

PHASE I & II GEO-ENVIRONMENTAL ASSESSMENT

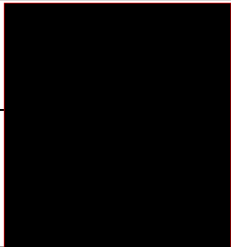
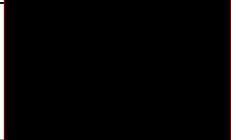
KYNGS GOLF & COUNTRY CLUB,
STATION ROAD, MARKET BOSWORTH

MR G DENNY

SEPTEMBER 2017



SUMMARY TABLE: PHASE I & II GEO-ENVIRONMENTAL ASSESSMENT	
SITE:	Kyngs Golf & Country Club, Station Road, Market Bosworth, Leicestershire
CLIENT:	Mr G Denny
DATE:	September 2017
REFERENCE	IV.149.17
DEVELOPMENT PROPOSAL:	Demolition and construction of new club house, and fifteen holiday homes
HUMAN HEALTH:	No significant risk; Made Ground in mounds near the south-west corner are not suitable for re-use in gardens or soft landscaping
CONTROLLED WATERS:	No risk
GAS RISK:	Gas protection measures to Characteristic Situation 2
RADON GAS:	No risk
COMMENTS:	Low environmental liability related to coal tar containing asphalt noted in areas where raised landscaping and paving are designated.
FOUNDATIONS:	Deep trenchfill for clubhouse and strip footings for Plots 1-6
FLOOR SLABS:	In-situ suspended or beam and block
CONCRETE:	DS-1 and AC-1
SOAKAWAYS:	Unsuitable in clay, may be viable in the north-east corner of the site
COMMENTS:	Additional investigation is required for Plots 7-15 in the form of cable percussion boreholes.

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Date:	29 th September 2017	
Version:	2.0 - Revised 7th September 2018	Revisions reflect revised development proposal



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1.0 INTRODUCTION

1.1 PREAMBLE

This Phase I & II Geo-Environmental Assessment has been produced for Mr G Denny to provide a pre-development contamination and geotechnical assessment of the site known as *Kyngs Golf & Country Club, Station Road, Market Bosworth, Leicestershire*. The Client is proposing to revamp the disused golf course, which includes demolishing the existing clubhouse and rebuilding a new one (planning reference: 17/00528/FUL). In addition, at least 15 holiday homes will be built along the eastern boundary which will be rented out.

At the time of writing this report, only the footprint of the proposed clubhouses and Plots 1-6 of the holiday homes have been investigated.

1.2 SITE LOCATION

The site is located approximately 1km west of Market Bosworth town centre. The National Grid Reference (NGR) for the approximate centre of the site is SK 396 033. The site location, development proposal and site layout are illustrated in Appendix A.

1.3 PROJECT BRIEF

The brief for the Phase I & II Geo-Environmental Assessment incorporates:

- A review and assessment of the site history, with reference to potentially contaminative uses.
- A review of regulatory authority and environmental data relating to the site and its environs.
- A site inspection.
- An appraisal of potential environmental risks.
- Development of a Phase I Conceptual Model
- Provision of a strategy for, and implementation of a Phase II Environmental and Geotechnical Assessment.
- Development of the Phase II Conceptual Model.
- Provision of recommendations to mitigate against environmental risks.
- Provision of geotechnical design parameters for the proposed development.

1.4 DATA REFERENCES

- Environmental Search Data (Supplied by Emapsite Ltd).
- Historical Ordnance Survey (OS) Mapping (Supplied by Emapsite Ltd).
- British Geological Survey Online Geological Mapping.
- BRE (2005), Special Digest 1: Concrete in aggressive ground.
- BSI (2015), BS 5930:2015 Code of practice for ground investigations.
- BS8004 (2015), Code of practice for foundations.
- BS8485 (2015), Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- PHE-BGS (2011), Joint Indicative Atlas of Radon in Great Britain.

1.5 LIMITATIONS

This report has been produced in accordance with industry best practice at the time of writing.

Ivy House Environmental Ltd has, in the production of this report, relied upon information provided by third parties. Ivy House Environmental Ltd does not warrant the accuracy of this information and will not be responsible for any opinions which Ivy House Environmental has expressed, or conclusions which it has drawn, in reliance upon information which is subsequently proven to be inaccurate.

All statements and opinions provided in this report have been reported in good faith and are based on the information gained during, and restrictions imposed by, site investigation

techniques used at the time. Ivy House Environmental cannot be held responsible for conditions not revealed by the investigation.

This report has been prepared for the sole use of the client and shall not be relied upon or transferred to third parties without the express written consent of Ivy House Environmental. Unauthorised third parties rely upon the information contained within this report at their own risk.

2.0 DESK STUDY AND SITE OBSERVATIONS

2.1 HISTORICAL REVIEW: SITE DEVELOPMENT

Ordnance Survey maps have been reviewed for the years 1886 - 2014. The historical development of the site and the locality are detailed below; the OS maps are contained in Appendix B.

1885 – The site originally consisted of agricultural fields with a footpath running through the middle of the site. A gas works was recorded 150m south-west of the site which is adjacent to the Ashby & Nuneaton Joint Railway, that has a roughly north to south orientation. Market Bosworth station was located approximately 230m south-east and a brick yard located 300m south-west. Ashby de la Zouch Canal is situated 280m west of the site with Market Bosworth town centre recorded approximately 900m east.

1903 – The site remains unchanged; a residential house was recorded outside of the south-east corner.

1955 – The gas works and brick yard were no longer recorded, and Market Bosworth Station was labelled as "(Goods)".

1966 – A works unit was located 200m south-west with numerous buildings labelled as works were recorded 170m west. A sewage works was situated 500m south-east.

1990 – There was an increase in residential development south of the site, which also included a depot within an industrial estate 250m away. The works west of the site were identified as Timber Fireproofing Works.

2010 – Four ponds were recorded near each corner of the site boundary. Although not shown on the historic maps, the site was converted into Kyng's Golf & Country Club by 2011, with the ponds created for aesthetic appearance. Soils were also imported for landscaping.

2014 – A drainage ditch was located in the middle of the site; there have been no further changes to the site or surrounding area.

2.1.1 SUMMARY

The site was originally agricultural land until 2011 when it later became Kyng's Golf & Country Club, which included the construction of numerous ponds and importation of soil, construction and demolition waste for landscaping. The surrounding area has included a gas works, industrial unit including a depot and timber fireproofing works, and a brick yard. A railway and Ashby de la Zouch Canal are located west of the site with Market Bosworth town centre located to the east.

2.2 DEVELOPMENT PROPOSAL

The existing golf course is to be re-designed including the demolition of the existing clubhouse and the erection of a new one. In addition, 15 No. holiday homes will be built along the eastern boundary which will be rented out. The rest of the golf course is to remain the same.

2.3 SITE DESCRIPTION

The site is located off Station Road in Market Bosworth and consists of a disused golf course. Access is along a road through two sets of gates which leads to an area of gravel hardstanding. In this area, there is a single storey building that was previously used as the club house and a storage area of miscellaneous items including timber and brick.

The remainder of the site consists of rolling grass land, which is laid out as a golf course. In addition, there are several man-made ponds located throughout the site. Mature trees and shrubs form the boundaries of the site; with several trees located within the site boundary. A tree survey may be required if plots lie within close proximity to the trees and hedges.

2.4 ANTICIPATED GEOLOGY

The BGS geological map for this area (Sheet 155, Coalville) records the Wolston Clay to be underlying the majority of the site, which is of Quaternary age, and consists of clay, silt and sand. A small area of the site near the north-east corner comprises glaciofluvial deposits, Mid Pleistocene in age, which contains sand and gravel. The solid strata are the Gunthorpe Member, Middle Triassic in age, which is of reddish brown mudstone with subordinate siltstone and sandstone, and gypsum veins.

Although artificial ground is not recorded on the geological maps, the site has recently been built up with imported materials in order to landscape the golf course. The depth of these deposits and the type of material imported are not known.

2.5 HYDROGEOLOGY & HYDROLOGY

2.5.1 Hydrogeology

The Wolston Clay is classified by the Environment Agency as a Secondary Aquifer (undifferentiated layers) whilst the glaciofluvial deposits are classed as a Secondary A Aquifer of permeable layers capable of supporting water supplies at a local rather than strategic scale. The Gunthorpe Member is classified as a Secondary B Aquifer of predominantly low permeability layers, which may store/yield limited amounts of groundwater.

There are no licensed groundwater abstractions within 250m; the site is not located within a groundwater Source Protection Zone (SPZ) and no information on groundwater levels is available for the site.

2.5.2 Hydrology

The nearest surface water features are the ponds located within the site boundary, a Tertiary River (drain) is located 219m north-east and the Ashby de la Zouch Canal is recorded 278m west.

Environment Agency data suggests that the site does not lie within an indicative fluvial floodplain.

2.6 COAL FIELDS

The site does not lie within a coal mining area and therefore there is no risk from coal workings.

2.7 MINERAL RESOURCES

There is no evidence of any mineral extraction taking place within the site boundary; however, a brick works was recorded 300m south-west, which became disused by 1955.

2.8 POTENTIALLY CONTAMINATIVE LAND USES

Environmental search data supplied by EMAPSITE (Appendix C) states that:

- The site is not located within 500m of a landfill site.
- There is a waste treatment facility 204m south, registered at Rossendale House on Station Road.
- There are no discharge consents within 250m, although there is an historic consent for process effluent into Friezeland Brook, which was revoked in May 2006.
- There are no IPC consents located within 250m of the site. However, there is a List 2 Dangerous Substance Inventory Site 262m west, which is registered to Palgrave Brown Timber and Fireproofing Ltd for the use of pH.
- There are no fuel sites located within 500m.

Based on local records, construction and demolition waste have been imported onto site sometime between 2002 and 2011 to create the golf course. The source of these materials is not known, although, according to the Client, they are thought to be inert.

Should potentially contaminated Made Ground be present on site, samples should be analysed for the following suite of determinands:

- Heavy metals, speciated PAH's, pH, inorganics and asbestos fibres.

2.9 ASBESTOS

No Asbestos Containing Materials (ACMs) were observed on site; however, there may be ACMs present within the Made Ground which has been used to landscape the site. It is unlikely that any asbestos has been used in the construction of the existing clubhouse as it was built post 2000.

2.10 RADON GAS ASSESSMENT

The site has been assessed following the guidelines in "Radon: guidance on protective measures for new buildings" (BR 211 - BRE, 2015).

The site is not within a Radon Affected Area as less than 1% of homes are above the action level, therefore no radon protective measures are required.

3.0 PHASE I CONCEPTUAL MODEL

3.1 SOURCE-PATHWAY-RECEPTOR

The conceptual model for the site considers the development proposal for residential without produce use and the preceding information.

The site's former uses as agricultural fields and a golf course are considered in respect to potential contaminative sources, in particular the importation of waste for landscaping.

There are no landfill sites within 500m; however, the imported Made Ground on the golf course may be a potential source of ground gas.

Potential contaminants of concern for the end user include Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAHs) and Asbestos Containing Materials (ACMs).

Pathways for the end user of the site include direct contact (dermal) with potentially contaminated soil dust; ingestion and inhalation of potentially contaminated soil dust; inhalation of soil vapours, ground gas and asbestos fibres.

The primary receptors for the site are construction workers and end users of the site (staff/temporary residents).

For the environment (controlled waters) the primary receptors are the underlying Secondary A Aquifer, Secondary B Aquifer and Secondary (undifferentiated layers) underlying the site and the ponds located within the previous golf course.

Potential contaminants of concern for the environment include Heavy Metals and Polycyclic Aromatic Hydrocarbons (PAHs).

The primary pathway for the environment is the leaching and vertical migration of contaminants through the vadose zone to the saturated zone.

The development of the conceptual model is illustrated on Table 3.1.

Table 3.1: Phase I Conceptual Site Model

HUMAN HEALTH			
SOURCE	PATHWAY	RECEPTOR	SOLUTION
Potentially contaminated Made Ground from historical site use (agricultural fields/golf course). Potential contaminants of concern include Heavy Metals, PAHs and ACMs	Ingestion of potentially contaminated soil, direct contact (dermal) with potentially contaminated soil and soil dust; ingestion and inhalation of potentially contaminated soil dust	Construction Workers	Basic PPE for all workers (overalls, gloves, dust mask if required) and wash facilities/personal hygiene
	Inhalation of soil vapours and ground gas (carbon dioxide and methane)	End Users (staff/temporary residents)	Medium risk – Phase II recommended
	Leaching into water supply pipes		
		Water Supply/End Users	Standard pipes may be suitable
CONTROLLED WATERS			
Potentially contaminated Made Ground from historical site use (agricultural fields/golf course). Potential contaminants of concern include Heavy Metals and PAHs	Leaching and vertical migration through the vadose zone to the saturated zone	Secondary A Aquifer (glaciofluvial deposits); Secondary Aquifer – undifferentiated layers (Wolston Clay) and Secondary B Aquifer (Gunthorpe Member)	Low risk- Phase II recommended
	Leaching and horizontal migration to surface waters	Ponds	

4.0 PHASE II FIELDWORK

4.1 INTRODUCTION

The Phase II intrusive investigation was undertaken on 30th August 2017 under the supervision of a suitably qualified Ivy House Environmental Engineer and in general accordance with the Code of Practice for Site Investigations BS5930:2015.

The Phase II investigation incorporated the following:

- The excavation of eleven trial pits to a maximum depth of 3.50mbgl.
- The analysis of five samples for a standard screening suite of organic and inorganic contaminants.
- The analysis of two samples for geotechnical design criteria including Plasticity Index (PI), water soluble sulphate and pH.

An exploratory hole location plan is included in Appendix A and trial pit logs are contained in Appendix D.

4.2 RATIONALE

The Phase II investigation has been designed to facilitate an assessment of the general ground conditions across the site, including contaminant sources, pathways and receptors. The investigation has also been designed in consideration of the current site layout and access restrictions, the development proposal and health and safety issues, the rationale behind the location of each exploratory hole is detailed in Table 4.1 below:

Table 4.1: Phase II Rationale

Hole ID	Location	Notes
TP1-5	Proposed houses (Plots 1-6)	Aid foundation design
TP6-8	Proposed clubhouse	
TP9-11	Mounds located in the proposed car park	Suitability of material re-use on site

4.3 LABORATORY ANALYSIS & TESTING

Selected soil samples were analysed at specialist environmental and geotechnical laboratories as detailed in the following sections.

4.3.1 Chemical Analysis

Two samples of Made Ground, one sample of topsoil and a sample of the natural strata (clay) were sent for analysis at a UKAS/MCERTS accredited laboratory. The scheduled parameters are detailed in Table 4.2.

Table 4.2: Soil Analysis

Sample ID	Depth (mbgl)	Strata	Suite
TP1	0.30	Made Ground	Standard Suite/EPH
TP2	0.50	Topsoil	
TP4	0.70	Natural	
TP11	2.90	Made Ground	

The soil analysis results are contained in Appendix E.

4.3.2 Geotechnical Testing

Two samples of clay were sent to a UKAS accredited laboratory and subjected to Plasticity Index (PI), water soluble sulphate and pH testing.

The geotechnical test results are contained in Appendix F.

4.3.3 Gas Monitoring

Gas monitoring has not been undertaken at this stage, however due to the presence of Made Ground on site it is recommended that gas monitoring wells are installed to monitor potentially high risk areas. Alternatively gas protection measures could be installed to Characteristic Situation 2.

5.0 GROUND CONDITIONS

The intrusive investigation has revealed that Topsoil and/or Made Ground across the site overlie superficial deposits of Wolston Clay. The solid strata were not encountered during this investigation. The site-specific observations are detailed in the following sections.

5.1 TOPSOIL

Topsoil was encountered in TP2, TP4 and TP8 to depths of between 0.50m and 0.70mbgl.

5.2 MADE GROUND

Made Ground was recorded in the majority of exploratory holes (with the exception of TP4, TP6 and TP8), and was encountered to depths of between 0.45m and 3.50mbgl. The Made Ground consisted of reddish brown slightly clayey SAND with varying gravel content of brick, concrete and quartz; dark brownish and black SAND and GRAVEL of brick, concrete, plastic, patio slabs and asphalt with a high cobble content of brick and concrete. In TP11 an organic odour was noted from 2.20m to 3.20mbgl.

In TP10 a soft dark brown CLAY with a low cobble content of brick and concrete had a stagnant odour from 2.90m to 3.50mbgl. The base of this material was not proven due to the limitations of the excavator reaching its maximum depth of 3.50mbgl. This material might have been derived from when the ponds were constructed.

It should be noted that neither topsoil nor Made Ground was recorded in TP8, and it consisted of grass overlying the natural strata.

5.3 SUPERFICIAL STRATA

The superficial deposits were encountered in all exploratory holes except for TP10, which recorded a minimum of 3.50m of Made Ground. The Wolston Clay comprised soft to stiff grey mottled brown slightly sandy to very sandy CLAY with a varying gravel content of quartz and flint. Overall the clay had a firm consistency and was only recorded as a soft consistency in TP7 from 0.70m to 1.70mbgl.

5.4 FIELD OBSERVATIONS

Contamination observations made during the intrusive investigation are detailed in Table 5.1. Overall there were no obvious signs of contamination, although the asphalt identified in TP9 and TP10 was sprayed with a PAK marker that illustrated that the material potentially contains coal tar.

Table 5.1: Fieldwork Observations

Location	Depth/Strata	Observation
TP9 & TP10	From G.L. to 2.80m to 2.90mbgl/Made Ground	Asphalt gravel
TP10	2.90m to 3.50mbgl/Made Ground	Stagnant odour
TP11	2.20m to 3.20mbgl/Made Ground	Organic odour

5.5 GROUNDWATER

Groundwater was not encountered in any of the exploratory holes.

6.0 GROUND CONDITIONS

The geotechnical assessment considers the development proposal for the demolition and construction of a new clubhouse and fifteen holiday homes. At this stage, only the clubhouse and Plots 1-6 of the holiday homes have been investigated and therefore recommendations cannot be made for the remaining plots.

6.1 GEOTECHNICAL LABORATORY TESTING

The results contained in Appendix F illustrate Modified Plasticity Index values of between 41% and 51% and moisture contents between 21.6% and 27.3%, indicating the Wolston Clay to be of high to very high plasticity and high volume change potential.

Water soluble sulphate and pH analysis revealed results of 31-357 SO₄mg/l and 7.7-9.9 respectively.

6.2 FOUNDATION DESIGN & FLOOR SLABS

The ground conditions comprised Made Ground of various depths, overlying the Wolston Clay Formation of soft to stiff clay. The foundations for the clubhouse and Plots 1-6 will be discussed separately below.

Clubhouse

The existing clubhouse will require demolition and old foundations removed before the new one is built. In TP6, which lies north of the proposed clubhouse, a soft to firm clay was encountered, which became stiff from 1.70mbgl. Based on this it is recommended that deep trenchfill foundations are used bearing on the stiff clay at 1.70mbgl. For preliminary design purposes, BS8004:2015 gives presumed bearing values which are the pressures which would normally result in an adequate factor of safety against shear failure. For the clubhouse founding on a stiff clay a presumed bearing value of 150 to 300kN/m² may be used. The lower end of this range is considered most appropriate at this site.

Made Ground has been imported onto the site during the creation of the golf course, which may be a source of ground gas; although the majority of the Made Ground makes up the mounds across the site. Based on the location of the proposed clubhouse, where there is minimal Made Ground it recommended that gas protection measures to Characteristic Situation 2 are installed, which should include in-situ suspended or beam and block floor slab with a 2000g gas membrane.

Plots 1-6

At present, there is a height difference of approximately 1m between proposed Plots 3 and 6 and the remaining plots. There is as an area of gravel hardcore and concrete hardstanding where Plots 1, 2, 4 and 5 are proposed and a grassed area at Plots 3 and 6. There are two possible options to deal with the height difference: either a granular engineered fill can be imported onto site creating a slope, depending on the finished floor levels, or the houses can be stepped accordingly.

For Plots 3 and 6, regardless of the above, the foundations should remain the same. We would recommend strip footings 600mm wide bearing on the firm clay at 1.00mbgl. However, as deep Made Ground was encountered in TP2 it is recommend that Plot 3 is deepened to at least 1.30mbgl. The presumed bearing value for founding on a firm clay is 75 to 150kN/m².

If an engineered fill is used to raise site levels, we would recommend consideration is given to a raft foundation for Plots 1, 2, 4 and 5. Should the site levels remain the same then strip footings 600mm wide are recommended bearing on the firm clay at 1.00mbgl with the same bearing value as Plots 3 and 6.

In a similar situation to the clubhouse, it is recommended that an in-situ suspended or beam and block floor slab is used for the plots with a 2000g gas membrane.

Trial pits 9, 10 and 11 were excavated in the mounds where the car park is proposed to assess whether the material can be re-used elsewhere on site to aid final profiling. The material encountered included brick, concrete, asphalt and plastic bags in TP11 that is considered to be unsuitable for re-use within the raising of the site levels, roads or car park.

Additional Investigation

For Plots 7-15, which are proposed to be on stilts among the artificial lakes, it is recommended that a separate investigation is carried out using cable percussion boreholes. These could include installations in order to carry out gas and groundwater monitoring.

6.3 EXCAVATION & GROUNDWATER CONDITIONS

All trial pits remained stable during excavation and groundwater was not encountered in any of the exploratory holes. Therefore, it is considered that excavations should remain stable in the short term.

6.4 SOAKAWAYS

Infiltration testing was not undertaken in any of the trial pits, and based on the Wolston Clay Formation underlying the majority of the site; it is considered soakaways will not be a viable option for surface water drainage.

Although not investigated at this stage, there is a possibility that soakaways may be appropriate in the sand and gravel deposits near the north-east corner, adjacent to Plots 7-15. However, this cannot be confirmed until further investigation is carried out.

6.5 BURIED CONCRETE

Based on the recorded water soluble sulphate concentrations and pH values it is considered appropriate to adopt a Basic Design Sulphate Class of DS-1, together with an Aggressive Chemical Environment of Concrete (ACEC) of AC-1. Mobile groundwater conditions have been assumed for this determination.

7.0 CONTAMINATION ASSESSMENT

The guidance detailed in Section 1.4 has been followed to ensure that the risk posed to identified receptors, as detailed in the conceptual site model, is reported according to accepted compliance criteria.

The Contaminated Land Exposure Assessment (CLEA) guidance and published Soil Guideline Values (SGV) have been incorporated with Generic Assessment Criteria (GAC), for determinands which do not have a published SGV, to provide a competent Tier 1 Assessment. The GAC and methodology references are contained in Appendix G.

7.1 HUMAN HEALTH

The results of chemical testing in the topsoil, Made Ground and natural soils have been compared against the GAC for residential without produce, and all contaminants were below their respective threshold. In addition, asbestos was not detected in the samples.

Due to the nature of the fill material in TP9 and TP10, which had gravel of asphalt, this material was not sent for analysis at a laboratory. However, the asphalt was sprayed with PAK marker which confirmed the potential presence of coal tar type macadam.

7.1.1 Ground Gas

There is variable Made Ground across the site which may be a source of ground gas, although the thickest Made Ground deposits are within the mounds. As gas monitoring has not been undertaken, it is recommended gas protection measures are installed to Characteristic Situation 2, which are discussed in more detail in Section 9.0.

7.2 CONTROLLED WATERS

Although there is some hazardous Made Ground (derived from the asphalt) forming the mounds adjacent to the western boundary, there is considered to be no significant risk to the underlying aquifers and adjacent ponds.

8.0 PHASE II CONCEPTUAL SITE MODEL

The conceptual model for the site considers the development proposal for residential without produce and the information gathered during the Phase I and II assessments.

The site's former uses as agricultural fields and a golf course are considered in respect to potential contaminative sources, in particular the importation of soils for landscaping, which may be a source of ground gas.

Concentrations of contaminants of concern do not exceed their respective assessment criteria.

Pathways for the end user of the site include direct contact (dermal) with contaminated soil dust; ingestion and inhalation of contaminated soil dust; inhalation of ground gas.

The primary receptors for the site are construction workers and end users of the site (staff/temporary residents).

For the environment (controlled waters) the primary receptors are the underlying Secondary A Aquifer, Secondary B Aquifer and Secondary (undifferentiated layers) underlying the site and the ponds located within the previous golf course.

There is considered to be no significant source of contamination which will impact controlled waters.

The development of the conceptual model is illustrated on Table 8.1.

