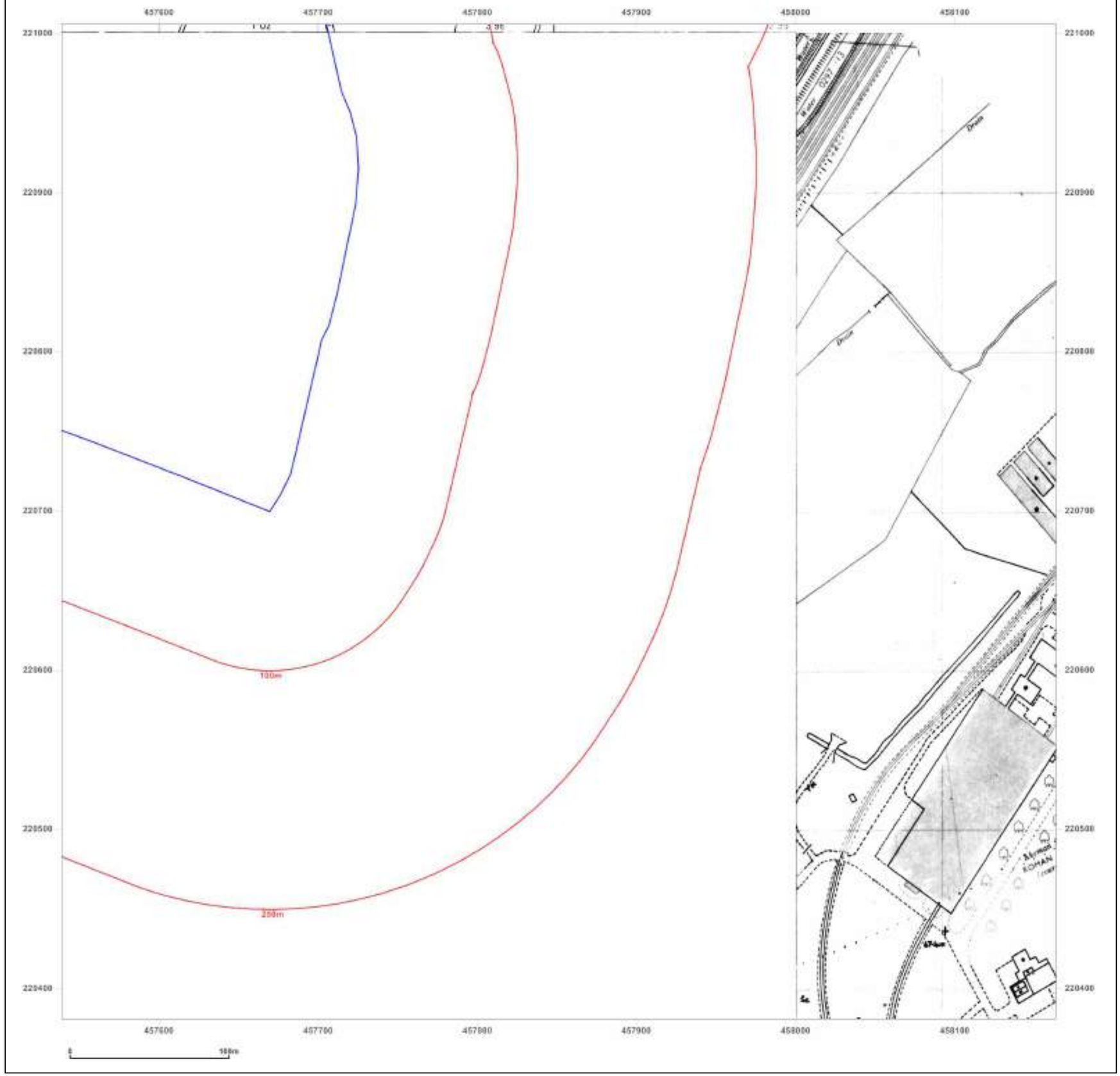

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1984-1986**

Scale: 1:2,500

Printed at: 1:2,500

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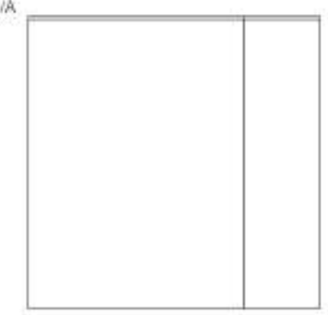
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1986
Revised 1986
Edition N/A
Copyright 1986
Levelled N/A

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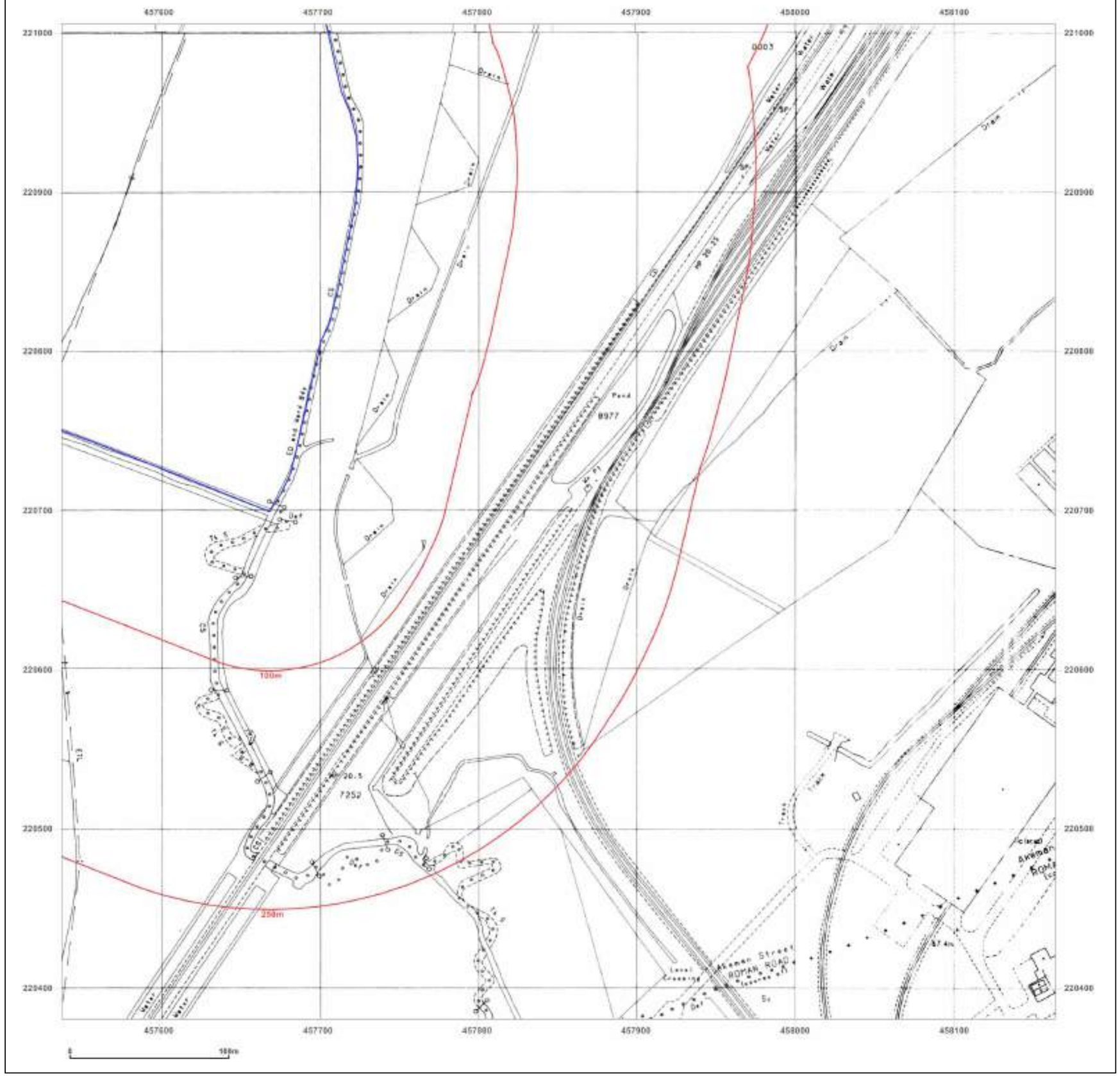

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

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

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

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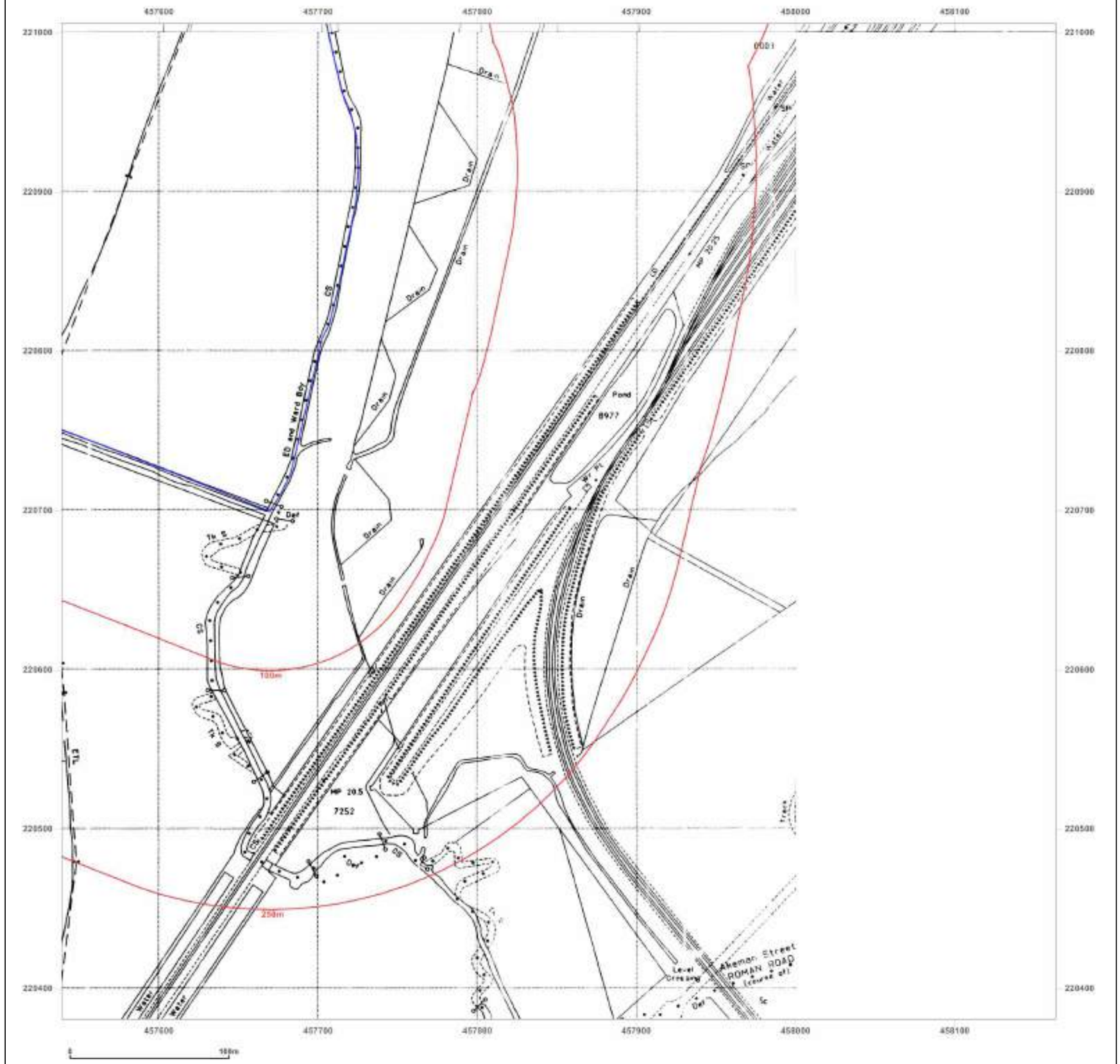

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_1
Grid Ref: 457851, 220693

Map Name: National Grid

Map date: **1993-1994**

Scale: 1:2,500

Printed at: 1:2,500

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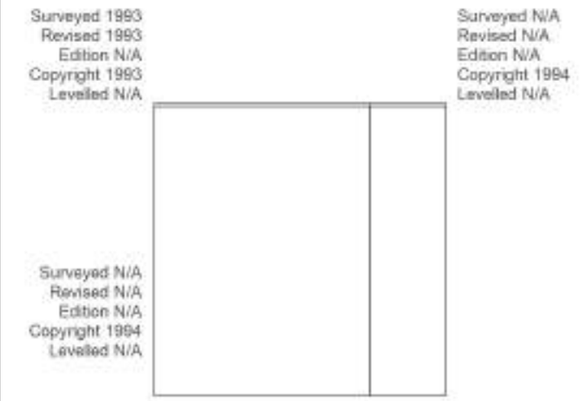

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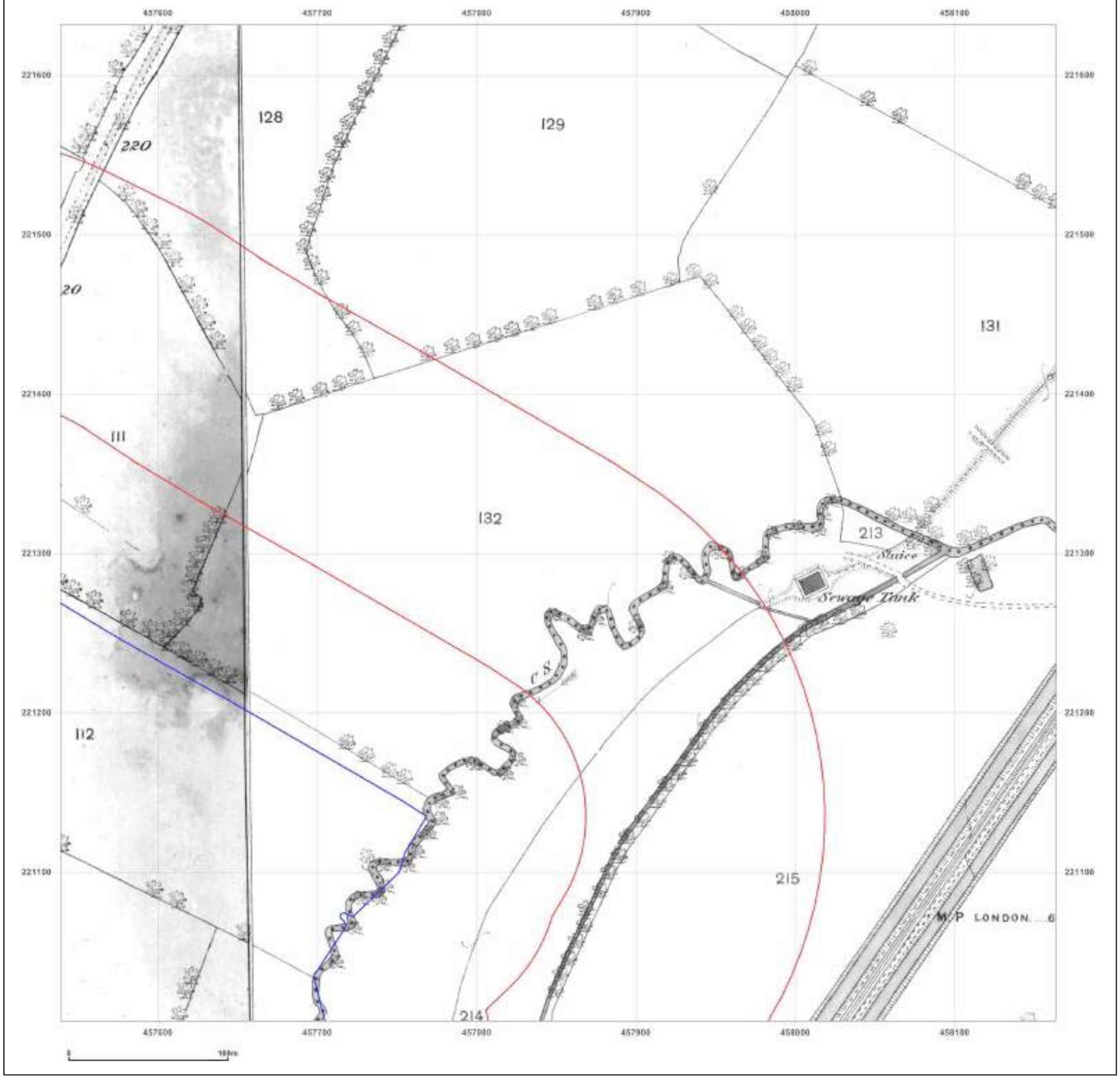

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: County Series

Map date: **1877-1881**

Scale: 1:2,500

Printed at: 1:2,500

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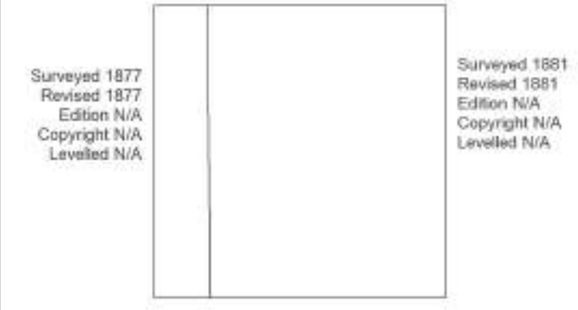

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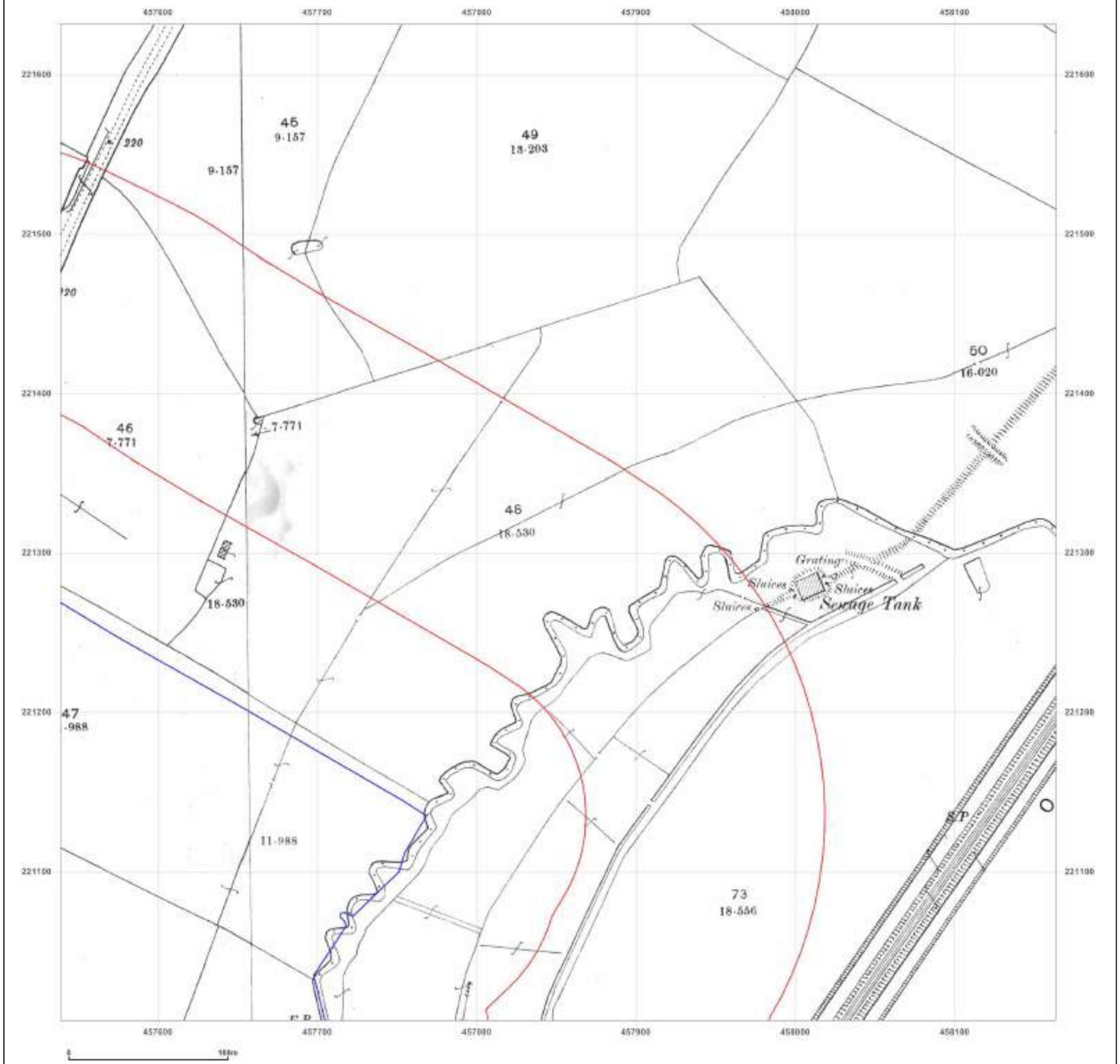

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: County Series

Map date: **1899-1900**

Scale: 1:2,500

Printed at: 1:2,500

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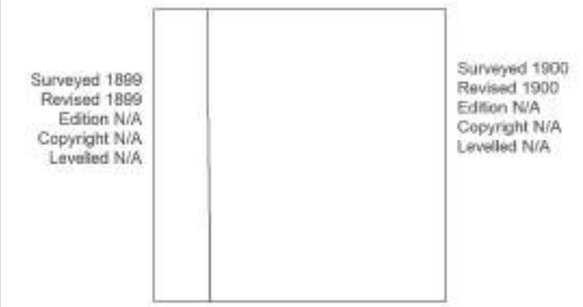

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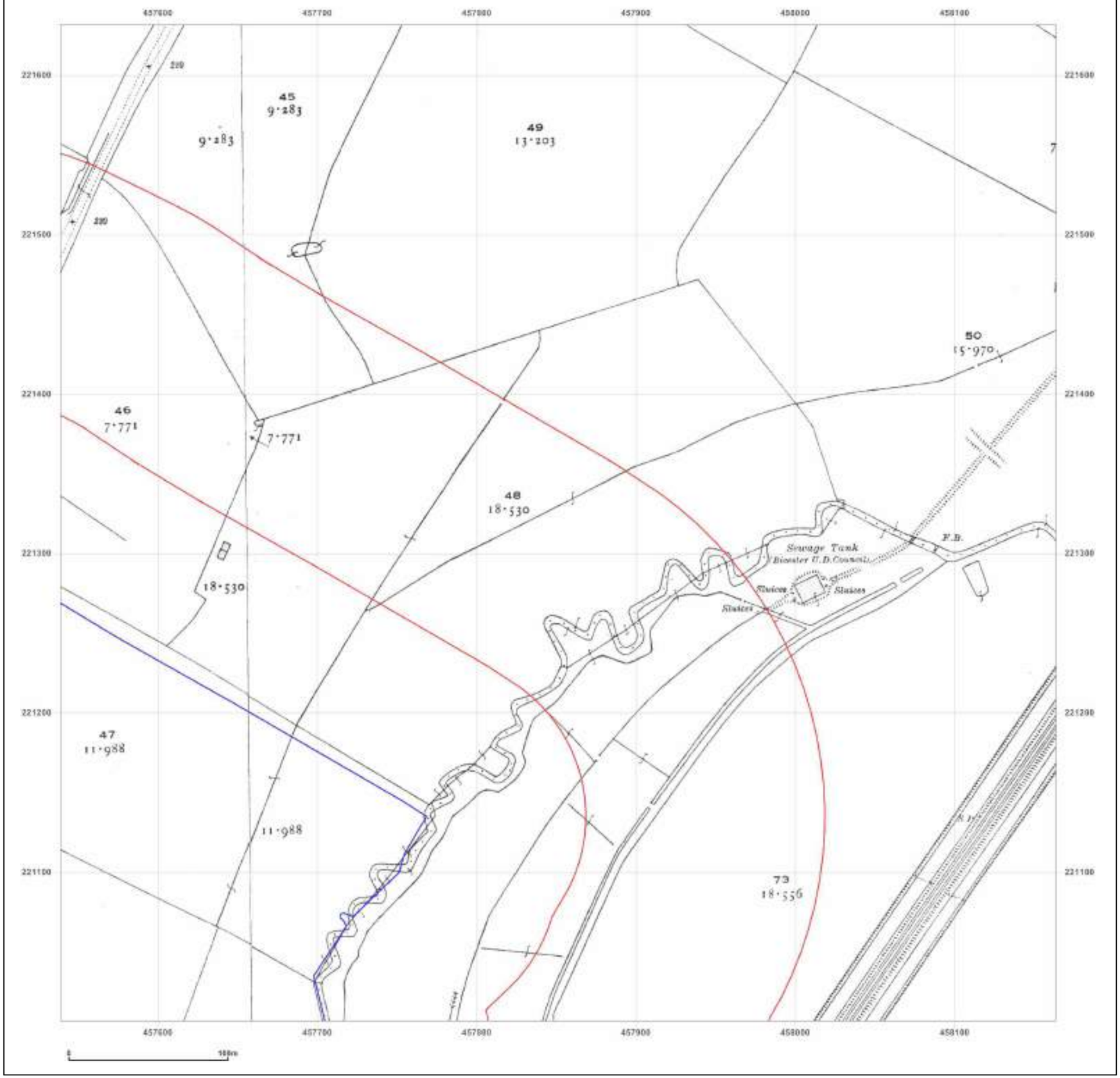

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: County Series

Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

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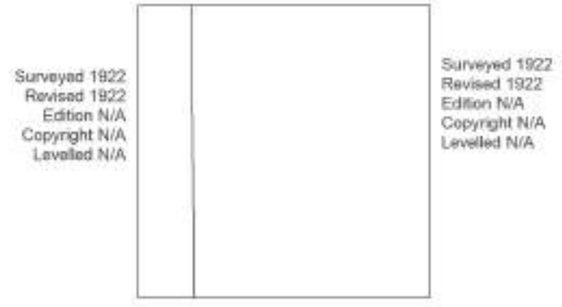

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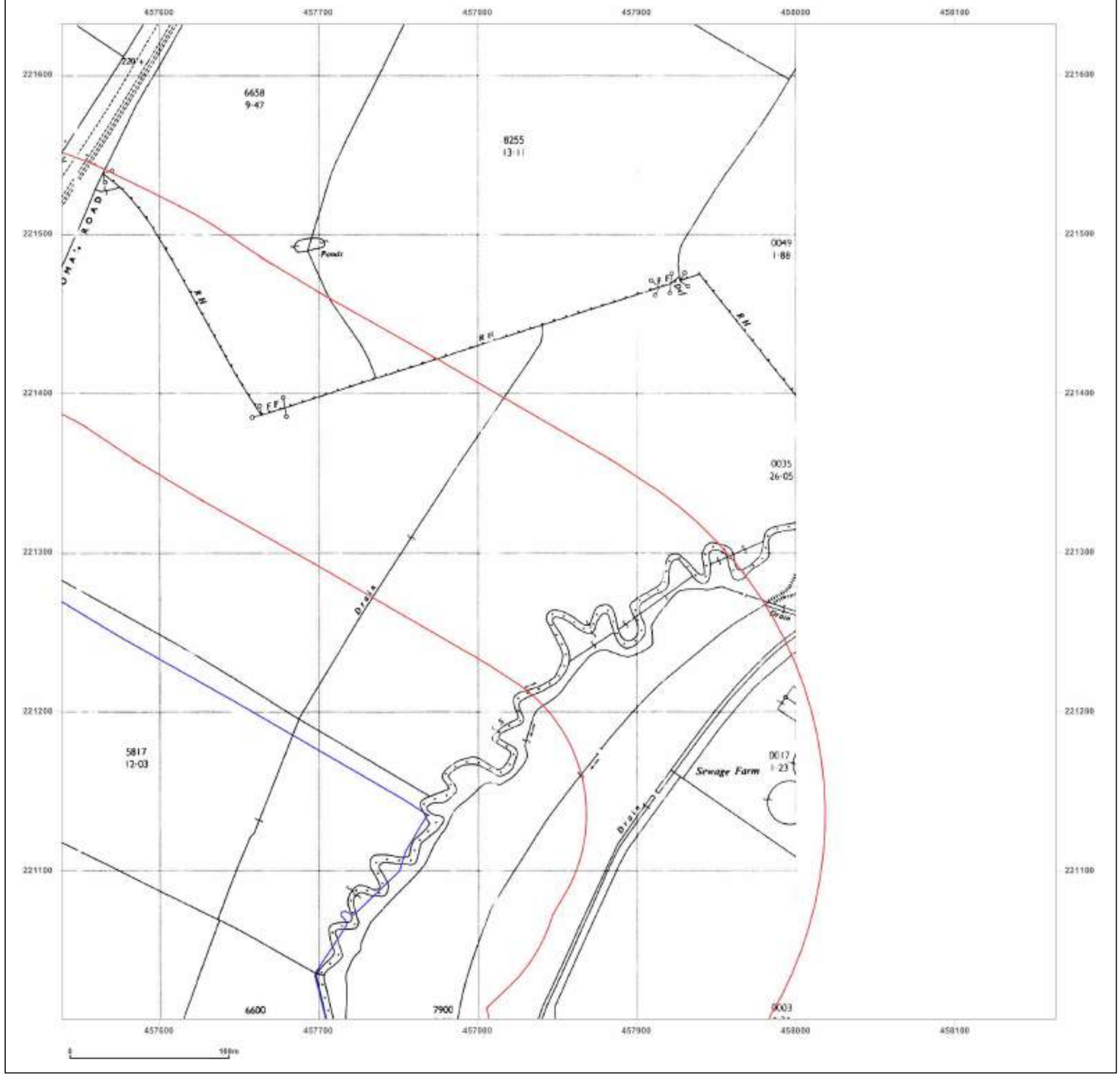

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
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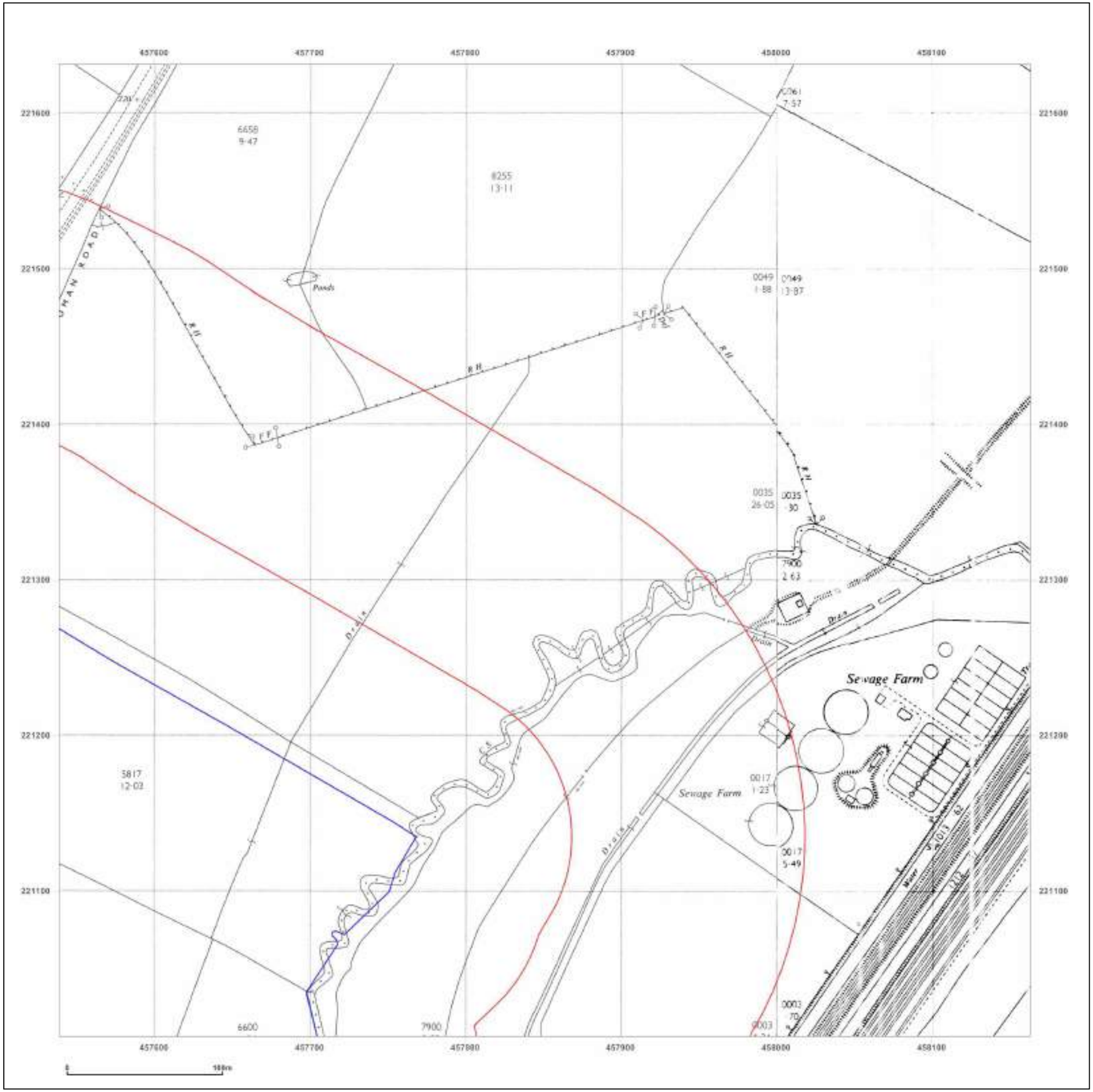

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1966-1968**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962