Table 8.1: Phase II Conceptual Site Model

HUMAN HEALTH			
SOURCE	PATHWAY	RECEPTOR	SOLUTION
Non-contaminated topsoil, Made ground and natural strata	Ingestion of contaminated soil, direct contact (dermal) with contaminated soil and soil dust; ingestion and inhalation of contaminated soil dust	Construction Workers	Basic PPE for all workers (overalls, gloves, dust mask if required) and wash facilities/personal hygiene
	Inhalation of ground gas (Carbon Dioxide and Methane)	End Users (staff/temporary residents)	Deposited waste should not be re-used in gardens/soft landscaping but may be suitable for use elsewhere on the golf course
			Gas protection measures to Characteristic Situation 2
	Leaching into water supply pipes	Water Supply/End Users	Standard pipes suitable
CONTROLLED WATERS			
No significant contamination	Leaching and vertical migration through the vadose zone to the saturated zone	Secondary A Aquifer (glaciofluvial deposits); Secondary Aquifer – undifferentiated layers (Wolston Clay) and Secondary B Aquifer (Gunthorpe Member)	No risk
	Leaching and horizontal migration to surface waters	Ponds	

9.0 RISK MANAGEMENT & REMEDIATION

At this stage, soil remediation is not considered to be required for the development.

Gas protection measures (Characteristic Situation 2) are required for the clubhouse and Plots 1-6; these should include a reinforced cast in-situ suspended floor slab with minimal penetration, minimum 2000g gas membrane and sealed service entries. Alternatively a precast beam and block floor can be used with a passive sub floor dispersal layer and gas membrane. This should be in line with BS8485 guidance.

9.1 WASTE MANAGEMENT

In-situ topsoil may be suitable for re-use on site, subject to further validation analysis and assessment. The majority of the Made Ground and natural soils across the site are likely to be classified as non-hazardous for disposal, should surplus waste soils be generated. Due to the design revisions for the car parking and landscaping, the buried macadam identified in Trial Pits TP9 & TP10 is unlikely to be disturbed, resulting in minimal contamination and waste liabilities.

10.0 RECOMMENDATIONS

Recommendations for further assessment of the site include:

- Gas protection measures installed to Characteristic Situation 2.
- An additional ground investigation will be required for Plots 7-15 using cable percussion boreholes.
- Should any signs of contamination be evident during construction activities, a qualified environmental specialist should be consulted to assess the risk posed to end users and the environment.

11.0 CONCLUSIONS

The site is located off Station Road in Market Bosworth and consists of an unused golf course. The development proposal is for demolition of the existing clubhouse and construction of a new Clubhouse as well as 15 No. holiday homes.

Historically, the site was agricultural fields until 2011 when it later became Kyng's Golf & Country Club. During construction of the golf course, soil was imported for landscaping and numerous ponds were built. The geological map for the area shows the Wolston Clay underlying the majority of the site, with glaciofluival deposits near the north-east corner. The solid strata consist of the Gunthorpe Member.

A trial pit investigation was undertaken on only part of the site, mainly the clubhouse and Plots 1-6. The ground conditions comprised Topsoil or Made Ground overlying the Wolston Clay, which comprised a soft to firm becoming stiff clay. Depending on the finished floor levels and if part of the site is built up for Plots 1-6, it is recommended strip footings 600mm wide are used for the majority of plots bearing on the firm to stiff clay at 1.00mbgl. However, for Plot 3 it is recommended the footings bear on the clay at 1.30mbgl due to their being deep Made Ground. For the clubhouse, it is recommended deep trenchfill is used bearing on the clay at 1.70mbgl. It is considered that either in-situ suspended or beam and block floor slabs with a 2000g gas membrane should be used for Plots 1-6 and the clubhouse.

The contamination assessment has concluded that the soils beneath the site do not pose a significant risk to human health or controlled waters. Buried asphalt recorded within the mounds near the western corner is unlikely to pose an environmental liability. The majority of the topsoil, Made Ground and natural soils are likely to be classed as non-hazardous for disposal.

APPENDIX A





KEY:



Approximate Site Location



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TITLE:

Site Location Plan

PROJECT:

Bosworth Golf Course

PROJECT No:

IV.149.17

DATE:

08/2017

SCALE:

NTS

DRAWN:

JH

DWG No:

Figure 1

DO NOT SCALE



KEY:

DO NOT SCALE



Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhouseenv.co.uk • www.ivyhouseenv.co.uk • 01332 661 967

TITLE:

Proposed Development Plan

PROJECT:

Bosworth Golf Course

PROJECT No:

IV.149.17

DATE:

08/2017

SCALE:

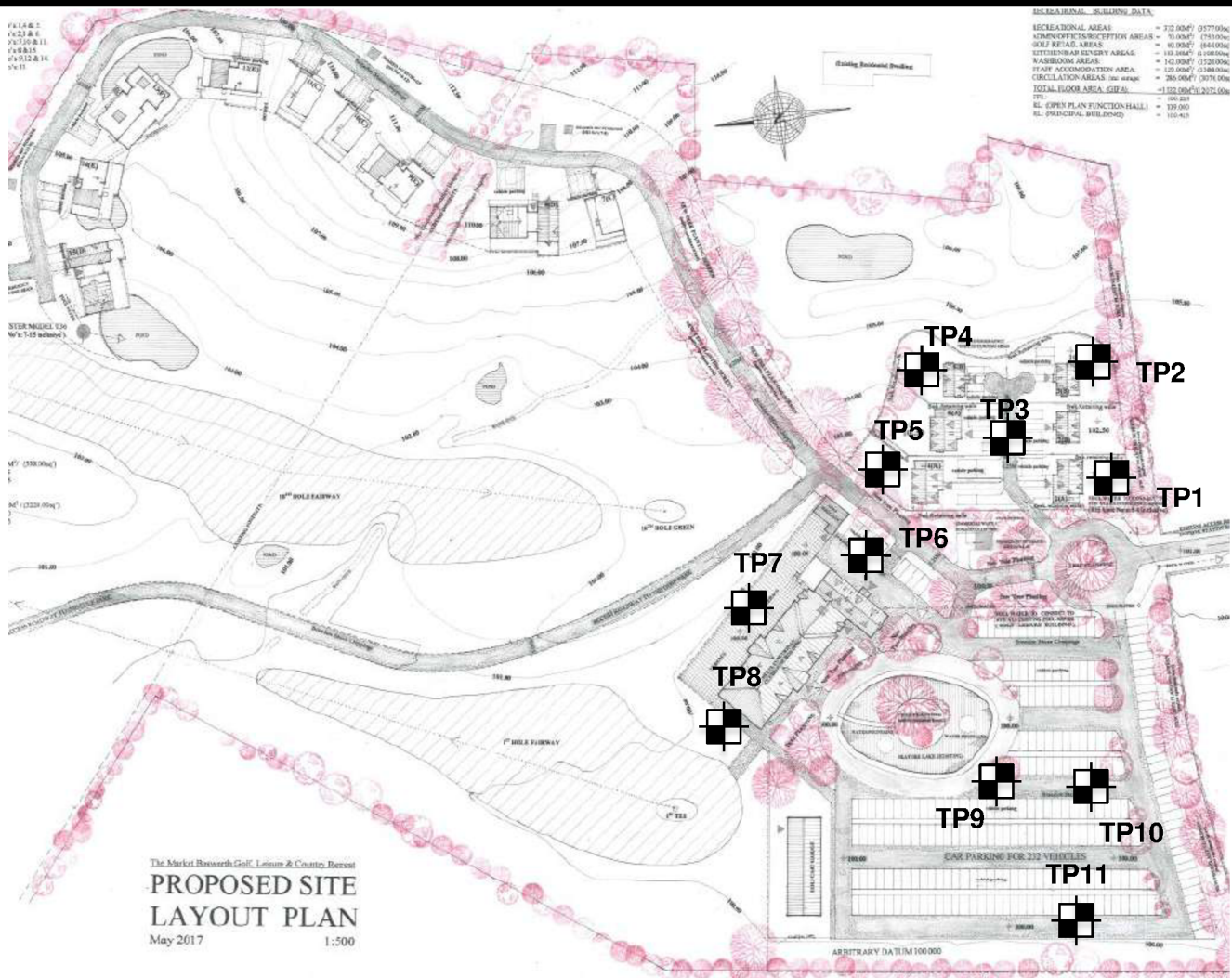
NTS

DRAWN:

JH

DWG No:

Figure 2



TITLE: Trial Pit Location Plan		
PROJECT: Bosworth Golf Course		
PROJECT No: IV.149.17	DATE: 08/2017	
SCALE: NTS	DRAWN: JH	DWG No: Figure 3

APPENDIX B



Site Details:

Kyngs Golf & Country
Club, Station Road

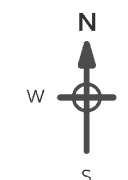
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Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: County Series

Map date: 1886

Scale: 1:2,500

Printed at: 1:2,500



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Surveyed 1886
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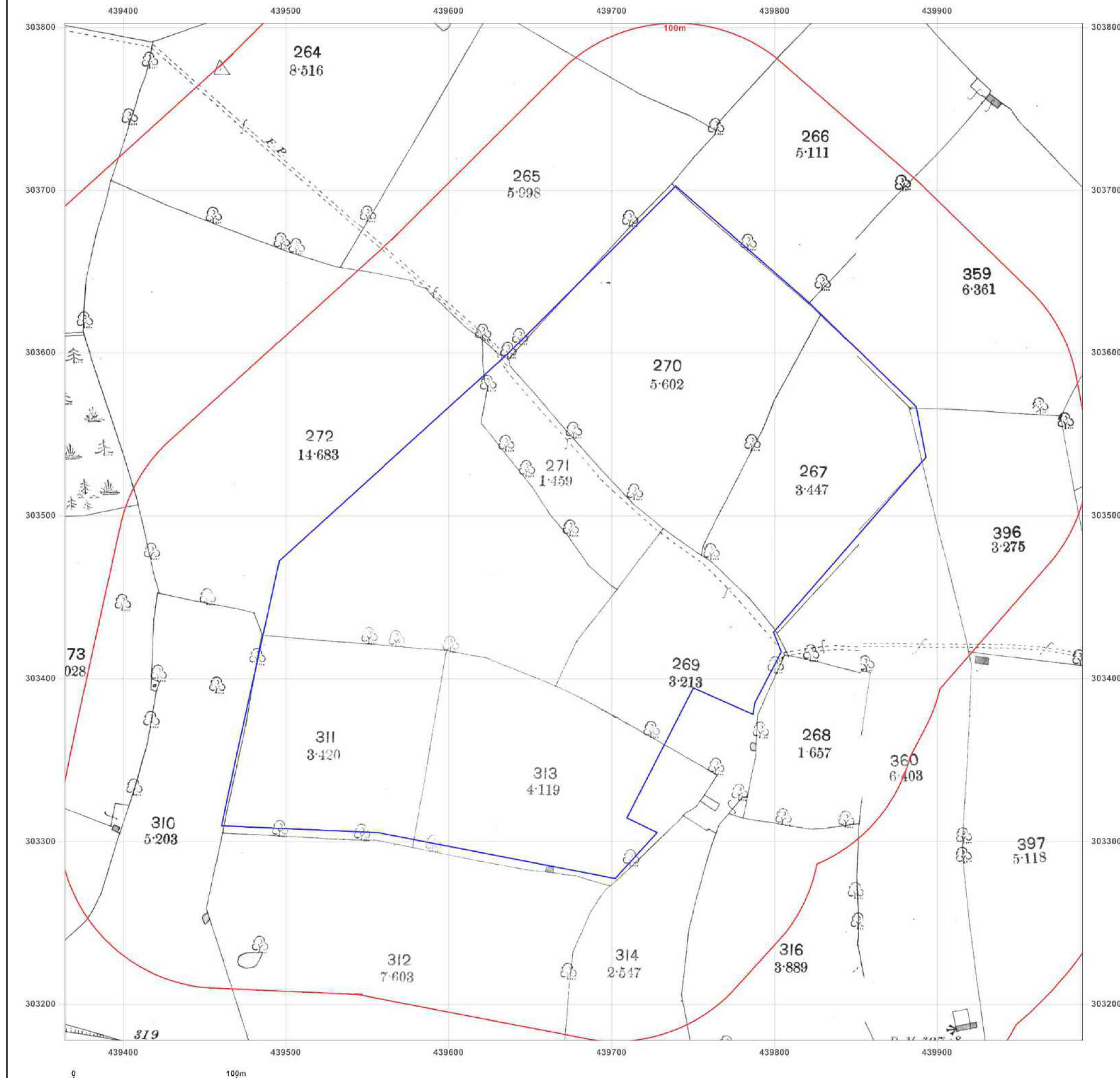


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Site Details:

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Club, Station Road

Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 1957

Scale: 1:2,500

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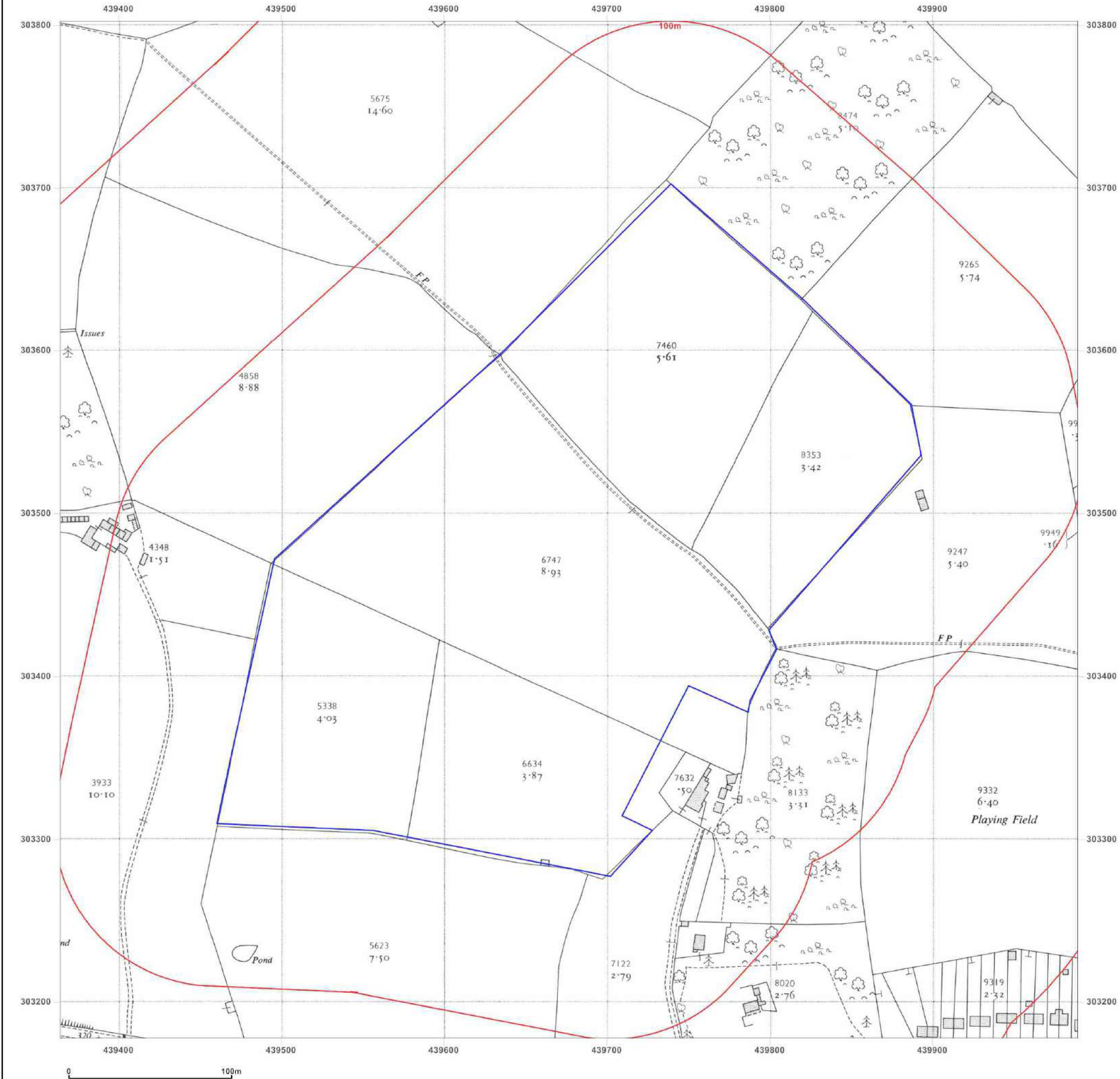


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Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

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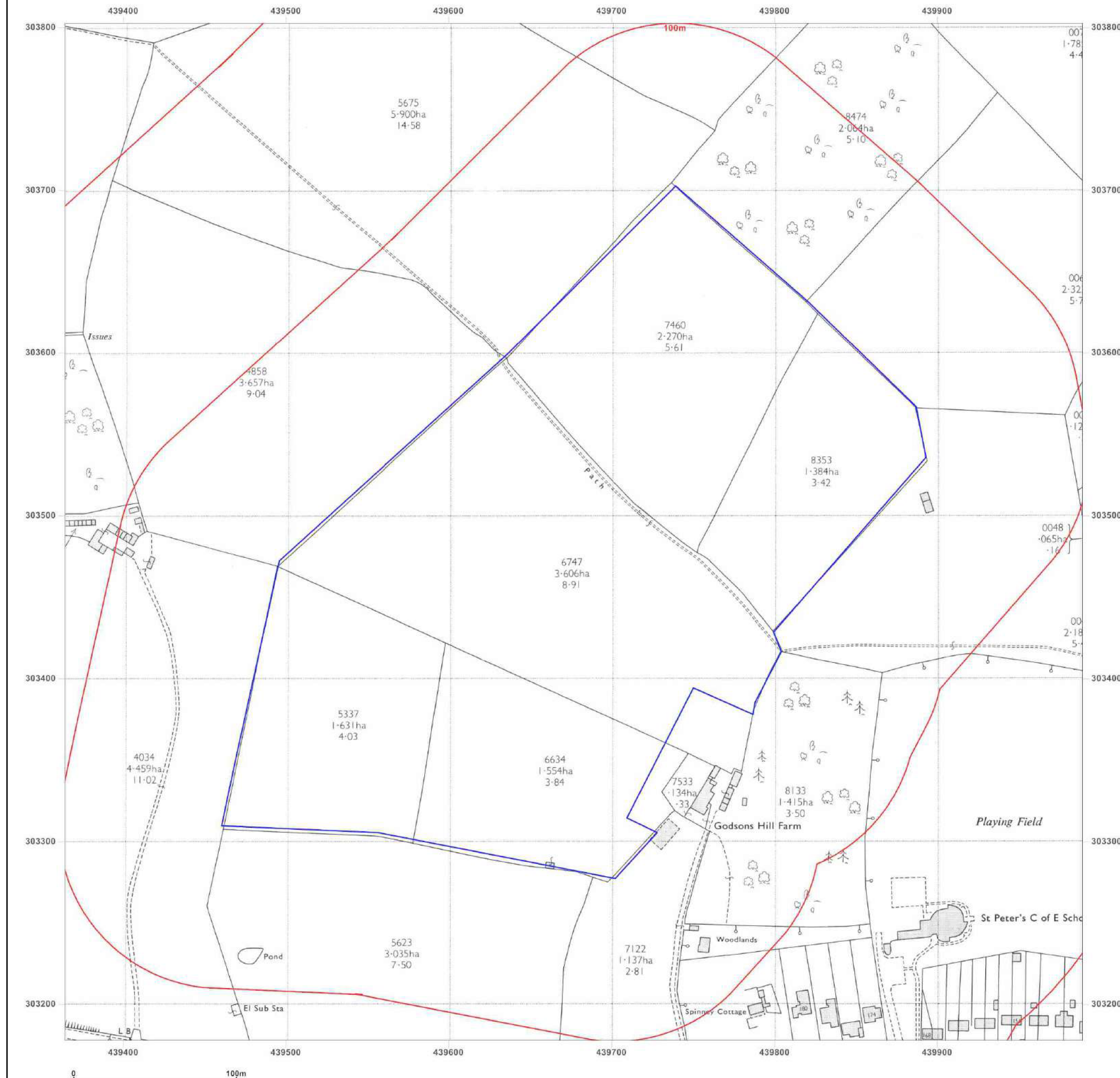


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Client Ref: EMS_440080_589559

Report Ref: EMS-440080_589559

Grid Ref: 439677, 303490

Map Name: National Grid

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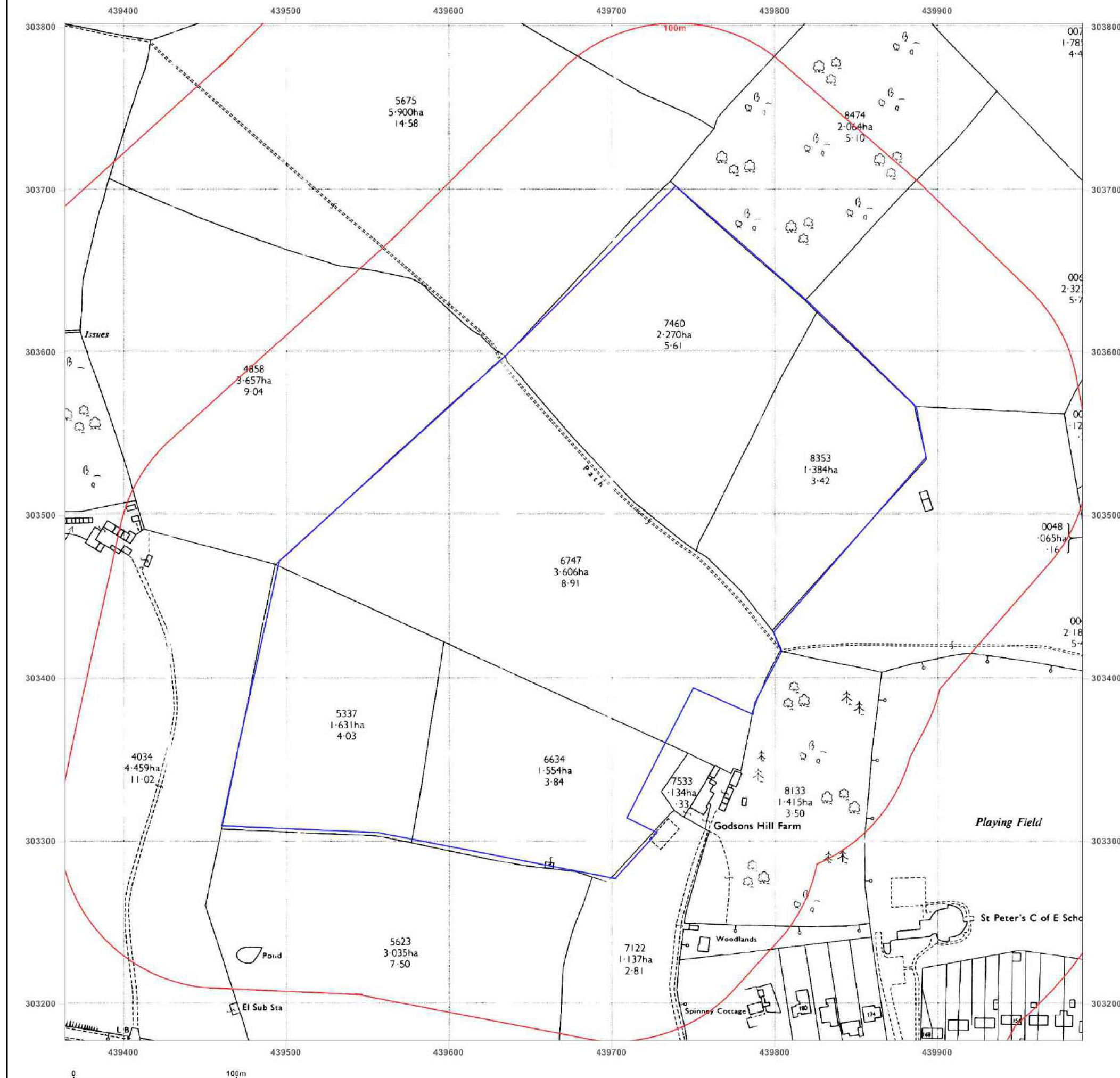


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Client Ref: EMS_440080_589559

Report Ref: EMS-440080_589559

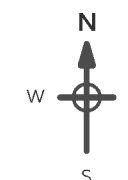
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 1985

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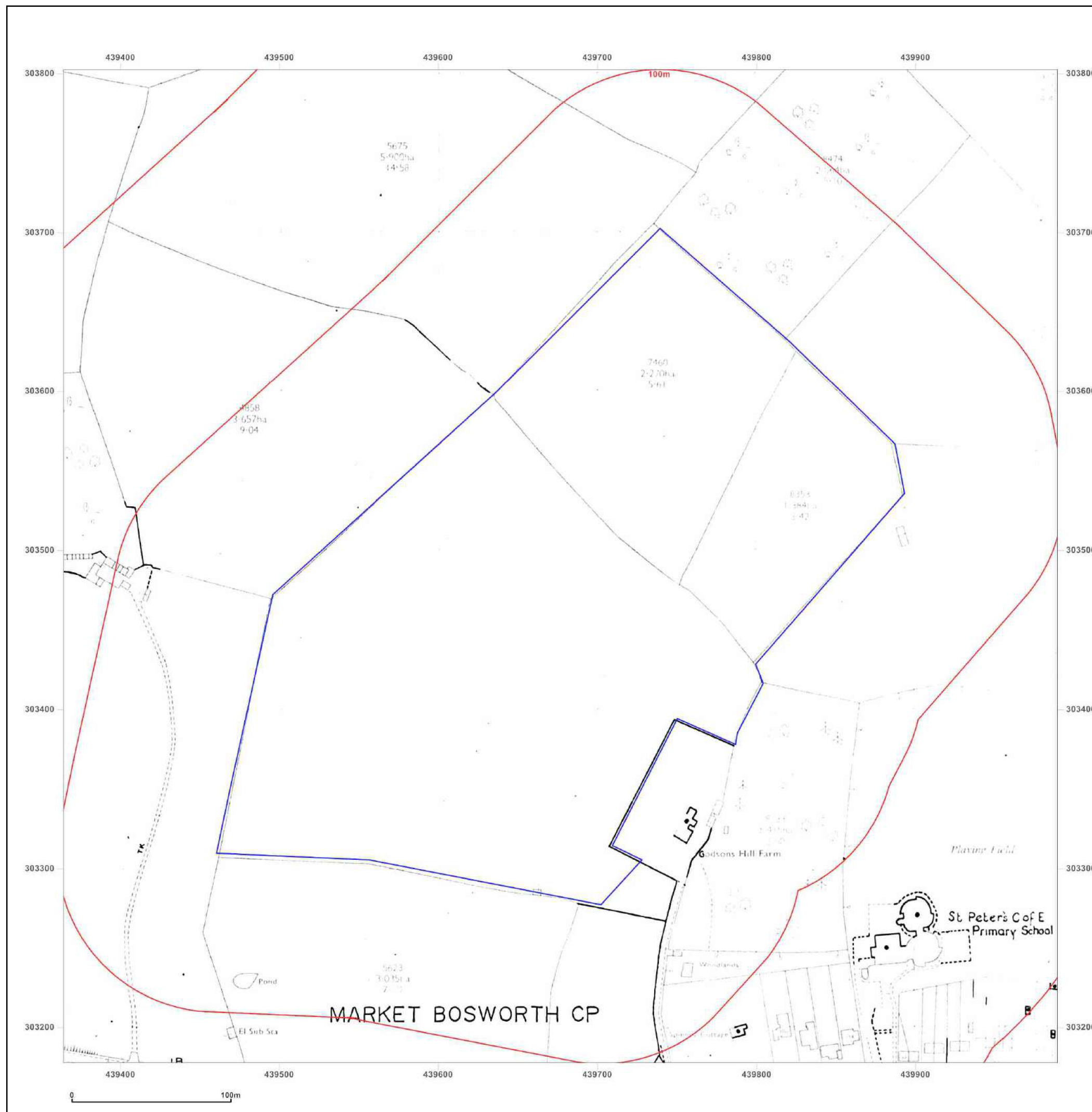


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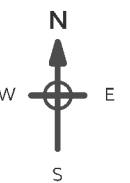
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Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 1994

Scale: 1:2,500

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Site Details:

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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: County Series

Map date: 1885

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1885
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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: County Series

Map date: 1901-1904

Scale: 1:10,560

Printed at: 1:10,560



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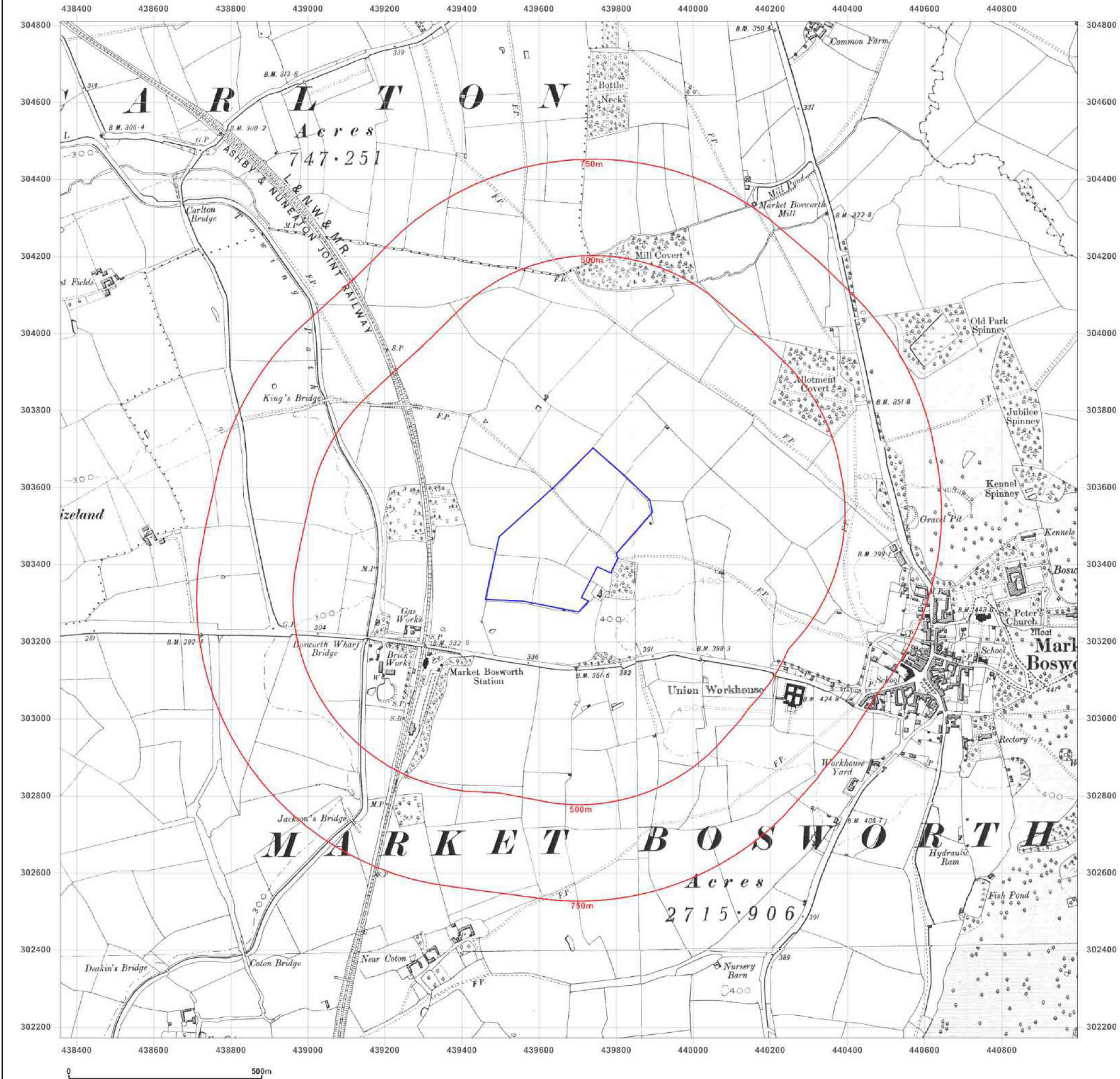


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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: Provisional

Map date: 1955

Scale: 1:10,560

Printed at: 1:10,560



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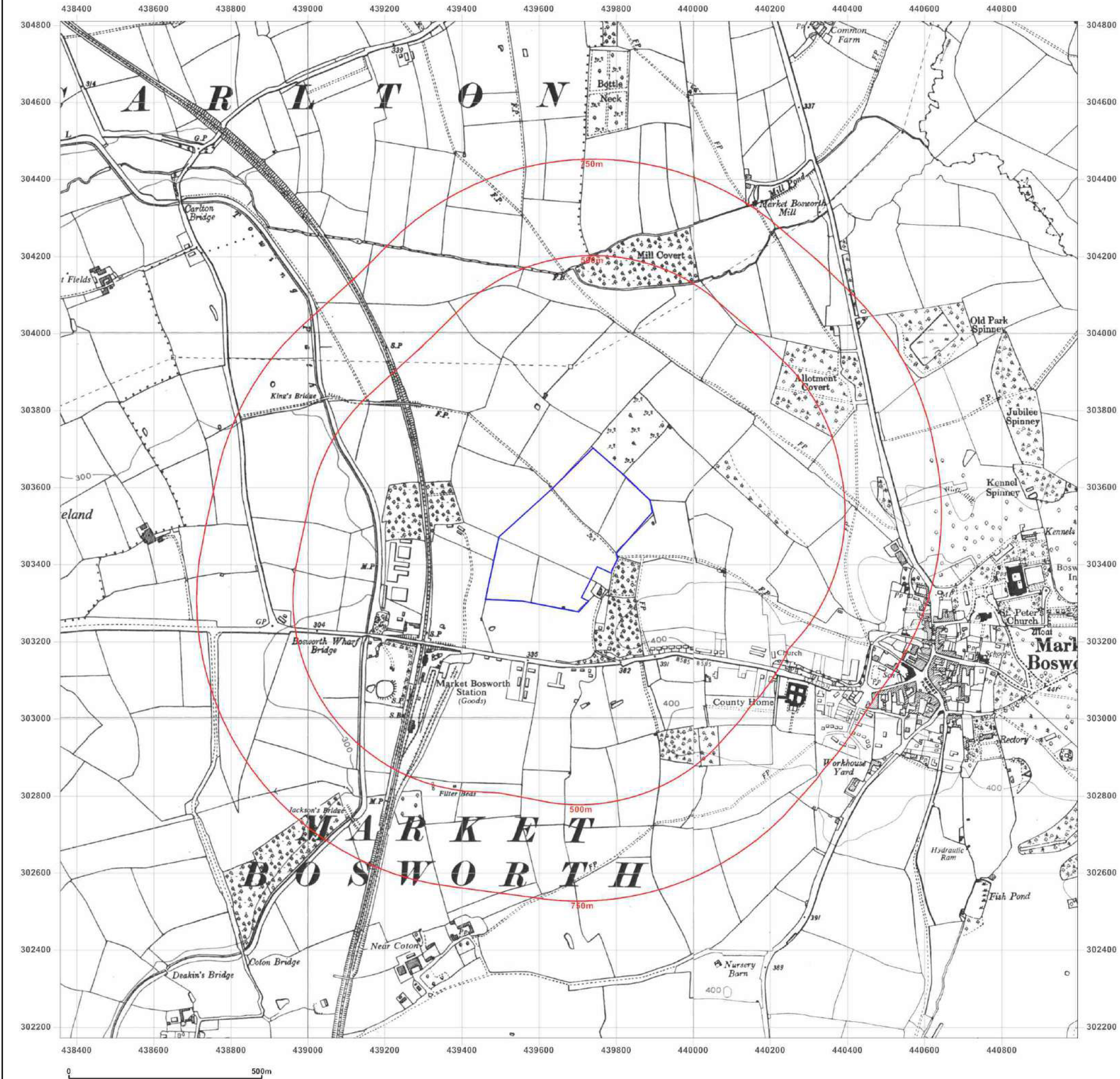


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Grid Ref: 439677, 303490

Map Name: Provisional

Map date: 1966

Scale: 1:10,560

Printed at: 1:10,560



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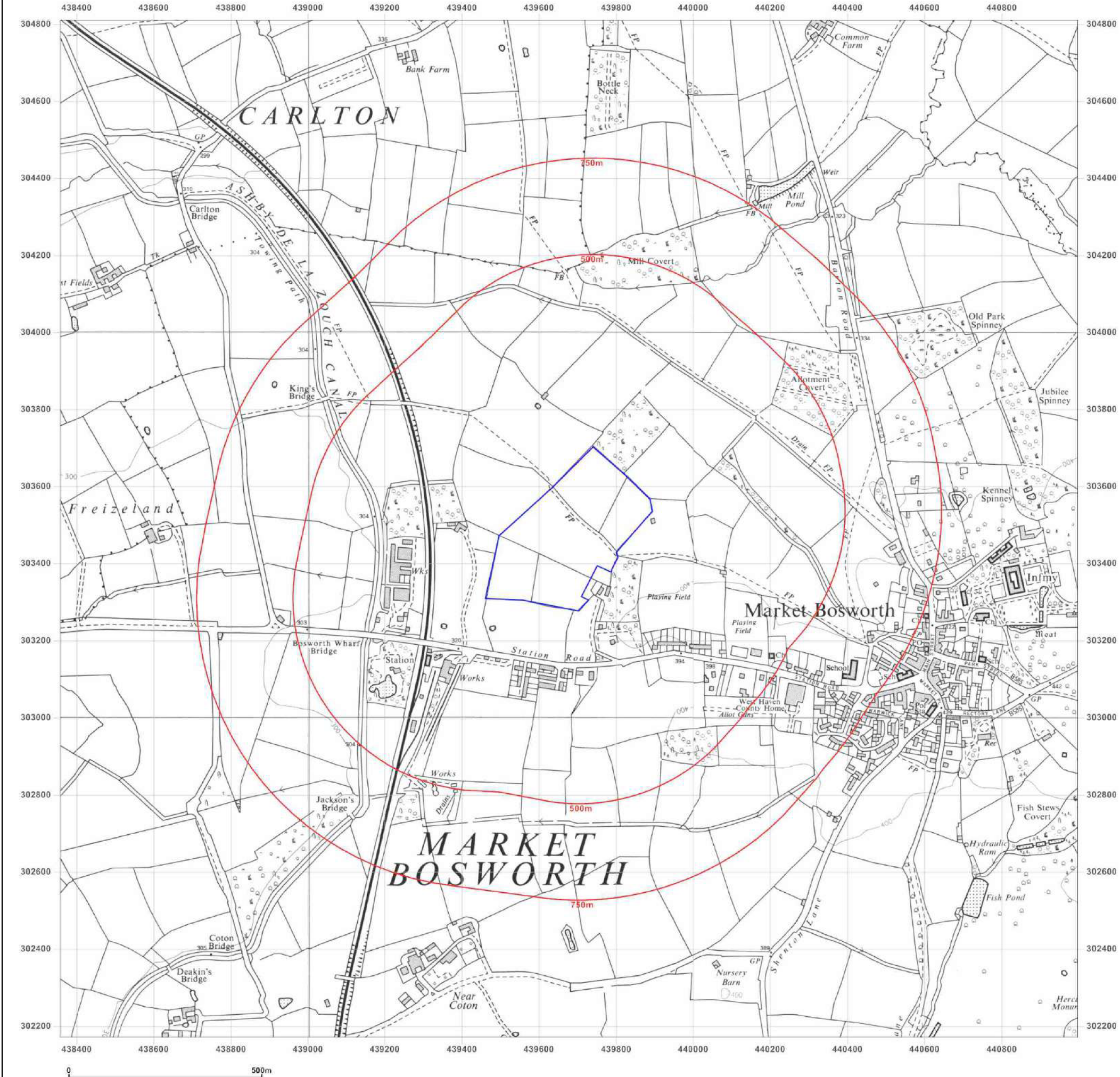


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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 1980

Scale: 1:10,000

Printed at: 1:10,000



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Edition N/A
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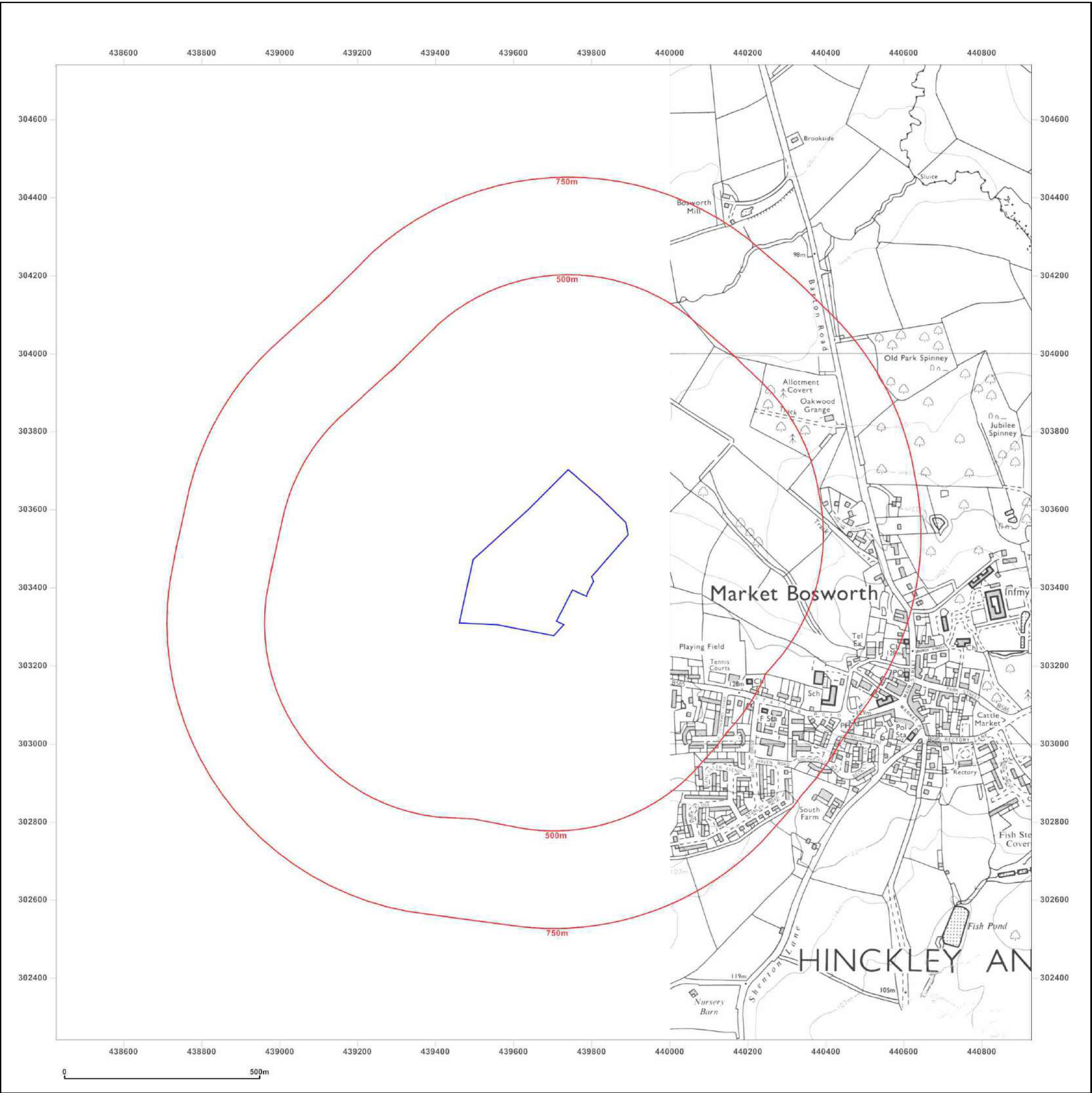


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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 1990

Scale: 1:10,000

Printed at: 1:10,000



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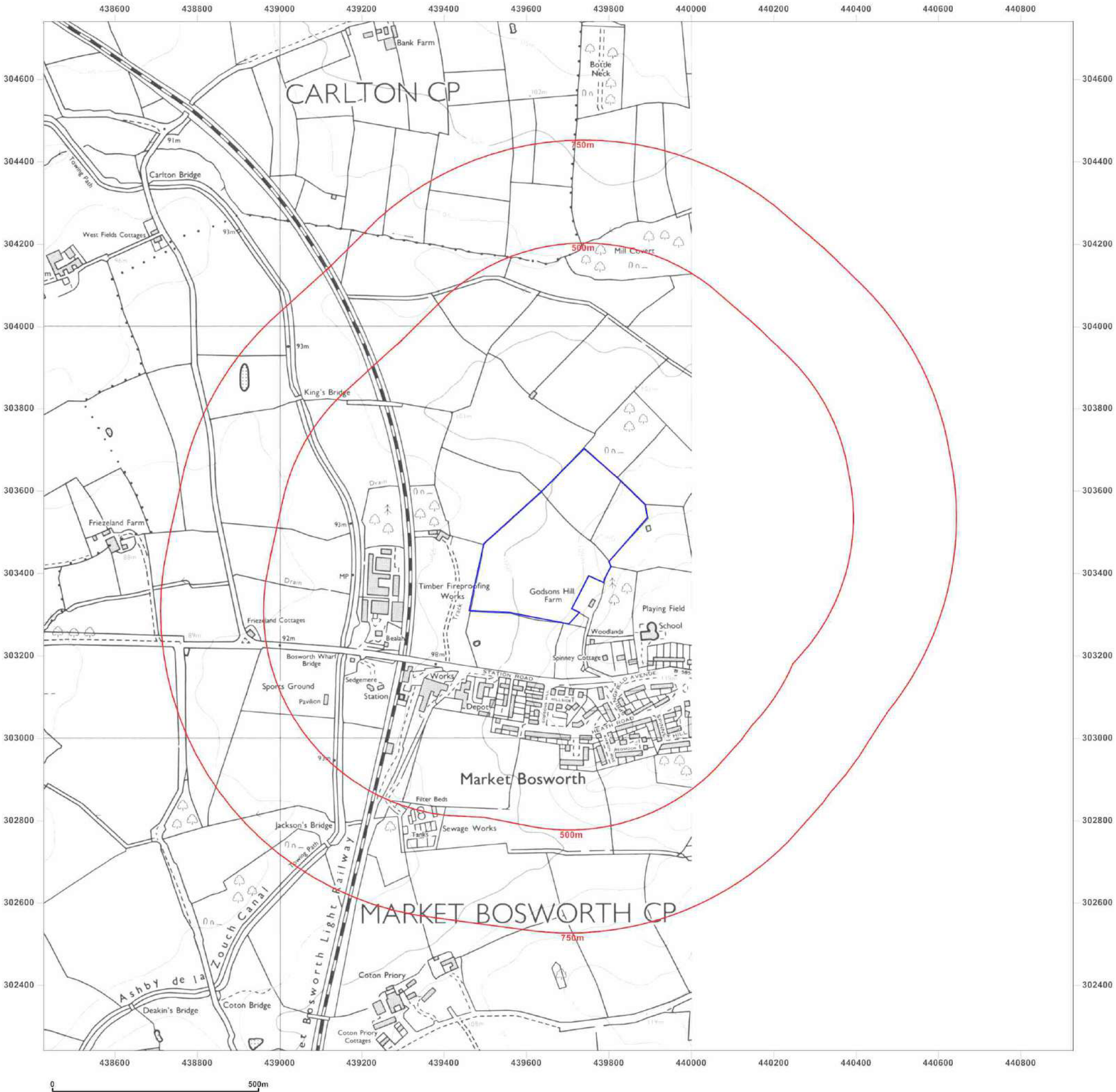


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Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



2002



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Site Details:

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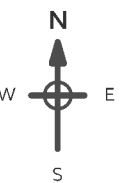
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Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010



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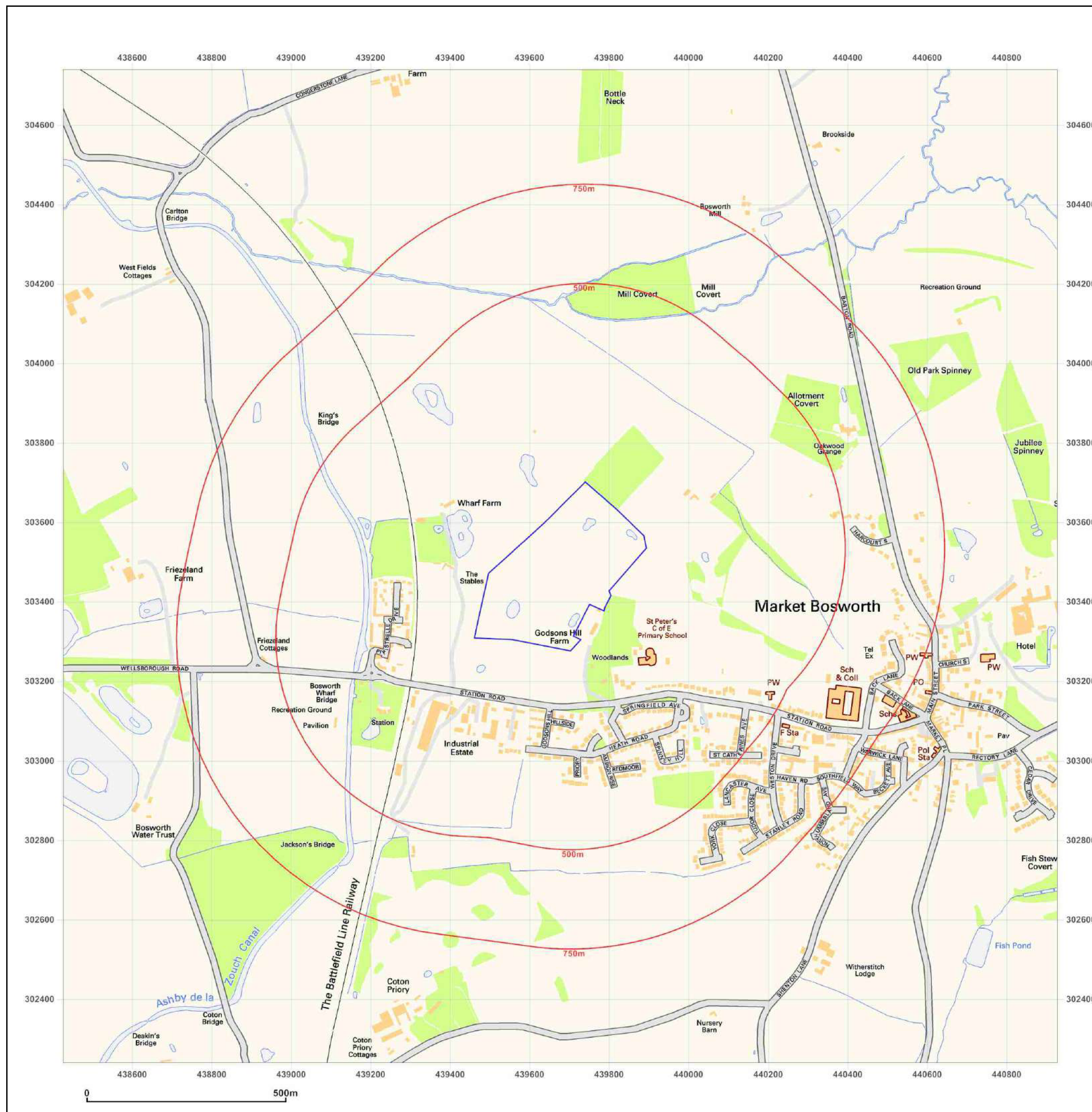