Surveyed N/A
Revised N/A
Edition N/A
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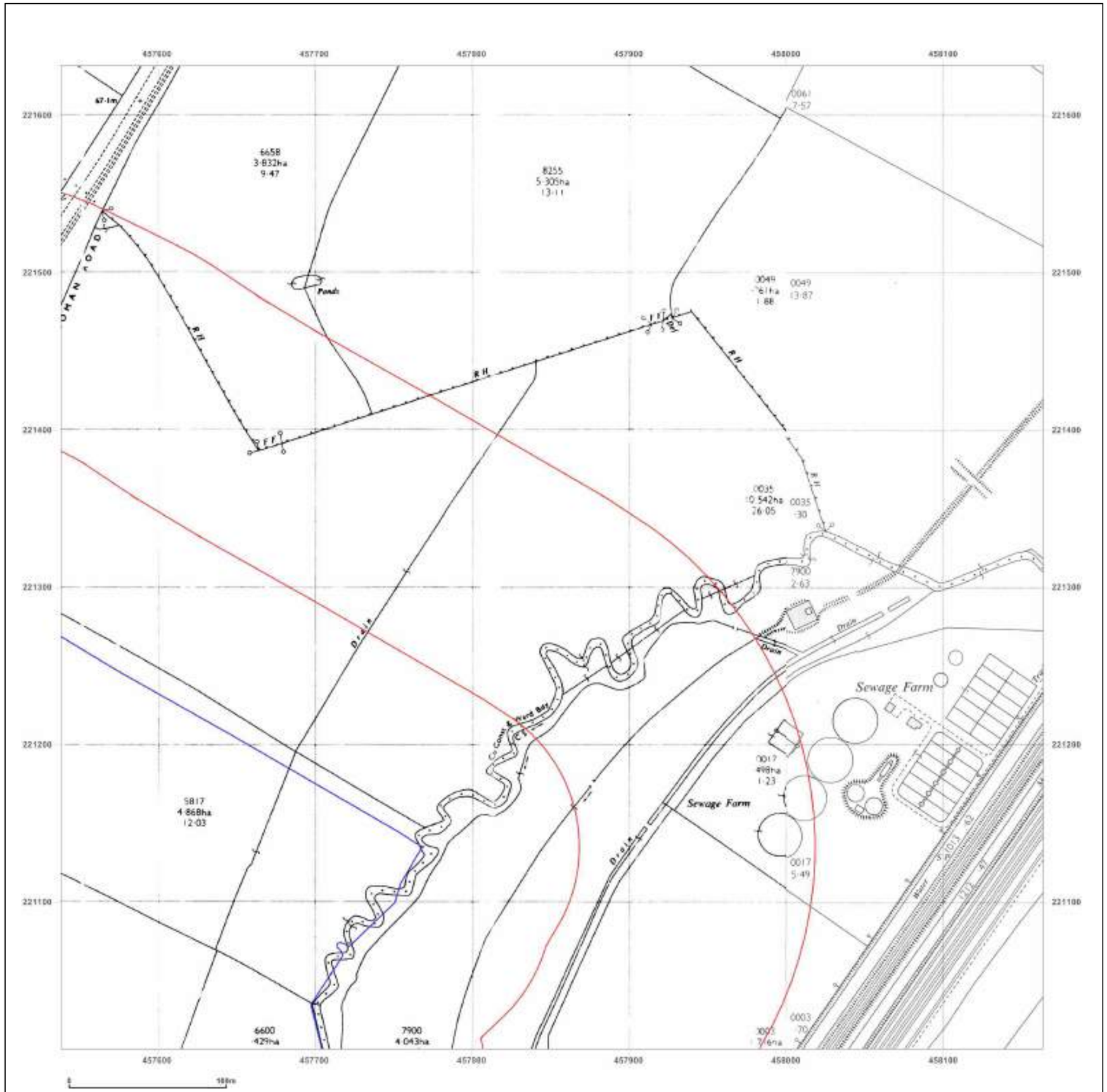

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Site Details:

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Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1967-1968**

Scale: 1:2,500

Printed at: 1:2,500

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

Surveyed	N/A
Revised	1966
Edition	N/A
Copyright	1968
Levelled	1962

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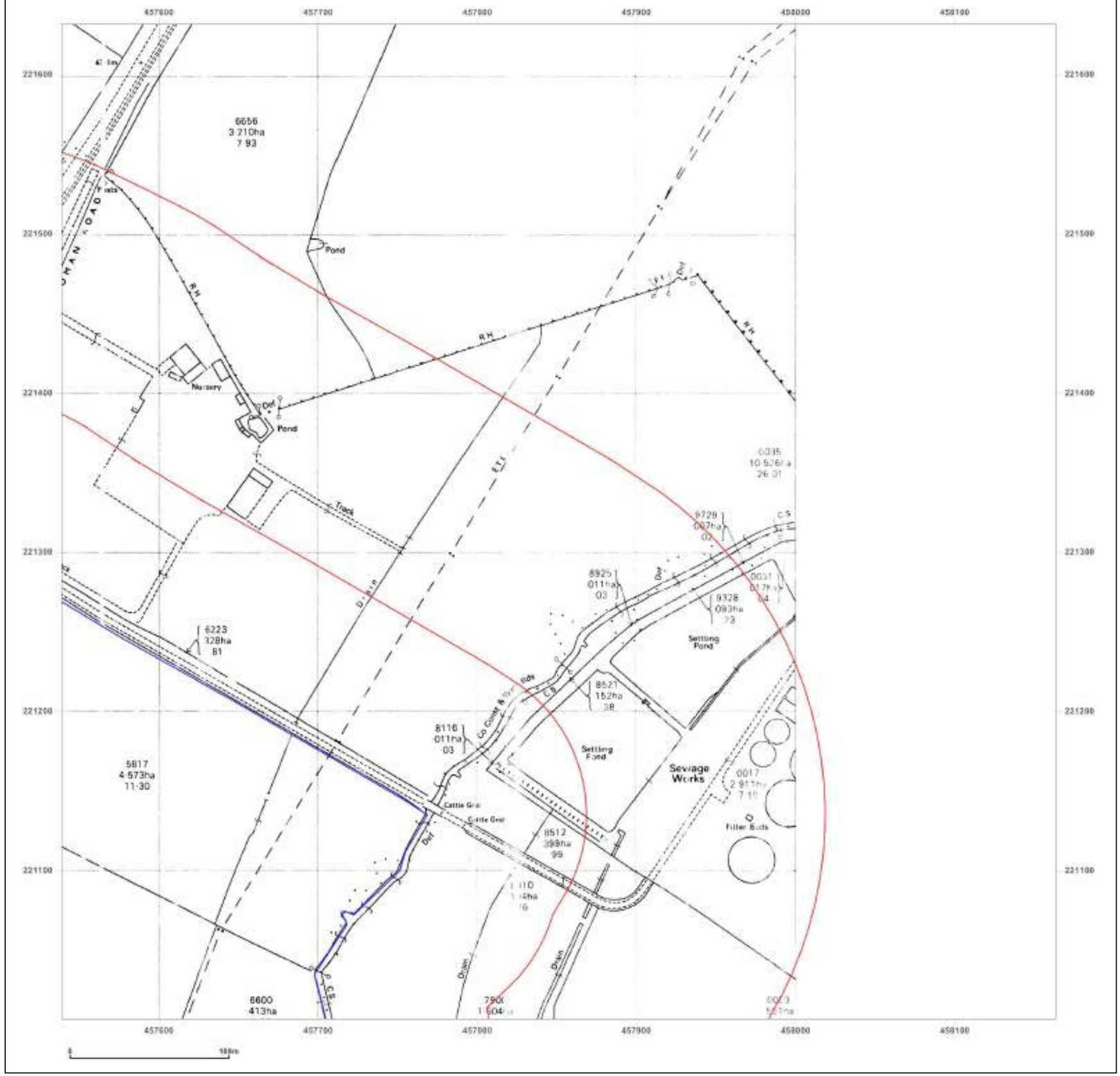

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Site Details:

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Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1984**

Scale: 1:2,500

Printed at: 1:2,500

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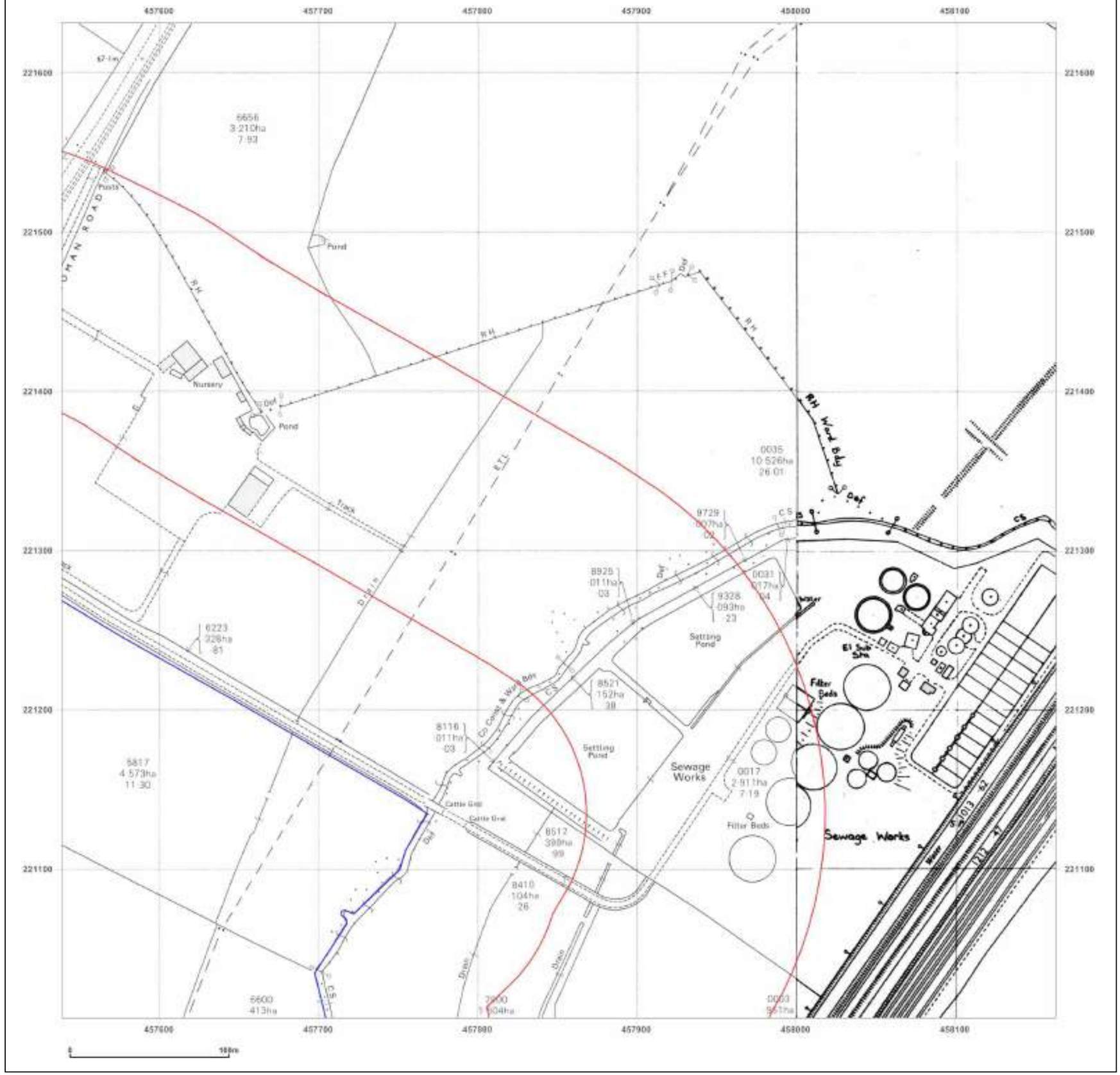

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1983-1986**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1983	Surveyed 1968
Revised 1983	Revised 1986
Edition N/A	Edition N/A
Copyright 1984	Copyright 1986
Levelled 1971	Levelled 1968

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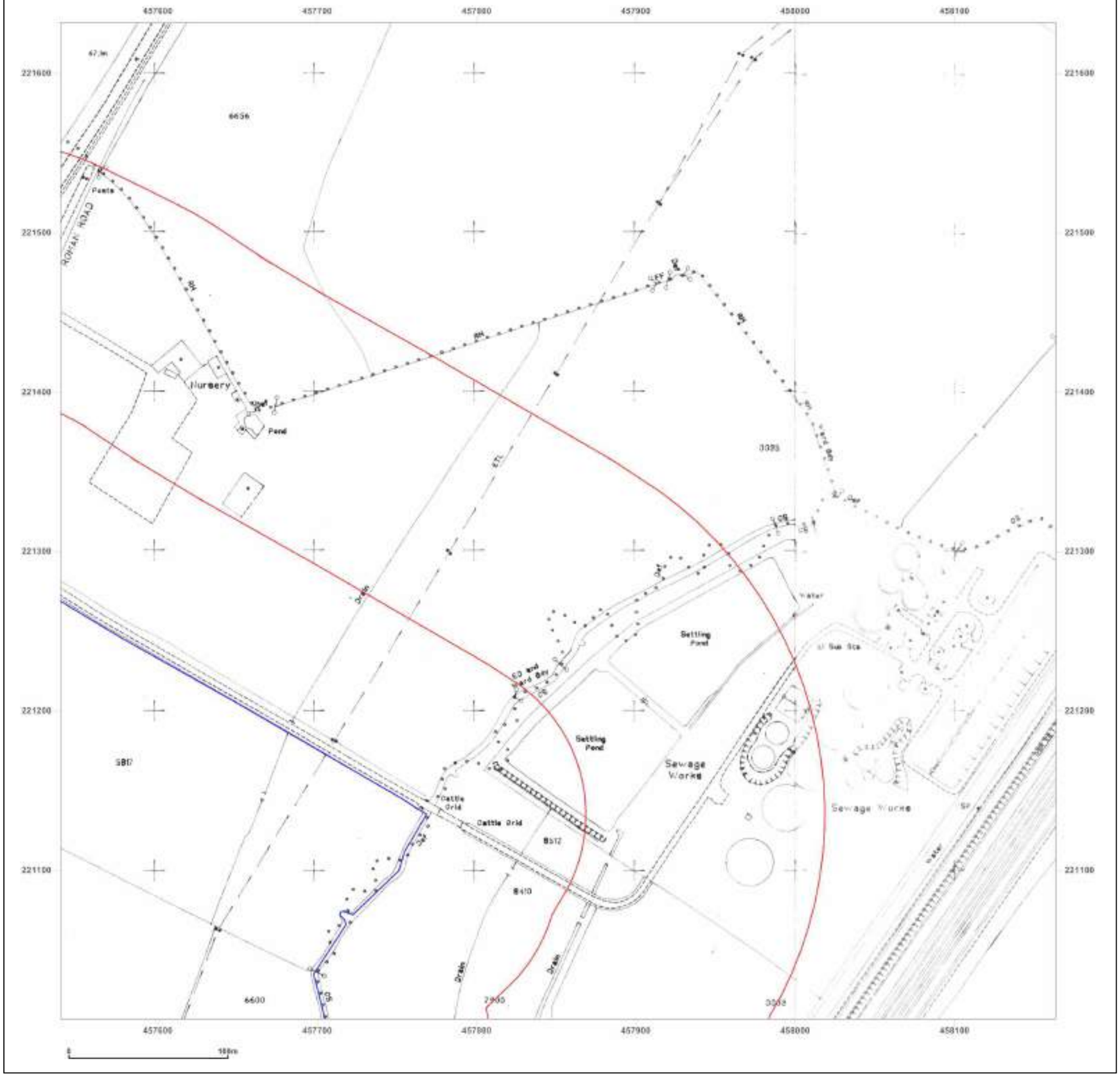

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1992**

Scale: 1:2,500

Printed at: 1:2,500

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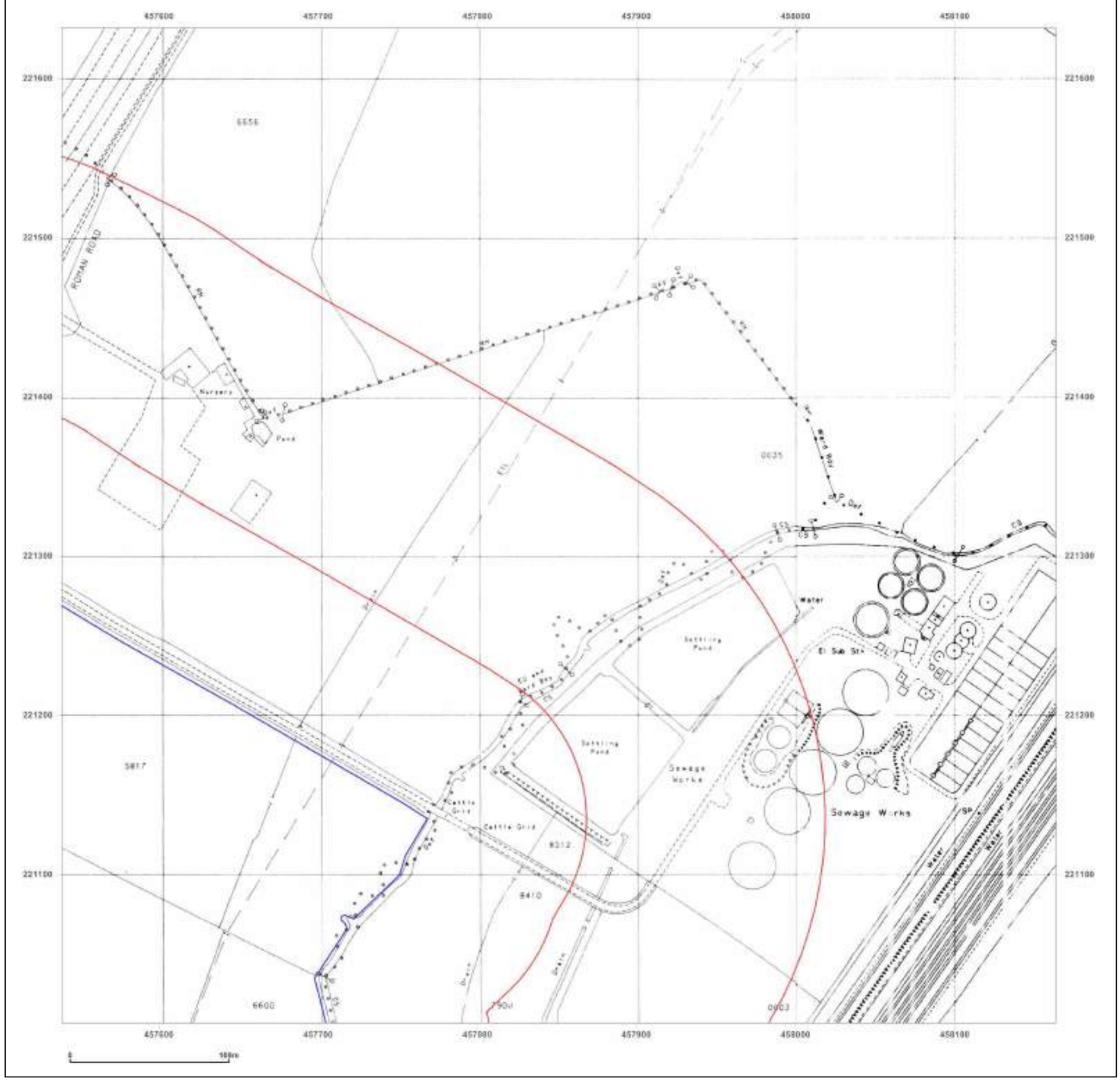

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Site Details:

The Promised Land
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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1993-1994**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1993
Edition N/A
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Levelled N/A

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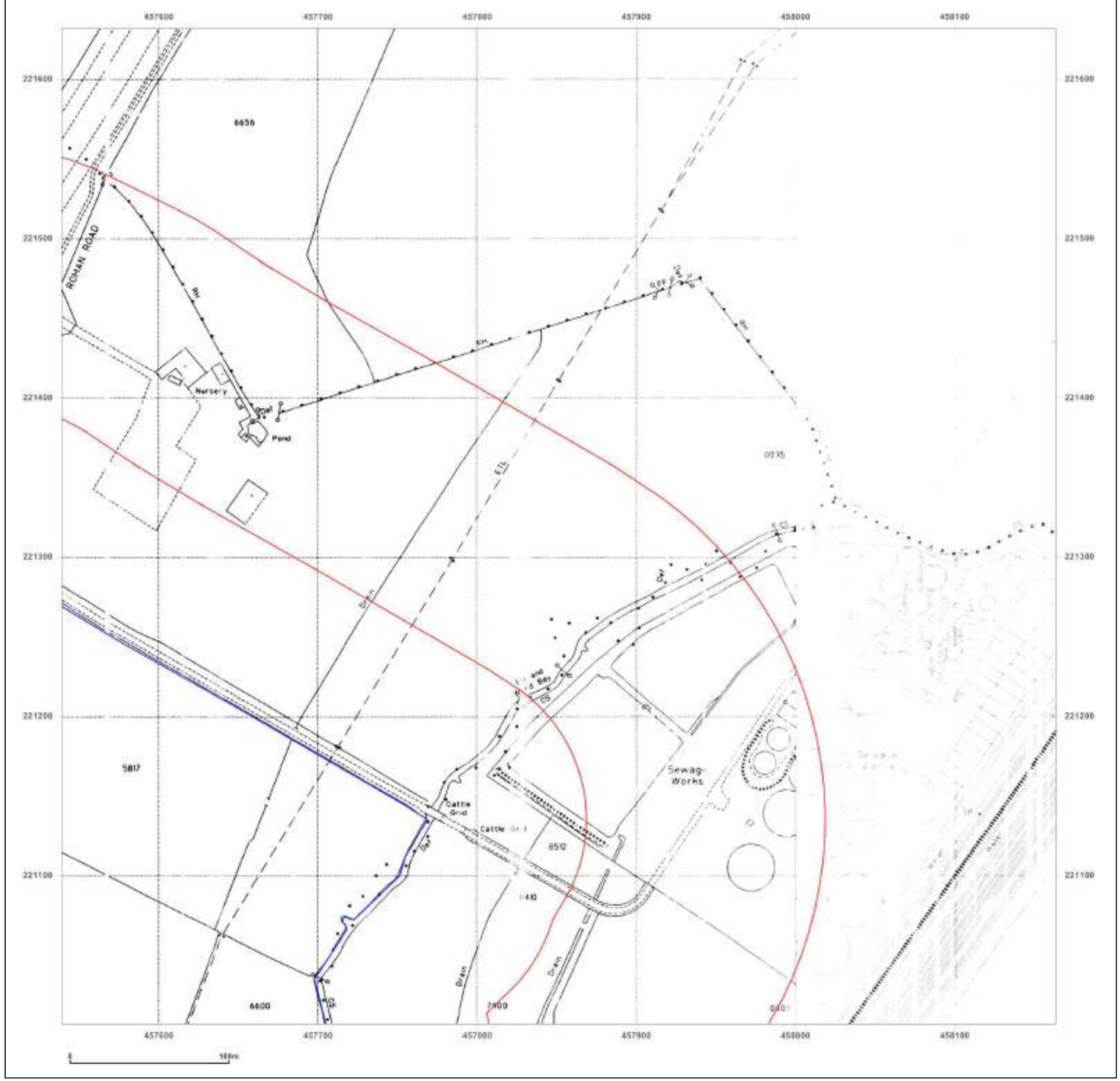

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
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Edition N/A
Copyright 1994
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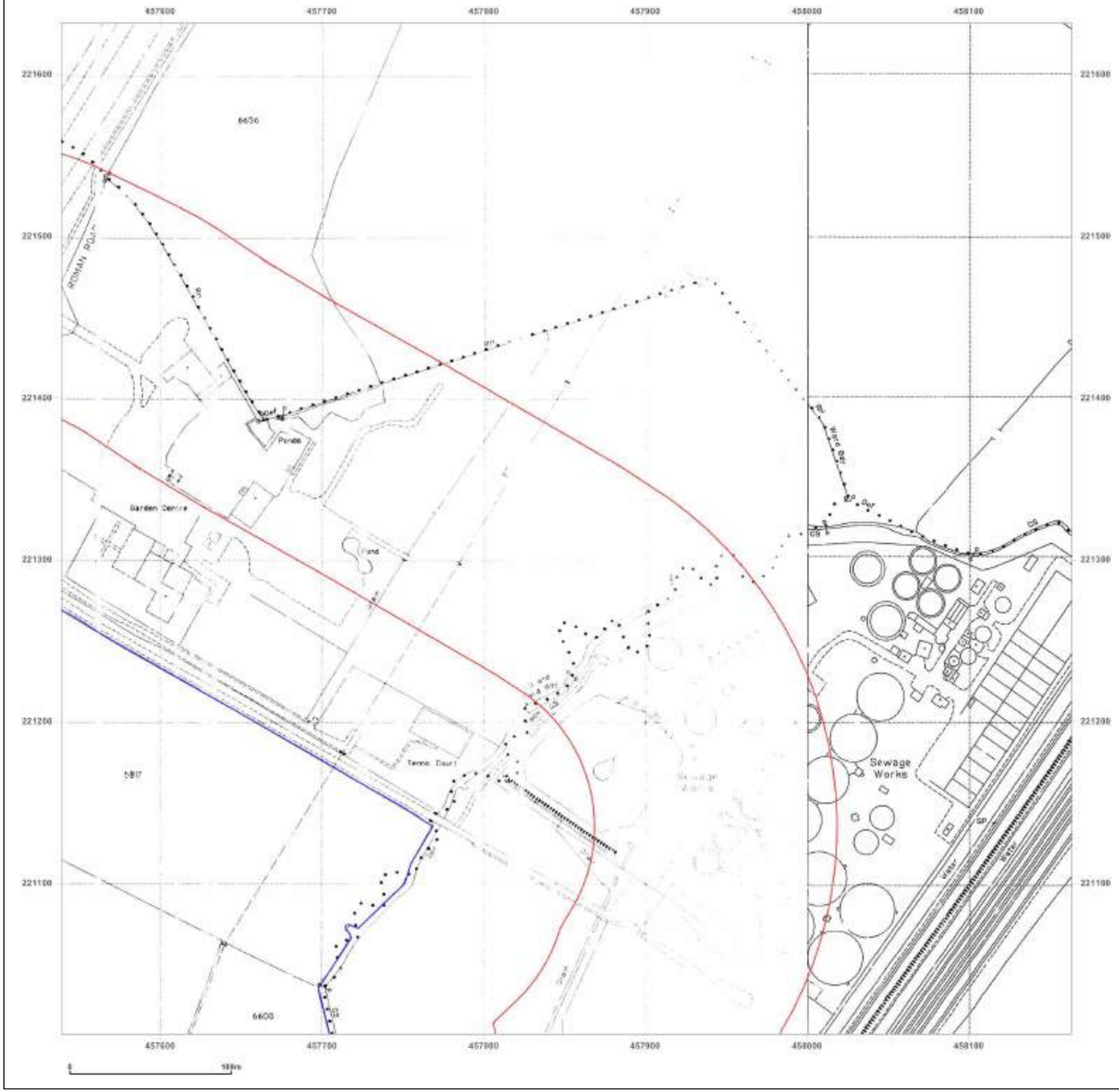

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Site Details:

The Promised Land
Farm,Wendlebury Road,Bicester

Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

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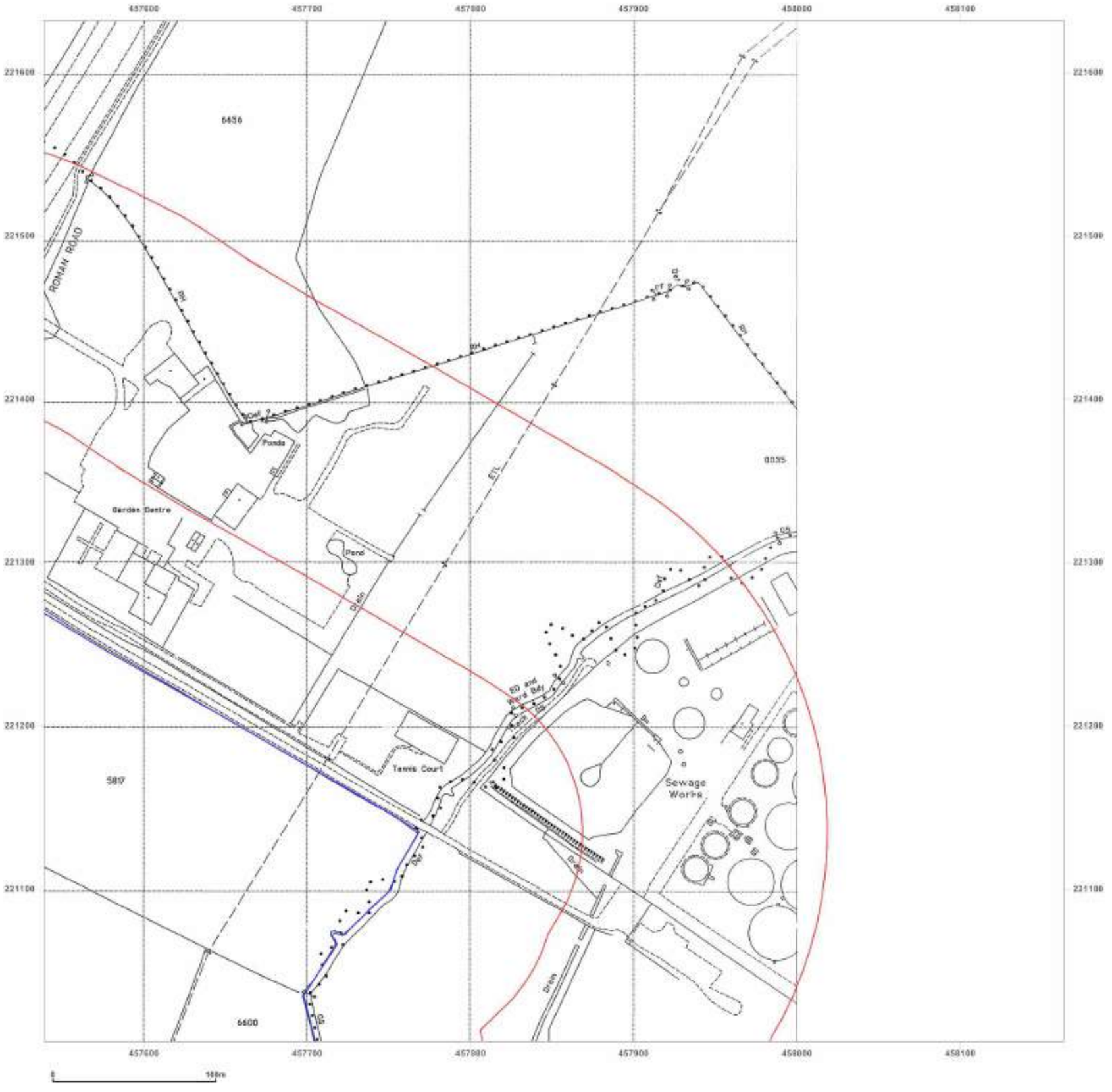

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Client Ref: EMS_482678_647813
Report Ref: EMS-482678_647813_LS_2_2
Grid Ref: 457851, 221319

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

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EmapSite

Masdar House, 1 Reading Road,
Eversley, RG27 0RP

Report Reference: EMS-482678_647814

Your Reference: EMS_482678_647814

Report Date 7 Jun 2018

Report Delivery Method: Email - pdf

Geo Insight

Address: The Promised Land Farm, Wendlebury Road, Bicester,

Dear Sir/ Madam,

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

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**The Promised Land Farm, Wendlebury Road, Bicester,**
Date:	**7 Jun 2018**
Reference:	**EMS-482678_647814**
Client:	**EmapSite**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	06-Sep-2015
Grid Reference:	457556,221013
Site Size:	15.35ha

Contents Page

Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

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

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and linear features	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale?	No

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of linear features within 500m of the study site boundary?	No

Section 3: Radon

3. Radon	3.1Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	2	10	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	3	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

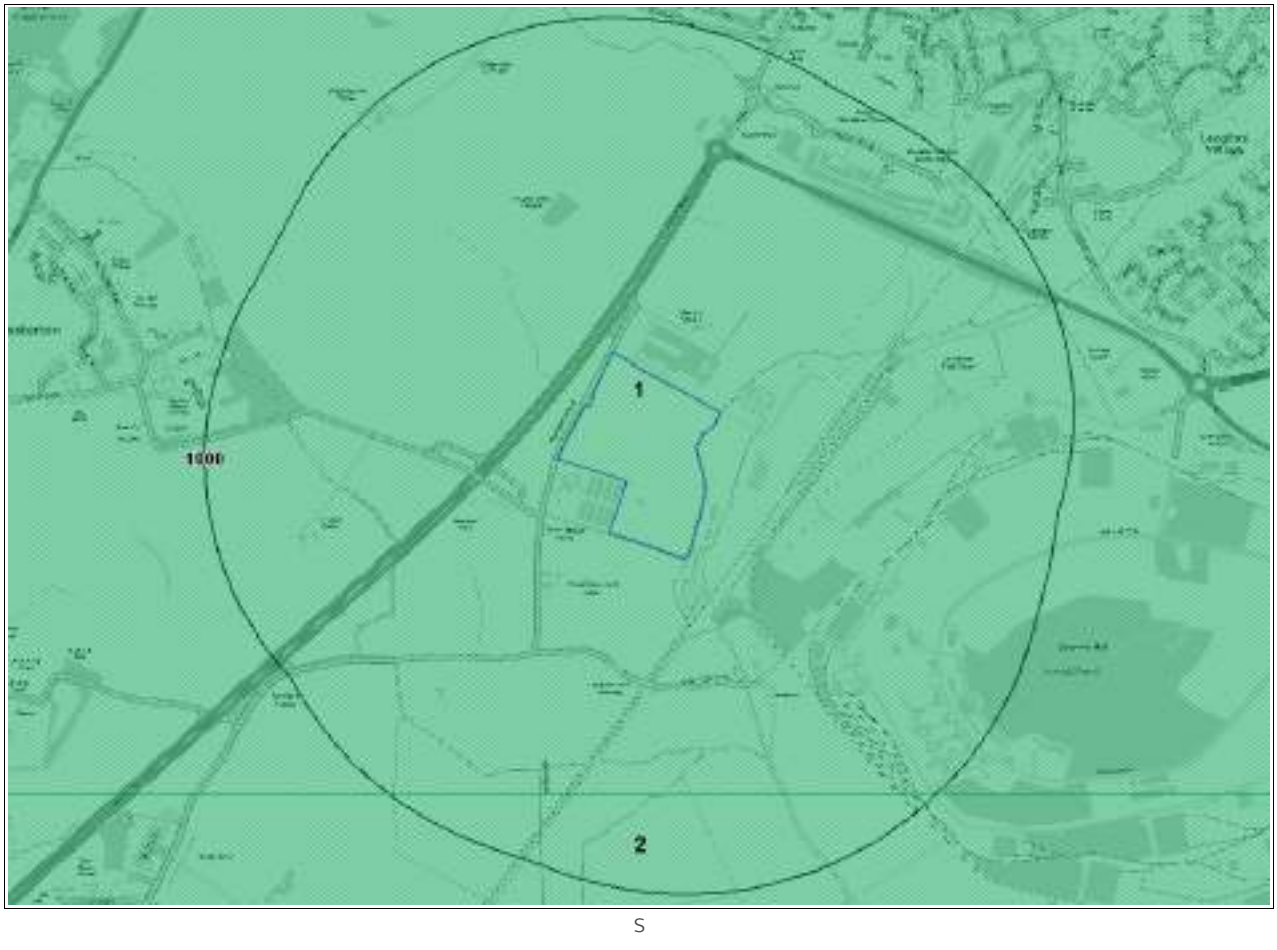
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Moderate
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Moderate
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	1	0