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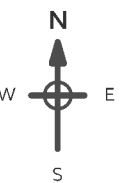
Client Ref: EMS_440080_589559
Report Ref: EMS-440080_589559
Grid Ref: 439677, 303490

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



2014



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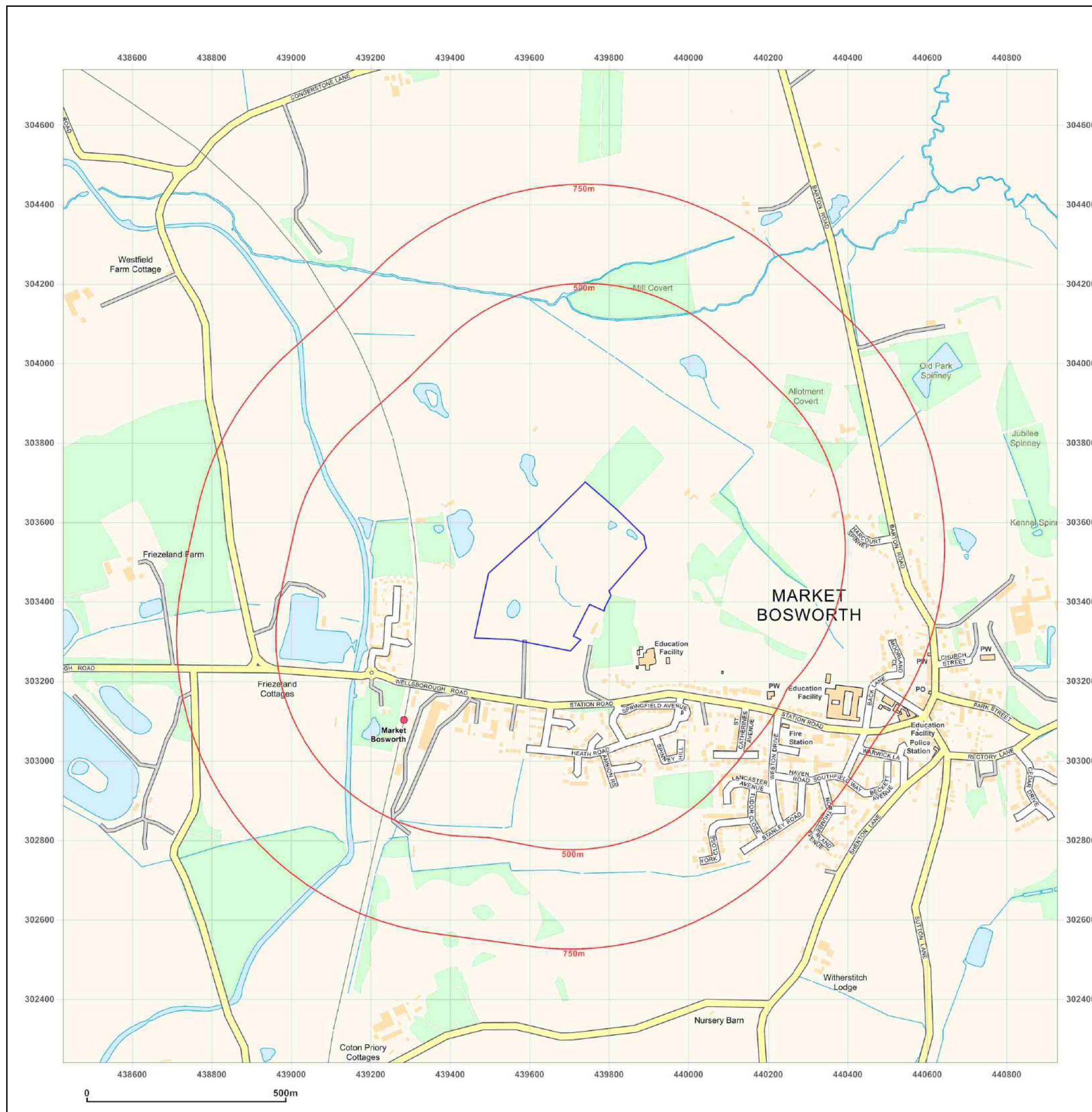


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APPENDIX C





emapsite

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

Report Reference: EMS-440080_589560

Your Reference: EMS_440080_589560

Report Date 14 Sep 2017

Report Delivery Email - pdf
Method:

Geo Insight

Address: Kyngs Golf & Country Club, Station Road,

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

Address: Kyngs Golf & Country Club, Station Road,

Date: 14 Sep 2017

Reference: EMS-440080_589560

Client: emapsite



Aerial Photograph Capture date: 09-Oct-2011

Grid Reference: 439675,303472

Site Size: 10.12ha

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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 landslide within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	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 faults 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 landslide 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 Faults

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 faults within 500m of the study site boundary?

No

Section 3: Radon

3. Radon

3.1 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 property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

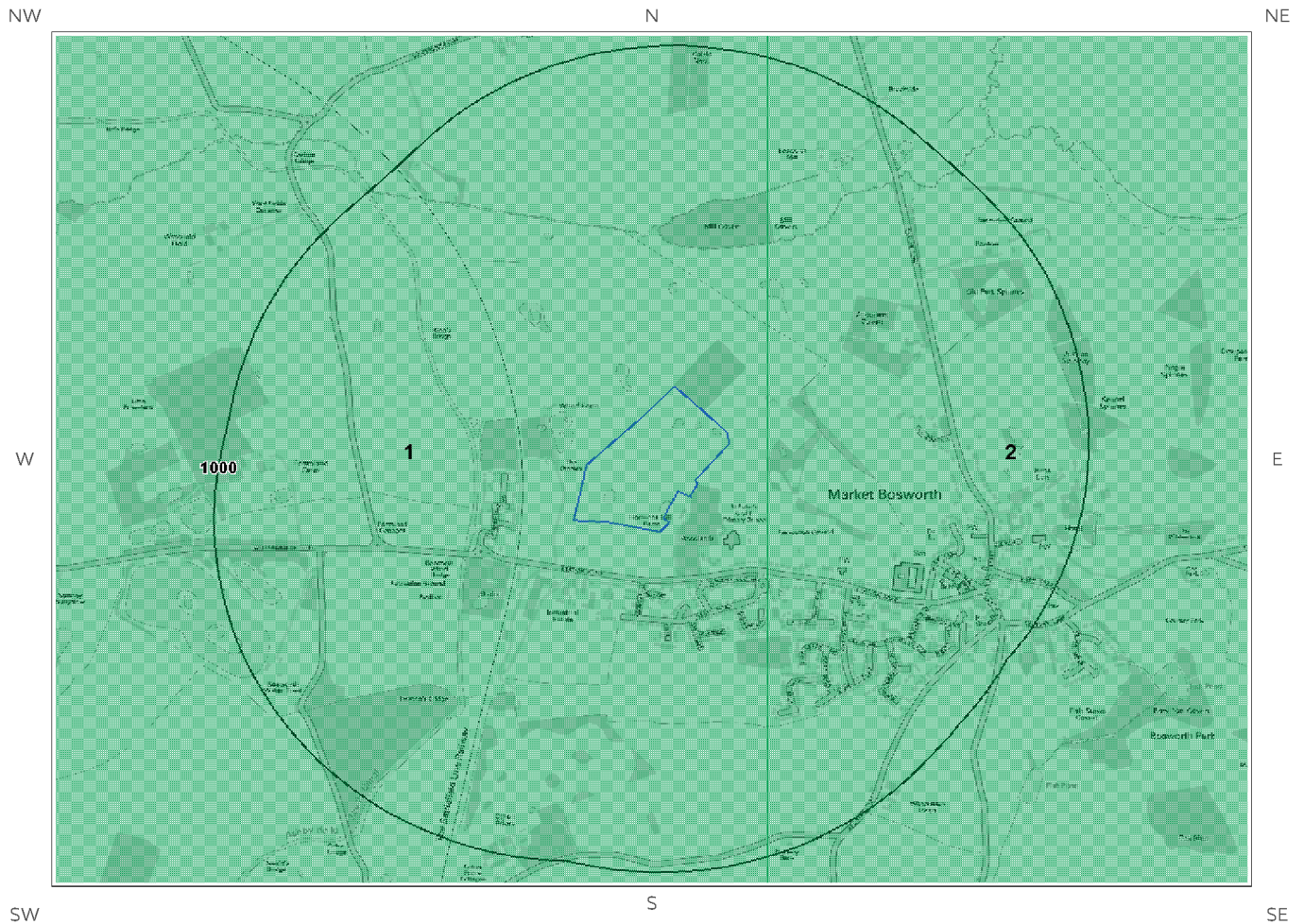
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	3	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	1	2

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	1	2	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

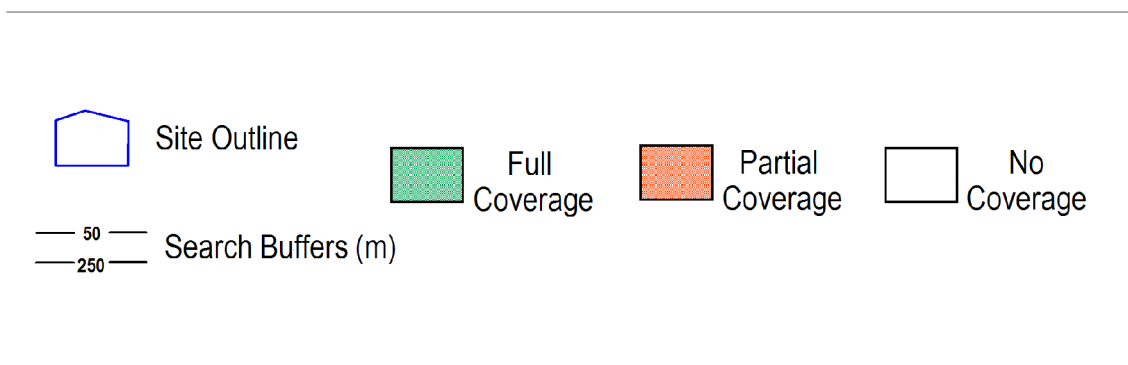
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Low				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Moderate				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	0	25		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	4	1	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	9	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	8	Not Searched	
9.5 Railway Projects	0	0	0	0	

1:10,000 Scale Availability



1_10,000 Availability Legend

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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	107.0	Some deposits are mapped	Full	Full	No coverage
N3	1297.0	Some deposits are mapped	Full	Full	No coverage
N4	1323.0	Some deposits are mapped	Full	Full	Some deposits are mapped

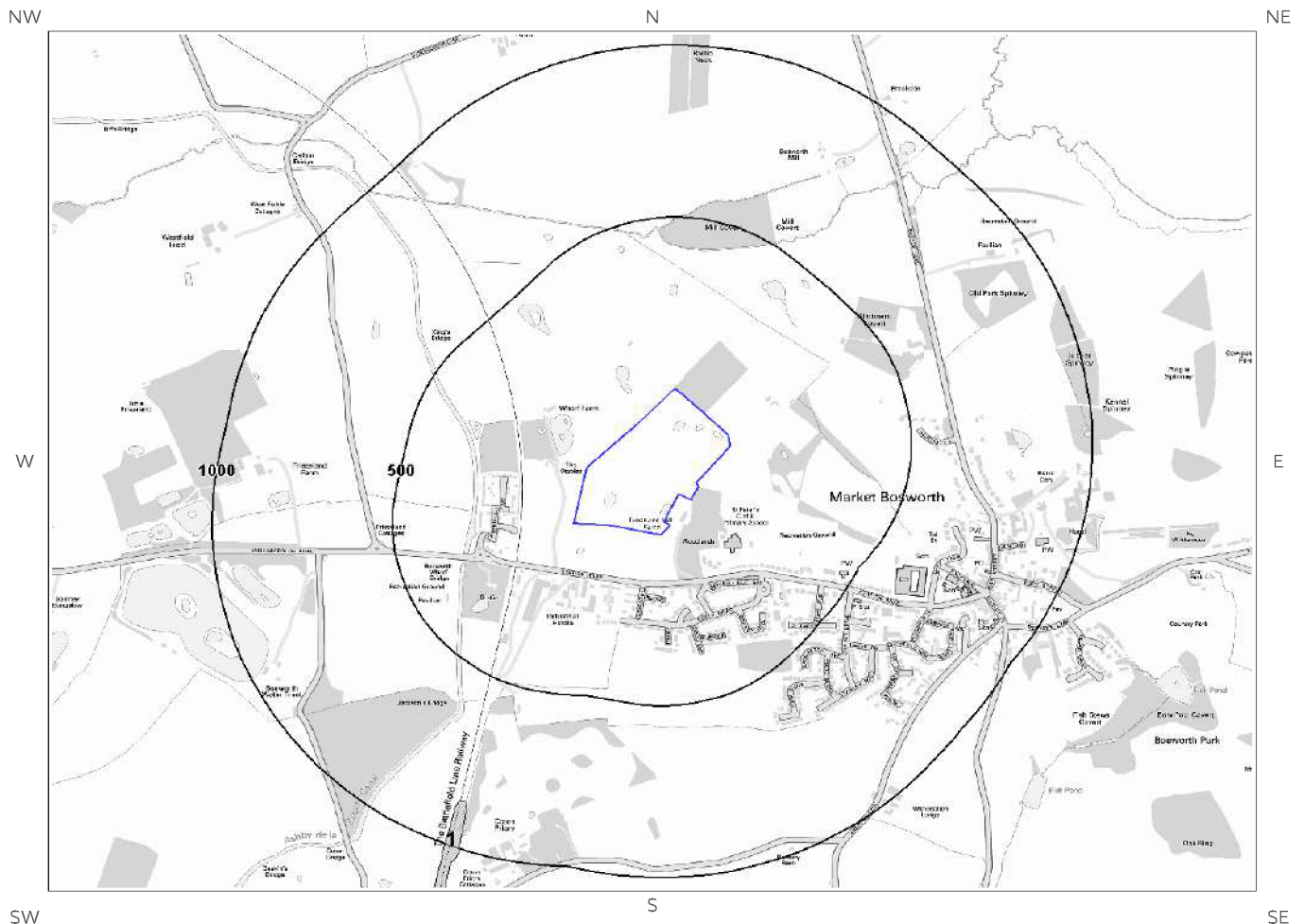
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not 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

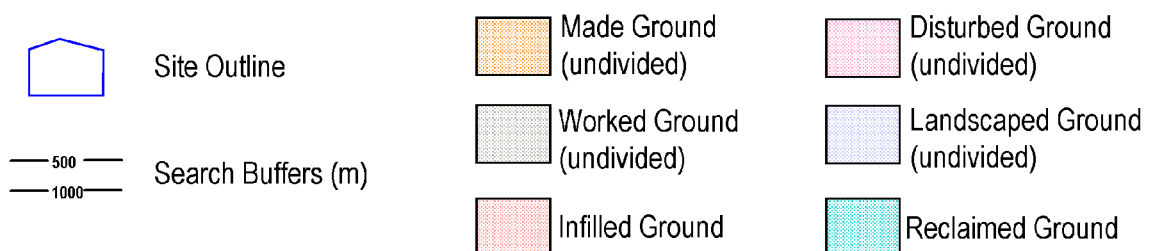
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

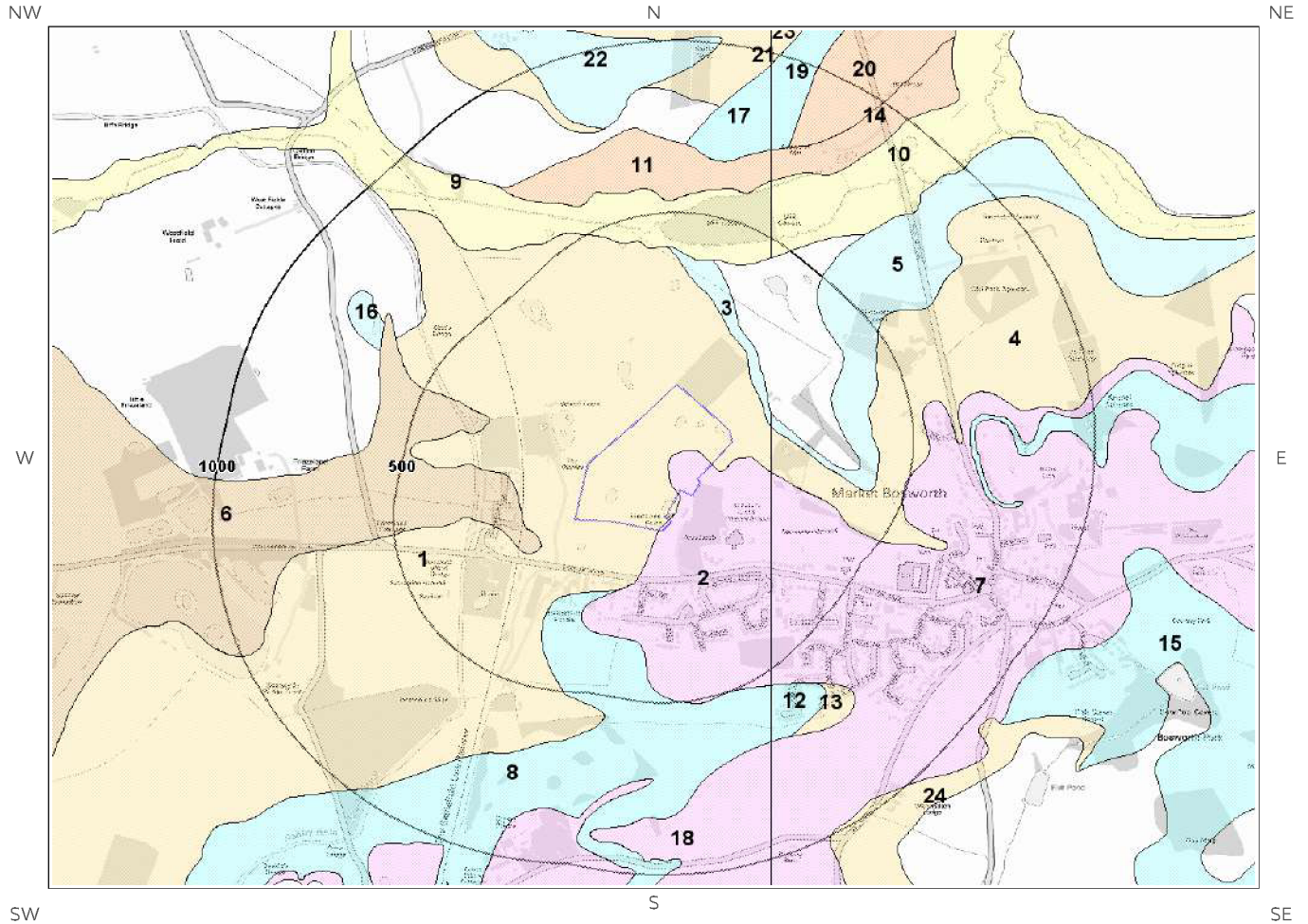
1.1 Artificial Ground

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? No

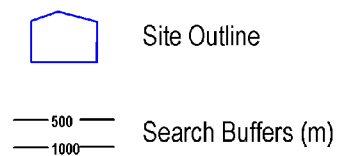
Database searched and no data found.

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



Artificial Ground Legend

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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	WOC-XCZS	Wolston Clay - Clay, Silt And Sand	Clay, Silt And Sand
2	0.0	On Site	GFDMP-XSV	Glaciofluvial Deposits, Mid Pleistocene - Sand And Gravel	Sand And Gravel
3	106.0	E	THT-DMTN	Thrussington Member - Diamicton	Diamicton
4	107.0	E	WOC-XCZS	Wolston Clay - Clay, Silt And Sand	Clay, Silt And Sand
5	114.0	E	THT-DMTN	Thrussington Member - Diamicton	Diamicton
6	115.0	SW	LDE-XCZS	Lacustrine Deposits - Clay, Silt And Sand	Clay, Silt And Sand
7	139.0	SE	GFDMP-XSV	Glaciofluvial Deposits, Mid Pleistocene - Sand And Gravel	Sand And Gravel
8	189.0	S	ODT-DMTN	Oadby Member - Diamicton	Diamicton
9	366.0	N	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
10	452.0	NE	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

1.2.2 Landslip

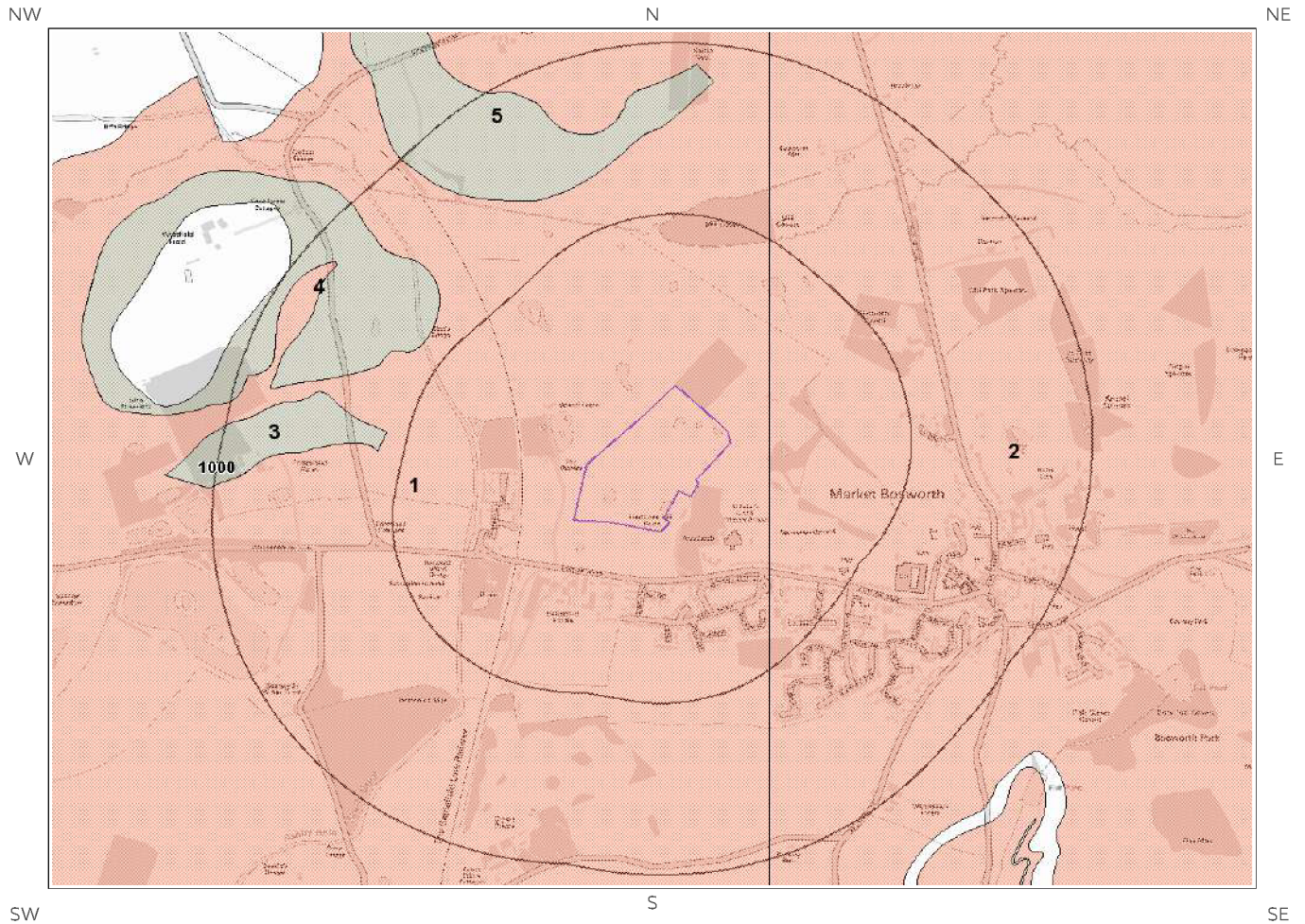
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

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 Faults Map (1:10,000 scale)

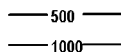


Bedrock and Faults Legend

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Site Outline



Search Buffers (m)

1.3 Bedrock and Faults

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	GUN-MDST	Gunthorpe Member - Mudstone	Ladinian Age - Anisian Age
2	107.0	E	GUN-MDST	Gunthorpe Member - Mudstone	Ladinian Age - Anisian Age

1.3.2 Faults

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

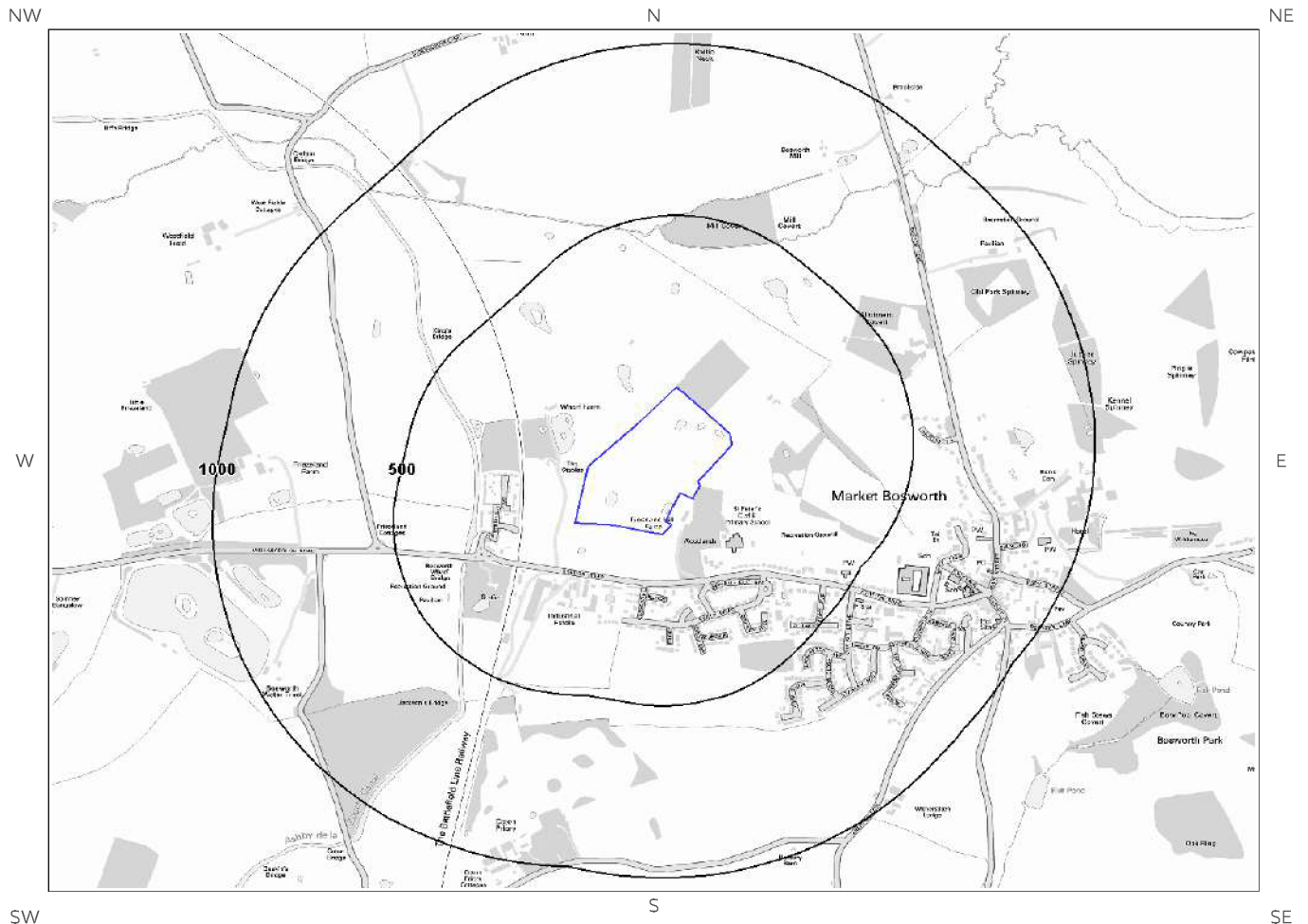
Database searched and no data found at this scale.

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.

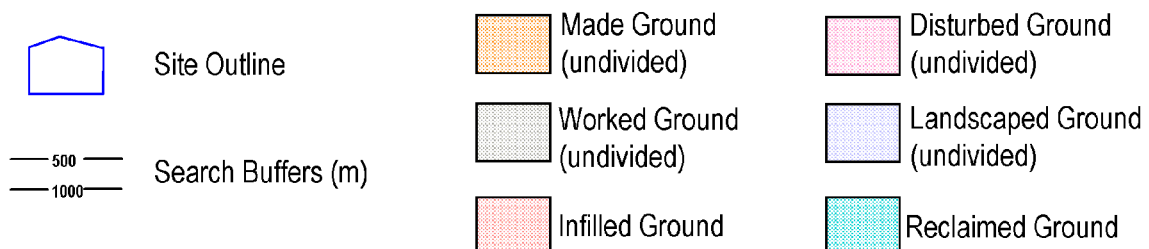
2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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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: 155

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? No

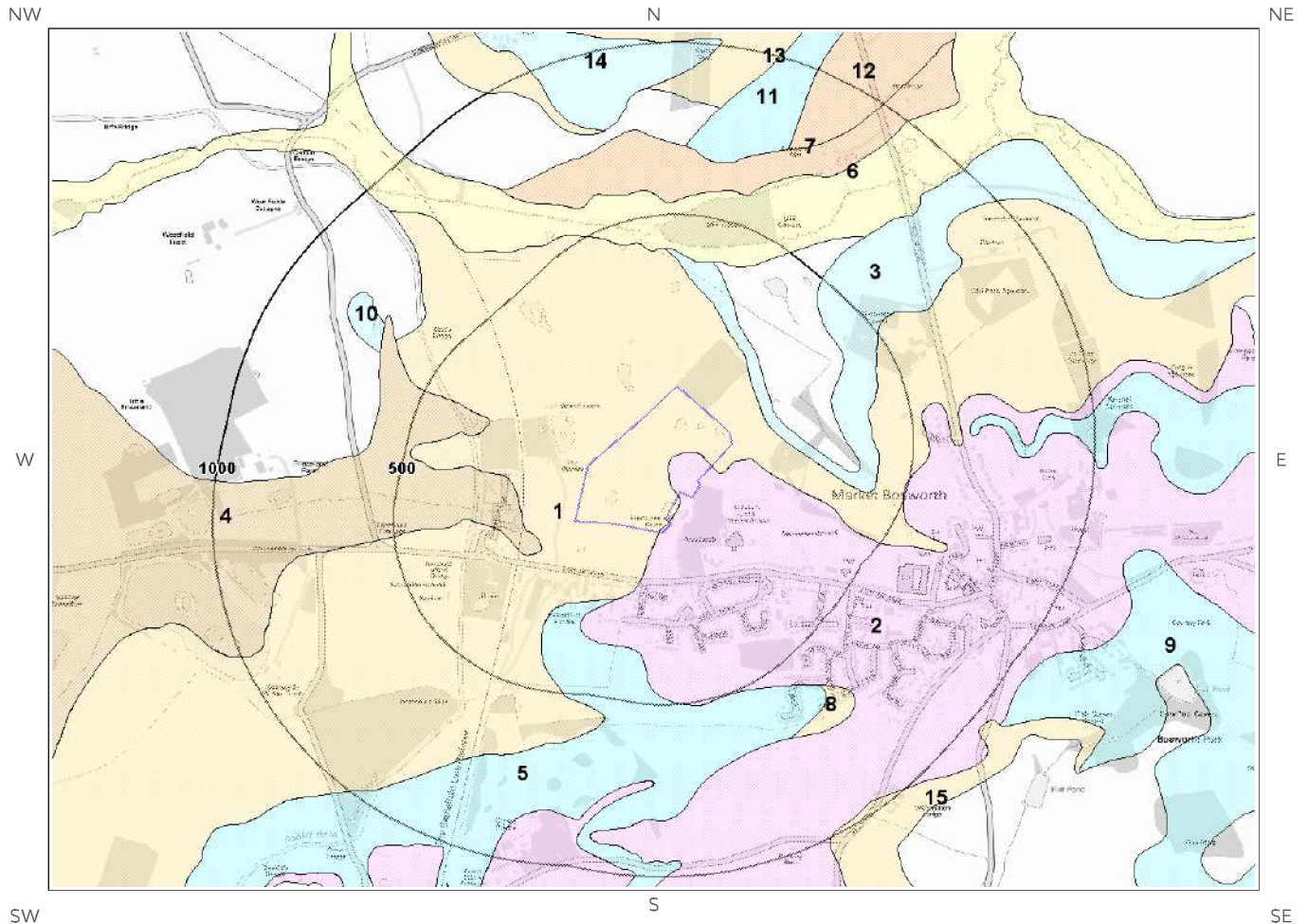
Database searched and no data found.

2.1.2 Permeability of Artificial Ground

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

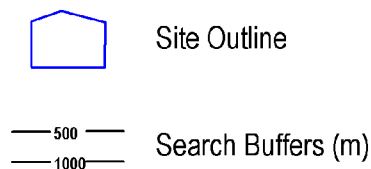
Database searched and no data found.

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



Ground Workings Legend

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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	BOSW-XCZ	BOSWORTH CLAY MEMBER	CLAY AND SILT
2	0.0	On Site	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
3	104.0	NE	THT-DMTN	THRUSSTON MEMBER	DIAMICTON
4	115.0	SW	LDE-XCZS	LACUSTRINE DEPOSITS	CLAY, SILT AND SAND
5	208.0	S	ODT-DMTN	OADBY MEMBER	DIAMICTON
6	366.0	N	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	Mixed	Low	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.

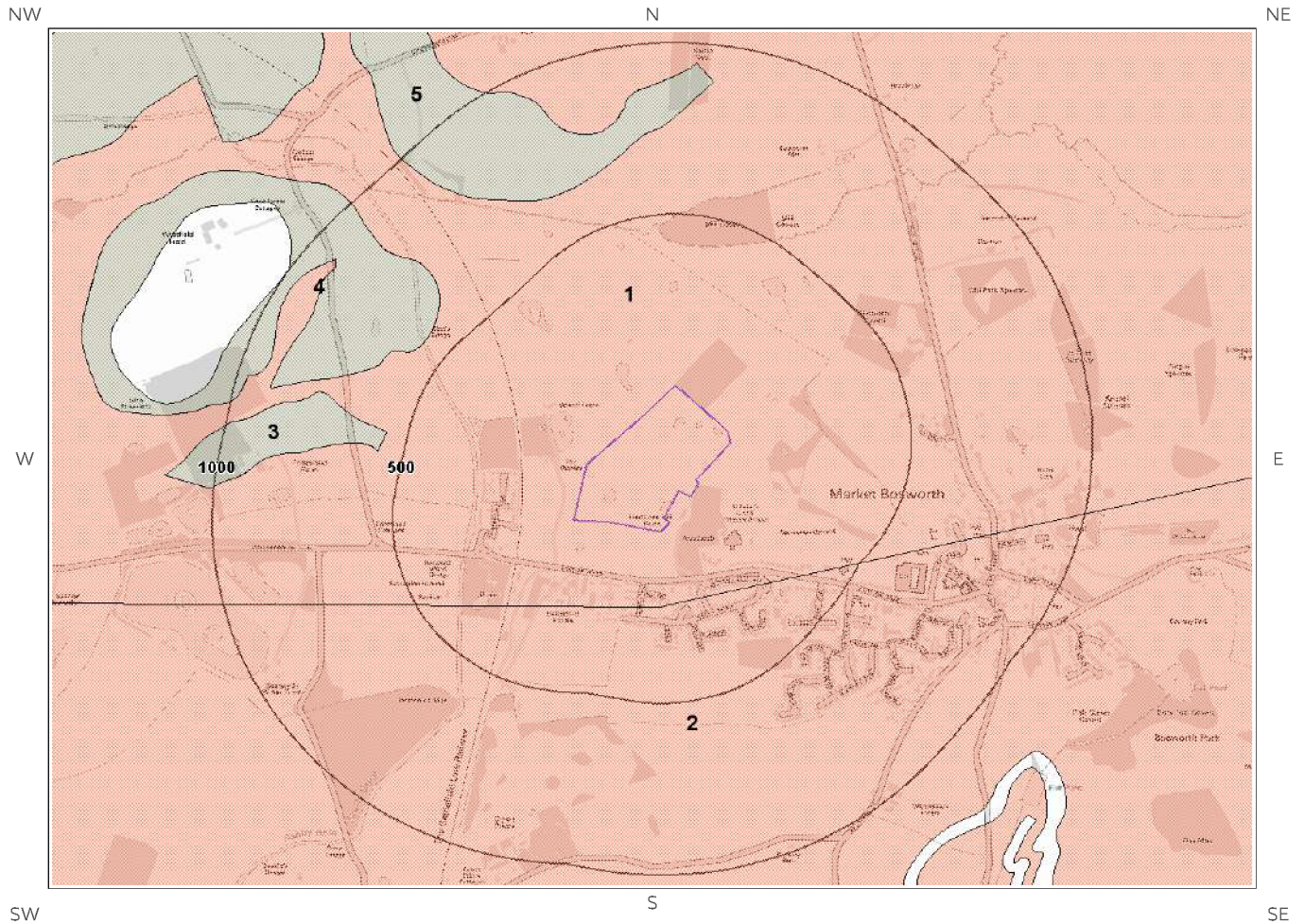
2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary?

No

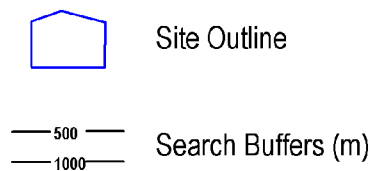
Database searched and no data found.

2.3 Bedrock and Faults Map (1:50,000 scale)



Ground Workings Legend

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2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 155

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	GUN-MDST	GUNTHORPE MEMBER - MUDSTONE	ANISIAN
2	213.0	S	GUN-MDST	GUNTHORPE MEMBER - MUDSTONE	ANISIAN

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	Fracture	Low	Low

2.3.3 Faults

Are there any records of Faults 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

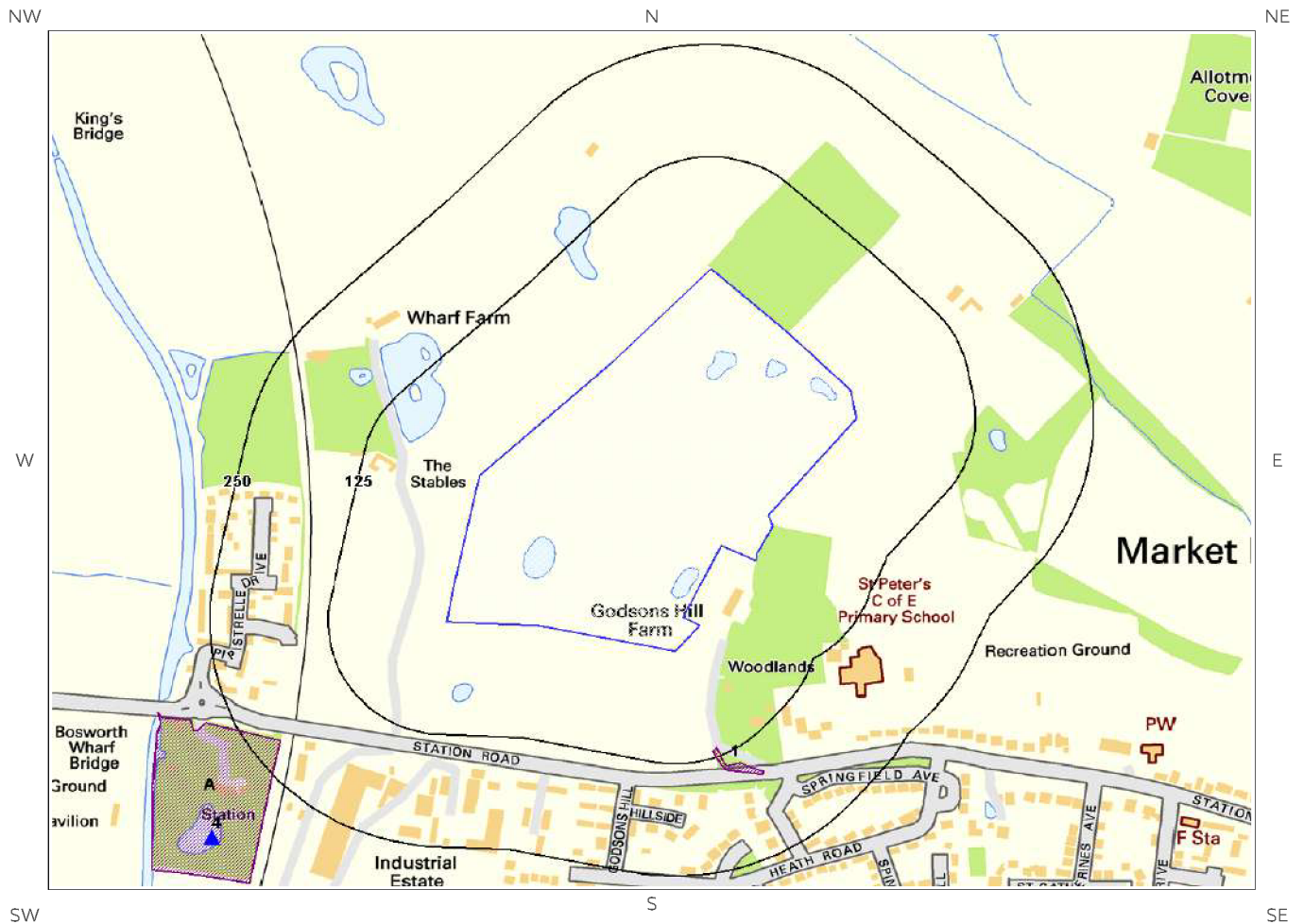
3.1 Radon Affected Areas

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.

3.2 Radon Protection

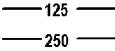
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings Map



Ground Workings Legend

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- | | | | |
|---|--------------------|---|----------------------------------|
|  | Site Outline |  | Historic Surface Ground Workings |
|  | Search Buffers (m) |  | 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
1	116.0	S	439750 303156	Unspecified Ground Workings	1885
2A	219.0	SW	439217 303114	Brick Works	1901
3A	219.0	SW	439217 303114	Brick Yard	1885

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
4	345.0	SW	439212 303070	Clay & Shale	Station Brick Yard	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	605.0	E	440497 303562	Sand	Market Bosworth Sand Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	678.0	E	440571 303521	Sand & Gravel	Bosworth Park Gravel Pit	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

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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? Yes

The following information provided by JPB is not represented on mapping: Whilst outside of an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property. Further details and a quote for services can be obtained by emailing this report to enquiries.gs@jpb.co.uk.

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 Peter Brett Associates natural cavities database.

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.

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

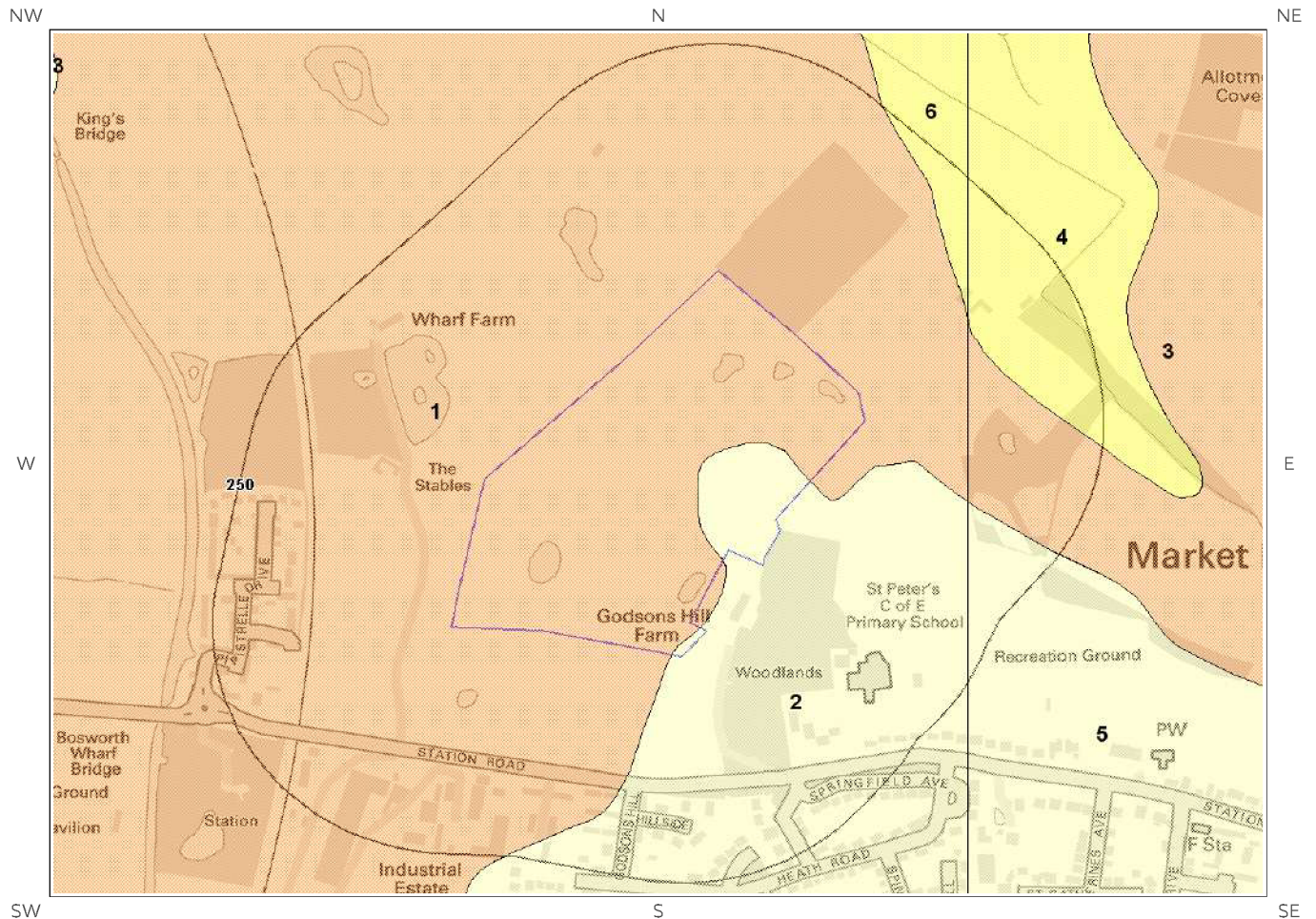
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

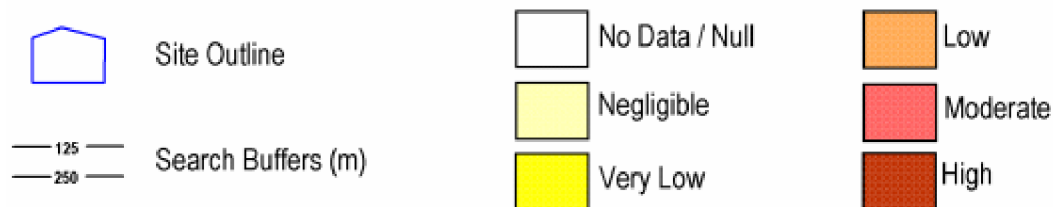
6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map