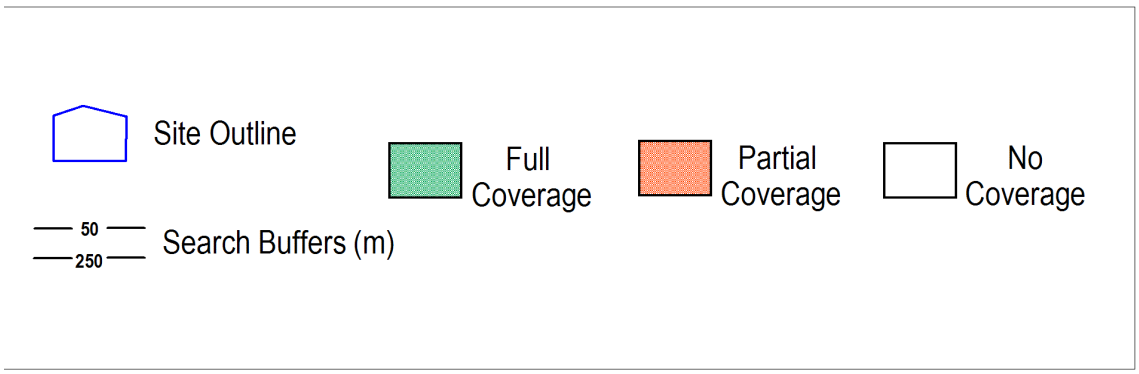
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	13	2	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	0	7	Not Searched
9.3 Historical Railways	0	0	0	Not Searched
9.4 Active Railways	0	0	12	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend



Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
2	700.0	Some deposits are mapped	Full	Full	No coverage

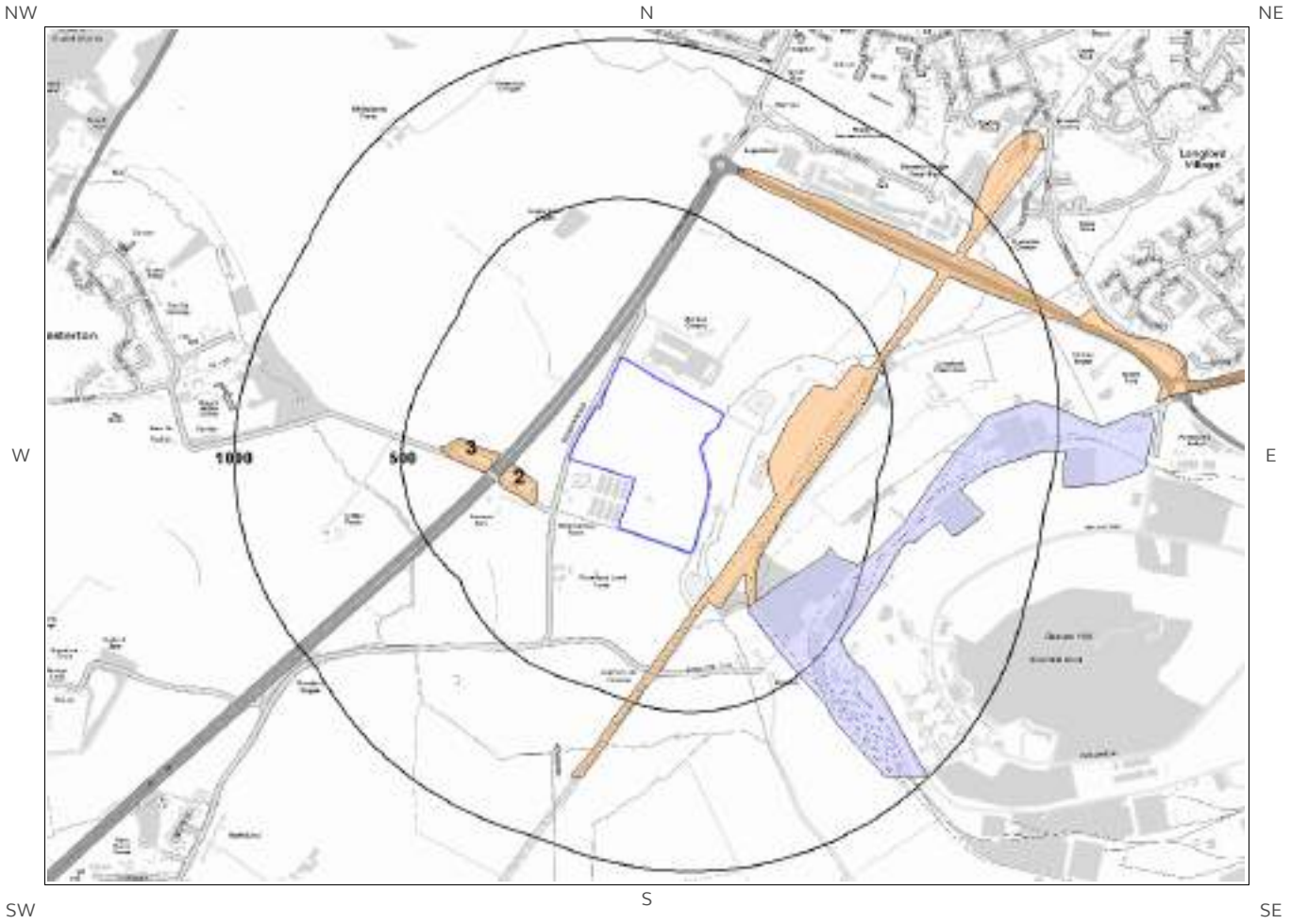
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground map (1:10,000 scale)



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

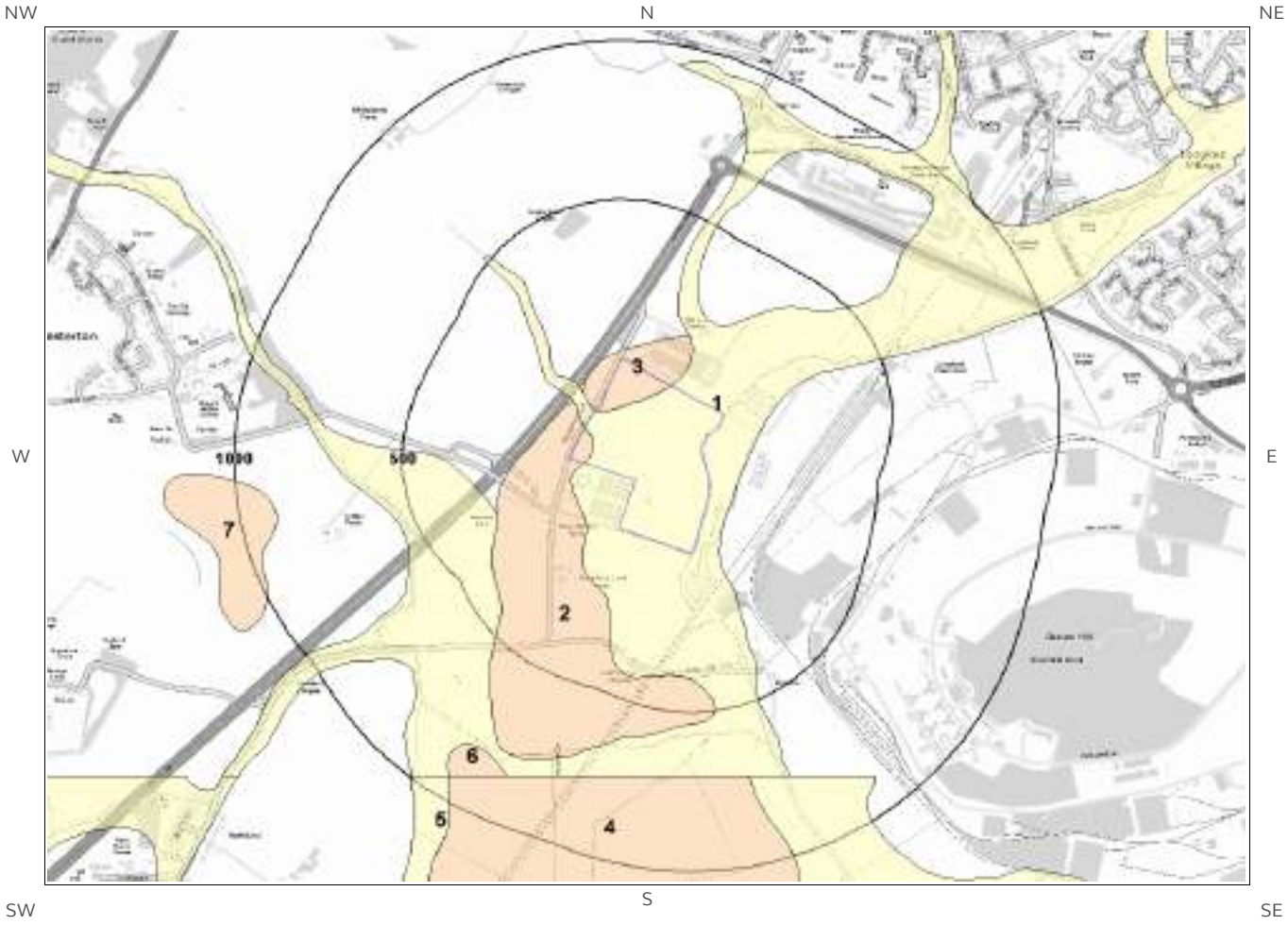
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	108.0	SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	125.0	SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	210.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	238.0	SE	LSGR-UKNOWN	Landscaped Ground (Undivided)	Unknown/unclassified Entry

1.2 Superficial Deposits and Landslips map (1:10,000 scale)



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	ALV-CSV	Alluvium - Sandy Gravelly Clay	Clay, Sandy, Gravelly
2	0.0	On Site	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel
3	0.0	On Site	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

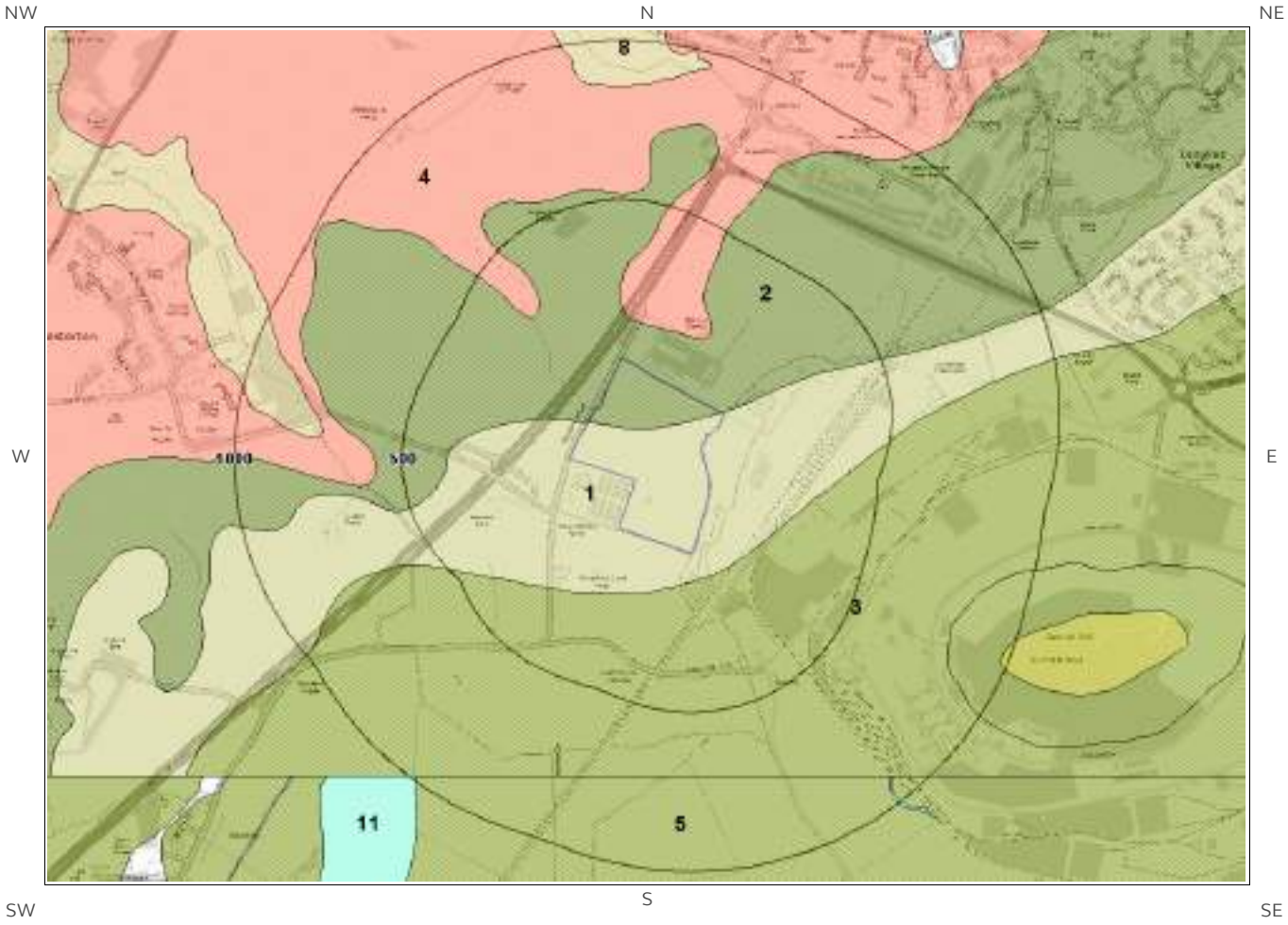
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and linear features map (1:10,000 scale)



Bedrock and linear features Legend

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	KLS-SDSL	Kellaways Sand Member - Sandstone And Siltstone, Interbedded	Callovian Age
2	0.0	On Site	KLC-MDST	Kellaways Clay Member - Mudstone	Callovian Age
3	85.0	S	PET-MDST	Peterborough Member - Mudstone	Callovian Age
4	126.0	N	CB-LMST	Cornbrash Formation - Limestone	Callovian Age - Bathonian Age

1.3.2 Linear features

Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale? No

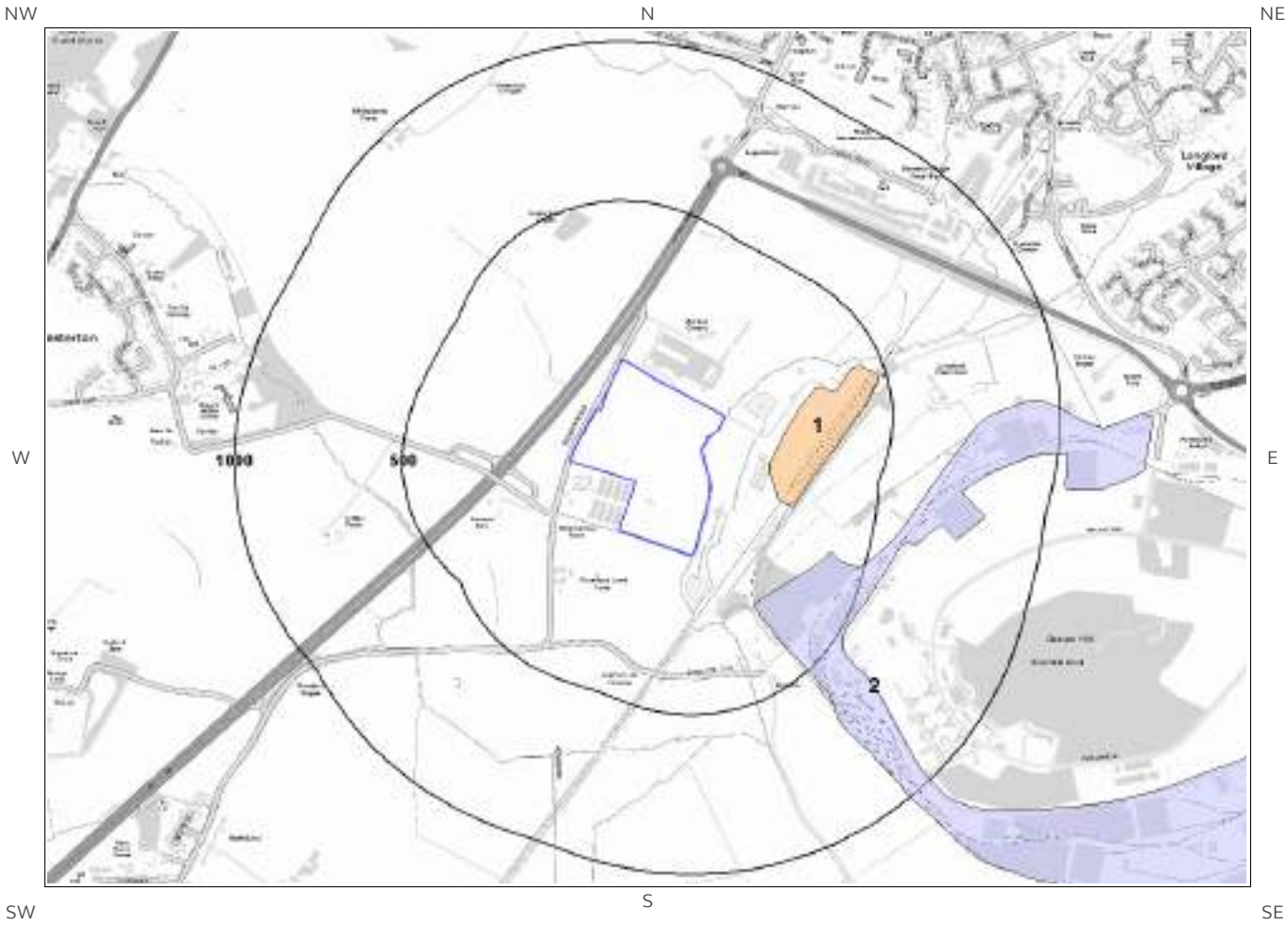
Database searched and no data found at this scale.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 219

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

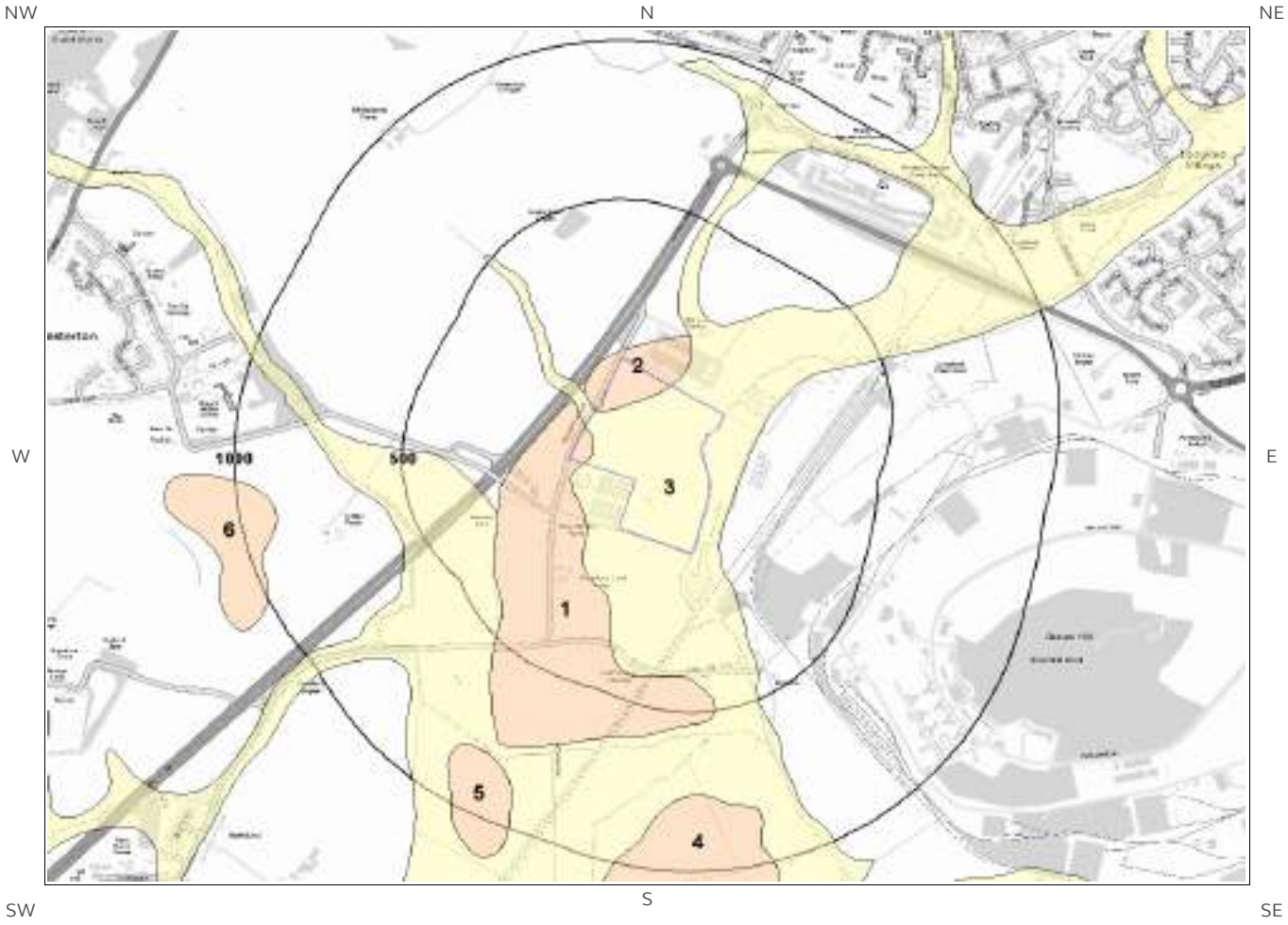
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	179.0	E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	240.0	SE	LSGR-ARTGR	LANDSCAPED GROUND (UNDIVIDED)	ARTIFICIALLY MODIFIED GROUND

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

2.2 Superficial Deposits and Landslips map (1:50,000 scale)



Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
2	0.0	On Site	RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
3	0.0	On Site	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High
0.0	On Site	Intergranular	High	Very Low
0.0	On Site	Intergranular	Very High	High

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

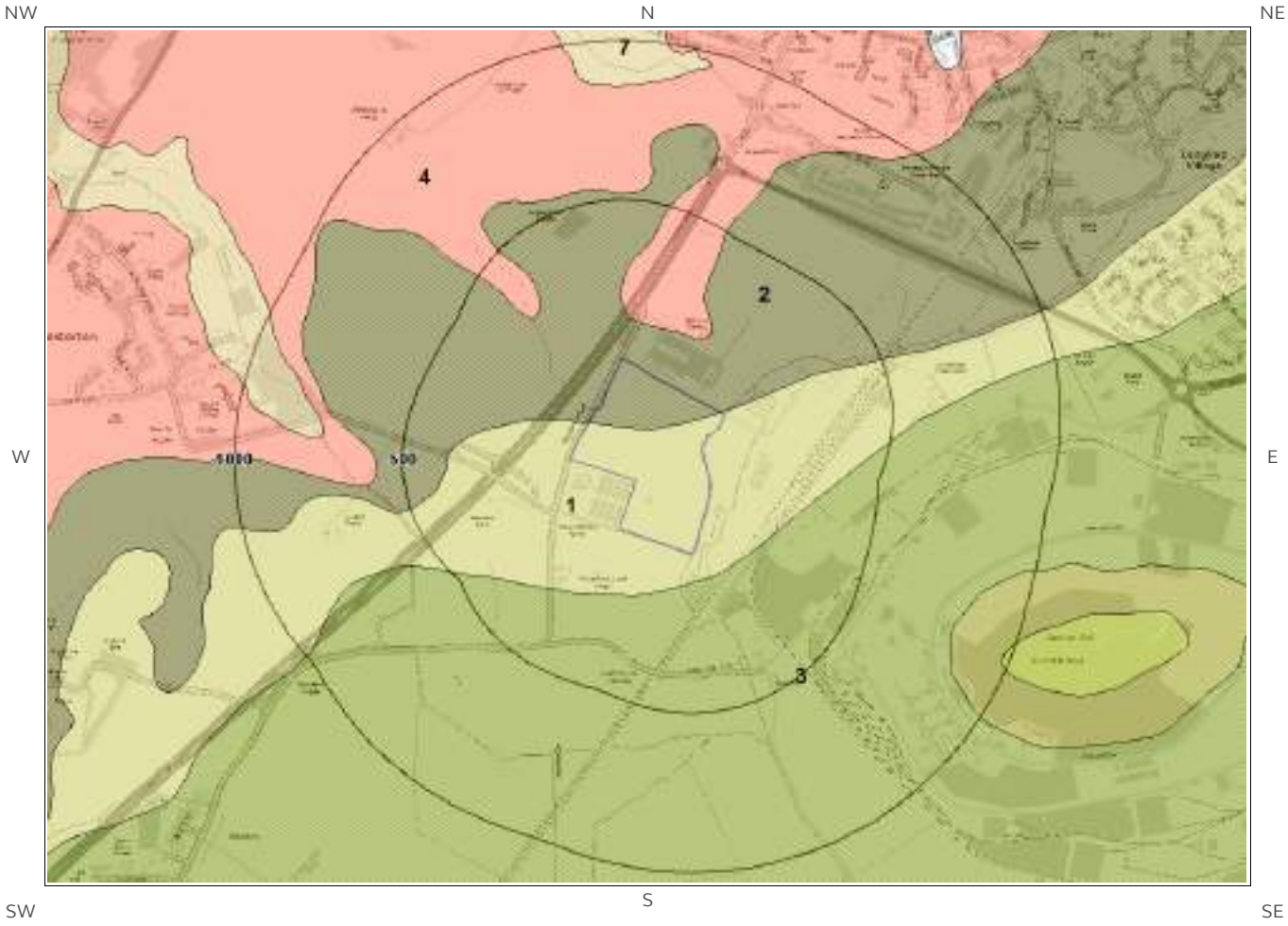
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and linear features map (1:50,000 scale)



Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 219

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	KLS-SDSL	KELLAWAYS SAND MEMBER - SANDSTONE AND SILTSTONE, INTERBEDDED	CALLOVIAN
2	0.0	On Site	KLC-MDST	KELLAWAYS CLAY MEMBER - MUDSTONE	CALLOVIAN
3	87.0	S	PET-MDST	PETERBOROUGH MEMBER - MUDSTONE	CALLOVIAN
4	127.0	N	CB-LMST	CORNBRASH FORMATION - LIMESTONE	BATHONIAN

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Moderate
0.0	On Site	Fracture	Low	Very Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

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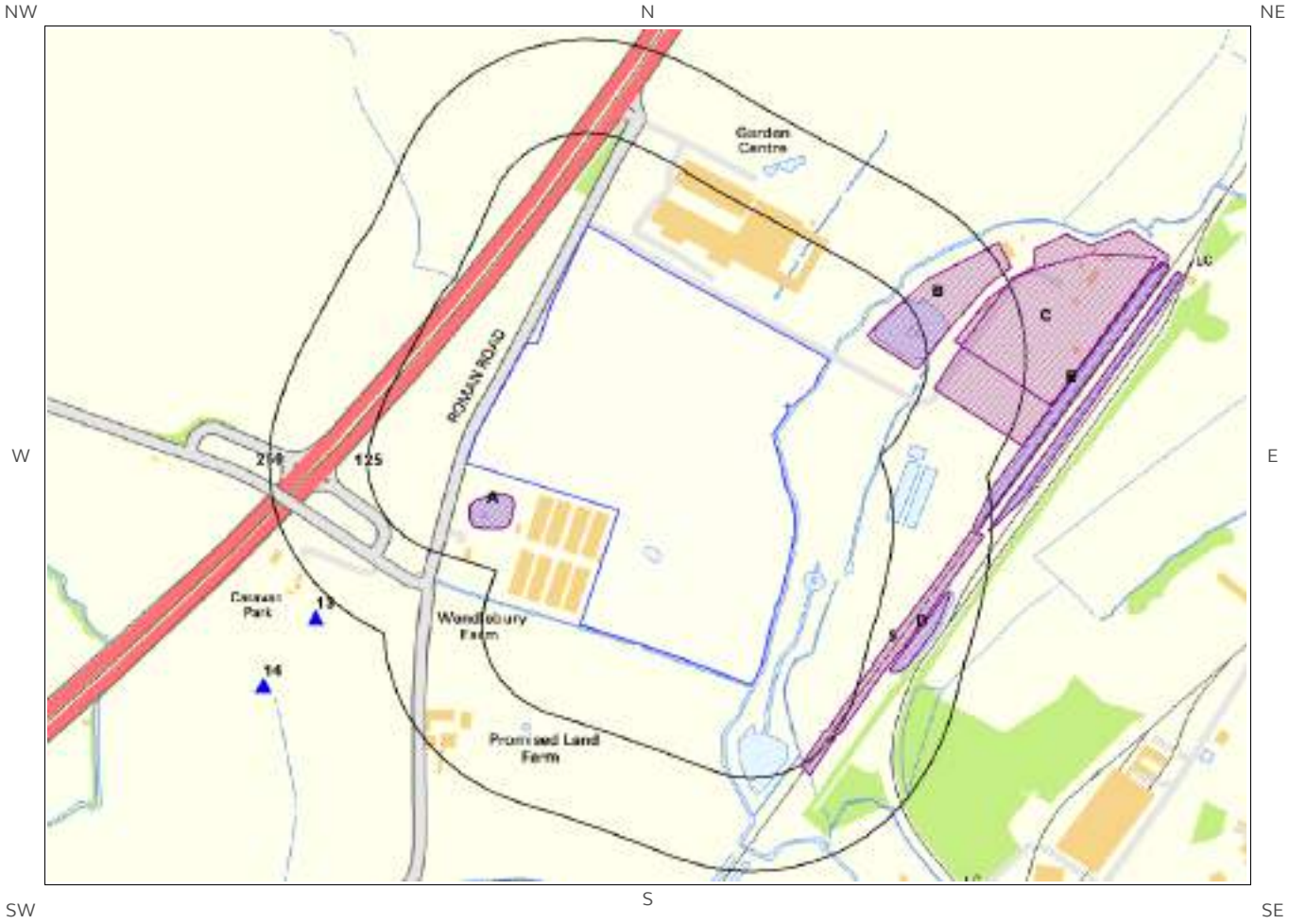
4 Ground Workings map



Ground Workings Legend

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1A	24.0	S	457341 220932	Pond	1995
2A	24.0	S	457341 220932	Pond	1985
3B	59.0	NE	457909 221207	Ponds	1985
4B	59.0	NE	457909 221207	Ponds	1995
5	112.0	SE	457849 220743	Cuttings	1880
6C	139.0	E	458051 221163	Sewage Works	1995
7C	139.0	E	458051 221163	Sewage Works	1985
8D	160.0	E	457884 220770	Pond	1985
9D	160.0	E	457884 220770	Pond	1995
10C	162.0	E	458056 221176	Sewage Farm	1970
11E	226.0	E	458075 221086	Water Body	1880
12E	246.0	E	458093 221079	Pond	1880

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

4.3 Current Ground Workings

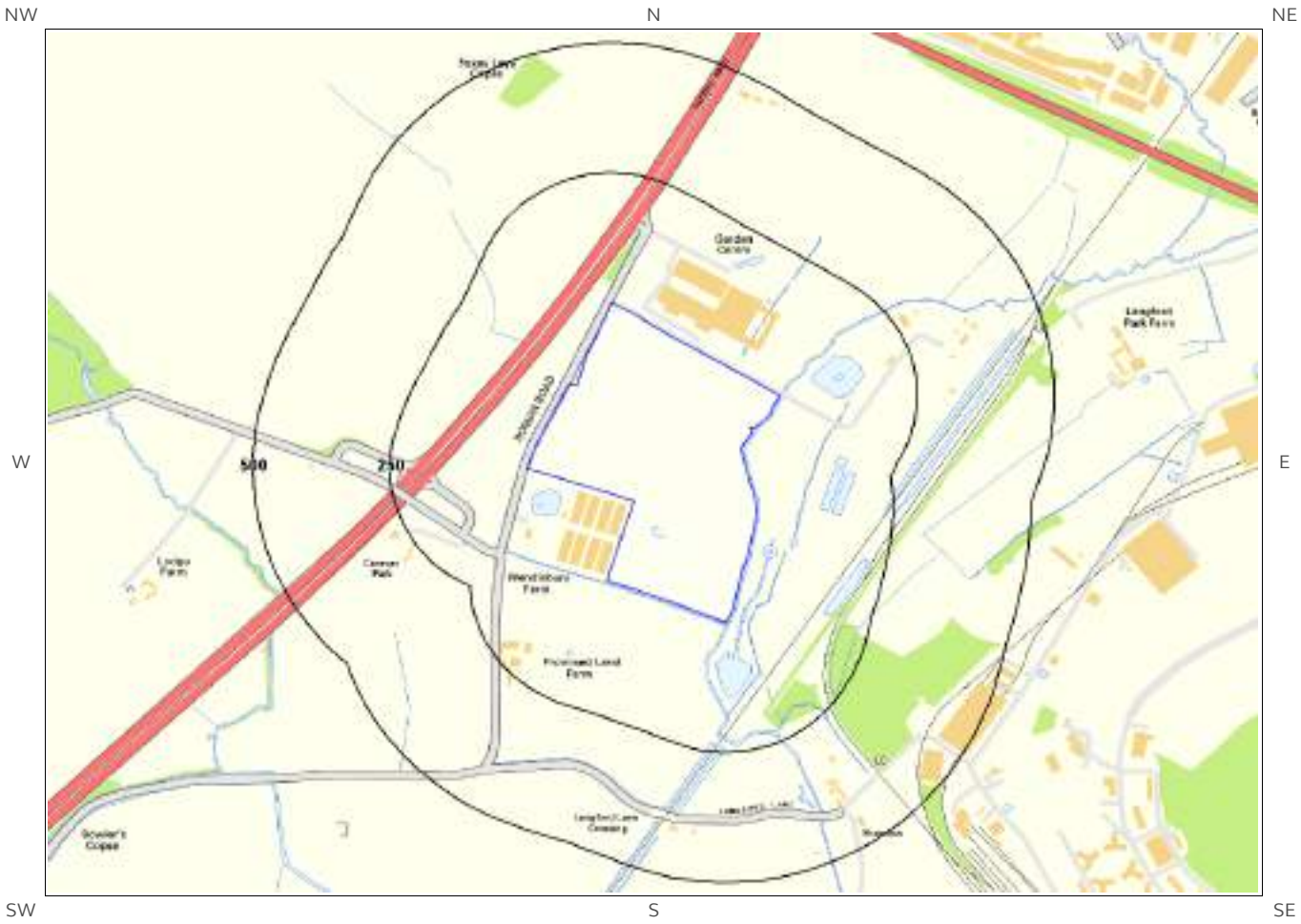
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
13	281.0	SW	457118 220789	Clay & Shale	Promised-land Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
14	393.0	SW	457051 220699	Clay & Shale	Promised-land Farm	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	397.0	SE	457965 220435	Limestone	Langford Lane Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities (point data)

Natural Cavities (polygon data)

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

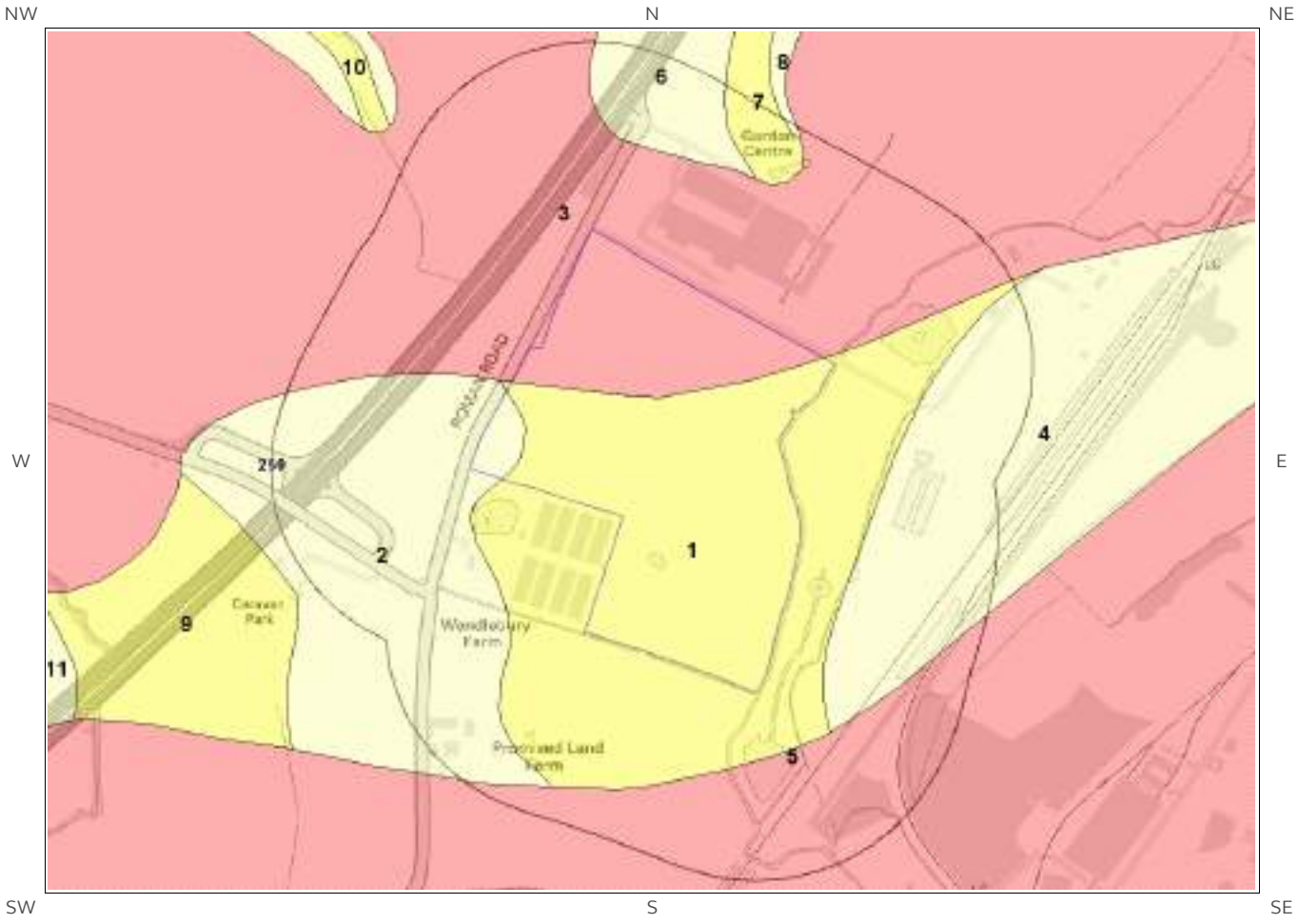
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



Shrink Swell Clay Legend

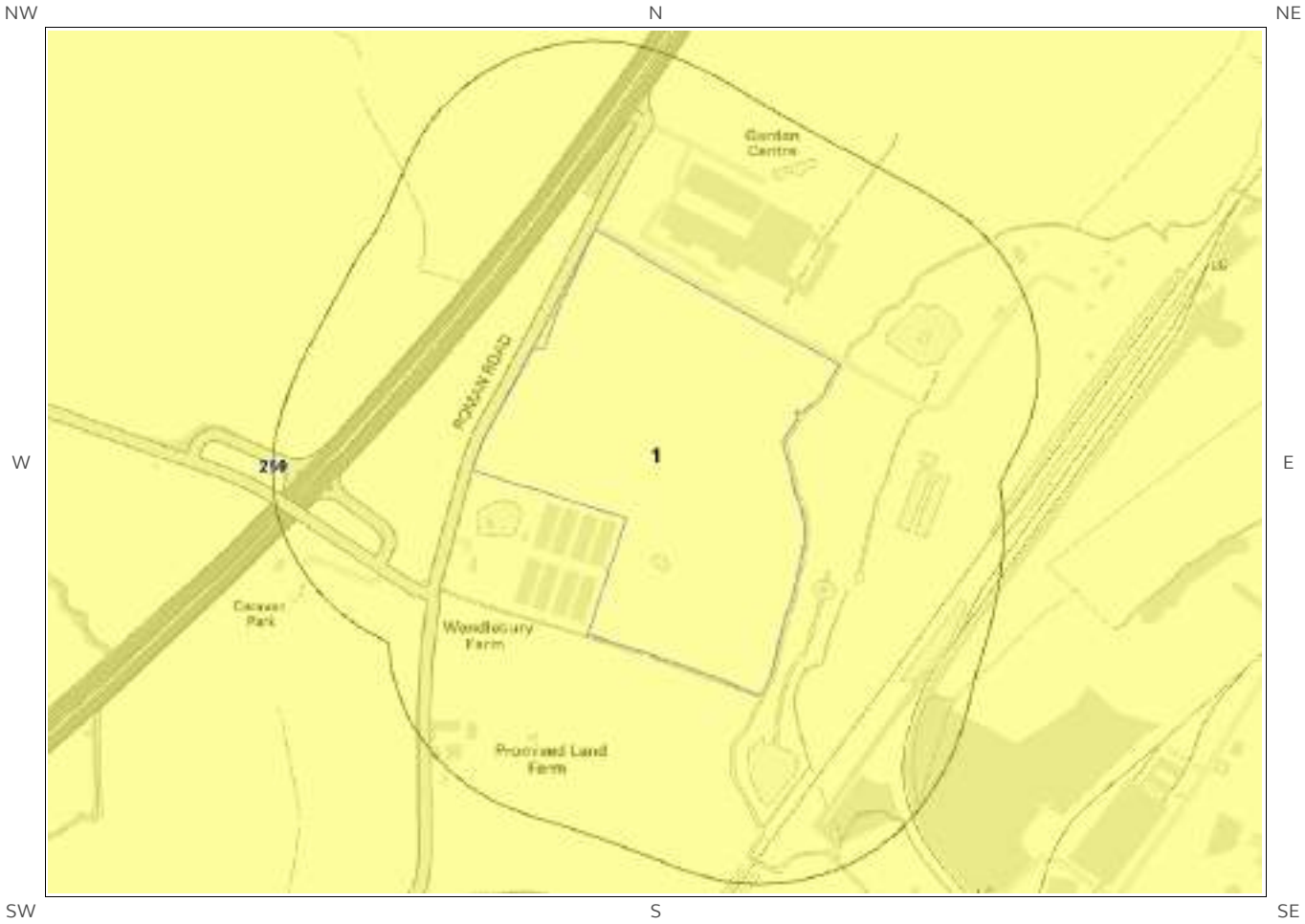
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.2 Landslides map



Landslides Legend

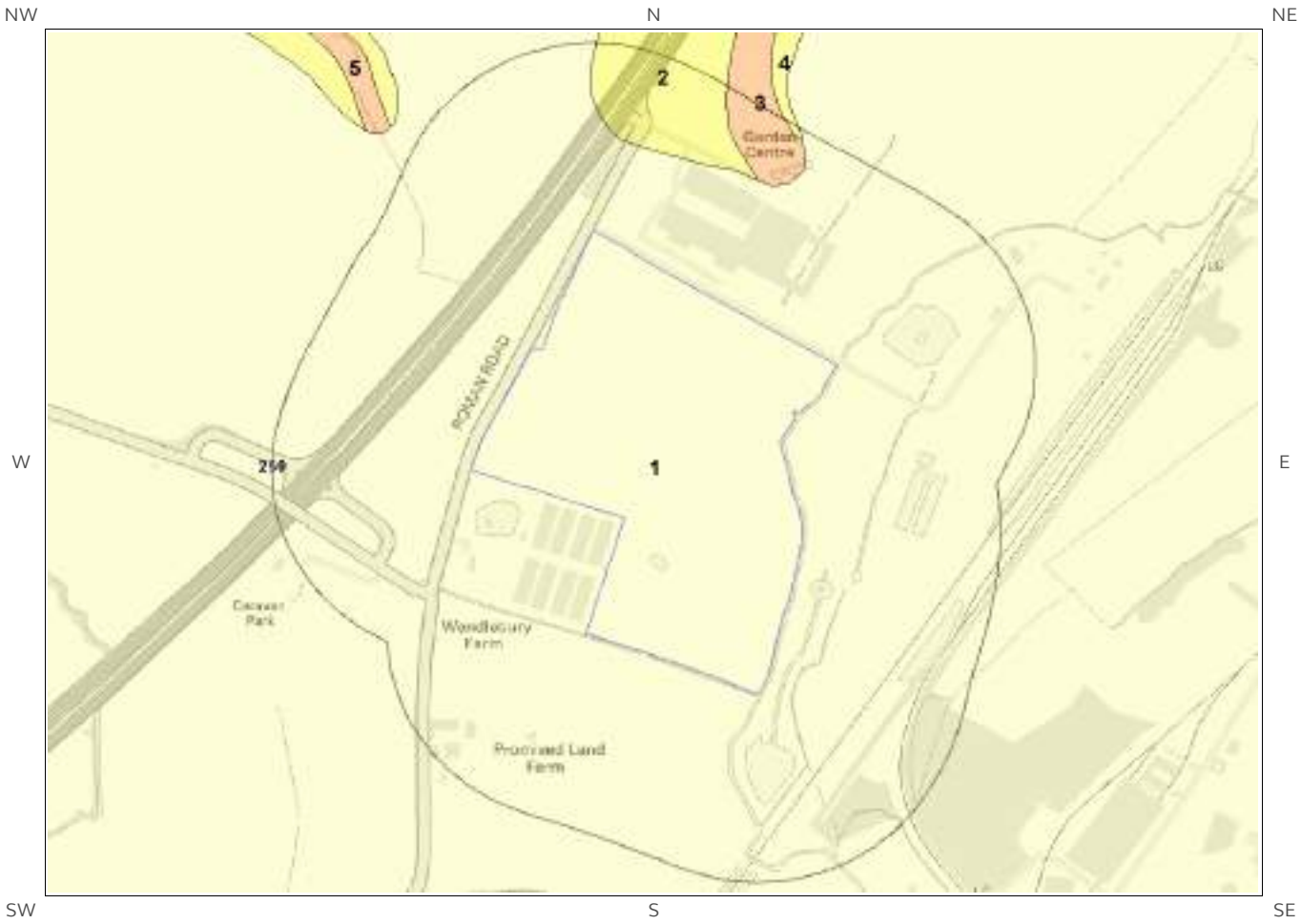
Site Outline

125
250
Search Buffers (m)

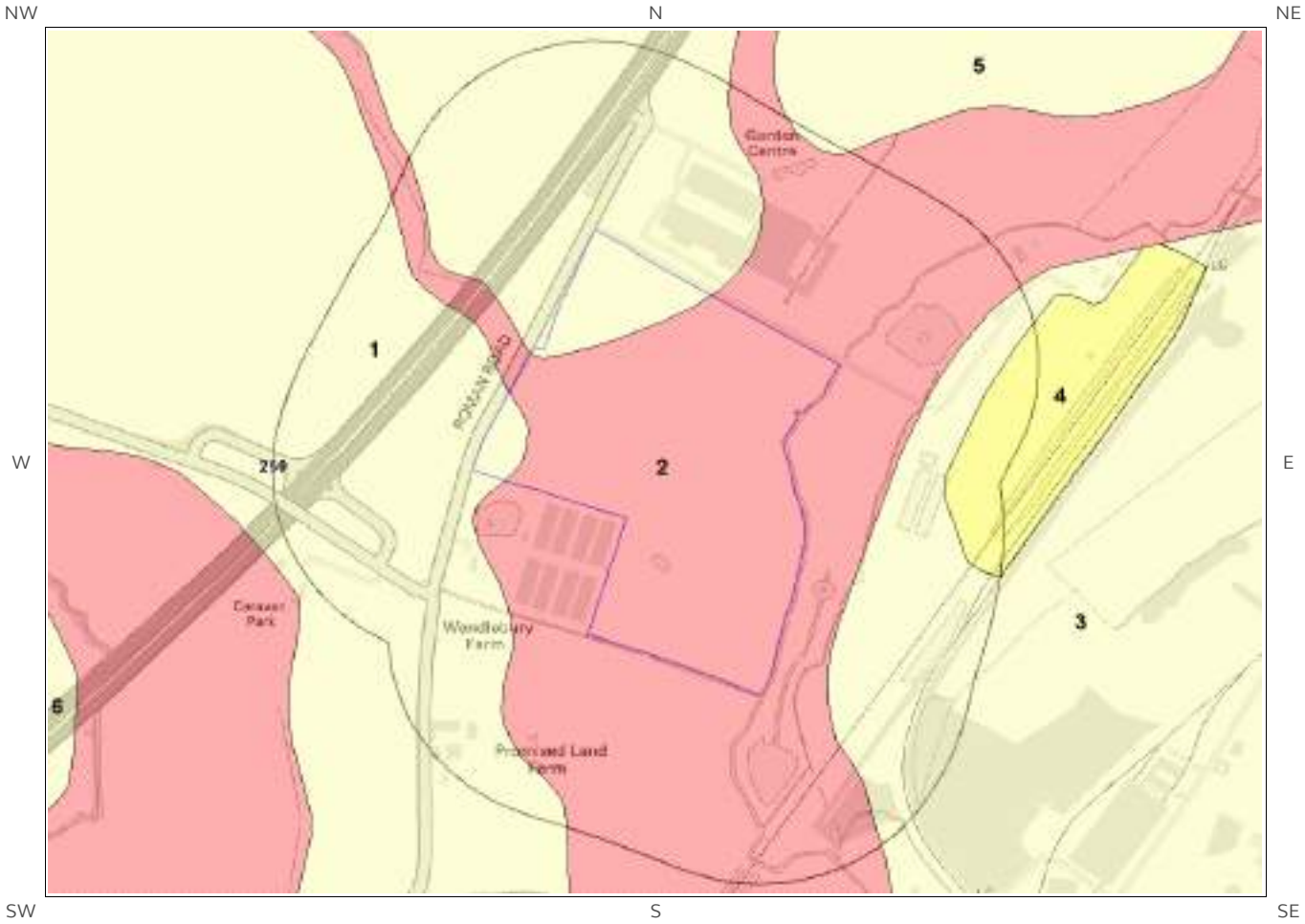
No Data / Null
Negligible
Very Low

Low
Moderate
High

6.3 Ground Dissolution of Soluble Rocks map



6.4 Compressible Deposits map



Compressible Deposits Legend

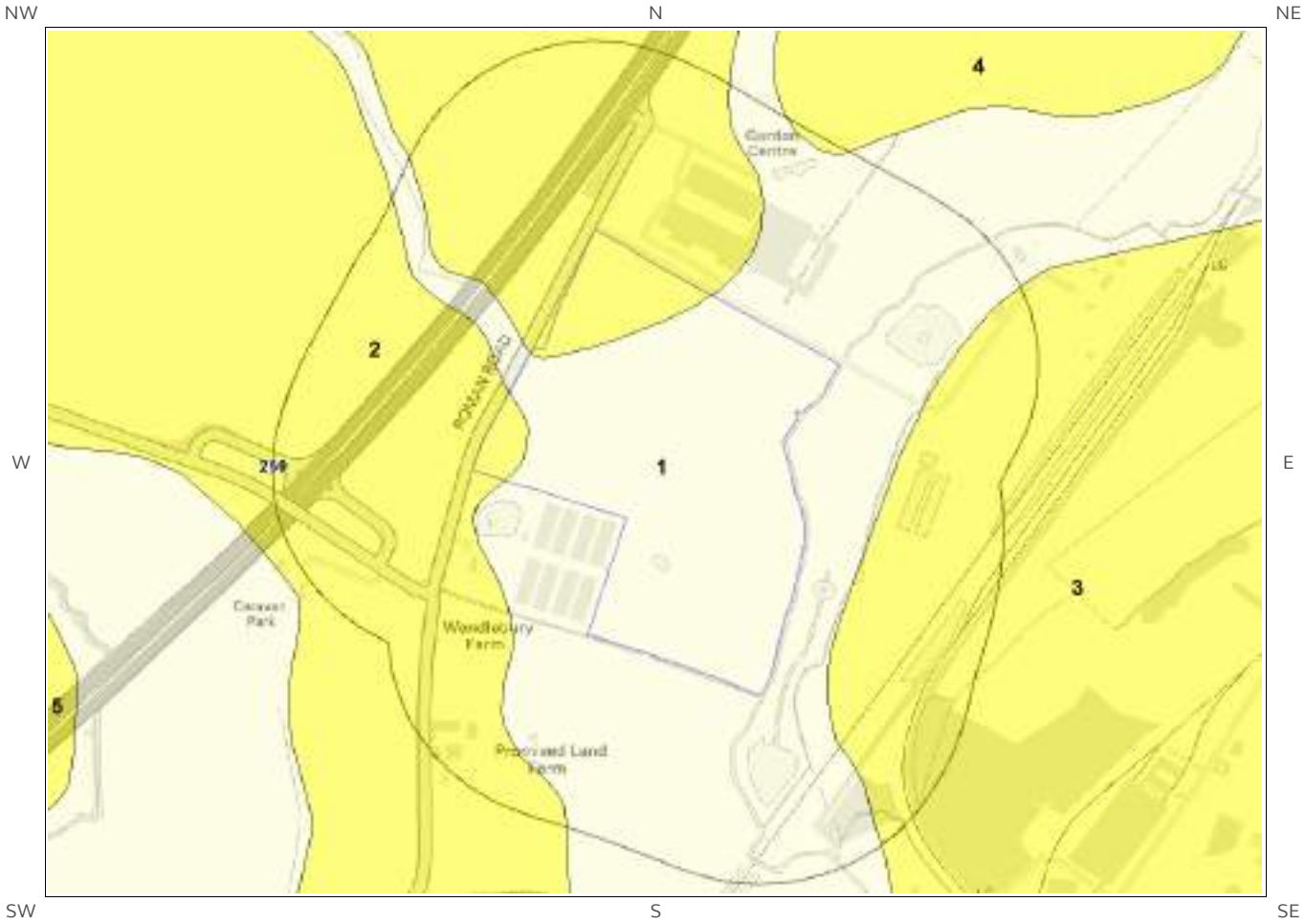
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.5 Collapsible Deposits map



Collapsible Deposits Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.6 Running Sand map

Running Sand Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Moderate

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
3	0.0	On Site	Moderate	Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

* This includes an automatically generated 50m buffer zone around the site

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

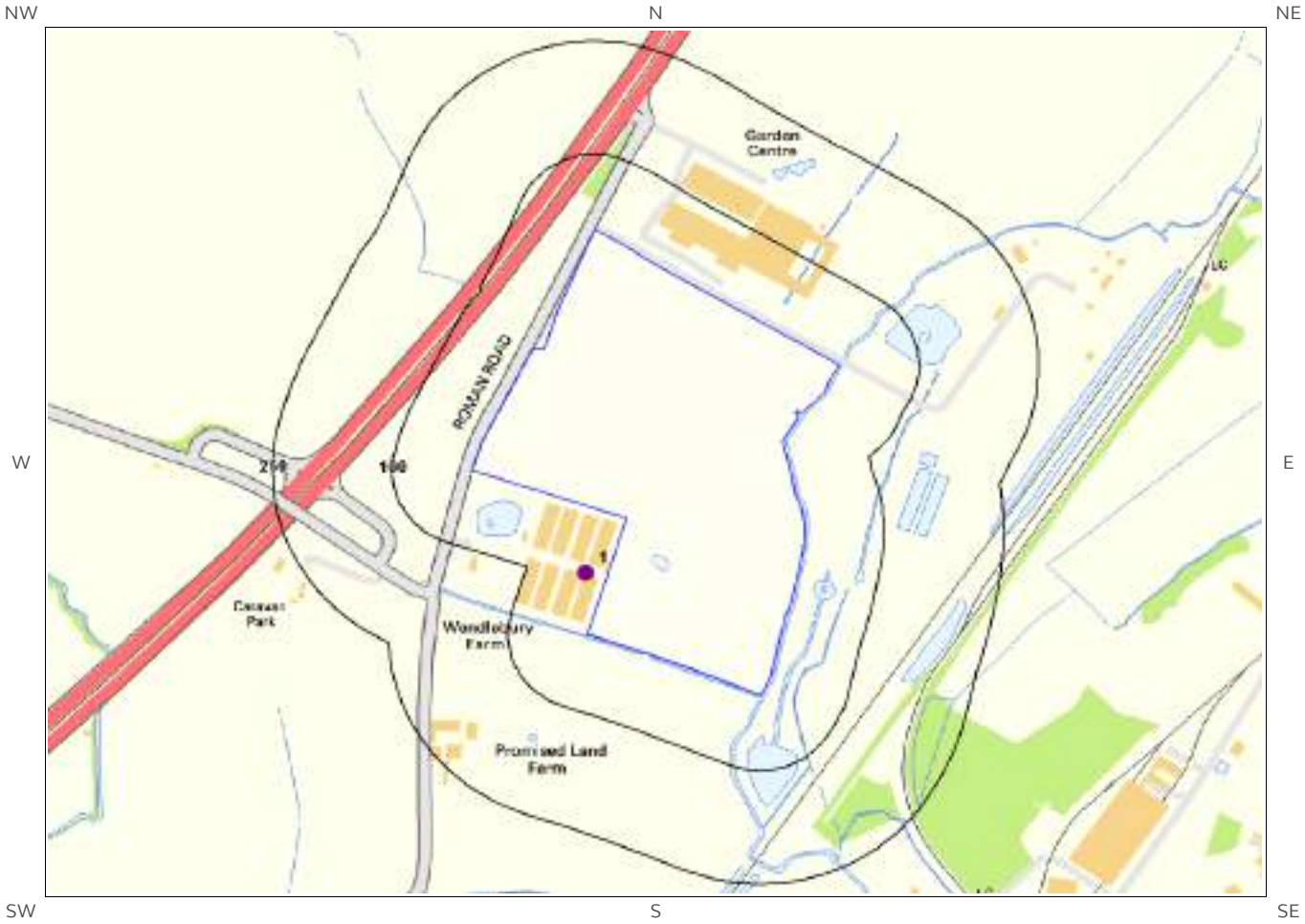
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
2	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
3	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
4	24.0	NW	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records map



Borehole Records Legend

Site Outline

Borehole Locations

125
250
Search Buffers (m)

7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	28.0	W	457450 220860	SP52SE28	15.0	PROMISED LAND FARM BICESTER OXON

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/336728

8 Estimated Background Soil Chemistry

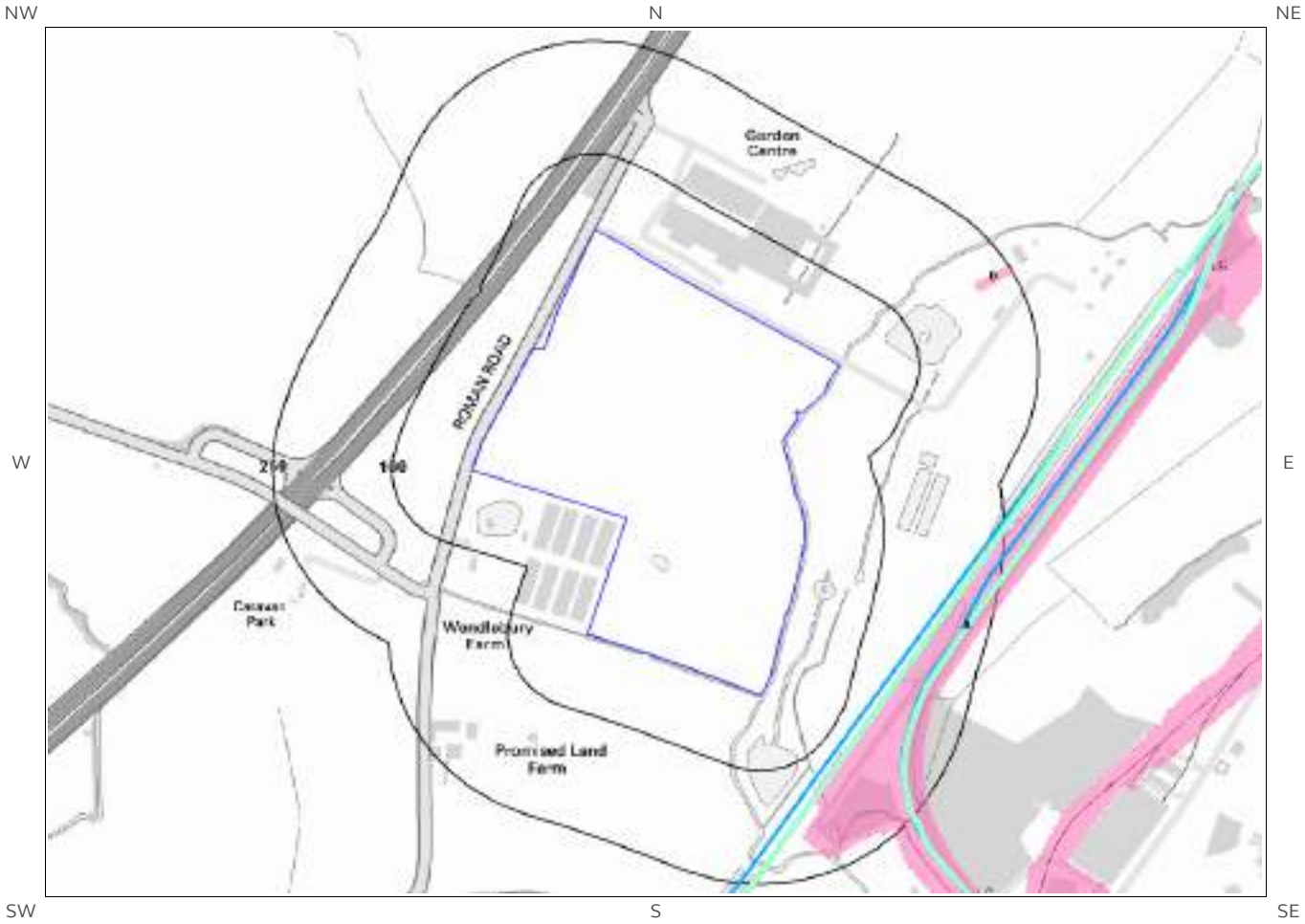
Records of background estimated soil chemistry within 250m of the study site boundary: 15

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

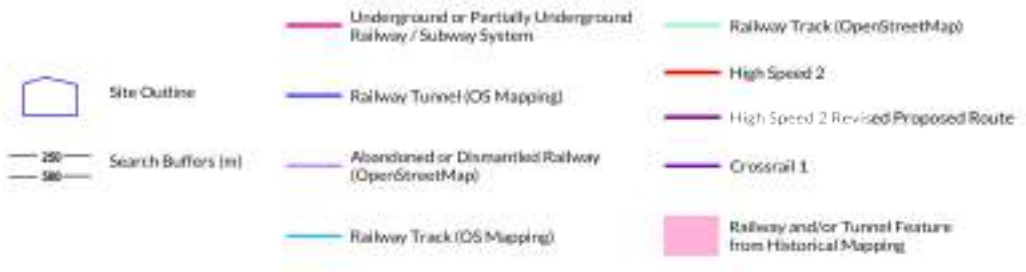
Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
12.0	NW	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
24.0	NW	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels map



Railways and Tunnels Legend



9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1A	127	SE	457851 220688	Railway Sidings	1985
2A	127	SE	457851 220688	Railway Sidings	1966
3A	127	SE	457851 220688	Railway Sidings	1970
4A	127	SE	457851 220688	Railway Sidings	1995
5	158	SE	457882 220729	Railway Sidings	1966
6B	200	NE	457963 221249	Railway Sidings	1995

ID	Distance (m)	Direction	NGR	Details	Date
7B	200	NE	457963 221249	Railway Sidings	1995

Any records that have been identified are represented on the Railways and Tunnels map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Name	Type
120	SE	Not given	Multi Track
120	SE	Not given	Multi Track
132	SE	Not given	Rail
132	SE	Not given	Rail
185	E	Not given	Multi Track
185	E	Not given	Multi Track
188	E	Bicester Military Railway	Rail
188	E	Bicester Military Railway	Rail
214	E	Not given	Multi Track
214	E	Not given	Multi Track
214	E	Not given	Multi Track
214	E	Not given	Multi Track

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project?	No
Is the study site within 500m of the route of the Crossrail 1 rail project?	No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a ***Groundsure HS2 and Crossrail 1 Report****.*

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

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sales@emapsite.com

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Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
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Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
Main switchboard: 020 7654 8000

Johnson Poole & Bloomer Limited

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Brierley Hill, West Midlands
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Email:**enquiries.gs@jpb.co.uk**
Website: **www.jpb.co.uk**

Ordnance Survey

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SO16 0AS

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Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
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Tel: 01252 845444
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
https://www.groundsure.com/terms-and-conditions-may25-2018

EmapSite

Masdar House, 1 Reading Road,
Eversley, RG27 0RP

Groundsure Reference:	EMS-482678_647815
Your Reference:	EMS_482678_647815
Report Date	7 Jun 2018
Report Delivery Method:	Email - pdf

Enviro Insight

Address: The Promised Land Farm, Wendlebury Road, Bicester,

Dear Sir/ Madam,

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

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**The Promised Land Farm, Wendlebury Road, Bicester,**
Date:	**7 Jun 2018**
Reference:	**EMS-482678_647815**
Client:	**EmapSite**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	06-Sep-2015
Grid Reference:	457556,221013
Site Size:	15.35ha

Report Reference: EMS-482678_647815
Client Reference: EMS_482678_647815

Contents Page

Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	2	15	30
1.2 Additional Information – Historical Tank Database	0	0	25	40
1.3 Additional Information – Historical Energy Features Database	0	0	0	2
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	2	12	16

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	10	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	4	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	1	9	8
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	1	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	2

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	4	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

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

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

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	Yes	No	No	No	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	4	24	104	48	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