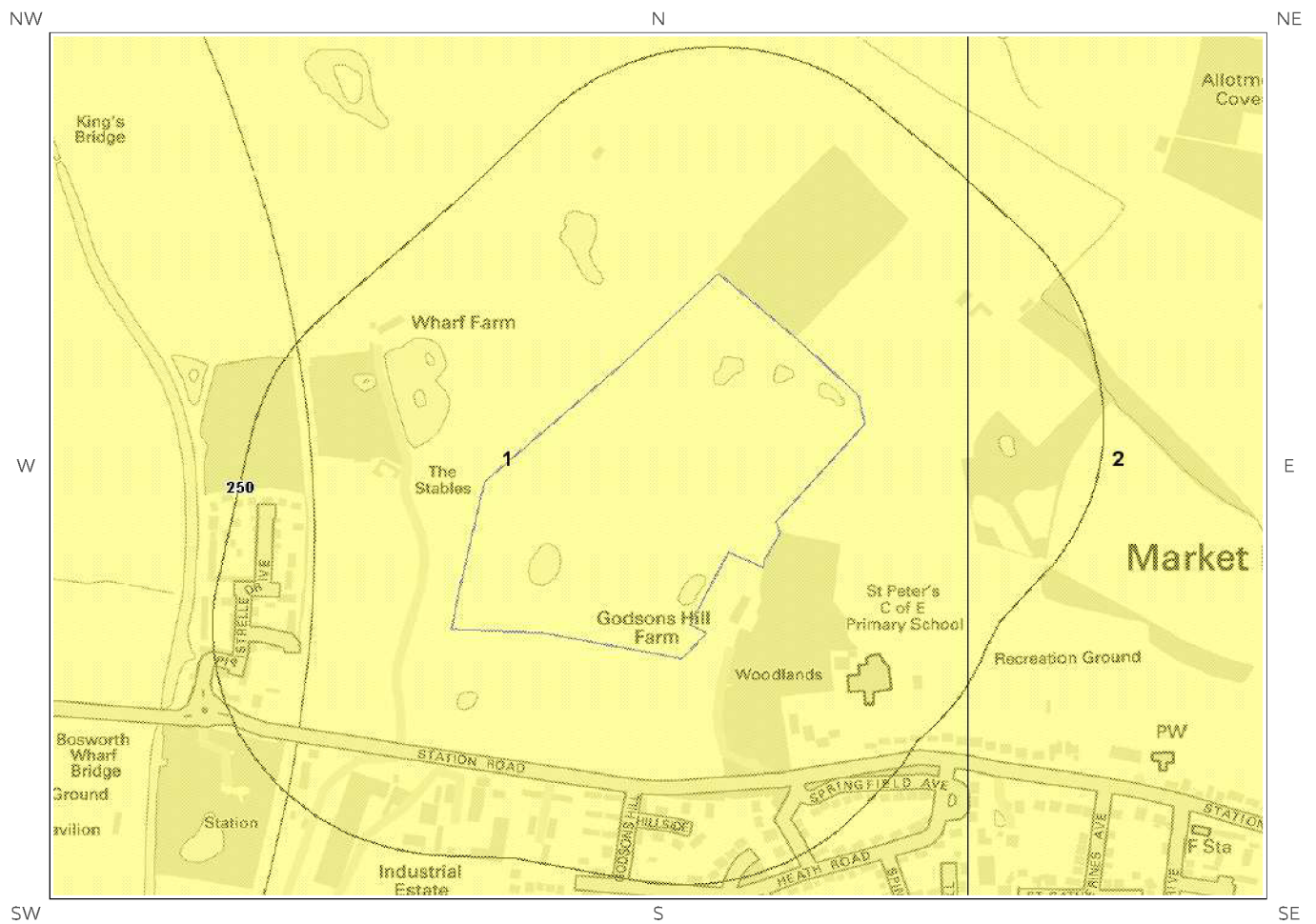


Shrink Swell Clay Legend

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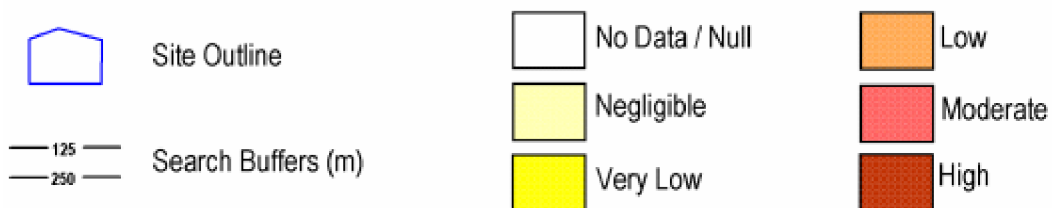


6.2 Landslides Map

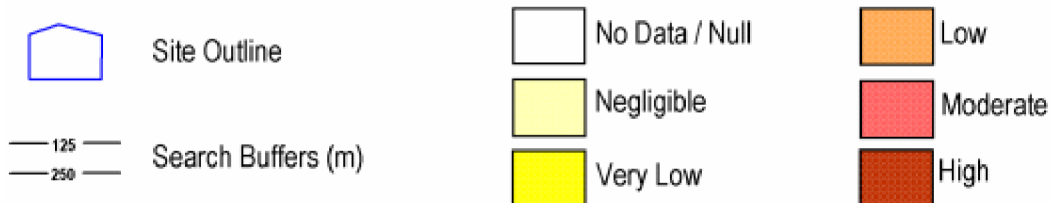
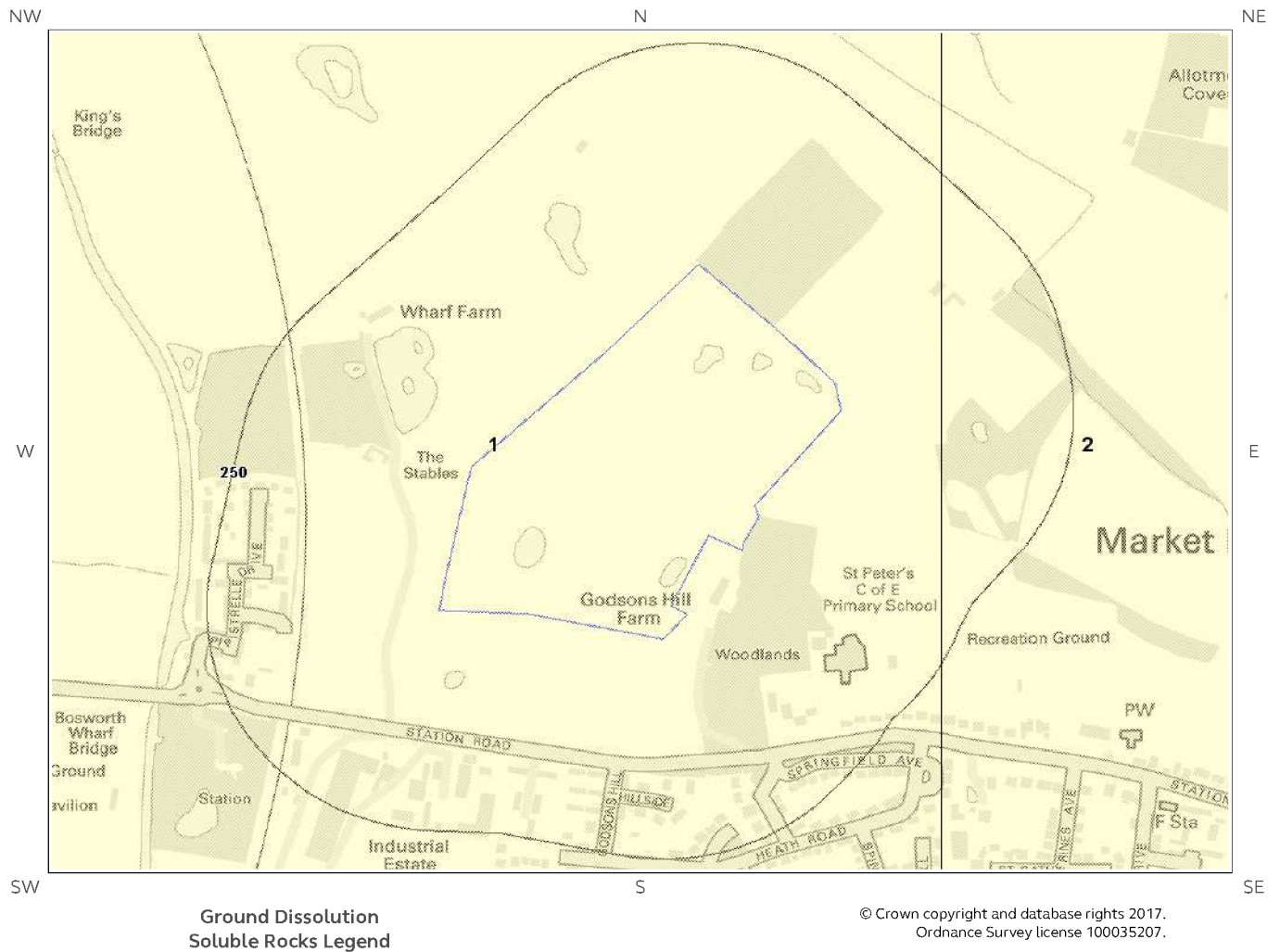


Landslides Legend

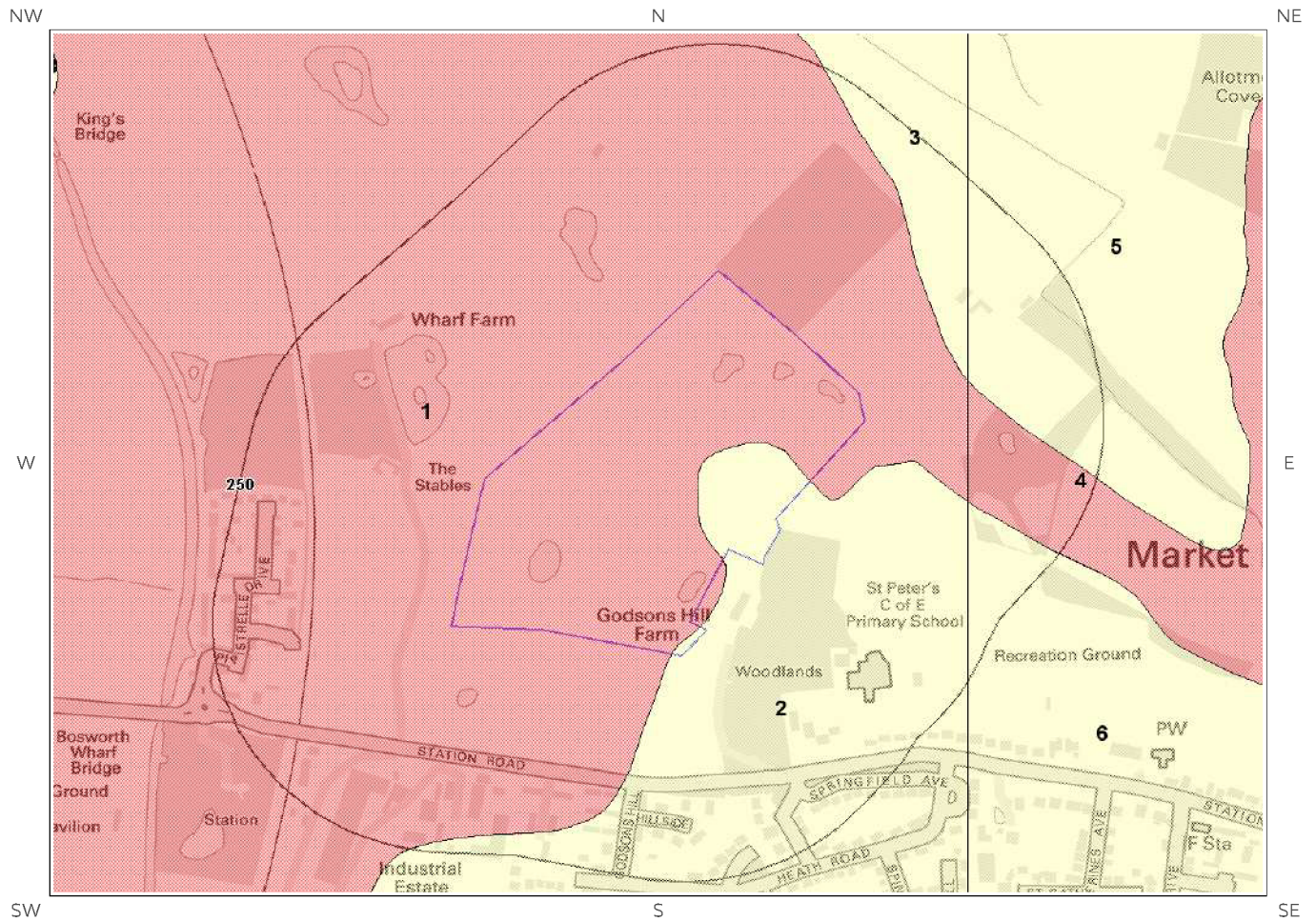
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6.3 Ground Dissolution of Soluble Rocks Map

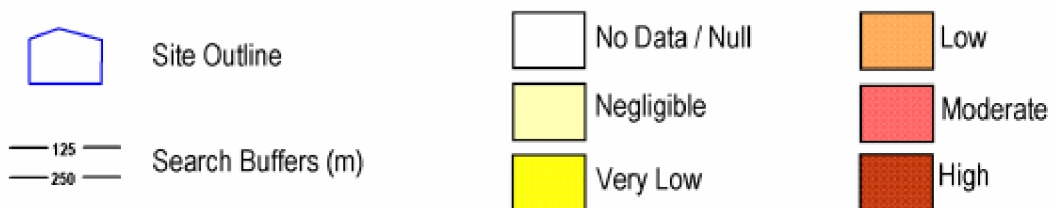


6.4 Compressible Deposits Map

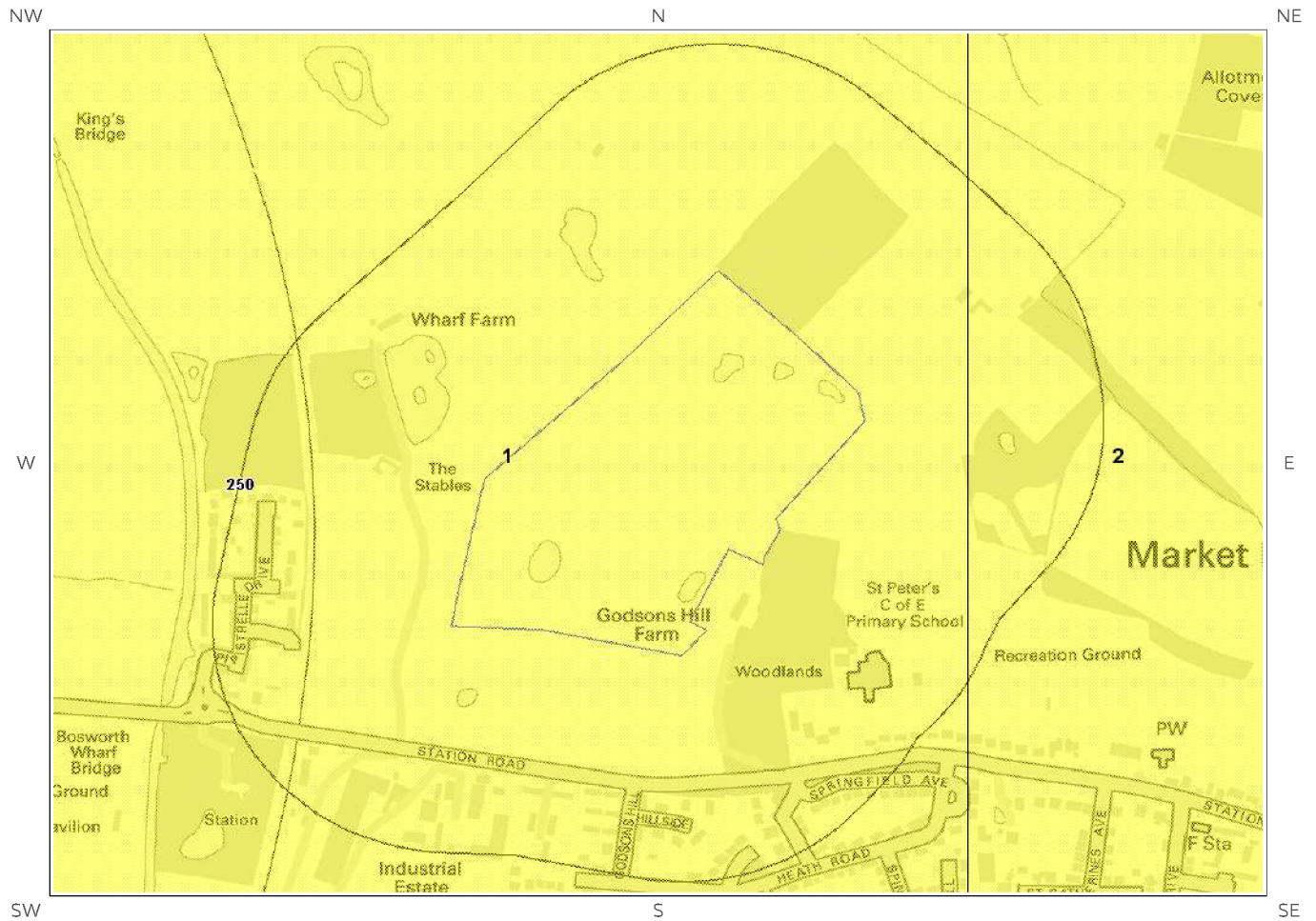


Compressible Deposits Legend

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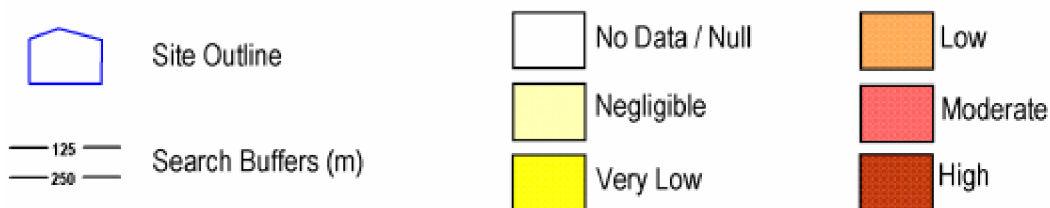


6.5 Collapsible Deposits Map

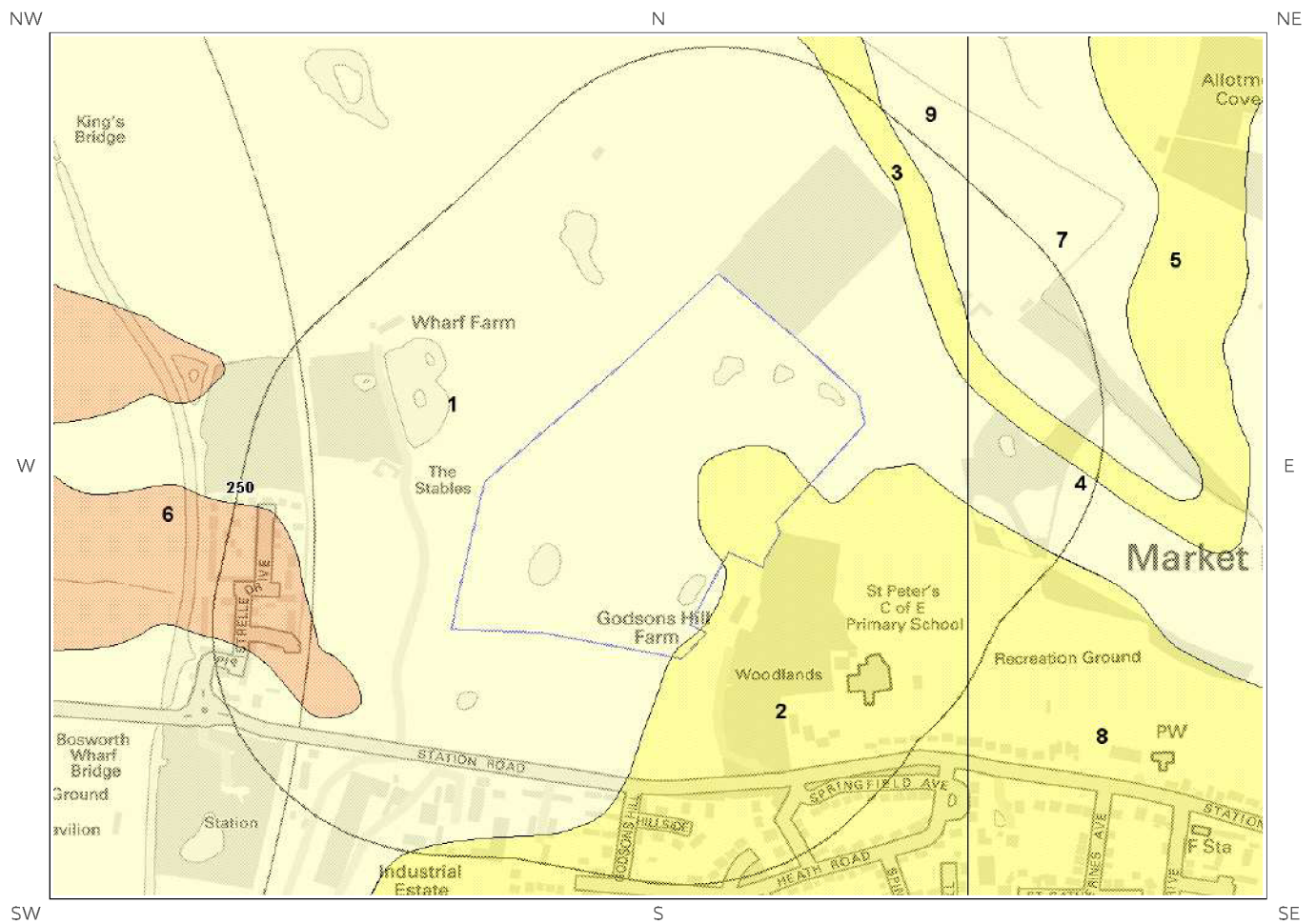


Collapsible Deposits Legend

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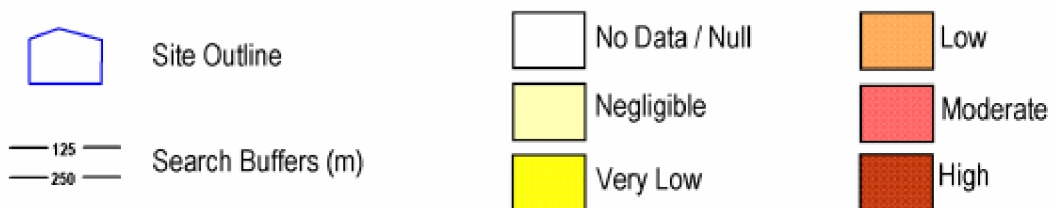


6.6 Running Sand Map



Running Sand Legend

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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	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. 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 possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
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.

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.

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

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	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.
2	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.

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	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.

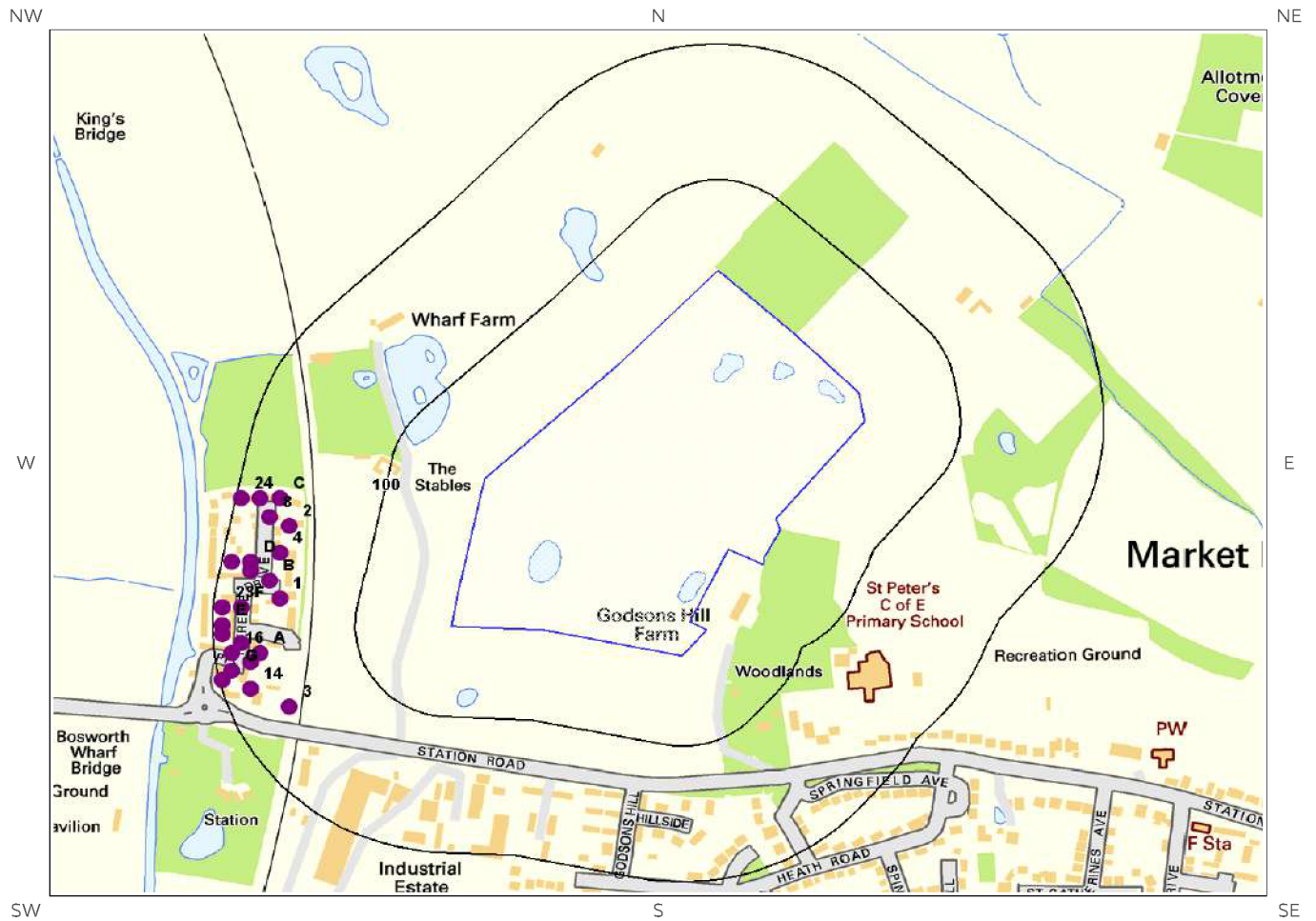
6.6 Running Sands

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	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.