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

Section 8: Designated Environmentally Sensitive Sites

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

Section 8: Designated Environmentally Sensitive Sites

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

Section 9: Natural Hazards

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

Section 10: Mining

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

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

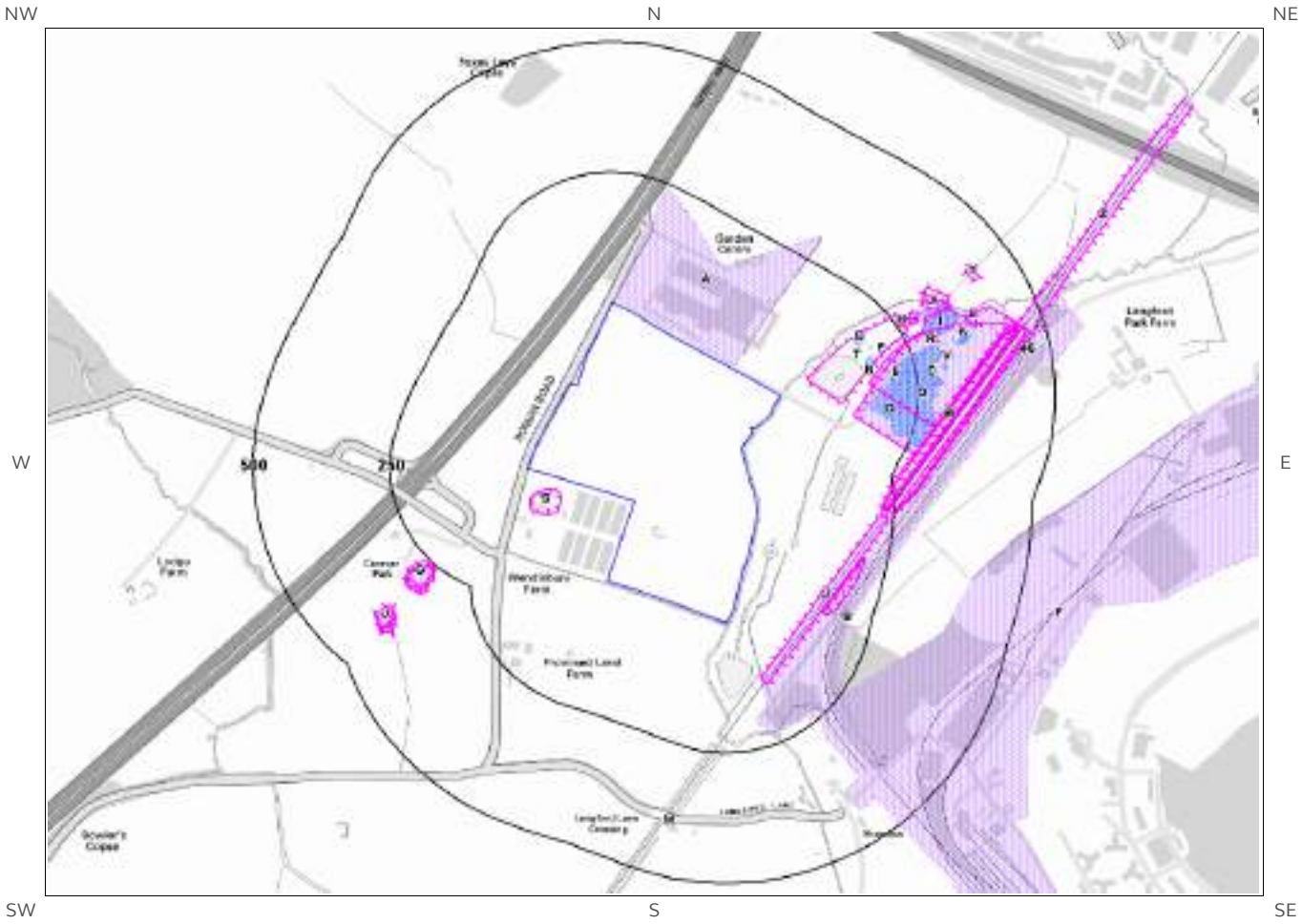
Note: Maps

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

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

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

1. Historical Land Use



Site Outline

250
500
Search Buffers (m)

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

Industrial Land Use

Potentially Infilled Land

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

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 47

ID	Distance [m]	Direction	Use	Date
1A	7	NE	Nursery	1995
2A	7	NE	Nursery	1985
3U	112	SE	Cuttings	1880
4B	127	SE	Railway Sidings	1995
5B	127	SE	Railway Sidings	1970
6B	127	SE	Railway Sidings	1966
7B	127	SE	Railway Sidings	1985
8C	139	E	Sewage Works	1995
9C	139	E	Sewage Works	1985
10C	162	E	Sewage Farm	1970
11D	187	E	Unspecified Tanks	1995
12D	187	E	Unspecified Tanks	1985
13E	204	E	Unspecified Tanks	1995
14E	204	E	Unspecified Tanks	1985
15C	213	E	Unspecified Tanks	1995
16C	213	E	Unspecified Tanks	1970
17C	213	E	Unspecified Tanks	1985
18G	251	SW	Unspecified Pit	1882
19F	253	SE	Unspecified Depot	1970
20F	253	SE	Unspecified Depot	1995
21F	253	SE	Unspecified Depot	1985
22F	253	SE	Unspecified Depot	1966
23H	254	NE	Unspecified Heap	1966
24G	257	SW	Old Clay Pit	1898
25G	261	SW	Unspecified Pit	1880
26C	267	E	Unspecified Tanks	1995
27C	267	E	Unspecified Tanks	1985
28C	273	E	Unspecified Tanks	1970
29H	273	NE	Sewage Tank	1880
30H	277	NE	Sewage Tank	1882
31I	295	NE	Unspecified Tanks	1995
32I	295	NE	Unspecified Tanks	1985
33K	340	E	Unspecified Tanks	1970

34J	361	SW	Unspecified Ground Workings	1882
35J	368	SW	Unspecified Pit	1880
36K	373	E	Unspecified Tank	1995
37K	373	E	Unspecified Tank	1985
38L	374	NE	Sewage Tank	1919
39L	374	NE	Sewage Tank	1898
40L	374	NE	Sewage Tank	1950
41J	374	SW	Old Clay Pit	1898
42M	391	S	Railway Building	1970
43M	392	S	Railway Station	1995
44M	392	S	Railway Station	1985
45Y	412	NE	Unspecified Heap	1966
46	448	E	Railway Building	1966
47Z	450	E	Cuttings	1880

1.2 Additional Information – Historical Tank Database

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

Records of historical tanks within 500m of the search boundary: 65

ID	Distance (m)	Direction	Use	Date
48D	163	E	Tanks	1995
49D	163	E	Tanks	1995
50N	166	E	Unspecified Tank	1995
51N	166	E	Unspecified Tank	1995
52N	166	E	Unspecified Tank	1995
53N	166	E	Unspecified Tank	1995
54O	168	NE	Unspecified Tank	1995
55O	168	NE	Unspecified Tank	1995
56N	169	E	Unspecified Tank	1995
57N	169	E	Unspecified Tank	1995
58O	183	NE	Unspecified Tank	1995
59O	183	NE	Unspecified Tank	1995
60D	190	E	Tanks	1992
61D	190	E	Tanks	1993
62P	197	NE	Unspecified Tank	1995
63P	197	NE	Unspecified Tank	1995
64E	205	E	Tanks	1983
65E	207	E	Tanks	1992
66E	207	E	Tanks	1993
67C	231	E	Tanks	1966

68Q	232	E	Tanks	1996
69Q	232	E	Tanks	1995
70Q	232	E	Tanks	1996
71Q	232	E	Tanks	1995
72C	232	E	Tanks	1992
73C	265	E	Tanks	1992
74C	265	E	Tanks	1986
75H	272	NE	Urban District Council Sewage Tank	1922
76H	272	NE	Sewage Tank	1900
77H	272	NE	Sewage Tank	1881
78C	272	E	Tanks	1966
79H	275	NE	Unspecified Tank	1996
80H	275	NE	Unspecified Tank	1996
81H	277	NE	Unspecified Tank	1996
82H	277	NE	Unspecified Tank	1996
83R	290	E	Unspecified Tank	1996
84R	290	E	Unspecified Tank	1996
85R	290	E	Unspecified Tank	1995
86R	290	E	Unspecified Tank	1995
87I	294	NE	Tanks	1996
88I	294	NE	Tanks	1995
89I	294	NE	Tanks	1996
90I	294	NE	Tanks	1995
91I	295	NE	Tanks	1992
92I	295	NE	Tanks	1986
93C	298	E	Tanks	1996
94C	301	E	Unspecified Tank	1996
95V	306	E	Unspecified Tank	1996
96I	332	E	Unspecified Tank	1995
97I	332	E	Unspecified Tank	1996
98I	332	E	Unspecified Tank	1996
99I	332	E	Unspecified Tank	1995
100K	335	E	Tanks	1996
101K	335	E	Tanks	1995
102K	335	E	Tanks	1995
103K	335	E	Tanks	1996
104K	336	E	Tanks	1992
105K	336	E	Tanks	1986
106K	342	E	Tanks	1966
107K	373	E	Unspecified Tank	1996
108K	373	E	Unspecified Tank	1995
109K	373	E	Unspecified Tank	1996
110K	373	E	Unspecified Tank	1995
111K	374	E	Unspecified Tank	1992
112K	374	E	Unspecified Tank	1986

1.3 Additional Information – Historical Energy Features Database

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

Records of historical energy features within 500m of the search boundary: 2

ID	Distance (m)	Direction	Use	Date
113R	303	E	Electricity Substation	1986
114R	303	E	Electricity Substation	1992

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

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

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

1.6 Potentially Infilled Land

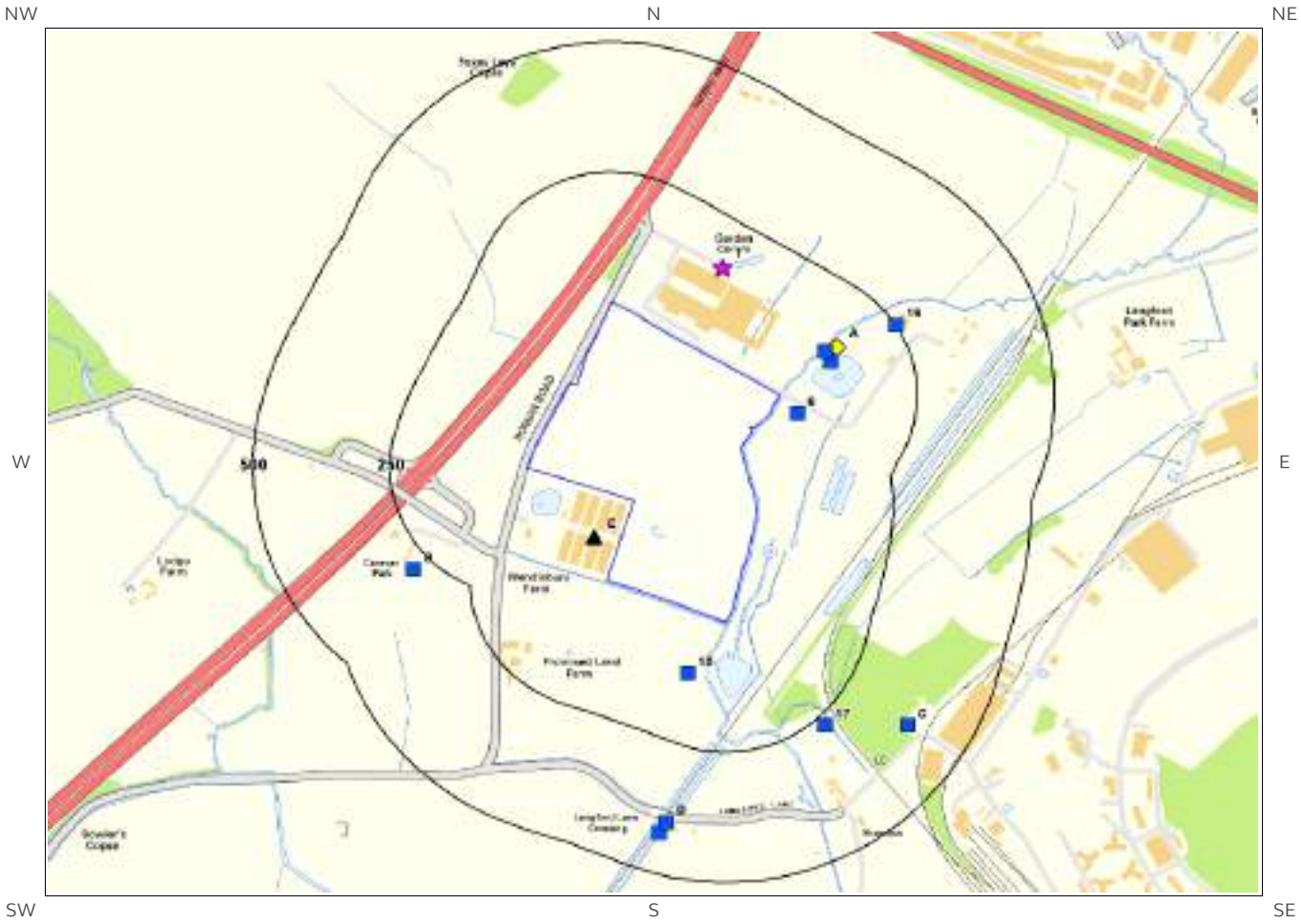
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 30

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

ID	Distance(m)	Direction	Use	Date
115S	24	S	Pond	1985
116S	24	S	Pond	1995
117T	59	NE	Ponds	1985
118T	59	NE	Ponds	1995
119U	112	SE	Cuttings	1880
120C	139	E	Sewage Works	1985

121C	139	E	Sewage Works	1995
122U	160	E	Pond	1985
123U	160	E	Pond	1995
124V	162	E	Sewage Farm	1970
125W	226	E	Water Body	1880
126W	228	E	Water Body	1882
127W	241	E	Water Body	1882
128W	246	E	Pond	1880
129G	251	SW	Unspecified Pit	1882
130H	254	NE	Unspecified Heap	1966
131G	257	SW	Old Clay Pit	1898
132G	261	SW	Unspecified Pit	1880
133H	273	NE	Sewage Tank	1880
134H	277	NE	Sewage Tank	1882
135X	310	NE	Pond	1880
136X	317	NE	Pond	1882
137J	361	SW	Unspecified Ground Workings	1882
138J	368	SW	Unspecified Pit	1880
139L	374	NE	Sewage Tank	1919
140L	374	NE	Sewage Tank	1950
141L	374	NE	Sewage Tank	1898
142J	374	SW	Old Clay Pit	1898
143Y	412	NE	Unspecified Heap	1966
144Z	450	E	Cuttings	1880

2. Environmental Permits, Incidents and Registers Map



Site Outline

250
500
Search Buffers (m)

Recorded Pollution Incident

Dangerous Substances (List 1)

Dangerous Substances (List 2)

Water Industry Referrals

Licenced Discharge Consents

Red List Discharge Consents

RAS 3 & 4 Authorisations

Part A(1) Authorised Processes and Historic IPC Authorisations

Part A(2) and Part B Authorised Processes

COMAH / NIHHS Sites

Sites Determined as Contaminated Land

Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

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

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

0

Database searched and no data found.

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

10

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
34E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: INTENSIVE FARMING; > 40,000 POULTRY	Permit Number: FP3238CF Original Permit Number: SP3637MV EPR Reference: - Issue Date: 3/4/2012 Effective Date: 3/4/2012 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
35E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: ASSOCIATED PROCESS	Permit Number: CP3631TR Original Permit Number: SP3637MV EPR Reference: - Issue Date: 30/6/2010 Effective Date: 30/6/2010 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
36E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: ASSOCIATED PROCESS	Permit Number: FP3238CF Original Permit Number: SP3637MV EPR Reference: - Issue Date: 3/4/2012 Effective Date: 3/4/2012 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded

ID	Distance (m)	Direction	NGR	Details	
37E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: INTENSIVE FARMING; > 40,000 POULTRY	Permit Number: CP3631TR Original Permit Number: SP3637MV EPR Reference: - Issue Date: 30/6/2010 Effective Date: 30/6/2010 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
38E	47	W	457430 220860	Operator: Faccenda Foods Limited Installation Name: Wendlebury Farm Poultry Unit Process: ASSOCIATED PROCESS	Permit Number: MP3935RW Original Permit Number: SP3637MV EPR Reference: - Issue Date: 4/12/2015 Effective Date: 4/12/2015 00:00:00 Last date noted as effective: 2018-03-01 Status: Effective
39E	47	W	457430 220860	Operator: Faccenda Foods Limited Installation Name: Wendlebury Farm Poultry Unit Process: INTENSIVE FARMING; > 40,000 POULTRY	Permit Number: MP3935RW Original Permit Number: SP3637MV EPR Reference: - Issue Date: 4/12/2015 Effective Date: 4/12/2015 00:00:00 Last date noted as effective: 2018-03-01 Status: Effective
40E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: ASSOCIATED PROCESS	Permit Number: SP3637MV Original Permit Number: SP3637MV EPR Reference: - Issue Date: 24/8/2007 Effective Date: 24/8/2007 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
41E	47	W	457430 220860	Operator: Faccenda Group Limited Installation Name: Wendlebury Farm Process: INTENSIVE FARMING; > 40,000 POULTRY	Permit Number: SP3637MV Original Permit Number: SP3637MV EPR Reference: - Issue Date: 24/8/2007 Effective Date: 24/8/2007 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
42E	47	W	457430 220860	Operator: Faccenda Foods Limited Installation Name: Wendlebury Farm Process: ASSOCIATED PROCESS	Permit Number: ZP3136VD Original Permit Number: SP3637MV EPR Reference: - Issue Date: 23/6/2014 Effective Date: 23/6/2014 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded
43E	47	W	457430 220860	Operator: Faccenda Foods Limited Installation Name: Wendlebury Farm Process: INTENSIVE FARMING; > 40,000 POULTRY	Permit Number: ZP3136VD Original Permit Number: SP3637MV EPR Reference: - Issue Date: 23/6/2014 Effective Date: 23/6/2014 00:00:00 Last date noted as effective: 2018-03-01 Status: Superceded

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

4

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
2A	138	NE	457871 221227	Name: Haul Waste Disposal Ltd Status: Active Receiving Water: Langford Brook	Authorised Substances: Chromium, Copper, Lead, Nickel, Zinc
3A	138	NE	457871 221227	Name: Powdertech (bicester) Ltd Status: Active Receiving Water: -	Authorised Substances: Zinc
4A	138	NE	457871 221227	Name: Hardide Ltd Status: Active Receiving Water: Langford Brook	Authorised Substances: Chromium, Copper, Lead, Nickel, Silver, Zinc
5A	138	NE	457871 221227	Name: Bicester Stw Status: Active Receiving Water: Langford Brook	Authorised Substances: Iron

---

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

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

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

ID	Distance (m)	Direction	NGR	Details	
6	45	SE	457800 221100	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTCR.1293 Permit Version: 1	Receiving Water: LANGFORD BROOK Status: REVOKED - UNSPECIFIED Issue date: 09/10/1972 Effective Date: 31-Jan-1985 Revocation Date: 01/11/1989
7A	112	NE	457860 221200	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 3	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 21/12/2000 Effective Date: 21-Dec-2000 Revocation Date: 31/03/2005
8A	112	NE	457860 221200	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 1	Receiving Water: LANGFORD BROOK Status: BY DIRECT. OF SEC OF STATE, (WATER ACT 1989 SCHED Issue date: 02/11/1989 Effective Date: 02-Nov-1989 Revocation Date: 31/03/1990
9A	112	NE	457860 221200	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 2	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 02/11/1989 Effective Date: 01-Apr-1990 Revocation Date: 20/12/2000
10A	118	NE	457850 221220	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 4	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 31/03/2005 Effective Date: 01-Apr-2005 Revocation Date: 29/03/2006
11A	118	NE	457850 221220	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 8	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 01/04/2010 Effective Date: 01-Apr-2010 Revocation Date: -
12A	118	NE	457850 221220	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 5	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 30/03/2006 Effective Date: 30-Mar-2006 Revocation Date: 28/06/2007
13A	118	NE	457850 221220	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 7	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 28/01/2009 Effective Date: 01-Apr-2009 Revocation Date: 31/03/2010

ID	Distance (m)	Direction	NGR	Details	
14A	118	NE	457850 221220	Address: BICESTER STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CNTD.0023 Permit Version: 6	Receiving Water: LANGFORD BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 29/06/2007 Effective Date: 29-Jun-2007 Revocation Date: 31/03/2009
15	118	S	457600 220600	Address: BICESTER (TOWN) STW, BICESTER, OX, BICESTER (TOWN) STW, BICESTER, OXON Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: CTCR.1723 Permit Version: 1	Receiving Water: LANGFORD BROOK Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 14/12/1980 Effective Date: 31-Jan-1985 Revocation Date: 07/03/2005
16	251	NE	457980 221270	Address: BICESTER SEWAGE TREATMENT WORKS, OXFORD ROAD, BICESTER, OXFORDSHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: CAWM.0807 Permit Version: 1	Receiving Water: THE LANGFORD BROOK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY Issue date: 12/11/2004 Effective Date: 01-Jun-2004 Revocation Date: -
17	269	SE	457850 220500	Address: BICESTER GARRISON, HQ STATION, ARNC, BICESTER GARRISON, HQ STATION, A, RNCOTT, BICESTER, OXON Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CATM.2739 Permit Version: 1	Receiving Water: LANGFORD BROOK Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 21/03/1997 Effective Date: 21-Mar-1997 Revocation Date: 10/08/2006
18B	286	SW	457100 220800	Address: Oxford Road Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: TEMP.1653 Permit Version: 1	Receiving Water: GAGLE BROOK Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113) Issue date: 02/11/1989 Effective Date: 02-Nov-1989 Revocation Date: 02/09/2010
19B	286	SW	457100 220800	Address: Oxford Road Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: TEMP.1653 Permit Version: 2	Receiving Water: Gagle Brook Status: SURRENDERED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: 13/10/2015
20C	386	SE	458000 220500	Address: M.O.D. Site 12E Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: TEMP.1422 Permit Version: 2	Receiving Water: Langford Brook Status: SURRENDERED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: 13/10/2015
21C	386	SE	458000 220500	Address: M.O.D. Site 12E Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: TEMP.1422 Permit Version: 1	Receiving Water: LANGFORD BROOK Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113) Issue date: 02/11/1989 Effective Date: 02-Nov-1989 Revocation Date: 02/09/2010
22D	400	S	457561 220315	Address: ALCHESTER HOUSE, LANGFORD LANE CROSSING, WENDLEBURY, BICESTER, OXFORDSHIRE, OX25 2NS Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CAWM.1163 Permit Version: 1	Receiving Water: TRIB OF THE GAGLE BROOK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY Issue date: 24/06/2005 Effective Date: 14-Jun-2005 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
23D	423	S	457548 220294	Address: ALCHESTER HOUSE, LANGFORD LANE CROSSING, WENDLEBURY, BICESTER, OXFORDSHIRE, OX25 2NS Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CAWM.1163 Permit Version: 1	Receiving Water: TRIB OF THE GAGLE BROOK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY Issue date: 24/06/2005 Effective Date: 14-Jun-2005 Revocation Date: -

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

1

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

ID	Distance (m)	Direction	NGR	Details	
1	160	NE	457662 221381	Incident Date: 09-Dec-2002 Incident Identification: 125299 Pollutant: Other Pollutant Pollutant Description: Microbiological	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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

0

Database searched and no data found.

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

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

Database searched and no data found.

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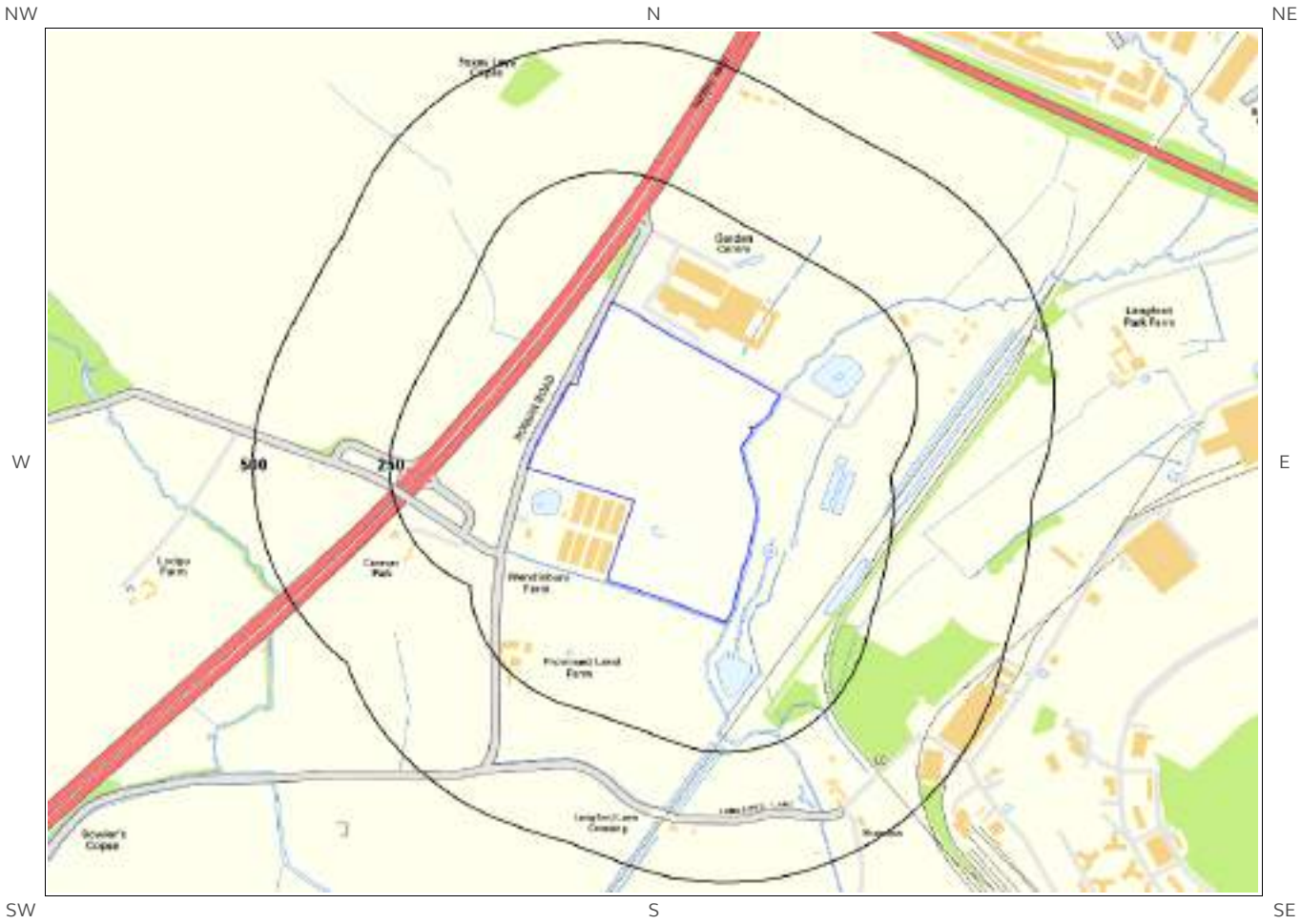
3. Landfill and Other Waste Sites Map



Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1312	NE	458800 221900	Site Address: London Road, Bicester, Oxfordshire Waste Licence: - Site Reference: 13.6.5821, TP0100 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Ploughley Rural District Council Licence Holder: - First Recorded: - Last Recorded: 31-Dec-1969

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

0

Database searched and no data found.

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

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1150	NE	458622 221906	Site Address: McGregor Railway Services Ltd, Station Yard, London Road, Bicester, Oxfordshire, OX26 6HU Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MCG001 EPR reference: EA/EPR/CP3599EP/S003 Operator: McGregor Railway Services Ltd Waste Management licence No: 86100 Annual Tonnage: 0.0	Issue Date: 27/10/1994 Effective Date: - Modified: 28/05/2008 Surrendered Date: 18/11/2009 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: S. M. Mcgregor Correspondence Address: -
Not shown	1150	NE	458622 221906	Site Address: McGregor Railway Services Ltd, Station Yard, London Road, Bicester, Oxfordshire, OX26 6HU Type: Metal Recycling Site (mixed MRS's) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MCG001 EPR reference: EA/EPR/CP3599EP/S003 Operator: McGregor Railway Services Ltd Waste Management licence No: 86100 Annual Tonnage: 0.0	Issue Date: 27/10/1994 Effective Date: - Modified: 28/05/2008 Surrendered Date: 18/11/2009 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: S. M. Mcgregor Correspondence Address: -

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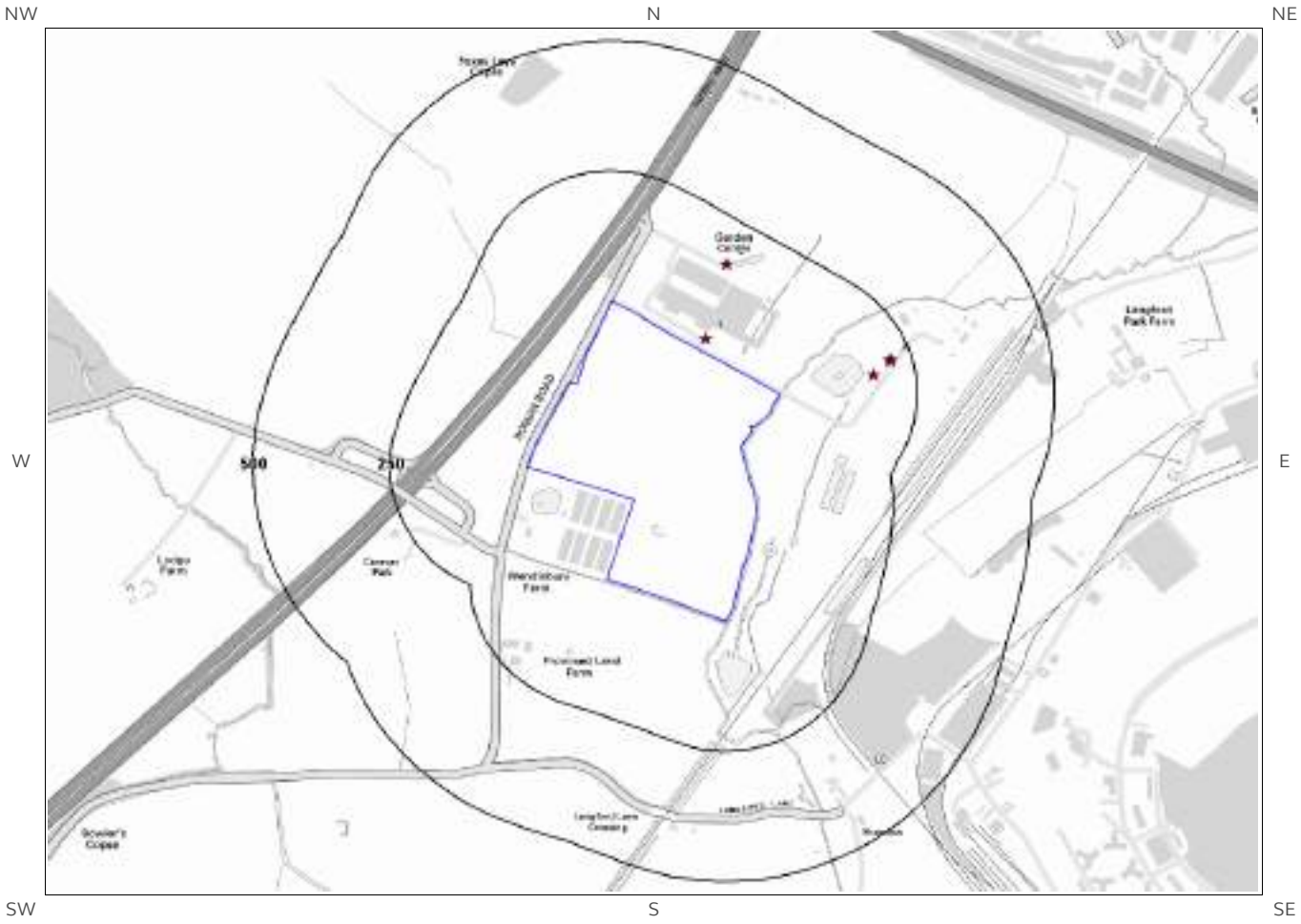
4. Current Land Use Map



Site Outline

Search Buffers (m)

250

500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 5

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	26	NE	Electricity Sub Station	457633 221244	OX25	Electrical Features	Infrastructure and Facilities
2	169	NE	Electricity Sub Station	457671 221387	OX25	Electrical Features	Infrastructure and Facilities
3	175	E	Works	457939 221173	OX25	Unspecified Works Or Factories	Industrial Features
4A	211	E	Sewage Works	457969 221201	OX25	Waste Storage, Processing and Disposal	Infrastructure and Facilities
5A	212	E	Sewage Works	457969 221203	OX25	Waste Storage, Processing and Disposal	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

5.3 Bedrock and Solid Geology

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

Lex Code	Description	Rock Type
KLS-SDSL	KELLAWAYS SAND MEMBER	SANDSTONE AND SILTSTONE, INTERBEDDED
KLC-MDST	KELLAWAYS CLAY MEMBER	MUDSTONE

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

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology

Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licenses

Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

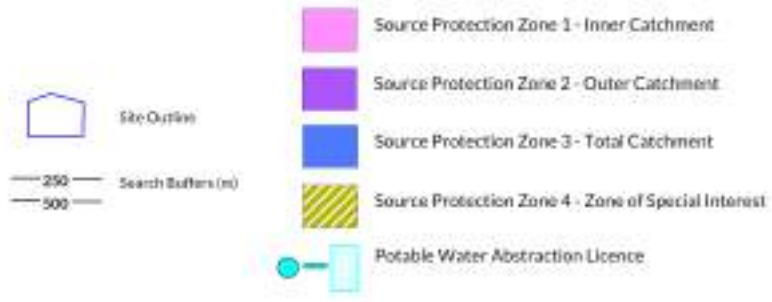
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

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



6d. Hydrogeology – Source Protection Zones within confined aquifer

Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

Site Outline

250
500
Search Buffers (m)

Tidal River
Inland River
Underground or Elevated Tidal River
Underground or Elevated Inland River
Foreshore
General Quality Assessment: Chemistry

Canal
Underground or Elevated Canal
Lock or Flight of Locks
Lake, Reservoir, or Marsh
Drain or Transfer
General Quality Assessment: Biology

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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

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

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

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

6.2 Aquifer within Bedrock Deposits

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

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
3	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
4	87	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	127	N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

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

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

ID	Distance (m)	Direction	NGR	Details	
6	58	W	457400 220800	Status: Active Licence No: 28/39/14/0295 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Wendlebury Lane, Bicester (a) Data Type: Point Name: FACCENDA CHICKEN LTD	Annual Volume (m^3): 16593 Max Daily Volume (m^3): 68.2 Original Application No: WRA/5248 Original Start Date: 8/7/1983 Expiry Date: - Issue No: 100 Version Start Date: 8/7/1983 Version End Date:
7	286	SW	457100 220800	Status: Historical Licence No: 28/39/14/0300 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Bicester Trailer Park, Oxford Road, Wendlebury Data Type: Point Name: M & L ROSSITER	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRA./5517 Original Start Date: 19/3/1987 Expiry Date: - Issue No: 100 Version Start Date: 19/3/1987 Version End Date:
8	311	SW	457200 220600	Status: Historical Licence No: 28/39/14/0329 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Promised Land Farm, Bicester (a) Data Type: Point Name: PROMISED LAND FARM	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.A/6293 Original Start Date: 16/11/1994 Expiry Date: - Issue No: 100 Version Start Date: 16/11/1994 Version End Date:
Not shown	859	NE	457990 222000	Status: Historical Licence No: 28/39/14/0349 Details: Pollution Remediation Direct Source: Thames Groundwater Point: Pringle Drive Filling Station Bicester Oxon Data Type: Point Name: ARCADIS GERAGHTY & MILLER INT INC.	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRW/A/1145 Original Start Date: 28/9/2004 Expiry Date: 31/3/2018 Issue No: 1 Version Start Date: 28/9/2004 Version End Date:
Not shown	1095	NW	456700 222100	Status: Historical Licence No: 28/39/14/0123 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Whitelands, Bicester (a) Data Type: Point Name: A D WOODLEY LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.A/1071 Original Start Date: 9/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 9/1/1967 Version End Date:
Not shown	1145	SW	456400 220300	Status: Historical Licence No: 28/39/14/0326 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Bowlers Copse, Wendlebury (a) Data Type: Point Name: PAIN	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.A/6034 Original Start Date: 29/12/1993 Expiry Date: - Issue No: 100 Version Start Date: 29/12/1993 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1892	SW	455900 219700	Status: Historical Licence No: 28/39/14/0064 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Home Farm, Wendlebury (a) Data Type: Point Name: MILLER	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WR.A/3179 Original Start Date: 10/10/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1985 Version End Date:

6.4 Surface Water Abstraction Licences

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

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1120	SE	457560 219140	Status: Active Licence No: 28/39/14/0350 Details: Make-Up Or Top Up Water Direct Source: Thames Surface Water - Non Tidal Point: Langford Brook At Merton Grounds Farm, Merton Data Type: Line Name: Emma Keeble and Francois Rodriges-Pereire	Annual Volume (m^3): 16256 Max Daily Volume (m^3): 145.47 Application No: NPS/WR/025972 Original Start Date: 6/5/2005 Expiry Date: 31/3/2018 Issue No: 3 Version Start Date: 9/6/2017 Version End Date:

6.5 Potable Water Abstraction Licences

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

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details	
1	286	SW	457100 220800	Status: Historical Licence No: 28/39/14/0300 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Bicester Trailer Park, Oxford Road, Wendlebury Data Type: Point Name: M & L ROSSITER	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRA./5517 Original Start Date: 19/3/1987 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

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

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

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

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

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

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
463	NW	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.9 River Quality

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

6.9.1 Biological Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
92A	45	SE	457800 221100	River Name: Langford Brook Reach: Bicester Stw - Ray End/Start of Stretch: Start of Stretch NGR	B	B	B	B	B
93A	45	SE	457800 221100	River Name: Langford Brook Reach: Stratton Audley - Bicester Stw End/Start of Stretch: End of Stretch NGR	B	B	B	B	B

6.9.2 Chemical Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
94A	45	SE	457800 221100	River Name: Langford Brook Reach: Bicester Stw - Ray End/Start of Stretch: Start of Stretch NGR	C	C	C	C	B
95A	45	SE	457800 221100	River Name: Langford Brook Reach: Stratton Audley - Bicester Stw End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	1158	NE	458837 221580	River Name: Langford Brook Reach: Stratton Audley - Bicester Stw End/Start of Stretch: Sample Point NGR	C	C	C	C	C

6.10 Ordnance Survey MasterMap Water Network

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

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

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

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	0 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.8
16	0 On Site	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
17	0 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.8
3	1 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.6
18	1 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.6
4	2 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.8
5	2 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
19	2 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.8
20	2 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
6	3 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
21	3 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
7	20 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.6
22	20 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.6
8	35 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.4
23	35 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.4
9	36 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
10	36 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
11	36 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
12	36 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
24	36 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
25	36 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
26	36 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
27	36 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
13	37 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
14	37 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
28	37 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
29	37 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
15	44 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
30	44 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
16	63 S	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.6
31	63 S	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.6
17	66 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
32	66 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
18	69 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
33	69 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
19	102 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
34	102 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
20	106 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.4
35	106 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.4
21	111 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.4
22	111 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
36	111 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.4
37	111 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
23	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
24	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
25	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
38	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
39	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
40	112 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
26	113 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
41	113 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
27	114 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
42	114 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
28	115 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
29	115 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.3
43	115 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
44	115 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.3
30	119 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
31	119 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
45	119 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
46	119 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
32	121 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
47	121 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
33	122 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
34	122 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
48	122 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
49	122 NW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
35	126 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
50	126 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
36	133 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
51	133 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
37	134 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
52	134 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
38	143 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
53	143 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
39	149 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
40	149 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
54	149 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
55	149 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
41	150 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
56	150 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
42	152 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
43	152 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
57	152 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
58	152 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
44	154 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
45	154 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
59	154 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
60	154 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
46	161 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
61	161 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
47	163 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
62	163 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
48	172 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
63	172 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
49	178 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
64	178 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
50	195 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
51	195 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.0
65	195 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
66	195 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.0
52	199 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
67	199 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
53	207 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
68	207 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
54	218 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
69	218 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
55	226 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
70	226 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
56	227 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
71	227 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
57	228 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
72	228 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
58	230 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
59	230 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
73	230 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
74	230 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
60	232 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
75	232 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
61	235 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
76	235 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
62	237 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
77	237 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
63	239 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
78	239 E	-	Lake, loch or reservoir.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
64	243 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 0.3
65	243 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
79	243 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 0.3
80	243 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
66	247 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
81	247 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
67	249 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
82	249 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
68	293 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
83	293 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
69	309 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
70	309 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
84	309 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
85	309 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
71	311 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
86	311 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
72	345 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
73	345 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
87	345 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
88	345 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
74	348 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0
75	348 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
89	348 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0
90	348 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
76	370 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	370 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
77	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
78	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
79	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
Not shown	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	376 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
80	390 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
95	390 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
81	395 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
82	395 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
96	395 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	395 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
83	398 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
98	398 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
84	400 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
85	400 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
99	400 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
100	400 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
86	401 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
101	401 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
87	405 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
102	405 E	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
88	435 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
103	435 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
89	439 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
90	439 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0
104	439 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
105	439 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0
91	441 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
106	441 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Thames Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

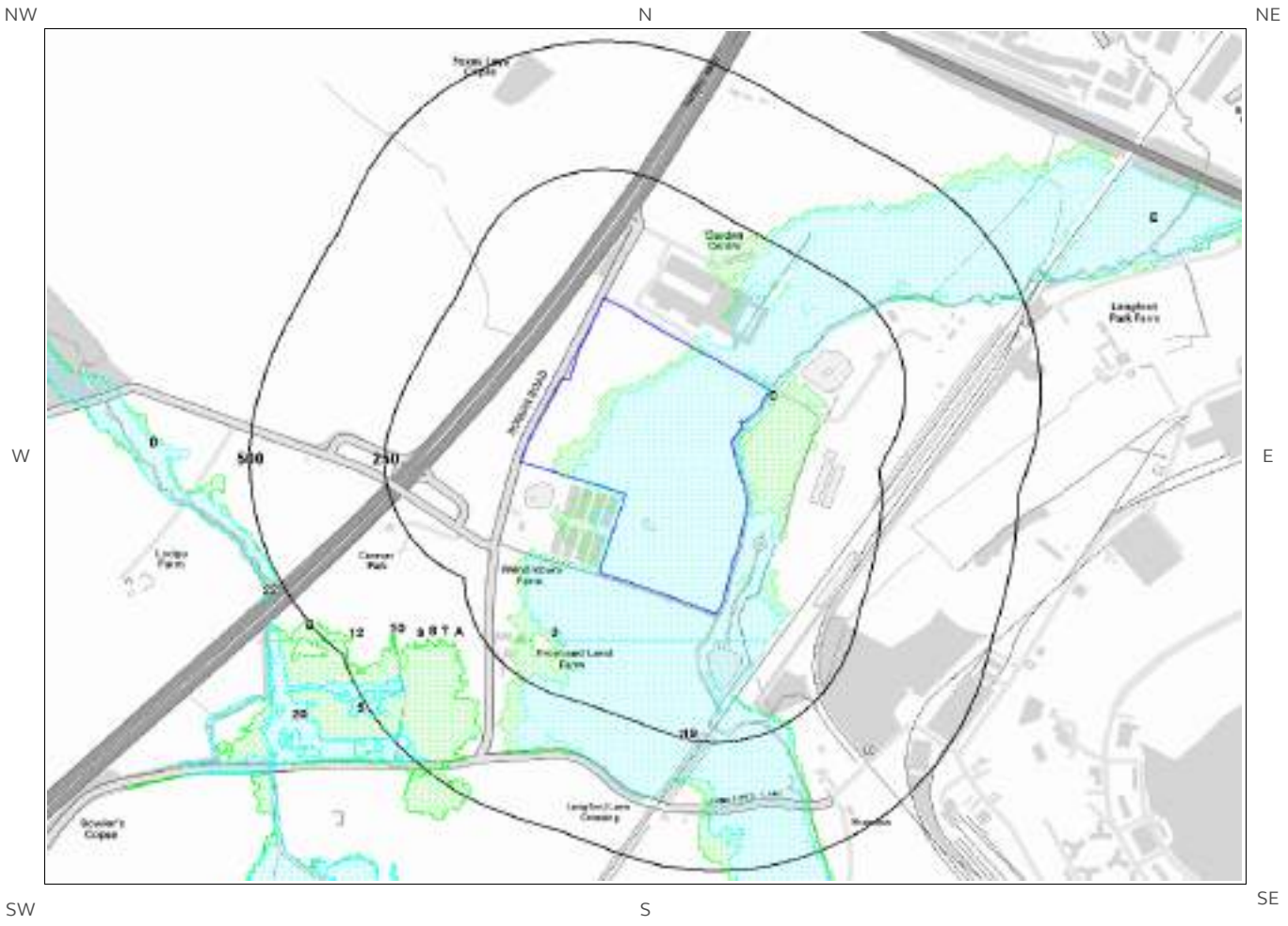
6.11 Surface Water Features

Surface water features within 250m of the study site — Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
1	SW
8	NE
18	E
23	E
24	S
36	E
66	NE
70	E
85	NW
103	NW
111	SE
116	E
134	NW
137	E
140	SE
145	SE
158	S
161	E
188	SE
196	E
198	SE
215	S
227	E
229	S
231	E
232	E
236	S
247	E

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



Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

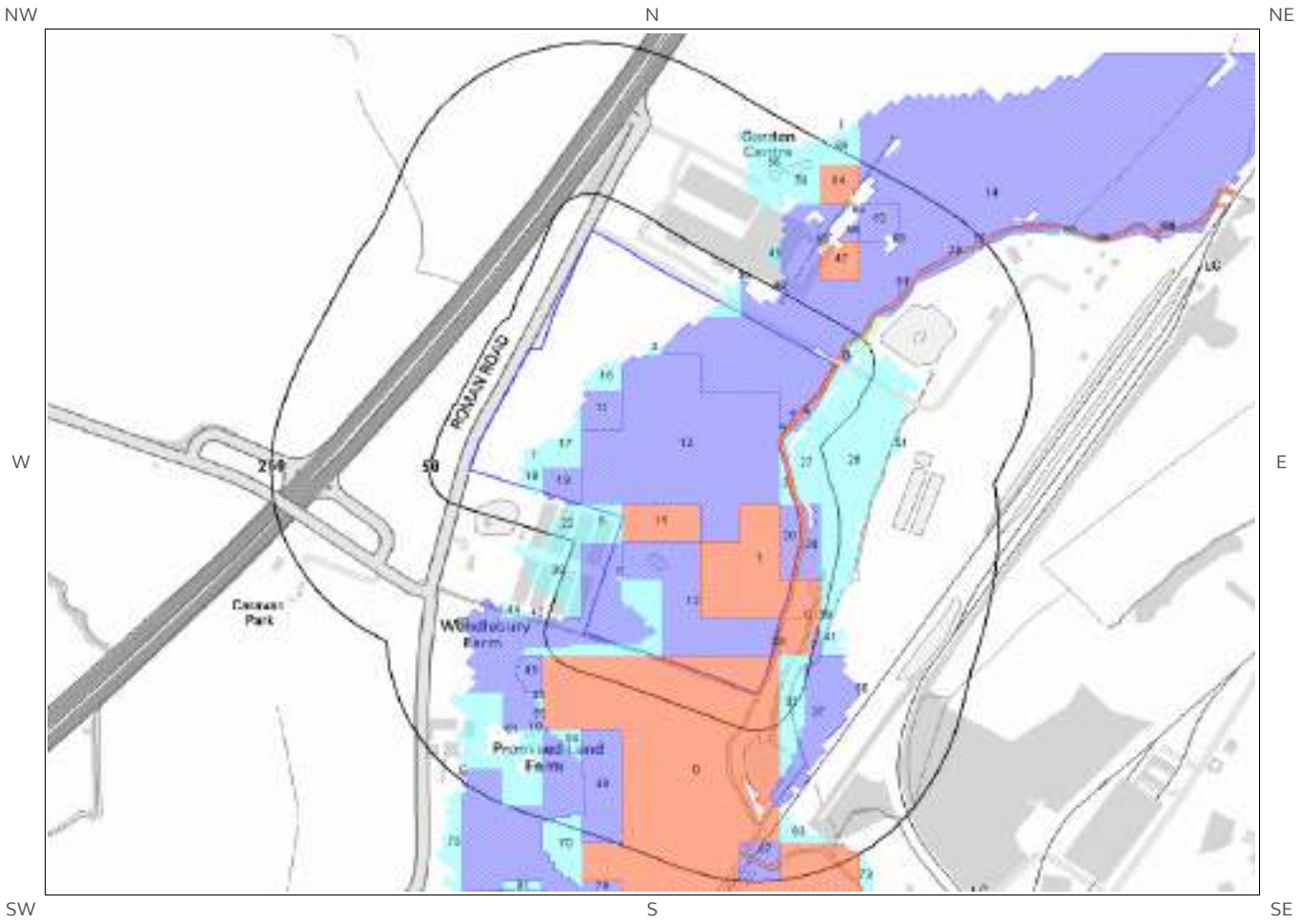
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

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



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

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

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

ID	Distance (m)	Direction	Update	Type
1C	0	On Site	29-May-2018	Zone 2 - (Fluvial /Tidal Models)
2	55	S	29-May-2018	Zone 2 - (Fluvial /Tidal Models)
3	162	SW	29-May-2018	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

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

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

ID	Distance (m)	Direction	Update	Type
1C	0	On Site	30-May-2018	Zone 3 - (Fluvial Models)
2	55	S	30-May-2018	Zone 3 - (Fluvial Models)

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

Highest risk of flooding onsite — High

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

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

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

ID	Distance (m)	Direction	RoFRas flood Risk
1	0.0	On Site	High
2	0.0	On Site	Low
3	0.0	On Site	Low
4	0.0	On Site	Low
5	0.0	On Site	Low
6	0.0	On Site	Low
7	0.0	On Site	Low
8	0.0	On Site	Low
9	0.0	On Site	Low
10	0.0	On Site	Medium
11	0.0	On Site	Medium
12	0.0	On Site	Medium
13	0.0	On Site	Medium
14	0.0	On Site	Medium
15	0.0	On Site	High
16	0.0	On Site	Low
17	0.0	On Site	Low
18	0.0	On Site	Low
19	0.0	On Site	Medium
20	0.0	On Site	Medium
21D	0.0	On Site	High
22	0.0	S	Low
23	2.0	E	Medium
24	4.0	E	Medium
25A	4.0	SE	Medium
26	4.0	SE	Low
27	5.0	SE	Low
28C	6.0	E	Low
29	8.0	NE	High
30	10.0	W	Low
31B	10.0	NE	Medium
32	11.0	E	Low
33A	15.0	SE	Low

34B	19.0	NE	Low
35	36.0	NE	Very Low
36	41.0	NE	Medium
37	42.0	E	Medium
38C	47.0	E	Low
39	47.0	E	Medium
40	50.0	NE	Medium

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site — None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site — Identified

Clearwater Flooding or Superficial Deposits Flooding — Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result	Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map

Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

1

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
6	811	E	UNKNOWN	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

2

The following Environmentally Sensitive Area records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	ESA Name	Data Source
4	379	S	Upper Thames Tributaries	Natural England
5	700	S	Upper Thames Tributaries	Natural England

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

3

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	0	On Site	Existing	DEFRA
2	678	N	Existing	DEFRA
3	700	S	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

* This indicates an automatically generated 50m buffer and site.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site	None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary	None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site Guidance: No Guidance Required.	None identified

Contact Details

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BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
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Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
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133-155 Waterloo Road, London, SE1 8UG
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Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
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Tel: 0345 7626 848
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Ordnance Survey
Adanac Drive, Southampton
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Local Authority
Authority: Cherwell District Council
Phone: 01295 252 535
Web: http://www.cherwell-dc.gov.uk/
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-may25-2018

APPENDIX C

TRIAL PIT LOG

TP1

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 2.35m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
					E	Grass over dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
ES	0.20			(0.30)				
				0.30	M	Firm brown CLAY with occasional rootlets. (SUBSOIL)		
				(0.10)				
D	0.50			0.40		Light brown and orangish brown SAND and GRAVEL. Gravel is fine to coarse, subrounded to subangular quartzite. (RIVER TERRACE DEPOSITS)		
				(0.20)				
				0.60		Firm closely fissured bluish grey and brown mottled silty CLAY. (KELLAWAYS FORMATION)		
D	0.80							
HV	0.80	Cu = 52						
					M			
HV	1.40	Cu = 72		(1.60)				
D	2.00					*At 1.95m bgl: stiff and dark bluish grey*		
HV	2.00	Cu = 85						
				2.20	M	Stiff thinly laminated dark grey CLAY with rare fossil shell fragments and occasional sand sized gypsum crystals. (KELLAWAYS FORMATION)		
D	2.30			(0.15)				
HV	2.30	Cu = 75		2.35	VH			
						End of Trial Pit at 2.35m		

Method: JCB 3CX

Groundwater: Seepage from 0.50m bgl.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.40m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP2

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 2.55m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.25)	E	Grass over dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
				0.25				
D	0.30			(0.15)	M	Stiff fissured brown CLAY with occasional rootlets. (SUBSOIL)		
				0.40				
D	0.50					Light brown and orangish brown slightly clayey SAND and GRAVEL. Gravel is fine to coarse, subrounded to subangular quartzite and limestone. (RIVER TERRACE DEPOSITS)		
B	0.60							
				(0.65)	M			
				1.05				
D	1.20					Firm closely fissured bluish grey and brown silty CLAY. (KELLAWAYS FORMATION)		
HV	1.20	Cu = 48						
				(1.20)	M			
D	1.70							
HV	1.80	Cu = 78				*From 1.80m bgl: stiff*		
				2.25	M			
D	2.30					Stiff dark grey silty CLAY with frequent fossil shell fragments and occasional pockets of fine sand. (KELLAWAYS FORMATION)		
HV	2.30	Cu = 82		(0.30)				
				2.55	VH	End of Trial Pit at 2.55m		

Method: JCB 3CX

Groundwater: Seepage from 0.60m bgl.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.50m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP3

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.05m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over stiff dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
				0.20		Firm brown and orangish brown mottled silty CLAY. (ALLUVIUM)		
ES	0.30							
D	0.50							
HV	0.50	Cu = 48						
				(1.00)	M			
						Between 1.00m and 1.10m bgl: band of orangish brown sandy gravelly silt		
				1.20		Firm bluish grey silty CLAY with rare fine to coarse sand sized gypsum crystals. (KELLAWAYS FORMATION)		
D	1.30							
HV	1.30	Cu = 51						
				(1.35)	M			
HV	2.00	Cu = 60						
				2.55		Firm thinly laminated dark bluish grey CLAY with rare relict rootlets. (KELLAWAYS FORMATION) *From 2.70m bgl: occasional pockets of fine to medium sand, damp with occasional fossil shell fragments.*		
D	2.60							
HV	2.60	Cu = 78						
				(0.50)	M			
D	2.90							
				3.05		End of Trial Pit at 3.05m		

Method: JCB 3CX

Groundwater: Seepage from 2.70m bgl. Groundwater at 2.90m bgl on completion.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.60m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

TRIAL PIT LOG

TP4

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.10m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.25)	E	Grass over firm dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
ES	0.20			0.25				
D	0.40			(0.35)	M	Firm light greyish brown sandy CLAY with occasional fossil shell fragments. (ALLUVIUM)		
				0.60				
D	0.80			(0.65)	M	Orangish brown slightly clayey sandy gravelly SILT. Gravel is fine to coarse, subrounded to subangular quartzite. (RIVER TERRACE DEPOSITS)		
				1.25				
D	1.30					Firm dark bluish grey CLAY with occasional relict rootlets and rare fine sand sized gypsum crystals. (KELLAWAYS FORMATION)		
HV	1.30	Cu = 45						
HV	1.60	Cu = 55						
HV	2.00	Cu = 68				*From 2.00m bgl: no rootlets*		
				(1.85)	M	*From 2.20m bgl: closely fissured*		
HV	2.40	Cu = 65						
D	2.80							
HV	2.80	Cu = 72						
				3.10		End of Trial Pit at 3.10m		

Method: JCB 3CX

Groundwater: Fast inflow from 0.80m bgl.

Stability: Collapse on both sides from 0.50m bgl. Continual collapse during excavation.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.60m
Width:	0.90m
Logged:	FHJ
Checked:	GPW

APPLIED GEOLOGY

TRIAL PIT LOG

TP5

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.95m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.35)	E	Grass over firm to stiff dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
ES	0.30			0.35				
HV	0.40	Cu = 40				Soft to firm becoming firm light brown and orangish brown silty CLAY. (ALLUVIUM)		
D	0.50							
				(0.80)				
HV	0.80	Cu = 18			E	*At 0.80m bgl: soft to firm*		
				1.15				
B	1.20					Orangish brown and light grey slightly clayey silty SAND and GRAVEL. Gravel is fine to coarse, subrounded to subangular quartzite and limestone. (RIVER TERRACE DEPOSITS)		
				(0.60)	M	*From 1.60m bgl: bluish grey*		
D	1.70			1.75				
HV	1.90	Cu = 50				Firm thinly laminated bluish grey silty CLAY. (KELLAWAYS FORMATION)		
D	2.00							
HV	2.50	Cu = 60		(1.75)	M			
				3.50				
D	3.70			(0.45)		Stiff closely fissured grey CLAY with occasional fossil shell fragments and rare fine sand sized gypsum crystals. (KELLAWAYS FORMATION)		
HV	3.70	Cu = 80			M			
				3.95		End of Trial Pit at 3.95m		

Method: JCB 3CX

Groundwater: Fast inflow from 1.20m bgl. Water level at 3.2m bgl after ten minutes.

Stability: Collapse on both sides from 1.15m to 1.75m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.50m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLIED GEOLOGY

TRIAL PIT LOG

TP6

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.60m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.25)	E	Grass over firm dark brown sandy friable CLAY with rootlets and occasional shell fragments. (TOPSOIL)		
				0.25				
ES	0.30					Firm light greyish brown sandy friable CLAY with frequent shell fragments. (ALLUVIUM)		
D	0.40			(0.25)				
				0.50	M	Soft to firm light grey and orangish brown mottled silty CLAY. (ALLUVIUM)		
				(0.25)	M			
HV	0.75	Cu = 30		0.75		Orangish brown and occasional light grey silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular limestone. (RIVER TERRACE DEPOSITS)		▼
D	0.90							
				(0.75)	M			
				1.50		Firm bluish grey silty CLAY with occasional relict rootlets. (KELLAWAYS FORMATION)		
D	1.60							
HV	1.60	Cu = 60						
				(0.90)	M			
				2.40		Stiff thinly laminated bluish grey silty CLAY. (KELLAWAYS FORMATION)		
HV	2.50	Cu = 80						
D	2.80							
				(1.20)	H			
				3.60	VH	End of Trial Pit at 3.60m		

Method: JCB 3CX

Groundwater: Seepage from 0.90m bgl.

Stability: Collapse on both sides from 0.90m to 1.50m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.60m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP7

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 2.80m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.25)	E	Grass over firm dark brown slightly gravelly friable CLAY with rootlets. Gravel is fine to coarse, subrounded to subangular limestone. (TOPSOIL)		
ES	0.20			0.25				
						Soft to firm orangish brown slightly sandy silty CLAY. (SUBSOIL)		
D	0.50			(0.45)	M			
				0.70				
						Orangish brown and light grey slightly gravelly sandy SILT. Gravel is fine to coarse, subrounded to angular limestone. (RIVER TERRACE DEPOSITS)		
				(0.50)	M			
				1.20				
						Firm bluish grey silty CLAY with occasional relict rootlets. (KELLAWAYS FORMATION)		
D	1.40							
HV	1.40	Cu = 50						
				(1.50)	M			
D	2.20					*From 2.20m bgl: stiff*		
HV	2.20	Cu = 90						
				2.70	H	Stiff bluish grey silty CLAY with thin indistinct laminations, rare fine sand sized gypsum crystals and shell fragments and occasional pyrite veins. (KELLAWAYS FORMATION)		
				(0.10)	VH			
				2.80		End of Trial Pit at 2.80m		

Method: JCB 3CX

Groundwater: Seepage from 1.00m bgl.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.70m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

TRIAL PIT LOG

TP8

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 2.90m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
ES	0.10			(0.15) 0.15	E	Grass over firm dark brown slightly sandy friable CLAY with rootlets. (TOPSOIL)		
D	0.30			(0.25) 0.40	M	Stiff brown slightly gravelly friable CLAY. Gravel is fine to coarse, subrounded to subangular limestone. (SUBSOIL)		
D	0.60			(0.80) 1.20	M	Firm orangish brown occasional mottled light greyish brown slightly sandy silty CLAY. (ALLUVIUM)		
D	1.50			(0.50) 1.70	M	Orangish brown sandy SILT. (RIVER TERRACE DEPOSITS)		
D HV	2.00 2.00	Cu = 50		(1.20)	M	Firm bluish grey and occasional mottled greenish brown silty CLAY with occasional relict rootlets and rare fine sand sized gypsum crystals. (KELLAWAYS FORMATION)		
D HV	2.80 2.80	Cu = 75		2.90	VH	*From 2.80m bgl: stiff* End of Trial Pit at 2.90m		

Method: JCB 3CX

Groundwater: Groundwater rising from rock sitting at 2.75m bgl 5 minutes after excavation.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.50m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

TRIAL PIT LOG

TP9

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.40m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.15)	E	Grass over firm dark brown slightly sandy friable CLAY with rootlets and occasional shell fragments.		
D	0.20			0.15 (0.20)		(TOPSOIL)		
				0.35	M	Stiff brown friable CLAY with occasional rootlets. (SUBSOIL)		
				(0.15)	M	Soft to firm orangish brown and light brown slightly sandy silty CLAY. (ALLUVIUM)		
				0.50				
D	0.60					Orangish brown silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded limestone (damp). (RIVER TERRACE DEPOSITS)		
					M			
B	1.20			(1.30)		*From 1.50m bgl: light greyish brown*		
				1.80				
D	1.90					Firm bluish grey silty CLAY. (KELLAWAYS FORMATION)		
HV	1.90	Cu = 60						
D	2.50					*From 2.50m bgl: stiff with occasional fine sand sized gypsum crystals*		
HV	2.50	Cu = 85		(1.60)	M			
HV	3.00	Cu = 90						
					VH	*From 3.30m bgl: indistinct thin laminations and occasional cobbles of limestone*		
D	3.40			3.40		End of Trial Pit at 3.40m		

Method: JCB 3CX

Groundwater: Seepage from 1.30m bgl.

Stability: Slight collapse from 0.70m to 1.80m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.60m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP10

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.70m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
D	0.10			(0.20)		Grass over firm dark brown friable CLAY with rootlets and frequent shell fragments.		
				0.20	E	(TOPSOIL)		
D	0.30			(0.25)		Firm greyish brown and orangish brown mottled silty CLAY with occasional rootlets.		
HV	0.40	Cu = 90		0.45	M	(SUBSOIL)		
D	0.60					Soft to firm orangish brown sandy CLAY.		
HV	0.60	Cu = 40		(0.45)	M	(ALLUVIUM)		
				0.90		Orangish brown silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular limestone.		
D	1.10			(0.40)	M	(RIVER TERRACE DEPOSITS)		
D	1.30			1.30		Soft to firm bluish grey silty CLAY with occasional relict rootlets.		
HV	1.30	Cu = 35				(KELLAWAYS FORMATION)		
D	1.80					*From 1.80m bgl: firm*		
HV	1.80	Cu = 50		(1.30)	M			
HV	2.60	Cu = 80		2.60		Stiff thinly laminated bluish grey silty CLAY.		
D	2.70					(KELLAWAYS FORMATION)		
				(1.10)	M			
				3.70		End of Trial Pit at 3.70m		

Method: JCB 3CX

Groundwater: Seepage from 1.20m bgl.

Stability: Collapse on west wall from 1.60m to 1.80m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP11

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.90m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over stiff dark brown friable CLAY with rootlets. (TOPSOIL)		
				0.20				
D	0.30			(0.15)	M	Stiff light brown friable CLAY with rare rootlets and occasional shell fragments. (SUBSOIL)		
				0.35				
D	0.50			(0.25)	M	Firm greyish brown and orangish brown mottled silty CLAY. (ALLUVIUM)		
HV	0.50	Cu = 52		0.60				
						Orangish brown and occasional light grey silty gravelly fine to coarse SAND. Gravel is fine to coarse, subangular to subrounded quartzite and limestone. (KELLAWAYS FORMATION)		
B	0.80							
				(1.15)	M			
				1.75				
						Firm to stiff bluish grey silty CLAY with rare relict rootlets. (KELLAWAYS FORMATION)		
D	1.90							
HV	1.90	Cu = 70						
						From 2.40m bgl: no rootlets		
D	2.80			(2.15)				
HV	2.80	Cu = 75			M	*From 2.80m bgl: stiff*		
						From 3.50m bgl: rare fine sand sized gypsum crystals		
D	3.60							
				3.90		End of Trial Pit at 3.90m		

Method: JCB 3CX

Groundwater: Seepage from 1.30m bgl.

Stability: Slight collapse on long sides from 1.30m to 1.80m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.70m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLIED GEOLOGY

TRIAL PIT LOG

TP12

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 4.10m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over stiff dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
ES	0.20			0.20 (0.15)	M	Stiff light brown silty friable CLAY with occasional rootlets. (SUBSOIL)		
D	0.40			0.35		Firm greyish brown and occasional mottled orangish brown CLAY. (ALLUVIUM)		
HV	0.40	Cu = 48						
HV	0.60	Cu = 45			M			
				(0.85)				
				1.20	M	Stiff light grey and orange-brown slightly gravelly sandy CLAY. Gravel is fine to coarse, subrounded limestone. (ALLUVIUM)		
D	1.40			(0.40)				
				1.60		Firm dark blue-grey silty CLAY with occasional fine to medium sand sized gypsum crystals and rare relict rootlets. (KELLAWAYS FORMATION)		
D	1.70							
HV	2.00	Cu = 70						
D	2.20					*From 2.20m bgl: no rootlets*		
HV	2.50	Cu = 75				*From 2.50m bgl: firm to stiff and closely fissured*		
				(2.50)	M			
HV	3.00	Cu = 85				*From 3.00m bgl: stiff*		
D	3.50							
				4.10		End of Trial Pit at 4.10m		

Method: JCB 3CX

Groundwater: Groundwater not encountered.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

TRIAL PIT LOG

TP13

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 4.00m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over firm dark brown friable CLAY with rootlets and occasional shell fragments. (TOPSOIL)		
				0.20				
ES	0.30					Soft light brown silty CLAY with occasional rootlets and rare shell fragments. (ALLUVIUM)		
				(0.50)	M			
				0.70				
D	0.80					Light grey silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular limestone. (RIVER TERRACE DEPOSITS)		▼
				(0.65)	M			
				1.35				
D	1.40					Soft bluish grey sandy SILT. (KELLAWAYS FORMATION)		
D	2.00			(1.25)	E			
B	2.20					*From 2.10m bgl: occasional shell fragments.*		
				2.60				
HV	2.80	Cu = 72				Firm to stiff becoming stiff dark grey silty CLAY with rare fine to medium sand sized gypsum crystals. (KELLAWAYS FORMATION)		
D	3.00							
HV	3.00	Cu = 85						
				(1.40)	M			
				4.00		End of Trial Pit at 4.00m		

Method: JCB 3CX

Groundwater: Groundwater encountered at 0.90m bgl.

Stability: Continual collapse from 0.70m to 1.35m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP14

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level	**Coordinates**	**Total Depth**	3.90m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.15)	E	Grass over stiff dark brown slightly sandy friable CLAY with rootlets. (TOPSOIL)		
				0.15				
D	0.30			(0.25)	M	Stiff dark brown mottled orangish brown friable CLAY with rare rootlets. (SUBSOIL)		
ES	0.30			0.40				
						Orangish brown silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular flint. (RIVER TERRACE DEPOSITS)		
D	0.70			(0.70)	M			
				1.10				
D	1.20				M	Stiff bluish grey slightly gravelly very sandy CLAY. Gravel is fine to coarse, subangular limestone. (KELLAWAYS FORMATION)		
				(0.50)				
				1.60				
						Bluish grey silty fine SAND. (KELLAWAYS FORMATION)		
D	1.80							
					M			
				(1.60)				
						From 2.50m bgl: occasional cobbles of compacted sand - broken up by hand		
D	2.60							
						From 2.80m bgl: occasional pockets of very soft sandy silt		
D	3.00							
				3.20				
D	3.30					Stiff grey silty CLAY with indistinct thin laminations. (KELLAWAYS FORMATION)		
HV	3.30	Cu = 80		(0.70)	H			
				3.90				
						End of Trial Pit at 3.90m		

Method: JCB 3CX

Groundwater: Seepage from 0.70m bgl.

Stability: Collapse on both long sides from 1.10m to 2.70m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.70m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

TRIAL PIT LOG

TP15

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 2.85m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over stiff dark brown sandy friable CLAY with rootlets. (TOPSOIL)		
				0.20				
D	0.30			(0.25)	M	Firm greyish brown and orangish brown silty CLAY. (ALLUVIUM)		
				0.45				
B	0.60					Orangish brown and light grey slightly clayey silty SAND and GRAVEL. Gravel is fine to coarse, subangular to subrounded flint and limestone. (RIVER TERRACE DEPOSITS)		
					M			
				(0.70)				
				1.15				
D	1.20					Firm dark bluish grey slightly sandy silty CLAY with rare relict rootlets and rare fossil shell fragments. (KELLAWAYS FORMATION)		
HV	1.20	Cu = 45						
					M			
				(0.95)				
				2.10				
B	2.30					Bluish grey silty slightly gravelly fine to coarse SAND. Gravel is fine to coarse, subangular to subrounded limestone. (KELLAWAYS FORMATION)		
				(0.60)	M			
				2.70				
D	2.80			(0.15)	M	Firm bluish grey slightly sandy CLAY with occasional rootlets and rare fossil shell fragments. (KELLAWAYS FORMATION)		
HV	2.80	Cu = 60		2.85		End of Trial Pit at 2.85m		

Method: JCB 3CX

Groundwater: Seepage from 1.90m bgl.

Stability: Collapse on west side from 0.20m to 1.00m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP16

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level		**Coordinates**	**Total Depth** 3.30m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.20)	E	Grass over stiff dark brown slightly sandy friable CLAY with rootlets. (TOPSOIL)		
				0.20				
ES	0.30					Stiff greyish brown and orangish brown mottled silty friable CLAY with occasional rootlets.		
D	0.40			(0.35)	M	(ALLUVIUM)		
				0.55				
D	0.70					Greyish brown silty SAND and GRAVEL. Gravel is fine to coarse, subrounded limestone.		
					M	(RIVER TERRACE DEPOSITS)		
				(0.75)				
				1.30				
D	1.40					Firm dark bluish grey silty CLAY with rare fossil shell fragments.		
HV	1.40	Cu = 55				(KELLAWAYS FORMATION)		
				(0.65)	M			
				1.95				
D	2.10					Firm bluish grey very sandy CLAY with occasional fine to coarse subrounded to subangular limestone gravel. (KELLAWAYS FORMATION)		
				(1.35)	M			
D	3.00							
				3.30				
						End of Trial Pit at 3.30m		

Method: JCB 3CX

Groundwater: Seepage from 1.20m bgl.

Stability: Stable

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.70m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

TRIAL PIT LOG

TP17

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	02/07/2018	**Scale**	1:25
Ground Level	**Coordinates**	**Total Depth**	3.40m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.25)	E	Grass over stiff dark brown friable CLAY with rootlets. (TOPSOIL)		
				0.25				
D	0.40			(0.30)	M	Stiff light brown and orangish brown mottled silty friable CLAY with frequent fossil shell fragments. (ALLUVIUM)		
D	0.60			0.55		Light grey silty SAND and GRAVEL. Gravel is fine to coarse, subrounded to subangular limestone. Sand is fine to coarse (wet). (RIVER TERRACE DEPOSITS)		
				(0.75)	M			
				1.30		Bluish grey silty fine to medium SAND with rare fine to coarse subrounded limestone gravel. (KELLAWAYS FORMATION)		
D	1.50							
				(2.00)	M			
B	2.40							
				3.30				
D	3.40			(0.10)	H	Stiff grey slightly sandy CLAY with rare fossil shell fragments. (KELLAWAYS FORMATION)		
				3.40		End of Trial Pit at 3.40m		

Method: JCB 3CX

Groundwater: Seepage at 0.60m and 3.00m bgl.

Stability: Collapse on both long sides from 0.60m to 1.20m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLIED GEOLOGY

TRIAL PIT LOG

TP18

Project	The Promised Land, Bicester	**Project No.**	AG2875-18
Client	Albion Land Ltd	**Sheet**	1 of 1
Date	03/07/2018	**Scale**	1:25
Ground Level	**Coordinates**	**Total Depth**	3.80m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
ES	0.10			(0.15) 0.15	E	Grass over stiff dark brown slightly sandy slightly gravelly friable CLAY with rootlets. Gravel is fine to coarse, subrounded to subangular limestone. (TOPSOIL)		
D	0.30			(0.30) 0.45	M	Soft to firm light brown silty CLAY with occasional shell fragments. (ALLUVIUM)		
B	0.60			(1.00) 1.45	M	Light grey silty SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, subrounded to subangular limestone (wet). (RIVER TERRACE DEPOSITS)		▼
D	1.50			(0.95) 2.40	M	Bluish grey slightly clayey silty SAND with frequent pockets of very soft (wet) sandy silt. (KELLAWAYS FORMATION)		
D	2.00					*From 2.20m bgl: occasional shell fragments*		
D	2.30							
D HV	2.60 2.60	Cu = 80		(1.40) 3.80	M	Stiff dark grey CLAY with thin indistinct laminations and rare shell fragments (wet). (KELLAWAYS FORMATION)		
						End of Trial Pit at 3.80m		

Method: JCB 3CX

Groundwater: Seepage from 0.35m bgl.

Stability: Collapse on long sides from 0.45m to 2.45m bgl.

Remarks: Trial pit backfilled with arisings on completion.

Length:	2.80m
Width:	0.70m
Logged:	FHJ
Checked:	GPW

APPLiED GEOLOGY

Exploratory Hole Log Key Sheet

Sample Notation

D	Small Disturbed sample
B	Bulk Disturbed sample
ES	Environmental sample
U	Undisturbed U100 sample
UT	Undisturbed UT100 sample
C	Core sample
W	Water sample

In Situ Test Notation

S	Standard Penetration Test
S (C)	Standard Penetration Test (cone)
HV	Hand Shear Vane Test
PID	Photoionization Detector Test
MEXE	Mexecone Cone Penetrometer Test
PP	Pocket Penetrometer Test
K	Permeability Test

Results Notation

Cu	Shear Strength	kN/m^2
N	SPT N Value	-
PID	VOC Concentration	ppm
( )	U/UT Blow Count	-

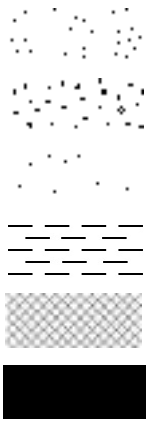
Rotary Core Notation

TCR	Total Core Recovery
SCR	Solid Core Recovery
RQD	Rock Quality Designation
FI	Fracture Index
If	Fracture Spacing
NI	Non Intact
NR	No Recovery
NA	Not Applicable

Ease of Dig

VE	Very Easy
E	Easy
M	Moderate
H	Hard
VH	Very Hard

Backfill Symbols



Sand

Gravel

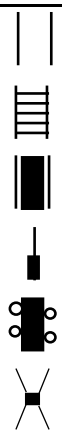
Concrete

Bentonite

Arisings

Grout

Installation Symbols



Plain Standpipe

Slotted Standpipe

Piezometer

Vibrating Wire Piezometer

Inclinometer

Extensometer
(with magnet locations)

Groundwater (GW)

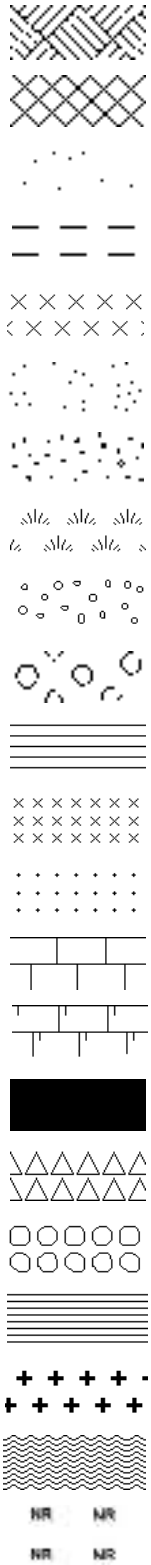
Rise

Groundwater Strike -
with Recorded Rise

Strike

Groundwater Strike -
No Recorded Rise

Legend Symbols



Topsoil

Made Ground

Concrete

Clay

Silt

Sand

Gravel

Peat

Cobbles

Boulders

Mudstone

Siltstone

Sandstone

Limestone

Chalk

Coal

Breccia

Conglomerate

Shale

Igenous Rock

Metamorphic Rock

No Recovery

Note: Most soils comprise a mixture of particle sizes. The soil type is graphically represented on the log and may be a combination of these symbols.

General Notes

1. Details of the standpipe/piezometer are given on the log. The 'Install' column shows a graphical representation of the installed including depth of instruments including slotted section or piezometer depth, and backfill details.

2. Standard Penetration Test is defined in BS EN ISO 17892. Total N value is shown on the logs, full details of the test increments, equipment references, water and casing levels shown on the SPT Summary Sheet.

APPLIED GEOLOGY

APPENDIX D

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: The Promised Land, Bicester
Job No: AG2875-18

Land Use: Residential with Plant Uptake
Dataset: All results
Soil Organic Matter (%) 6.0 %

Exploratory Hole Reference		TP1	TP3	TP4	TP5	TP8	TP12	TP13	TP14	TP16	TP18	No. of samples (n)	Residential with Plant Uptake	Residential without Plant Uptake	Allotments	Commercial / Industrial	Public Open Space (Residential)	Public Open Space (Parks)	Source/Justification
Depth (m)		0.20-0.20	0.30-0.30	0.20-0.20	0.30-0.30	0.10-0.10	0.20-0.20	0.30-0.30	0.30-0.30	0.30-0.30	0.10-0.10								
Strata		Topsoil	Alluvium	Topsoil	Topsoil	Topsoil	Topsoil	Alluvium	Alluvium	Alluvium	Topsoil								
	Units																		
Organic Matter (%)	%	7.9	1.3	7.3	4.5	8.5	7.9	4.7	3.5	3.4	6.9	10							
pH		7.9	8	7.9	8	7.2	7.8	8.3	8.2	7.8	7.9	10							
Arsenic	mg/kg	12	9.2	9.2	14	9.5	13	8.6	10	18	12	10	37	40	43	640	79	170	LQM/CIEH S4UL (2015)
Beryliium	mg/kg	1.1	1.3	0.92	1.4	0.7	1.3	0.85	1.3	1.8	1	10	1.7	2	35	12	2.2	63	LQM/CIEH S4UL (2015)
Boron	mg/kg	16	17	15	13	12	16	16	12	13	17	10	290	11000	45	240000	21000	46000	LQM/CIEH S4UL (2015)
Cadmium	mg/kg	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	10	11	85	1.9	190	120	560	LQM/CIEH S4UL (2015)
Chromium	mg/kg	33	40	32	43	22	39	30	41	61	30	10	910	910	18000	8600	1500	33000	LQM/CIEH S4UL (2015)
Chromium (Hexavalent)	mg/kg	**4**						**4**				2	6	6	1.8	33	7.7	220	LQM/CIEH S4UL (2015)
Copper	mg/kg	37	17	25	29	20	33	16	17	23	29	10	2400	7100	520	68000	12000	44000	LQM/CIEH S4UL (2015)
Lead	mg/kg	65	13	26	47	27	51	11	13	19	26	10	200	310	80	2330	630	1300	C4SL (2014)
Mercury	mg/kg	1.9	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	10	40	56	19	1100	120	240	LQM/CIEH S4UL (2015)
Nickel	mg/kg	24	19	16	25	15	22	14	22	32	17	10	130	180	53	980	230	800	LQM/CIEH S4UL (2015)
Selenium	mg/kg	**1**	**1**	2.5	2.3	1.1	1.8	1.6	**1**	**1**	2	10	250	430	88	12000	1100	1800	LQM/CIEH S4UL (2015)
Vanadium	mg/kg	49	57	37	54	32	50	36	52	83	47	10	410	1200	91	9000	2000	5000	LQM/CIEH S4UL (2015)
Zinc	mg/kg	110	68	55	87	74	96	34	44	110	55	10	3700	40000	620	730000	81000	170000	LQM/CIEH S4UL (2015)
Naphthalene	mg/kg	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	13	13	24	1100	4900	3000	LQM/CIEH S4UL (2015)
Acenaphthylene	mg/kg	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	1100	6000	200	100000	15000	30000	LQM/CIEH S4UL (2015)
Acenaphthene	mg/kg	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	920	6000	160	100000	15000	30000	LQM/CIEH S4UL (2015)
Fluorene	mg/kg	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	860	4500	160	71000	9900	20000	LQM/CIEH S4UL (2015)
Phenanthrene	mg/kg	**0.05**	**0.05**	**0.05**	0.39	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	440	1500	90	23000	3100	6300	LQM/CIEH S4UL (2015)
Anthracene	mg/kg	**0.05**	**0.05**	**0.05**	0.12	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	11000	37000	2200	540000	74000	150000	LQM/CIEH S4UL (2015)
Fluoranthene	mg/kg	0.31	**0.05**	**0.05**	0.72	0.41	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	890	1600	290	23000	3100	6400	LQM/CIEH S4UL (2015)
Pyrene	mg/kg	0.33	**0.05**	**0.05**	0.56	0.38	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	2000	3800	620	54000	7400	15000	LQM/CIEH S4UL (2015)
Benzo[a]anthracene	mg/kg	0.27	**0.05**	**0.05**	1.3	0.36	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Chrysene	mg/kg	0.21	**0.05**	**0.05**	0.77	0.22	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Benzo[b]fluoranthene	mg/kg	0.3	**0.05**	**0.05**	1.2	0.42	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Benzo[k]fluoranthene	mg/kg	0.11	**0.05**	**0.05**	0.66	0.15	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Benzo[a]pyrene	mg/kg	0.27	**0.05**	**0.05**	1.1	0.34	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10	5	5.3	5.7	76	10	21	C4SL (2014)
Dibenzo[a,h]anthracene	mg/kg	**0.05**	**0.05**	**0.05**	0.36	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Indeno[1,2,3-cd]pyrene	mg/kg	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Benzo[g,h,i]perylene	mg/kg	**0.05**	**0.05**	**0.05**	0.27	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	10							Genotoxic PAH see Benzo(a)pyrene
Total of 16 PAHs	mg/kg																		
Phenols (Total)	mg/kg	**1**						**1**				2	380	1200	83	1300	1300	1300	LQM/CIEH S4UL (2015)
Benzene	mg/kg	**0.001**						**0.001**		**0.001**		3	0.37	1.4	0.075	90	73	110	LQM/CIEH S4UL (2015)
Toluene	mg/kg	**0.001**						**0.001**		**0.001**		3	660	3900	120	180000	56000	100000	LQM/CIEH S4UL (2015)
Ethylbenzene	mg/kg	**0.001**						**0.001**		**0.001**		3	260	440	91	27000	25000	27000	LQM/CIEH S4UL (2015)
m&p Xylene	mg/kg	**0.001**						**0.001**		**0.001**		3	310	430	160	30000	43000	31000	LQM/CIEH S4UL (2015)
o-Xylene	mg/kg	**0.001**						**0.001**		**0.001**		3	330	480	160	33000	43000	33000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C5-C6	mg/kg	**0.001**						**0.001**		**0.001**		3	160	160	3900	12000	600000	180000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C6-C8	mg/kg	**0.001**						**0.001**		**0.001**		3	530	530	13000	40000	620000	320000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C8-C10	mg/kg	**0.001**						**0.001**		**0.001**		3	150	150	1700	11000	13000	21000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C10-C12	mg/kg	**1**						**1**		**1**		3	760	770	7300	47000	13000	24000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C12-C16	mg/kg	**2**						**2**		**2**		3	4300	4400	13000	90000	13000	26000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C16-C21	mg/kg	**8**						**8**		**8**			-	-	-	-	-	-	-
Aliphatic TPH >C21-C35	mg/kg	8.7						**8**		11		3	110000	110000	270000	No Risk	250000	490000	LQM/CIEH S4UL (2015)
Aliphatic TPH >C35-C44	mg/kg	**8.4**						**8.4**		**8.4**		3	110000	110000	270000	No Risk	250000	490000	LQM/CIEH S4UL (2015)
Total Aliphatic Hydrocarbons	mg/kg	**10**						**10**		11		3							
Aromatic TPH >C5-C7	mg/kg	**0.001**						**0.001**		**0.001**			300	1400	57	86000	56000	92000	LQM/CIEH S4UL (2015)
Aromatic TPH >C7-C8	mg/kg	**0.001**						**0.001**		**0.001**		3	660	3900	120	180000	56000	100000	LQM/CIEH S4UL (2015)
Aromatic TPH >C8-C10	mg/kg	**0.001**						**0.001**		**0.001**		3	190	270	51	17000	5000	9300	LQM/CIEH S4UL (2015)
Aromatic TPH >C10-C12	mg/kg	**1**						**1**		**1**		3	380	1200	74	34000	5000	10000	LQM/CIEH S4UL (2015)
Aromatic TPH >C12-C16	mg/kg	**2**						**2**		**2**		3	660	2500	130	38000	5000	10000	LQM/CIEH S4UL (2015)
Aromatic TPH >C16-C21	mg/kg	**10**						**10**		**10**		3	930	1900	260	28000	3800	7800	LQM/CIEH S4UL (2015)
Aromatic TPH >C21-C35	mg/kg	**10**						**10**		**10**		3	1700	1900	1600	28000	3800	7900	LQM/CIEH S4UL (2015)
Aromatic TPH >C35-C44	mg/kg	**8.4**						**8.4**		**8.4**		3	1700	1900	1600	28000	3800	7900	LQM/CIEH S4UL (2015)
Total Aromatic Hydrocarbons	mg/kg	**10**						**10**		**10**									
Total Petroleum Hydrocarbons	mg/kg	**10**						**10**		11									
Pesticides/Herbicides Screen in Soil				Absent	-	Absent		Absent	Absent		Absent								LQM/CIEH S4UL (2015)
																			LQM/CIEH S4UL (2015)
Asbestos in Soil		Not-detected			Not-detected	Not-detected		Not-detected		Not-detected									LQM/CIEH S4UL (2015)

Key -

Value within sample set exceeds screening value

Statistical value exceeds screening value

LQM/CIEH S4UL Reference No. S4UL3159 (2015)

Values in **bold** are reported at the laboratory limit of detection

Benzo(a)pyrene has been used as a 'surrogate marker for genotoxic PAH' as discussed in Appendix E of CL:AIRE SP1010 'Development of C4SL for Assessment of Land Affected by Contamination', December 2013.

This allows assessment of the combined carcinogenic risk associated with genotoxic PAH using only b(a)p. Genotoxic PAHs include Benz(a)pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Indeno(123cd)pyrene, Benzo(ghi)perylene and have been marked with a * on the table.

APPLiED GEOLOGY

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Analytical Report Number : 18-91849

Project / Site name:	The Promised Land, Bicester	**Samples received on:**	06/07/2018
Your job number:	AG2875-18	**Samples instructed on:**	06/07/2018
Your order number:	13108	**Analysis completed by:**	13/07/2018
Report Issue Number:	1	**Report issued on:**	13/07/2018
Samples Analysed:	10 soil samples		

Signed: _____

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 18-91849

Project / Site name: The Promised Land, Bicester
Your Order No: 13108

Lab Sample Number				997412	997413	997414	997415	997416
Sample Reference				TP1	TP3	TP4	TP5	TP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.30-0.30	0.20-0.20	0.30-0.30	0.10-0.10
Date Sampled				02/07/2018	02/07/2018	02/07/2018	02/07/2018	03/07/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	11	12	13	17	12
Total mass of sample received	kg	0.001	NONE	1.0	1.1	1.0	1.1	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	8.0	7.9	8.0	7.2
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	46	35	40	24	38
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.023	0.017	0.020	0.012	0.019
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	22.8	17.4	20.2	12.2	18.8
Organic Matter	%	0.1	MCERTS	7.9	1.3	7.3	4.5	8.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.39	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.12	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.31	< 0.05	< 0.05	0.72	0.41
Pyrene	mg/kg	0.05	MCERTS	0.33	< 0.05	< 0.05	0.56	0.38
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05	1.3	0.36
Chrysene	mg/kg	0.05	MCERTS	0.21	< 0.05	< 0.05	0.77	0.22
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.30	< 0.05	< 0.05	1.2	0.42
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.11	< 0.05	< 0.05	0.66	0.15
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05	1.1	0.34
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.36	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.27	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.80	< 0.80	< 0.80	7.42	2.28

Analytical Report Number: 18-91849

Project / Site name: The Promised Land, Bicester
Your Order No: 13108

Lab Sample Number				997412	997413	997414	997415	997416
Sample Reference				TP1	TP3	TP4	TP5	TP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.30-0.30	0.20-0.20	0.30-0.30	0.10-0.10
Date Sampled				02/07/2018	02/07/2018	02/07/2018	02/07/2018	03/07/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	9.2	9.2	14	9.5
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.3	0.92	1.4	0.70
Boron (total)	mg/kg	1	MCERTS	16	17	15	13	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-	-	-
Chromium (III)	mg/kg	1	NONE	30	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	33	40	32	43	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	37	17	25	29	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	65	13	26	47	27
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.9	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	19	16	25	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	2.5	2.3	1.1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	49	57	37	54	32
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	68	55	87	74
Magnesium (water soluble)	mg/kg	5	NONE	7.0	< 5.0	5.9	6.1	7.1
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	8.7	-	-	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	-	-	-	-
TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	< 10	-	-	-	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	Absent	-	Absent

Analytical Report Number: 18-91849

Project / Site name: The Promised Land, Bicester
Your Order No: 13108

Lab Sample Number				997417	997418	997419	997420	997421
Sample Reference				TP12	TP13	TP14	TP16	TP18
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.30-0.30	0.30-0.30	0.30-0.30	0.10-0.10
Date Sampled				02/07/2018	03/07/2018	03/07/2018	02/07/2018	03/07/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	22	15	25	21
Total mass of sample received	kg	0.001	NONE	0.89	1.2	0.95	0.93	1.0
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Not-detected	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	8.3	8.2	7.8	7.9
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	70	54	40	62	55
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.035	0.027	0.020	0.031	0.028
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	35.0	26.8	19.9	30.8	27.5
Organic Matter	%	0.1	MCERTS	7.9	4.7	3.5	3.4	6.9
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

Analytical Report Number: 18-91849

Project / Site name: The Promised Land, Bicester
Your Order No: 13108

Lab Sample Number				997417	997418	997419	997420	997421
Sample Reference				TP12	TP13	TP14	TP16	TP18
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.30-0.30	0.30-0.30	0.30-0.30	0.10-0.10
Date Sampled				02/07/2018	03/07/2018	03/07/2018	02/07/2018	03/07/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	8.6	10	18	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	0.85	1.3	1.8	1.0
Boron (total)	mg/kg	1	MCERTS	16	16	12	13	17
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	-	-
Chromium (III)	mg/kg	1	NONE	-	29	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39	30	41	61	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	16	17	23	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	51	11	13	19	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	14	22	32	17
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.8	1.6	< 1.0	< 1.0	2.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	50	36	52	83	47
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	34	44	110	55
Magnesium (water soluble)	mg/kg	5	NONE	10	5.9	6.1	8.2	8.9
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	< 8.0	-	11	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	< 8.4	-	< 8.4	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	11	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	< 10	-	11	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	-	< 10	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	< 8.4	-	< 8.4	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	< 10	-	< 10	-
TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	-	< 10	-	11	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	Absent	Absent	-	Absent

Analytical Report Number : 18-91849

Project / Site name: The Promised Land, Bicester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
997412	TP1	None Supplied	0.20-0.20	Brown loam and clay with vegetation.
997413	TP3	None Supplied	0.30-0.30	Brown loam and clay with vegetation.
997414	TP4	None Supplied	0.20-0.20	Brown loam and clay with vegetation.
997415	TP5	None Supplied	0.30-0.30	Brown loam and clay with vegetation.
997416	TP8	None Supplied	0.10-0.10	Brown loam and clay with vegetation.
997417	TP12	None Supplied	0.20-0.20	Brown loam and clay with vegetation.
997418	TP13	None Supplied	0.30-0.30	Brown clay and loam.
997419	TP14	None Supplied	0.30-0.30	Brown loam and clay with vegetation.
997420	TP16	None Supplied	0.30-0.30	Brown clay.
997421	TP18	None Supplied	0.10-0.10	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 18-91849

Project / Site name: The Promised Land, Bicester

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Pesticides and Herbicides in soil screening	In-house method	In-house method		W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-21348-1
Initial Date of Issue:	26-Jul-2018
Client	Applied Geology
Client Address:	Unit 23, Abbey Park Stareton Kenilworth Warwickshire CV8 2LY
Contact(s):	Frankie Hadley Jones Lab Results
Project	AG2875-18 - The Promised Land, Bicester

Quotation No.:		**Date Received:**	19-Jul-2018
Order No.:	13163	**Date Instructed:**	19-Jul-2018
No. of Samples:	9		
Turnaround (Wkdays):	5	**Results Due:**	25-Jul-2018
Date Approved:	26-Jul-2018		

Approved By:

Details: Robert Monk, Technical Manager

Results - Soil

Project: AG2875-18 - The Promised Land, Bicester

Client: Applied Geology				**Chemtest Job No.:**	18-21348	18-21348	18-21348	18-21348	18-21348	18-21348	18-21348	18-21348	18-21348
Quotation No.:				**Chemtest Sample ID.:**	656613	656614	656615	656616	656617	656618	656619	656620	656621
Order No.: 13163				Client Sample Ref.:	TP4	TP7	TP12	TP18	TP13	TP8	TP2	TP6	TP17
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.30	2.20	1.70	2.60	1.40	1.50	0.50	0.90	1.50
				Bottom Depth (m):	1.30	2.20	1.70	2.60	1.40	1.50	0.50	0.90	1.50
				Date Sampled:	02-Jul-2018	03-Jul-2018	02-Jul-2018	03-Jul-2018	03-Jul-2018	03-Jul-2018	02-Jul-2018	03-Jul-2018	02-Jul-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	0.016	< 0.010	0.015					
Sulphate (Acid Soluble)	M	2430	%	0.010	0.080	0.40	0.11	0.16					
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.14	0.88	0.27	0.51	0.085	< 0.010	< 0.010	< 0.010	0.71
Moisture	N	2030	%	0.020	23	22	19	18	17	13	7.3	9.2	12
Soil Colour	N	2040		N/A	Black	Black	Black	Grey					
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones					
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay					
pH	M	2010		N/A	8.3	7.5	8.0	7.6	8.2	8.4	8.5	8.6	7.6
Magnesium (Water Soluble)	N	2120	mg/l	10.000							< 10	< 10	
Total Sulphur	M	2175	%	0.010	0.39	4.7	1.4	3.1					

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

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B33 0SJ

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email: admin@geolabs.co.uk
web: www.geolabs.co.uk

Applied Geology
Unit 23
Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

For the attention of Mr F Hadley-Jones

12 August 2018
Report No : GEO/27825/01

Dear Sirs

Our ref **GEO / 27825**
Your Ref **AG2875-18**

Date samples received	26/07/2018
Date written instructions received	26/07/2018
Date testing commenced	27/07/2018
Date of sample disposal	**09/09/2018**

Project **THE PROMISED LAND, BICESTER**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Geotechnical Test Summary
2	8	Liquid & Plastic Limits and Water Content
3	5	Particle Size Distribution

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory. This report should not be reproduced except in full without the written permission of the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of no less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully
on behalf of **GEOLABS Limited**

J A Reynolds
Laboratory Manager

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Depth (m)	Sample Ref	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
TP11	0.80-0.80		B	Yellowish brown very clayey, very sandy fine to coarse GRAVEL.															Particle Size Distribution
TP13	2.20-2.20		B	Grey very clayey SAND with some gravel. Gravel is fine to coarse.	23.8	26	16	10	86										Particle Size Distribution
TP15	2.30-2.30		B	Grey very clayey SAND with some gravel. Gravel is fine to coarse.	14.3	26	16	10	81										Particle Size Distribution
TP16	2.10-2.10		D	Dark grey slightly sandy CLAY with some gravel. Gravel is fine to medium.	15.0	28	13	15	90										
TP2	0.60-0.60		B	Yellowish brown clayey sandy fine to coarse GRAVEL.															Particle Size Distribution
TP3	0.50-0.50		D	Greenish grey slightly sandy CLAY with rare gravel. Gravel is fine to coarse.	26.4	73	22	51	96										
TP3	1.30-1.30		D	Greenish grey CLAY.	38.2	73	25	48	100										
TP6	1.60-1.60		D	Black CLAY with rare fine gravel.	35.2	72	24	48	99										
TP8	0.60-0.60		D	Yellowish brown sandy CLAY with some gravel. Gravel is fine to medium.	17.2	32	12	20	84										
TP8	2.00-2.00		D	Dark grey CLAY.	36.0	75	24	51	100										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

GEOLABS

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Borehole / Trial Pit	Depth (m)	Sample Ref	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
TP9	1.20-1.20		B	Yellowish brown clayey very sandy fine to medium GRAVEL.															Particle Size Distribution

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

GEOLABS

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

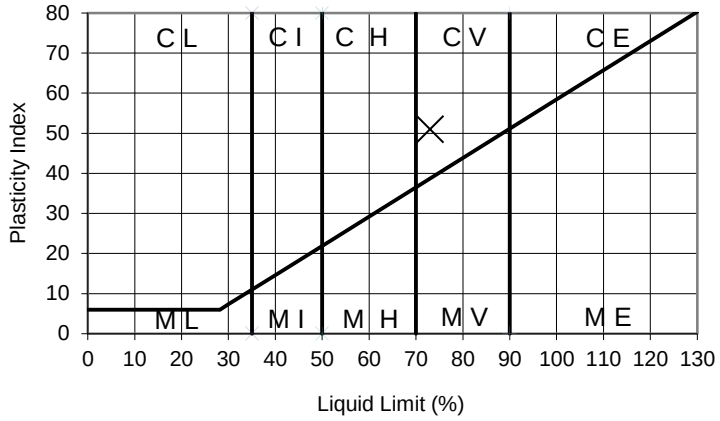
BH / TP	TP3
Depth (m)	0.50
Sample Type	D

Description:

Greenish grey slightly sandy CLAY with rare gravel. Gravel is fine to coarse.

Preparation : Sample as received

Water Content : (BS EN ISO 17892-1:2014)	26.4	%
Percentage passing 425µm sieve :	96	%
Liquid Limit :	73	%
Plastic Limit :	22	%
Plasticity Index :	51	
Equivalent Water Content of material passing 425µm sieve :	27	%
Liquidity Index :	0.11	



Checked and Approved by:

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

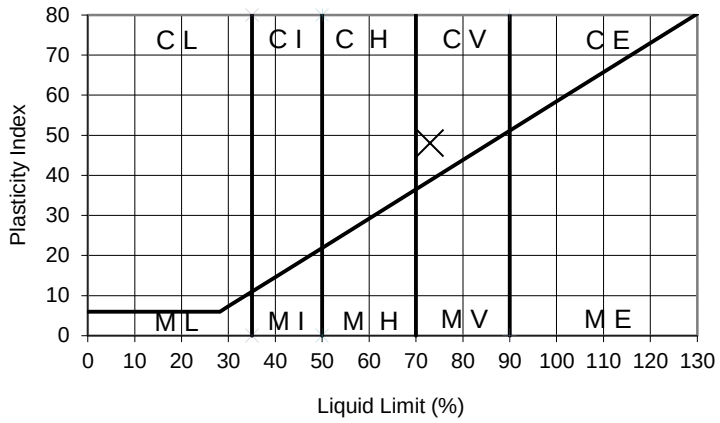
BH / TP	TP3
Depth (m)	1.30
Sample Type	D

Description:

Greenish grey CLAY.

Preparation : Sample as received

Water Content : (BS EN ISO 17892-1:2014)	38.2	%
Percentage passing 425µm sieve :	100	%
Liquid Limit :	73	%
Plastic Limit :	25	%
Plasticity Index :	48	
Equivalent Water Content of material passing 425µm sieve :	38	%
Liquidity Index :	0.28	



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J A Reynolds - Laboratory Manager
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Project Number:

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Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

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UKAS

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

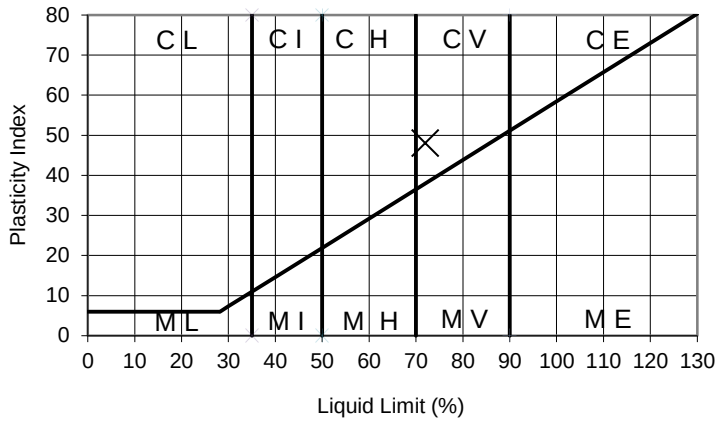
BH / TP	TP6
Depth (m)	1.60
Sample Type	D

Description:

Black CLAY with rare fine gravel.

Preparation : Sample as received

Water Content : (BS EN ISO 17892-1:2014)	35.2	%
Percentage passing 425µm sieve :	99	%
Liquid Limit :	72	%
Plastic Limit :	24	%
Plasticity Index :	48	
Equivalent Water Content of material passing 425µm sieve :	36	%
Liquidity Index :	0.24	



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GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

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BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

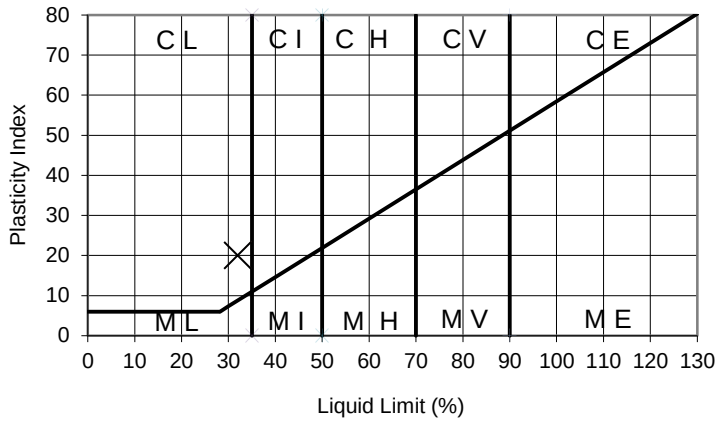
BH / TP	TP8
Depth (m)	0.60
Sample Type	D

Description:

Yellowish brown sandy CLAY with some gravel. Gravel is fine to medium.

Preparation : Sample washed and air dried

Water Content : (BS EN ISO 17892-1:2014)	17.2	%
Percentage passing 425µm sieve :	84	%
Liquid Limit :	32	%
Plastic Limit :	12	%
Plasticity Index :	20	
Equivalent Water Content of material passing 425µm sieve :	21	%
Liquidity Index :	0.43	



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THE PROMISED LAND, BICESTER
AG2875-18

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UKAS

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

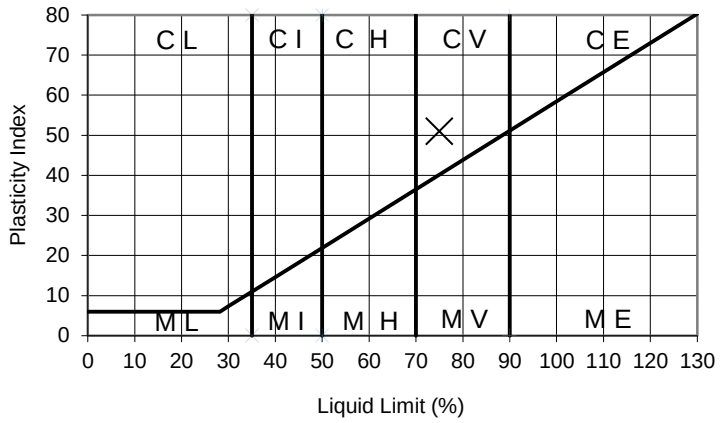
BH / TP	TP8
Depth (m)	2.00
Sample Type	D

Description:

Dark grey CLAY.

Preparation : Sample as received

Water Content : (BS EN ISO 17892-1:2014)	36.0	%
Percentage passing 425µm sieve :	100	%
Liquid Limit :	75	%
Plastic Limit :	24	%
Plasticity Index :	51	
Equivalent Water Content of material passing 425µm sieve :	36	%
Liquidity Index :	0.24	



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THE PROMISED LAND, BICESTER
AG2875-18

GEOLABS

UKAS

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

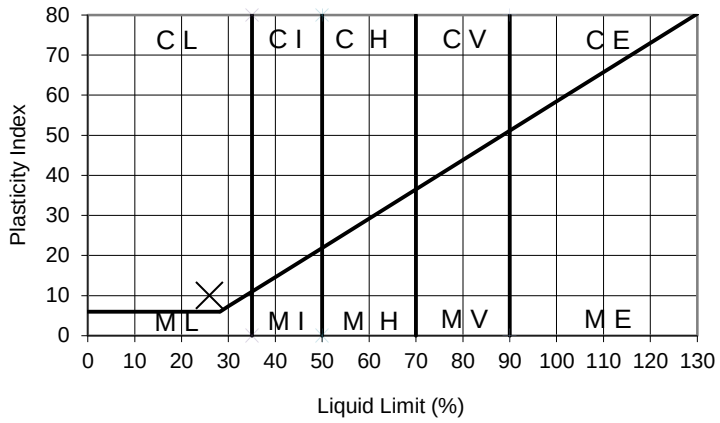
BH / TP	TP13
Depth (m)	2.20
Sample Type	B

Description:

Grey very clayey SAND with some gravel. Gravel is fine to coarse.

Preparation : Sample washed and air dried

Water Content : (BS EN ISO 17892-1:2014)	23.8	%
Percentage passing 425µm sieve :	86	%
Liquid Limit :	26	%
Plastic Limit :	16	%
Plasticity Index :	10	
Equivalent Water Content of material passing 425µm sieve :	28	%
Liquidity Index :	1.18	



Checked and Approved by:

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

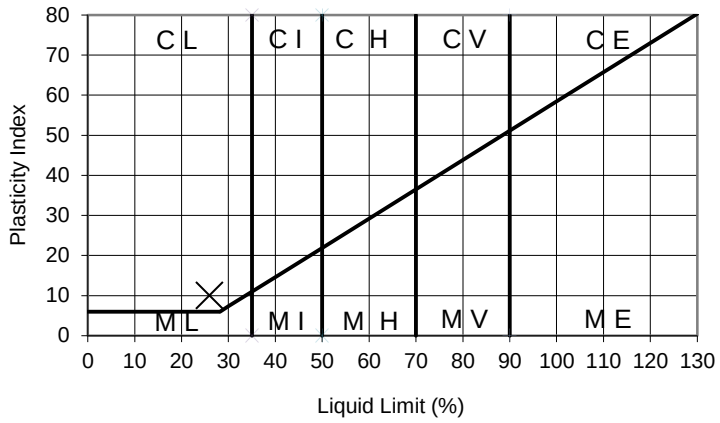
BH / TP	TP15
Depth (m)	2.30
Sample Type	B

Description:

Grey very clayey SAND with some gravel. Gravel is fine to coarse.

Preparation : Sample washed and air dried

Water Content : (BS EN ISO 17892-1:2014)	14.3	%
Percentage passing 425µm sieve :	81	%
Liquid Limit :	26	%
Plastic Limit :	16	%
Plasticity Index :	10	
Equivalent Water Content of material passing 425µm sieve :	18	%
Liquidity Index :	0.17	



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J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

BS1377 : Part 2 : 1990 Clauses 4.4 & 5

LIQUID AND PLASTIC LIMITS

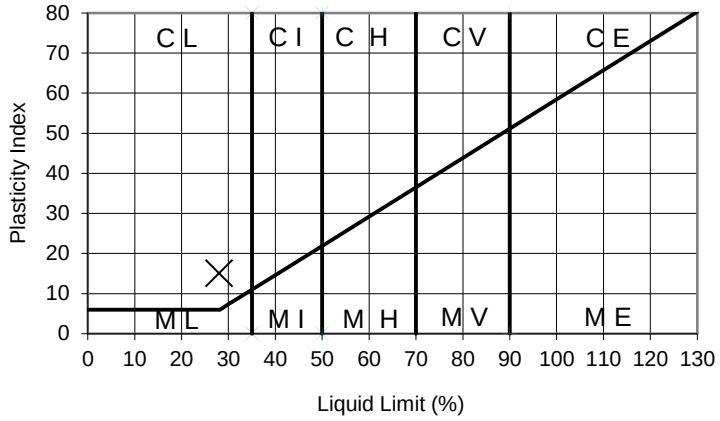
BH / TP	TP16
Depth (m)	2.10
Sample Type	D

Description:

Dark grey slightly sandy CLAY with some gravel. Gravel is fine to medium.

Preparation : Sample washed and air dried

Water Content : (BS EN ISO 17892-1:2014)	15.0	%
Percentage passing 425µm sieve :	90	%
Liquid Limit :	28	%
Plastic Limit :	13	%
Plasticity Index :	15	
Equivalent Water Content of material passing 425µm sieve :	17	%
Liquidity Index :	0.24	



Checked and Approved by:

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

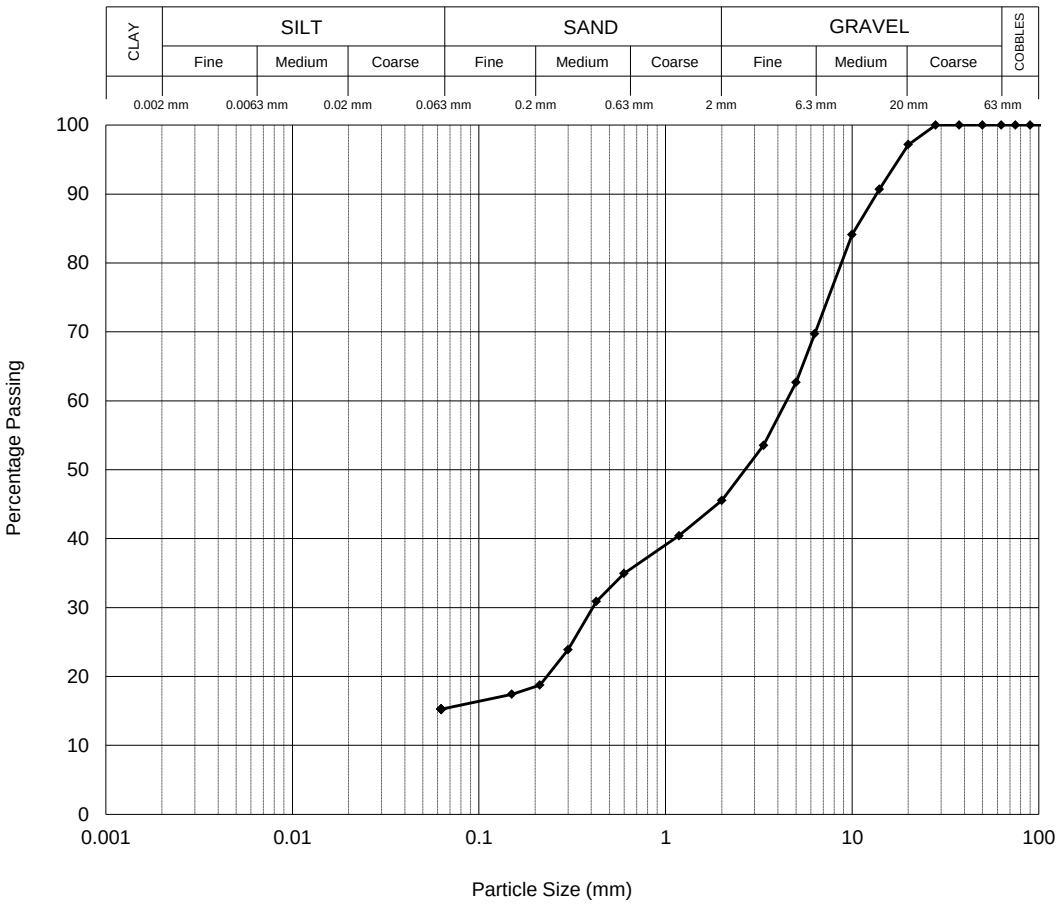
BH / TP No.	TP2
Depth (m)	0.60-0.60
Sample Type	B

Description

Yellowish brown clayey sandy fine to coarse GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	97
14.0 mm	91
10.0 mm	84
6.30 mm	70
5.00 mm	63
3.35 mm	54
2.00 mm	46
1.18 mm	40
600 µm	35
425 µm	31
300 µm	24
212 µm	19
150 µm	17
63 µm	15



Particle Proportions	
Cobbles	0
Gravel	54
Sand	30
Silt & Clay	16

Checked and Approved by

J A Reynolds - Laboratory Manager
12/08/2018

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BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

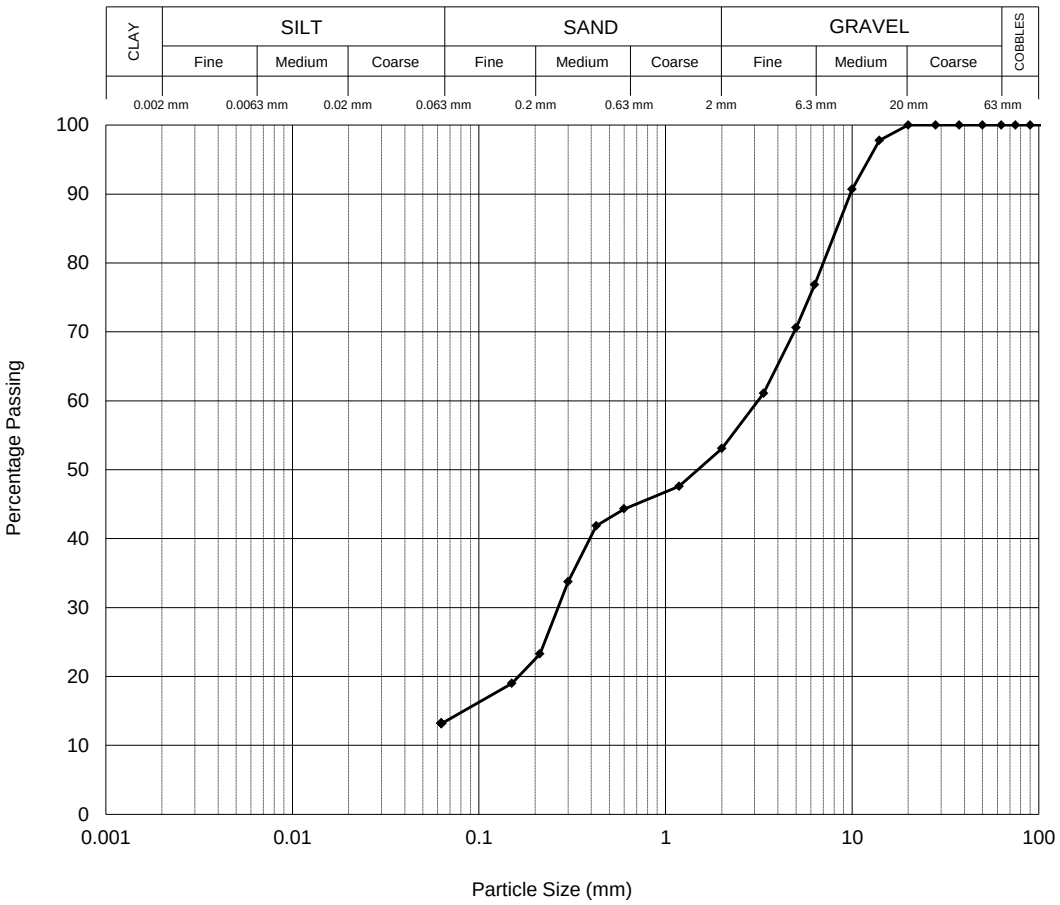
BH / TP No.	TP9
Depth (m)	1.20-1.20
Sample Type	B

Description

Yellowish brown clayey very sandy fine to medium GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	98
10.0 mm	91
6.30 mm	77
5.00 mm	71
3.35 mm	61
2.00 mm	53
1.18 mm	48
600 µm	44
425 µm	42
300 µm	34
212 µm	23
150 µm	19
63 µm	13



Particle Proportions	
Cobbles	0
Gravel	47
Sand	40
Silt & Clay	13

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BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

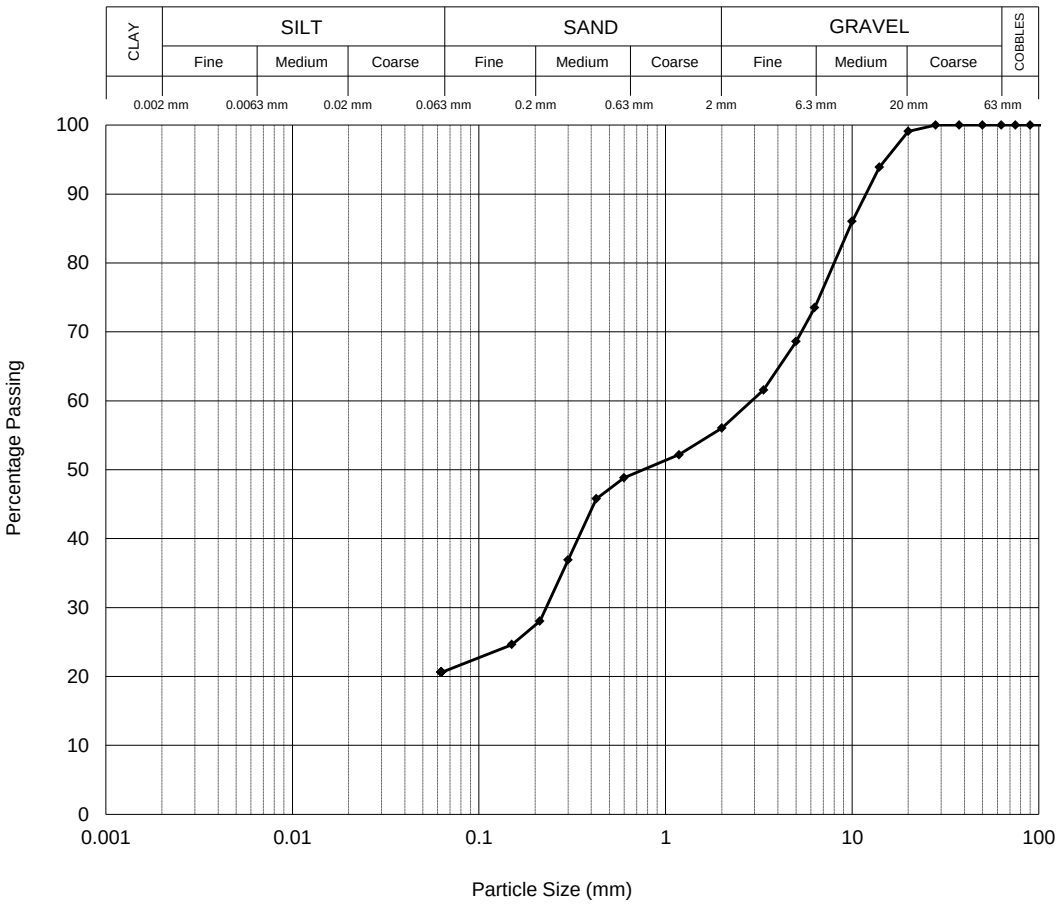
BH / TP No.	TP11
Depth (m)	0.80-0.80
Sample Type	B

Description

Yellowish brown very clayey, very sandy fine to coarse GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	99
14.0 mm	94
10.0 mm	86
6.30 mm	74
5.00 mm	69
3.35 mm	62
2.00 mm	56
1.18 mm	52
600 µm	49
425 µm	46
300 µm	37
212 µm	28
150 µm	25
63 µm	21



Particle Proportions	
Cobbles	0
Gravel	44
Sand	35
Silt & Clay	21

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BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

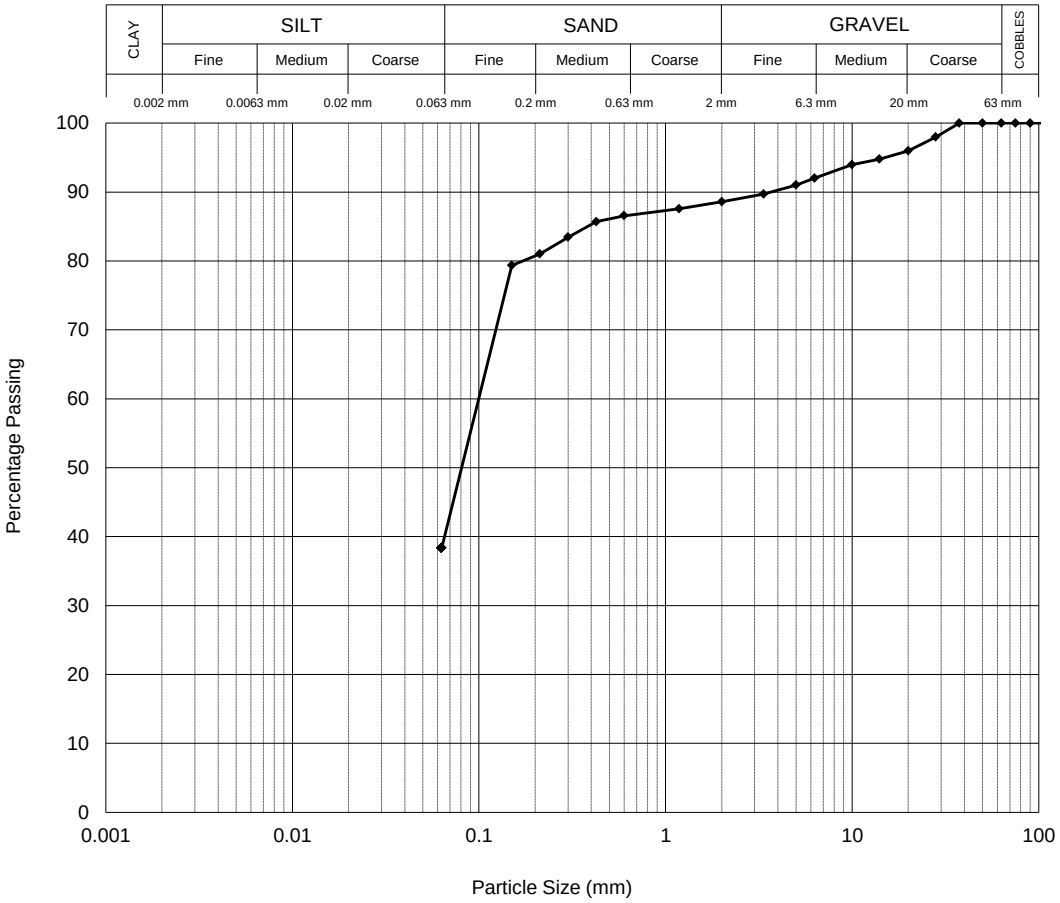
BH / TP No.	TP13
Depth (m)	2.20-2.20
Sample Type	B

Description

Grey very clayey SAND with some gravel. Gravel is fine to coarse.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	98
20.0 mm	96
14.0 mm	95
10.0 mm	94
6.30 mm	92
5.00 mm	91
3.35 mm	90
2.00 mm	89
1.18 mm	88
600 µm	87
425 µm	86
300 µm	83
212 µm	81
150 µm	79
63 µm	38



Particle Proportions	
Cobbles	0
Gravel	11
Sand	50
Silt & Clay	39

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GEOLABS

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

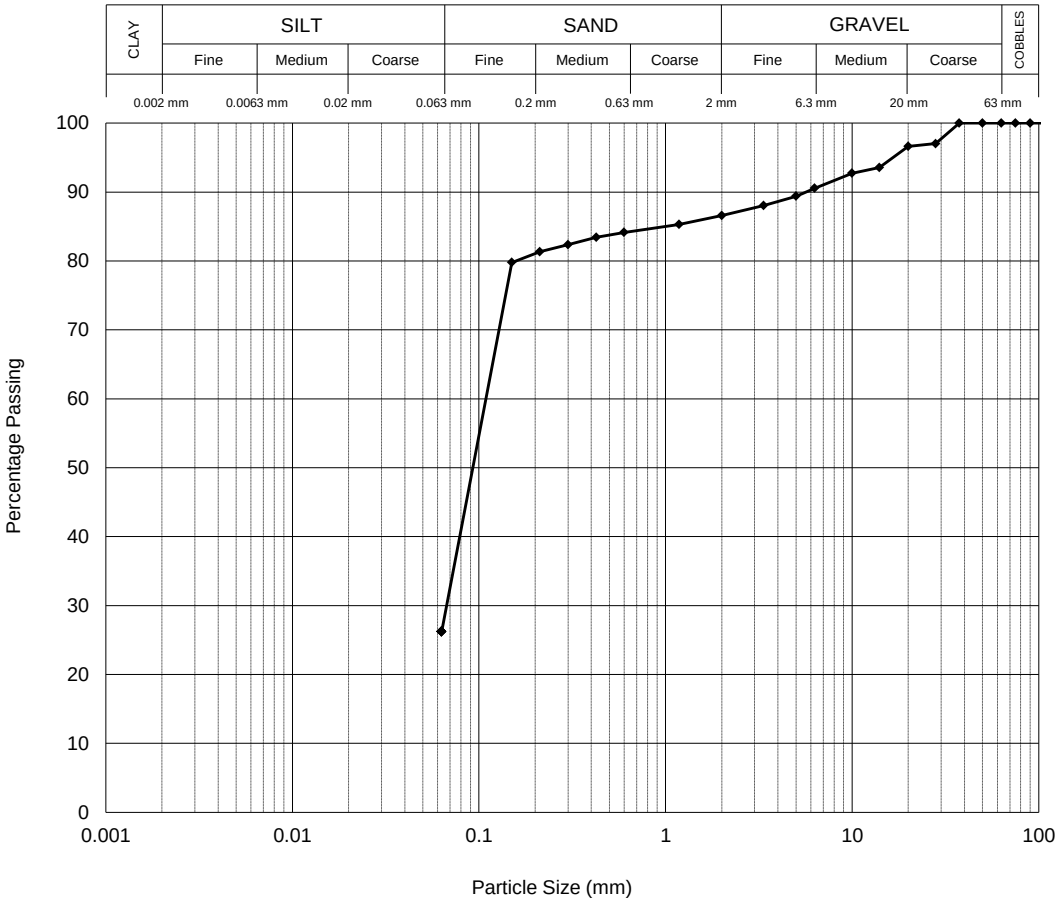
BH / TP No.	TP15
Depth (m)	2.30-2.30
Sample Type	B

Description

Grey very clayey SAND with some gravel. Gravel is fine to coarse.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	97
20.0 mm	97
14.0 mm	94
10.0 mm	93
6.30 mm	91
5.00 mm	89
3.35 mm	88
2.00 mm	87
1.18 mm	85
600 µm	84
425 µm	83
300 µm	82
212 µm	81
150 µm	80
63 µm	26



Particle Proportions	
Cobbles	0
Gravel	13
Sand	60
Silt & Clay	27

Checked and Approved by

J A Reynolds - Laboratory Manager
12/08/2018

Project Number:

GEO / 27825

Project Name:

THE PROMISED LAND, BICESTER
AG2875-18

GEOLABS

APPENDIX E

APPENDIX H

APPENDIX E

STANDARD FIELDWORK AND ASSESSMENT PROCEDURES

Scope of Work

The scope of work undertaken is defined in Section 1 of the Report. It should be noted that Applied Geology Limited does not provide arboricultural surveys, specialist surveys for the detection of invasive plant species (such as Japanese Knotweed) or protected species of wildlife. Information from environmental and ecological datasets is included from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website, however, if a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted. Similarly, information on flood risk is included; obtained from the Environment Agency Web site and the GroundSure report; but this is not intended to be a full hydrological study and, if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development. Also, whilst our field staff have undergone asbestos awareness training, Applied Geology does not undertake asbestos surveys or provide specific advice relating to asbestos-containing materials. Any suspected asbestos-containing materials observed by our field staff will be mentioned in the report but further assessment by others may be required.

Fieldwork

Fieldwork is generally carried out in accordance with BS5930 (2015) “Code of Practice for Site Investigations” and BS10175 (2011) Investigation of Potentially Contaminated Sites, unless otherwise stated.

Prior to commencement on site, statutory services plans are generally obtained and verbal enquiries are also made regarding the positions of private or statutory services on site. Prior to excavation or drilling, locations are scanned with a cable avoidance tool (CAT) and service pits are generally excavated at borehole positions, where possible.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in the report appendices, together with sample depths, the results of in-situ testing, comments on groundwater inflows, and any other pertinent information. The strata descriptions are in general accordance with BS5930:2015. Disturbed plastic pot and glass amber jar samples are recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future laboratory testing.

Light cable percussion boreholes are generally drilled using a Pilcon Wayfarer or Dando rig and are advanced using equipment to bore 200/150mm diameter boreholes. Disturbed plastic pot samples are recovered from all deposits encountered to allow examination and laboratory testing. Certain strata are cased off due to their tendency to collapse, particularly in the presence of groundwater inflows and/or to reduce the risk of cross contamination. In situ Standard Penetration Tests, using Split Spoon (SPT) and Cone (CPT) are undertaken in the boreholes to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT “N” value results. Within the fine grained (cohesive) deposits, “undisturbed” 100mm driven open tube samples were recovered from the various deposits to provide samples for examination and laboratory testing. On encountering groundwater, boring is usually suspended for 20 minutes while any rise in water level is recorded. Full details of the groundwater observations and monitoring results during boring operations are included on the borehole records. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion, unless otherwise stated on the individual logs.

Unless otherwise stated on the relevant logs, trial pits are excavated using a wheeled backhoe excavator, usually with a 0.6m wide bucket. The excavations are logged from the ground surface by an Engineering Geologist / Geo-environmental Engineer and relevant field testing, appropriate to the soils encountered, is carried out on samples brought to the surface. Representative disturbed soil

samples are collected from selected horizons for subsequent laboratory testing. The trial pits are usually unshored and where reasonable, left open for a period of time to allow observations of pit stability and depth and inflow rate of any groundwater ingress. The excavations are backfilled with arisings prior to moving on to the next position. Any trial pits carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable.

Driven Continuous Sampling (DCS) boreholes are drilled using a track mounted Global mini-rig or similar using sampling tubes of varying diameter (decreasing with depth). Samples of the deposits encountered are recovered in 1m long clear plastic liners, which are logged and sub-sampled on site by an Engineering Geologist. Generally for geotechnical investigations, during the drilling process in-situ Standard Penetration Tests (SPTs) are undertaken at selected depths to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT “N” value results. Groundwater seepages are noted during drilling if encountered. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion.

Unless specifically stated in the report, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of the exploratory holes where it is considered they may impact on proposed development.

It should be noted that groundwater levels at any particular site may fluctuate due to rainfall, seasonal variations etc and, therefore, levels may be different to those measured during the course of the fieldwork and monitoring period.

Laboratory Testing

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by a UKAS accredited specialist laboratory. Chemical testing was undertaken by a UKAS accredited specialist chemical testing laboratory and MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

Contamination Assessment – Human Health

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and relevant screening values. Risk to human health has been initially assessed by comparing soil results against various published screening criteria. These have been sourced from the following, in order of preference:

- DEFRA. Category 4 Screening Levels (C4SL), March 2014;
- LQM/CIEH S4UL for Human Health Risk Assessment (S4UL), 2015*;
- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (GAC), 2010.

Except for lead and benzo(a)pyrene, the assessments will be carried out by comparing results against the LQM/CIEH S4UL in the first instance, where these values are exceeded, then reference will be made to the C4SLs where such exist. Lead will only be compared to the C4SL because no S4UL exists for lead. For Benzo(a)pyrene, Applied Geology has chosen to adopt the approach presented by the C4SL committee rather than the approach proposed by LQM/CIEH. Further discussion on this is presented below.

It is our view, and the view of others in the industry, that the C4SL were derived for use in both the Part IIA system and through the planning system, as they allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial action. The C4SLs are considered to represent a contamination level that is 'low' from a toxicological view point, which we therefore consider to be 'acceptable' under planning.

Historically, the level of contamination has been assessed with reference to SGV values which were derived to represent a 'minimal' level of contamination. The SGVs are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination and, where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/S4UL/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

At this time, there are two toxicological methodologies that can be used in the derivation of screening criteria for PAHs; Relative Potency Factor (RPFs) or the Surrogate Marker approach. Applied Geology has chosen (based on the latest guidance from the Health Protection Agency (HPA) to use the surrogate marker approach proposed in the C4SL methodology, whereby benzo(a)pyrene can be used as a surrogate marker for all 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker benzo(a)pyrene is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only benzo(a)pyrene. In order to confirm that the mixture of genotoxic PAH in the soil is similar to the coal tar mixture used in the toxicological study, various PAH ratios are plotted and checked to see that they fall within the limits set in HPA, 2010.

Contamination Assessment – Water Quality

Risks to water quality has been assessed by following the Environment Agency guidance on groundwater protection (previously known as GP3), updated on their website in March 2017, see https://www.gov.uk/government/policies/water-quality and 'The Environment Agency's approach to groundwater protection' (March 2017 Version 1.0).

For hazardous substances, which should be prevented from entering groundwater, the screening criteria are initially set as the limit of detection, however, if groundwater has already been impacted, an appropriate environmental standard will then be used. For hazardous substances, background quality may also be taken into account.

For non-hazardous compounds, their release should not result in any pollution or significant risk of pollution in the future, as such comparison with UK DWS or EQS standards will allow determination of whether pollution could occur. Typically screening criteria will be sourced from the following:

- Environmental Standards (ES), which are defined in European legislation such as the Water Framework Directive (WFD) (2000/60/EC) and the Priority Substances Directive (PSD) (2008/105/EC) a daughter directive of the WFD.
- The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction, 2010.
- UK Water Supply (Water Quality) Regulations, 2010.
- UK quality standards for water to be used for direct abstraction to potable supply e.g. Surface Water (Abstraction for Drinking Water) (Classification) Regulations, 1996.
- World Health Organisation (WHO) Guidelines for Drinking Water Quality.

Re-use of Soils and Waste Soil Disposal

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will probably be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption may also be required.

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous, prior to removal from site, as required by the “Duty of Care” (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC (“Landfill Directive”). Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description “Soil and Stones”, EWC code 17 05 04. Waste Acceptance Criteria (WAC) testing is required for many Inert wastes and generally for all Hazardous Waste but not for non-hazardous waste. There are certain restrictions for inert wastes regarding topsoil and peat. Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

Health & Safety Aspects

As outlined within the HSE publication ‘Successful Health and Safety Management - HSG65’, this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations.

Where excavations are undertaken on site, trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Care should be taken when digging excavations to prevent undermining or causing loss of support to the foundations of the nearby adjoining structures. Surcharging such as from spoil or vehicle movements close to excavation sides should be avoided. Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.