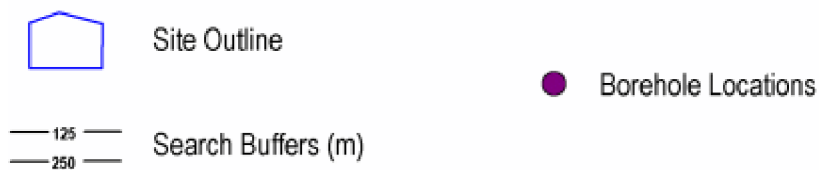
ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records Map



Borehole Records Legend

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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:

25

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	183.0	W	439280 303340	SK30SE39	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 8
2	190.0	W	439290 303420	SK30SE55	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS16
3	192.0	SW	439290 303220	SK30SE1	8.22	MARKET BOSWORTH
4	193.0	W	439280 303390	SK30SE56	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS17
5B	197.0	W	439270 303360	SK30SE58	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS19
6A	202.0	W	439260 303280	SK30SE45	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS6
7C	206.0	W	439280 303450	SK30SE54	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS15
8	211.0	W	439270 303430	SK30SE37	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 6
9A	214.0	W	439250 303270	SK30SE44	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS4
10B	218.0	W	439250 303370	SK30SE36	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 5
11D	220.0	W	439250 303380	SK30SE57	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS18
12A	221.0	W	439240 303290	SK30SE33	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 2
13F	221.0	W	439240 303330	SK30SE38	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 7
14	222.0	W	439250 303240	SK30SE32	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 1
15C	225.0	W	439260 303450	SK30SE53	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS14
16	232.0	W	439230 303280	SK30SE35	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 4

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
17G	236.0	W	439230 303260	SK30SE43	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS3
18D	240.0	W	439230 303380	SK30SE50	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS11
19E	240.0	W	439220 303310	SK30SE46	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS7
20E	240.0	W	439220 303310	SK30SE34	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH 3
21E	240.0	W	439220 303300	SK30SE42	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS2
22F	241.0	W	439220 303330	SK30SE49	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS10
23	241.0	W	439220 303330	SK30SE47	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS8
24	245.0	W	439240 303450	SK30SE52	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS13
25G	248.0	W	439220 303250	SK30SE60	-1.0	PALGRAVE BROWN STATION ROAD MARKET BOSWORTH WS21

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.

#3: scans.bgs.ac.uk/sobi_scans/boreholes/203778

8 Estimated Background Soil Chemistry

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

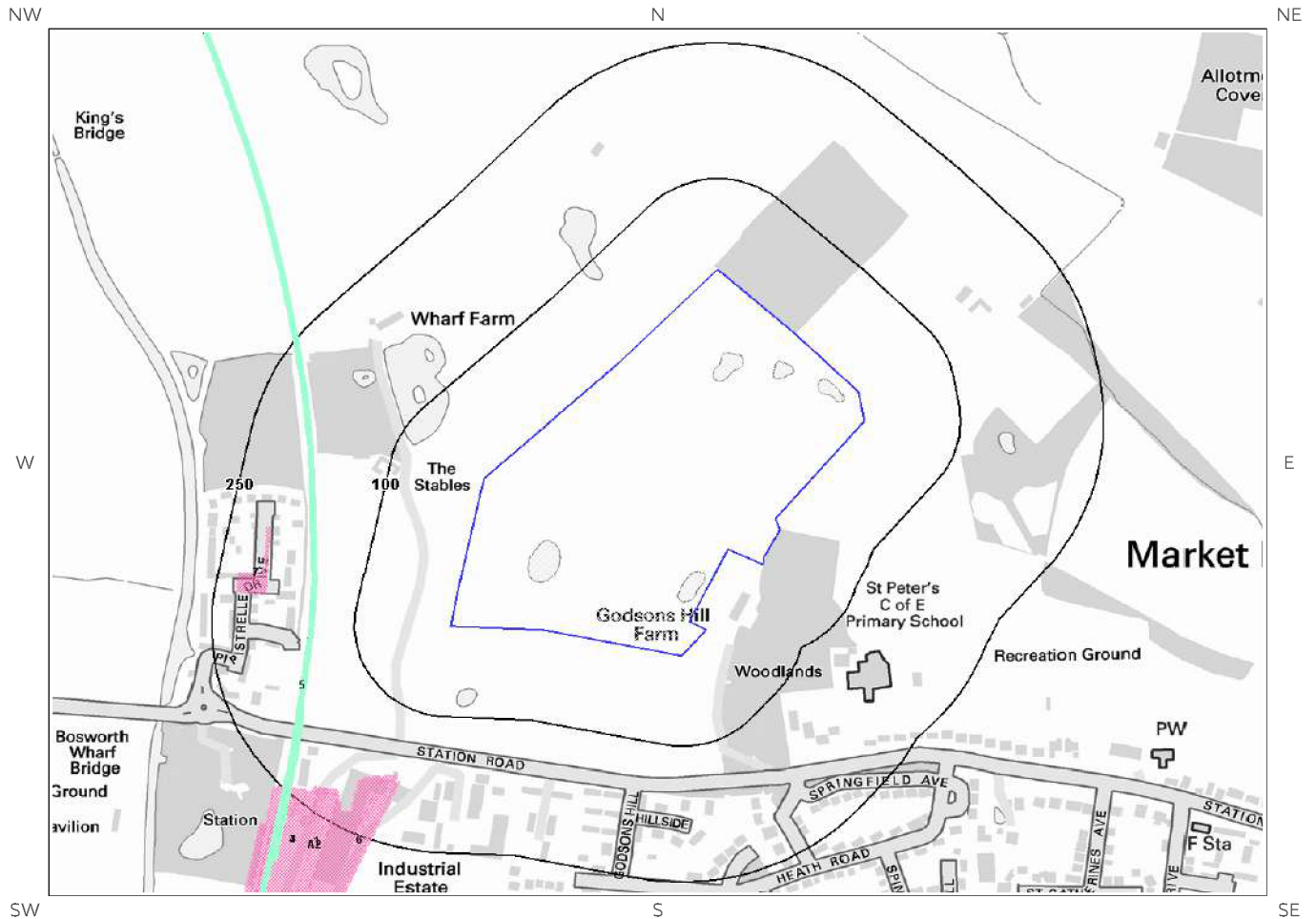
5

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 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
18.0	NW	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg

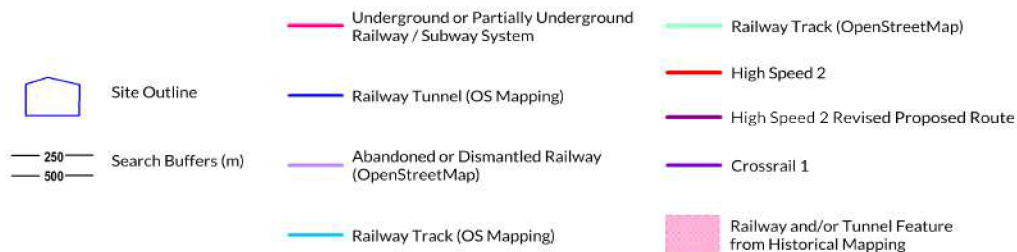
*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

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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
5	151	W	439305 303240	Railway Sidings	1969
1	173	S	439204 302744	Railway Sidings	1950
2	179	S	439315 303002	Railway Sidings	1966
6	182	S	439364 303069	Railway Sidings	1957
7	196	W	439267 303382	Railway Sidings	1957
3	220	SW	439281 303004	Railway Sidings	1885

ID	Distance (m)	Direction	NGR	Details	Date
4	220	SW	439281 303004	Railway Sidings	1901
8A	227	SW	439313 303061	Railway Sidings	1957
9A	230	SW	439309 303061	Railway Sidings	1969

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
145	W	Battlefield Line Railway	Preserved
145	W	Battlefield Line Railway	Preserved
147	W	Not given	Multi Track
147	W	Not given	Multi Track
177	SW	Battlefield Line Railway	Preserved
177	SW	Battlefield Line Railway	Preserved
203	SW	Not given	Multi Track
203	SW	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.

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.

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NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 09-Oct-2011
Grid Reference: 439675,303472
Site Size: 10.12ha

Report Reference: EMS-440080_589561
Client Reference: EMS_440080_589561

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Overview of Findings

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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	0	21	20
1.2 Additional Information – Historical Tank Database	0	0	1	3
1.3 Additional Information – Historical Energy Features Database	0	0	4	0
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	1	0
1.6 Potentially Infilled Land	0	0	3	18

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	0	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	0	1
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	1	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	0	0	3
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	1
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	1	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	1	2	0	1

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	11	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 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No					
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes					
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 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	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	0	0	3	2
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	1	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	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)	1	0	2	2	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 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	Yes	No	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	1	7	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low					
7.4 Are there any Flood Defences within 250m of the study site?	No					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No					
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential below Surface					
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High					

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	1
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	0	1
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	0	0	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	1	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Moderate
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very 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 property 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 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

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 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: 41

ID	Distance [m]	Direction	Use	Date
1M	116	S	Unspecified Ground Workings	1885
2A	147	S	Unspecified Works	1966
3A	151	S	Unspecified Works	1990
4	159	S	Unspecified Depot	1990
5B	160	W	Timber Fireproofing Works	1990
6B	160	W	Unspecified Works	1966
7C	171	W	Gas Works	1885
8	173	S	Railway Sidings	1950
9	179	S	Railway Sidings	1966
10C	182	SW	Gas Works	1901
11D	196	SW	Railway Building	1990
12C	204	SW	Gasometer	1901
13C	204	SW	Gasometer	1885
14D	205	SW	Railway Station	1966
15D	207	SW	Goods Station	1950
16D	212	SW	Railway Station	1901
17D	212	SW	Railway Station	1885
18E	219	SW	Brick Yard	1885
19E	219	SW	Brick Works	1901
20F	220	SW	Railway Sidings	1901
21F	220	SW	Railway Sidings	1885
22	253	W	Boat House	1885
23	259	SW	Railway Station	1990
24Q	276	NW	Cuttings	1885
25	298	SW	Railway Building	1966
26	299	SW	Unspecified Tanks	1885
27R	305	SW	Unspecified Pit	1885
28F	364	SW	Railway Building	1966
29F	364	SW	Railway Building	1950
30F	370	SW	Railway Building	1901
31F	370	SW	Railway Station	1885
32F	374	SW	Railway Building	1990
33G	416	NW	Cuttings	1950

34G	424	NW	Cuttings	1901
35H	479	S	Unspecified Works	1966
36H	481	S	Sewage Works	1990
37I	483	S	Filter Beds	1990
38I	488	S	Filter Beds	1950
39J	491	S	Unspecified Tanks	1990
40H	494	S	Unspecified Tanks	1966
41J	495	S	Filter Beds	1950

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: 4

ID	Distance (m)	Direction	Use	Date
42	225	W	Unspecified Tank	1969
43I	484	S	Tanks	1975
44I	487	S	Tanks	1975
45J	488	S	Tanks	1994

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: 4

ID	Distance (m)	Direction	Use	Date
46K	109	S	Electricity Substation	1985
47K	109	S	Electricity Substation	1969
48L	159	S	Electricity Substation	1985
49L	160	S	Electricity Substation	1969

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: 1

ID	Distance (m)	Direction	Use	Date
50D	153	SW	Garage	1985

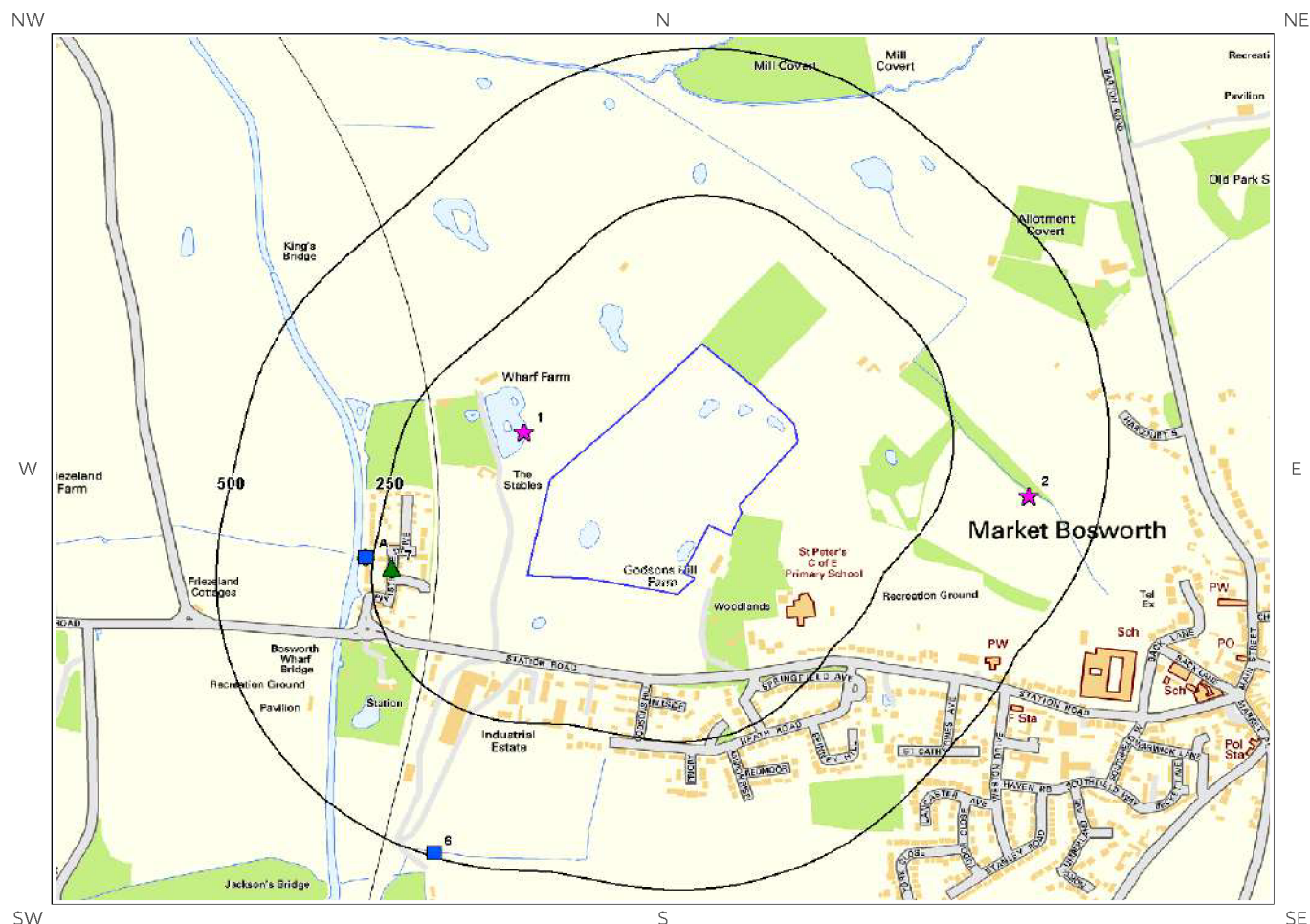
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 21

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

ID	Distance(m)	Direction	Use	Date
51M	116	S	Unspecified Ground Workings	1885
52E	219	SW	Brick Works	1901
53E	219	SW	Brick Yard	1885
54N	252	W	Canal	1990
55N	252	W	Canal	1966
56N	252	W	Canal	1950
57O	255	S	Ponds	1885
58O	255	S	Ponds	1901
59P	268	W	Canal	1901
60P	268	W	Canal	1885
61Q	276	NW	Cuttings	1885
62R	305	SW	Unspecified Pit	1885
63R	318	SW	Pond	1966
64R	318	SW	Ponds	1950
65R	322	SW	Ponds	1901
66G	416	NW	Cuttings	1950
67G	424	NW	Cuttings	1901
68H	481	S	Sewage Works	1990
69I	483	S	Filter Beds	1990
70I	488	S	Filter Beds	1950
71J	495	S	Filter Beds	1950

2. Environmental Permits, Incidents and Registers Map



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- | | | |
|--|---|--|
|  Site Outline |  Recorded Pollution Incident |  RAS 3 & 4 Authorisations |
|  Search Buffers (m) |  Dangerous Substances (List 1) |  Part A(1) Authorised Processes and Historic IPC Authorisations |
| |  Dangerous Substances (List 2) |  Part A(2) and Part B Authorised Processes |
| |  Licenced Discharge Consents |  COMAH / NIHHS Sites |
| |  Red List Discharge Consents |  Sites Determined as Contaminated Land |
| |  Water Industry Referrals |  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:

0

Database searched and no data found.

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:

1

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
3A	262	W	439200 303340	Name: Palgrave Brown Timber & Fireproofing Ltd. Status: Not Active Receiving Water: Friezeland Brook Authorised Substances: pH

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

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
7	219	W	439241 303319	Address: Palgrave Brown Timber, Station Rd, Nuneaton, CV13 0PQ Process: timber process Status: Historical Permit Permit Type: Part B Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

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:

3

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

ID	Distance (m)	Direction	NGR	Details
4A	262	W	439200 303340	Address: PREMISES AT STATION ROAD, MARKET BOSWORTH, NUNEATON, WARWICKSHIRE Effluent Type: SEWAGE & TRADE COMBINED - UNSPECIFIED Permit Number: T/20/30227/T Permit Version: 1 Receiving Water: FRIEZELAND BROOK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 25/01/1996 Effective Date: 25-Jan-1996 Revocation Date: 30/07/1998

ID	Distance (m)	Direction	NGR	Details	
5A	262	W	439200 303340	Address: PREMISES AT STATION ROAD, MARKET BOSWORTH, NUNEATON, WARWICKSHIRE Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: T/20/35315/T Permit Version: 1	Receiving Water: FRIEZELAND BROOK Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 31/07/1998 Effective Date: 31-Jul-1998 Revocation Date: 12/05/2006
6	493	S	439310 302840	Address: MARKET BOSWORTH PUMPING STATION, STATION ROAD, NUNEATON, LEICESTERSHIRE Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: T/20/30314/O Permit Version: 1	Receiving Water: FRIEZELAND BROOK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/02/1996 Effective Date: 15-Feb-1996 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:

2

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	88	NW	439453 303552	Incident Date: 29-Dec-2003 Incident Identification: 208357 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 1 (Major) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2	381	E	440263 303445	Incident Date: 24-Jul-2010 Incident Identification: 805791 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) 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.

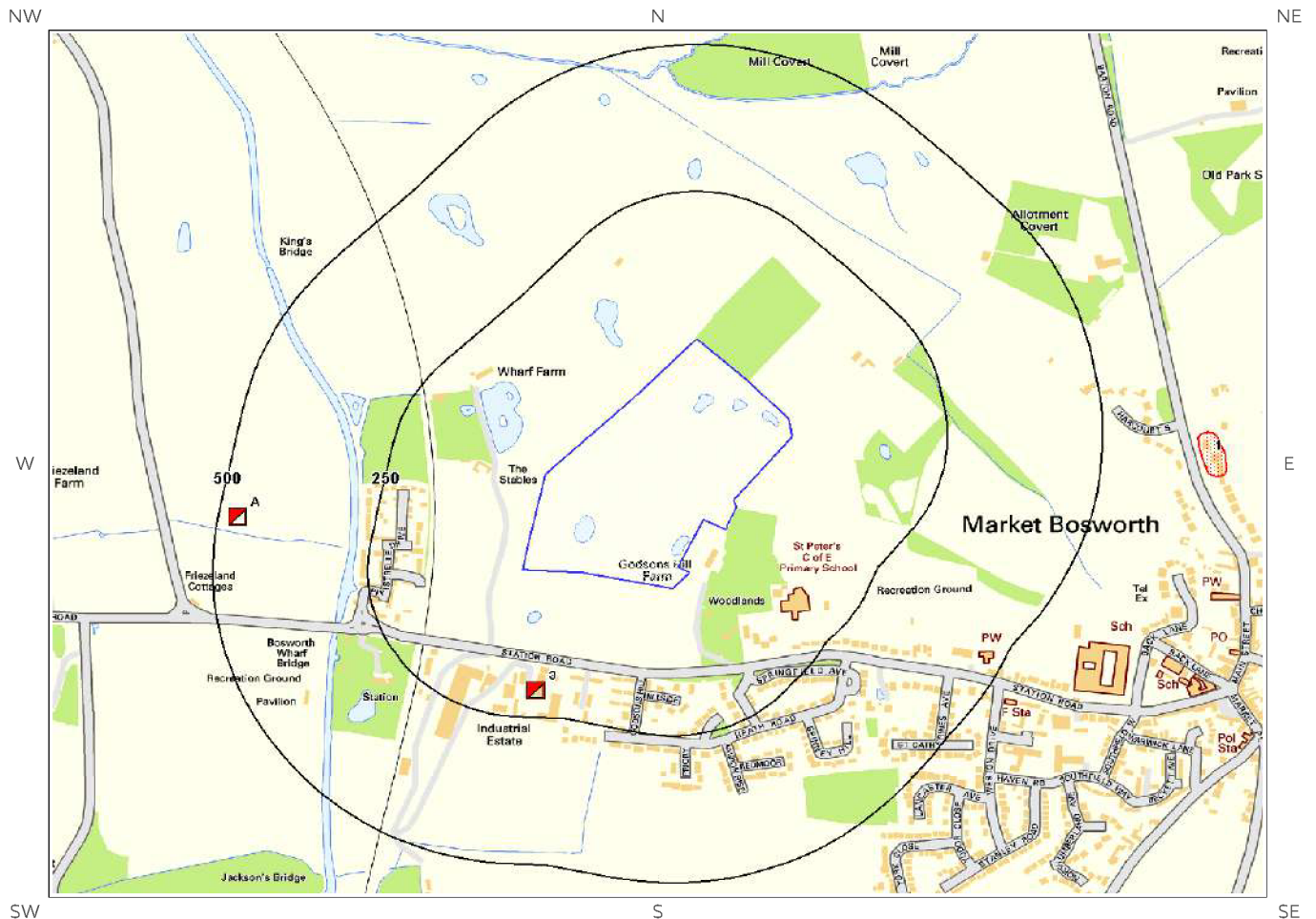
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

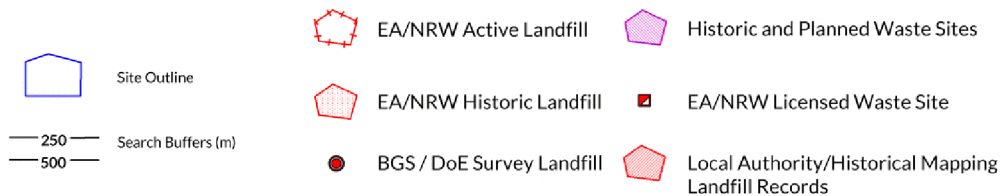
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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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:

2

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
1	653	E	440500 303500	Site Address: Market Bosworth Landfill Site, Barton Road, Market Bosworth, Leicestershire Waste Licence: - Site Reference: GDO 349, 2400/9000 Waste Type: Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1235	N	439500 304900	Site Address: Charton Landfill Site, Main Street, Carlton, Leicestershire Waste Licence: - Site Reference: GDO 191 Waste Type: Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

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:

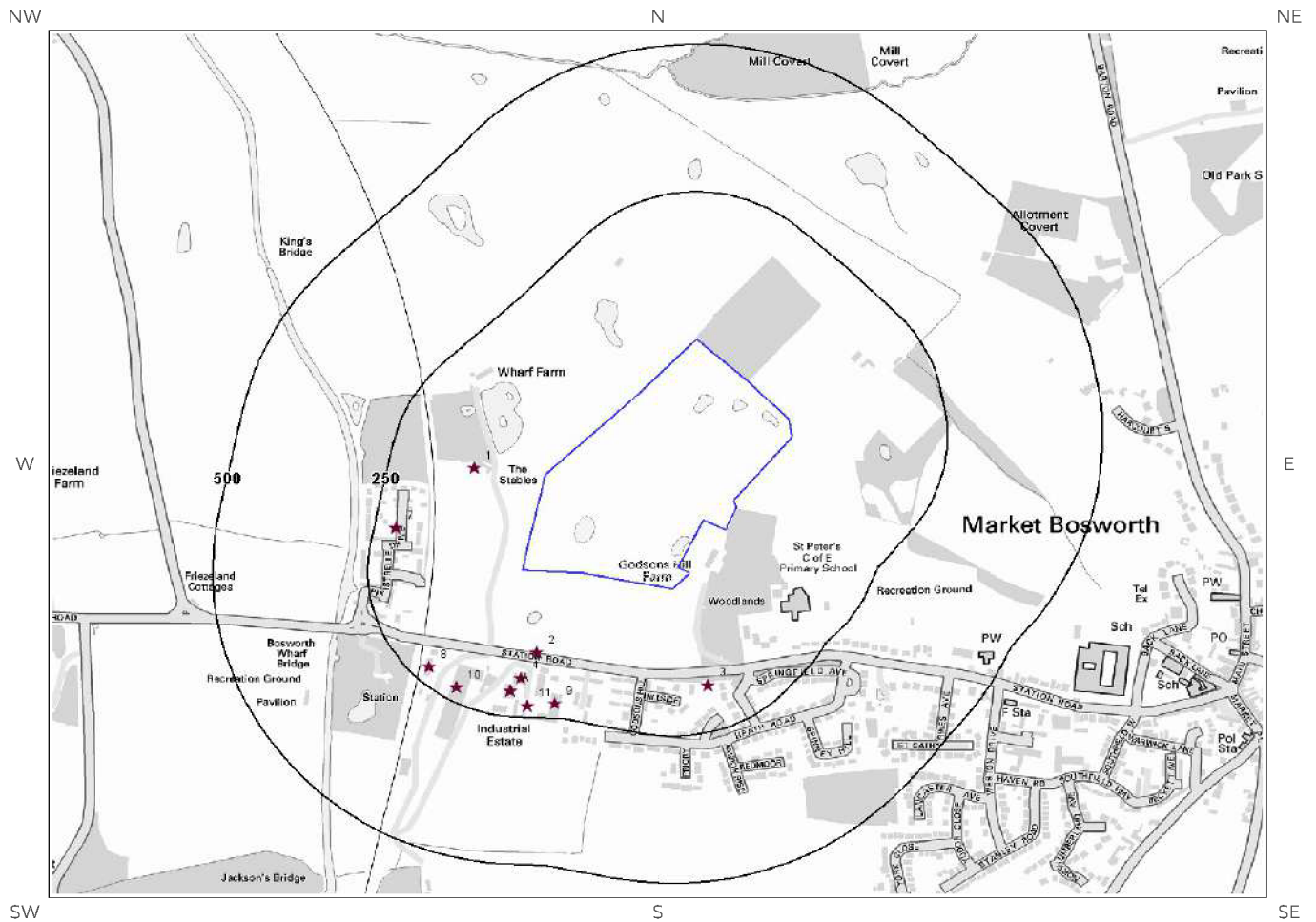
4

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
3	204	S	439480 303105	Site Address: Rossendale House, 1-4, Station Road, Station Road Ind Est, Market Bosworth, Warwickshire, CV13 0PE Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FLY001 EPR reference: EA/EPR/TP3292FJ/A001 Operator: Flying Spares Ltd Waste Management licence No: 40125 Annual Tonnage: 2500.0 Issue Date: 04/11/2004 Effective Date: - Modified: - Surrendered Date: 0 Expiry Date: 0 Cancelled Date: 0 Status: Issued Site Name: Flying Spares Ltd Correspondence Address: -
4A	469	W	439000 303400	Site Address: Bosworth Marina, Carlton Road, Market Bosworth, Leics, CV13 6PD Type: Use of waste in construction <100,000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GJP002 EPR reference: EA/EPR/AB3305GQ/A001 Operator: G J P Marina Developments Limited Waste Management licence No: 400534 Annual Tonnage: 99999.0 Issue Date: 16/09/2013 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bosworth Marina Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
5A	469	W	439000 303400	Site Address: Bosworth Marina, Carlton Road, Market Bosworth, Leics, CV13 6PD Type: Use of waste in construction <100,000 tps Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAG010 EPR reference: EA/EPR/BB3402FR/S002 Operator: Wagstaff Developments (2010) Ltd Waste Management licence No: 400534 Annual Tonnage: 0.0 Issue Date: 16/09/2013 Effective Date: 16/04/2014 Modified: - Surrendered Date: 2.01701e+016 Expiry Date: 0 Cancelled Date: 0 Status: Surrendered Site Name: Bosworth Marina Correspondence Address: -
Not shown	1307	N	439673 305008	Site Address: - Type: Mobile Plant for remediation of land Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ARD017 EPR reference: EA/EPR/BB3700XE/A001 Operator: A R Demolition Ltd Waste Management licence No: 105567 Annual Tonnage: 0.0 Issue Date: 12/06/2014 Effective Date: - Modified: - Surrendered Date: 0 Expiry Date: 0 Cancelled Date: 0 Status: Issued Site Name: Mobile Plant - S R 2008 No27 Correspondence Address: -

4. Current Land Use Map



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4. Current Land Uses

4.1 Current Industrial Data

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

11

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	115	W	Station Garage	439381 303484	The Stables, Station Road, Market Bosworth, Nuneaton, CV13 0PE	Secondhand Vehicles	Motoring
2	138	S	Electricity Sub Station	439482 303171	CV13	Electrical Features	Infrastructure and Facilities
3	172	S	Electricity Sub Station	439758 303115	CV13	Electrical Features	Infrastructure and Facilities
4	183	S	Reuben Heaton	439456 303127	Unit 1 Station Road Industrial Estate, Station Road, Market Bosworth, Nuneaton, CV13 0PE	Hobby, Sports and Pastime Products	Consumer Products
5A	205	S	Savage Lighting	439438 303106	Alexander House Station Road Industrial Estate, Station Road, Market Bosworth, Nuneaton, CV13 0PE	Lampshades and Lighting	Consumer Products
6A	205	S	Pro-tech C N C Ltd	439438 303106	Alexander House Station Road Industrial Estate, Station Road, Market Bosworth, Nuneaton, CV13 0PE	Precision Engineers	Engineering Services
7	216	W	Tank	439255 303382	CV13	Tanks (Generic)	Industrial Features
8	223	SW	Bosworth Garage Ltd	439308 303146	Station Road, Market Bosworth, Nuneaton, CV13 0PE	Vehicle Repair, Testing and Servicing	Repair and Servicing
9	223	S	Flying Spares	439510 303084	Rosendale House, Station Road, Market Bosworth, Nuneaton, CV13 0PE	Vehicle Parts and Accessories	Motoring
10	226	SW	Works	439352 303111	CV13	Unspecified Works Or Factories	Industrial Features
11	229	S	Industrial Estate	439466 303080	CV13	Business Parks and Industrial Estates	Industrial Features

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
BOSW-XCZ	BOSWORTH CLAY MEMBER	CLAY AND SILT
GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

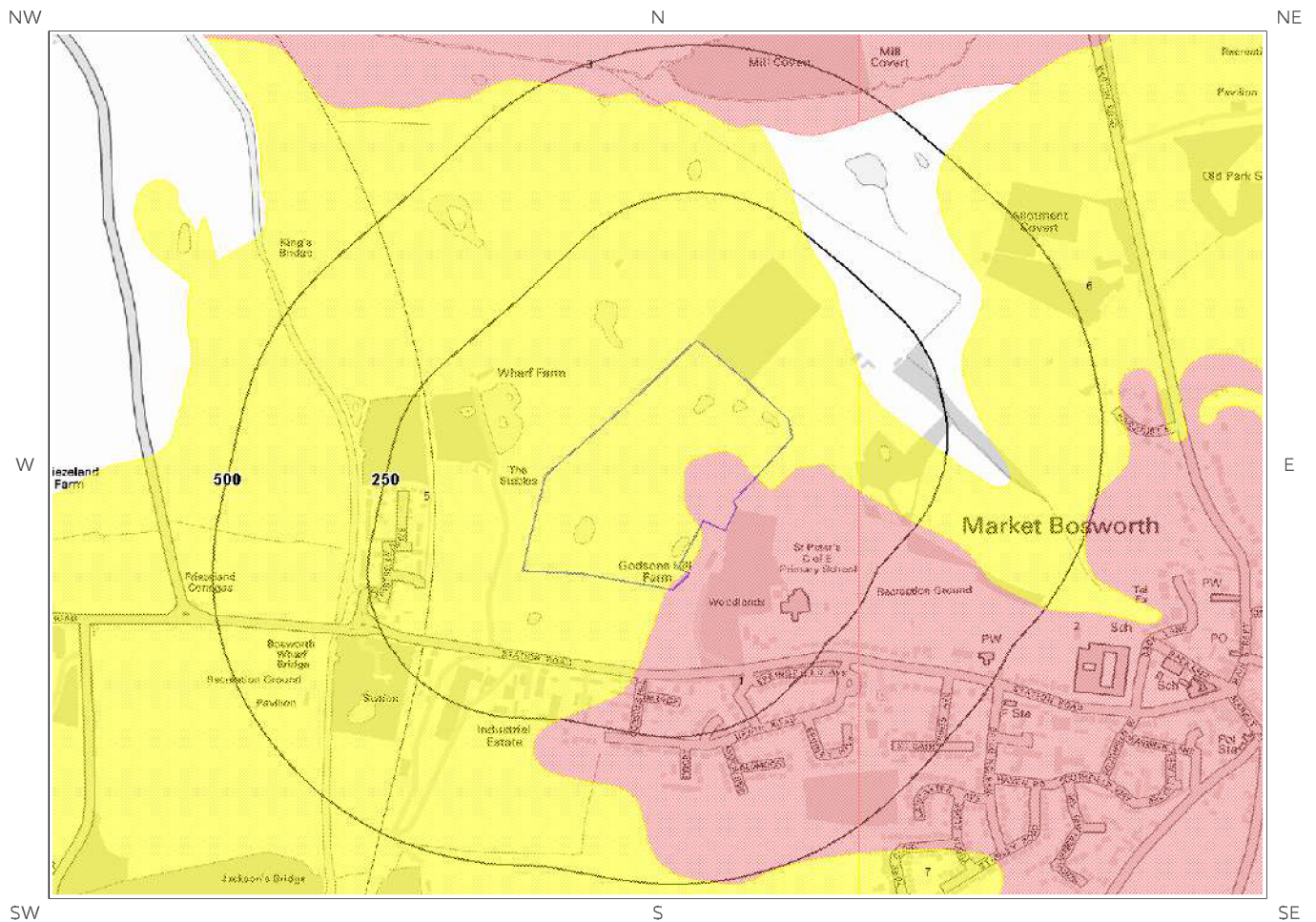
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GUN-MDST	GUNTHORPE MEMBER	MUDSTONE

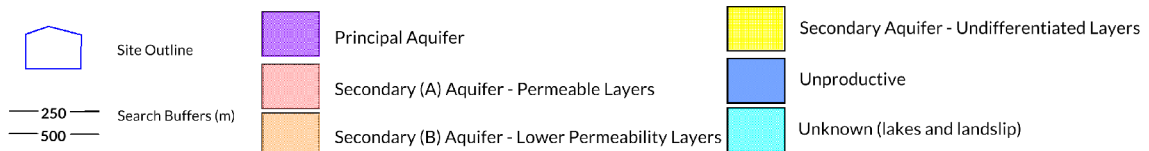
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

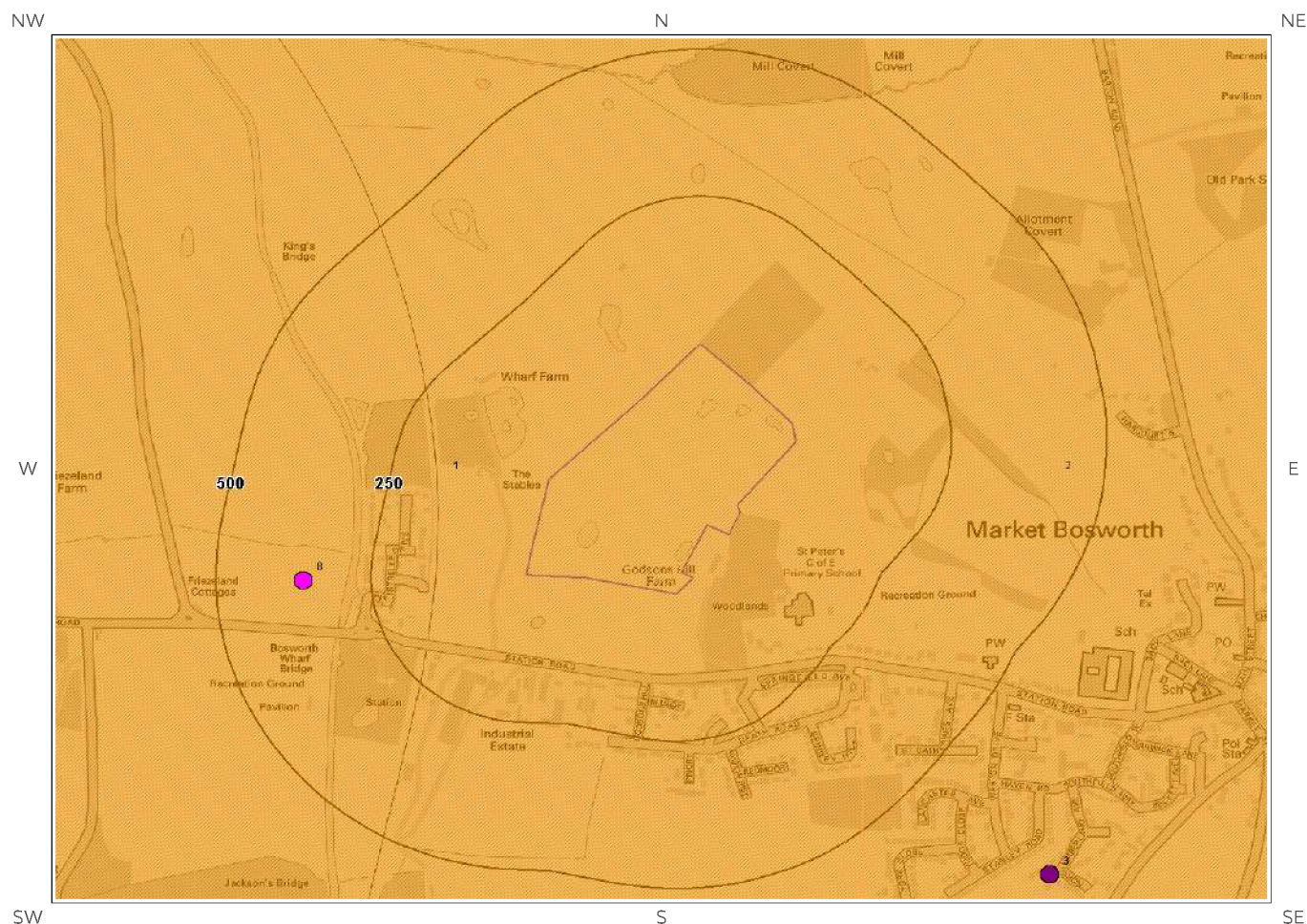
6a. Aquifer Within Superficial Geology



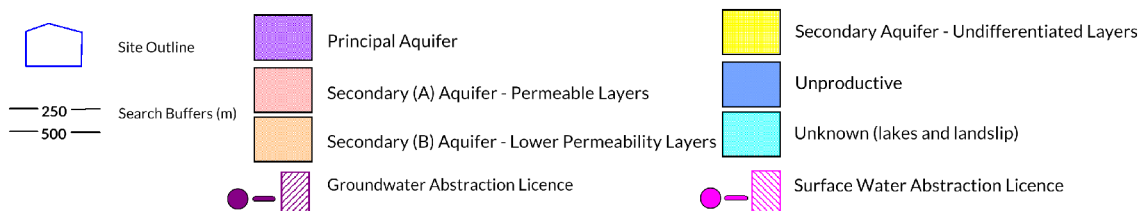
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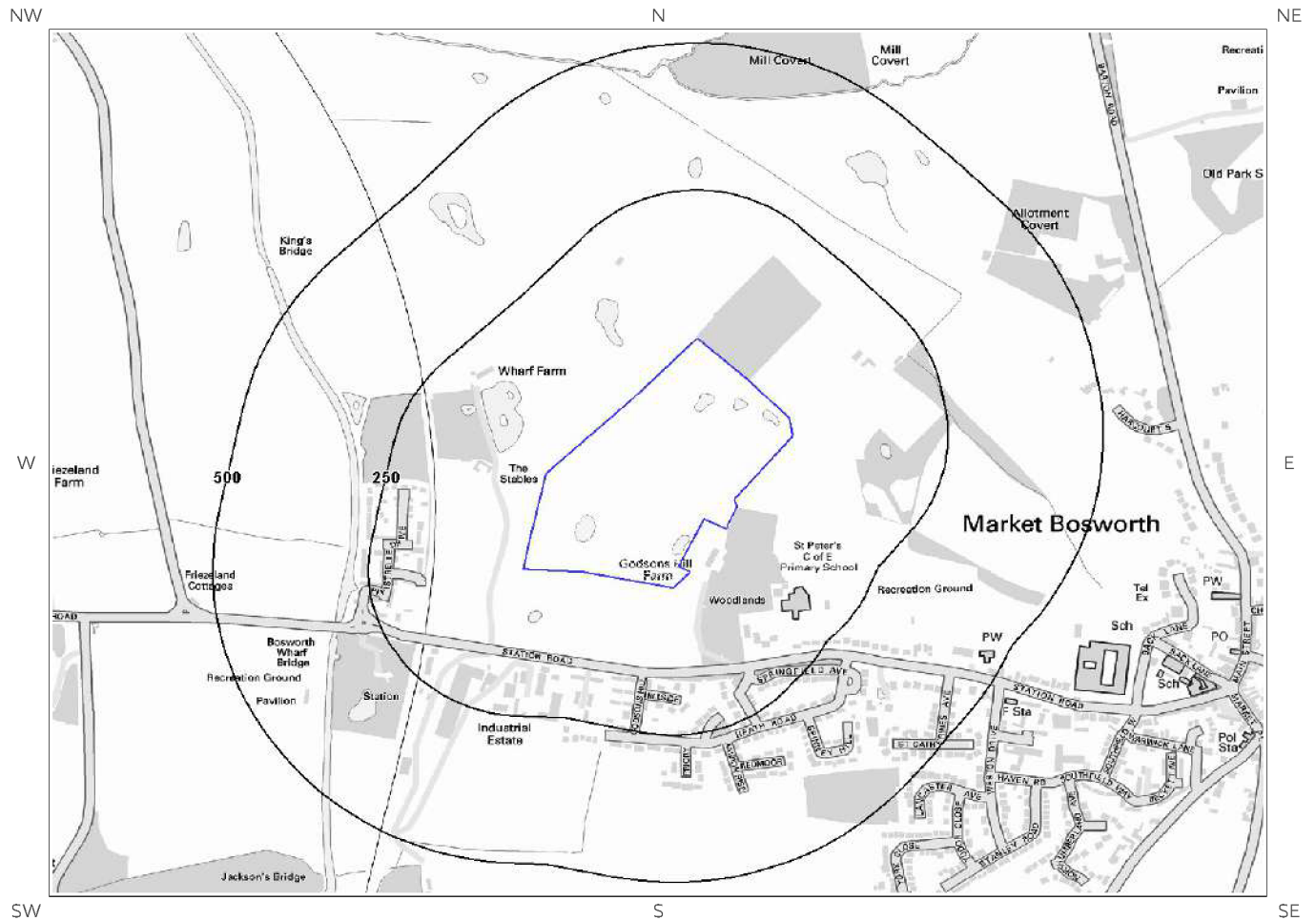
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



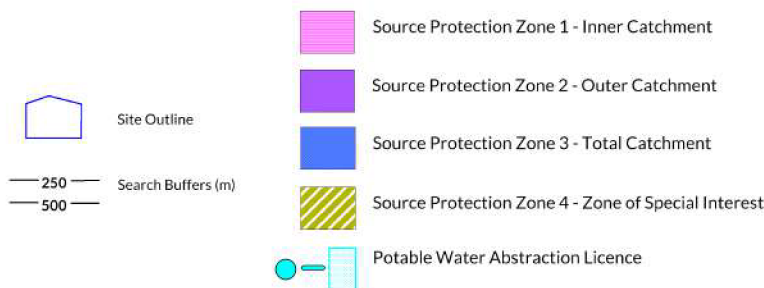
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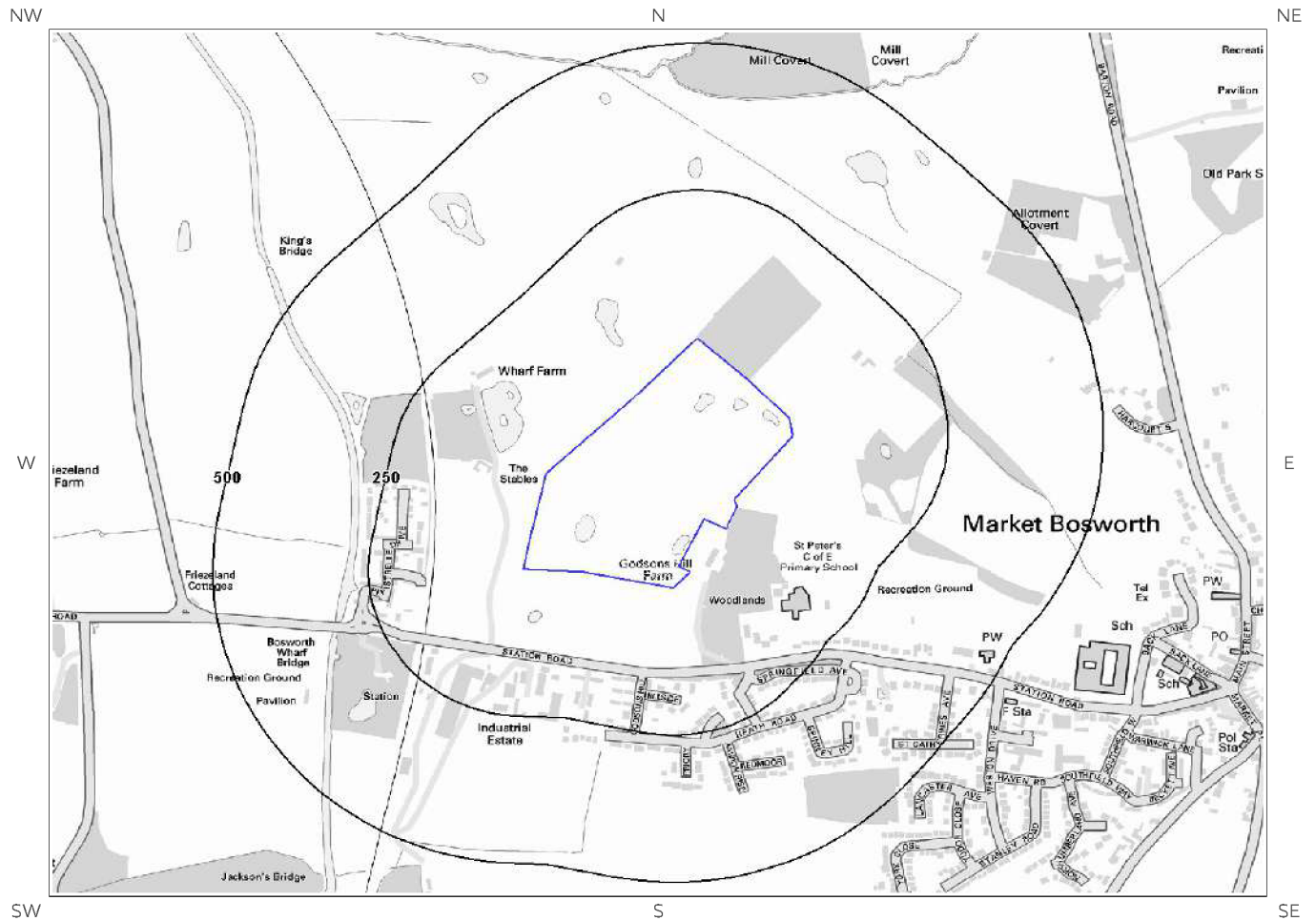
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



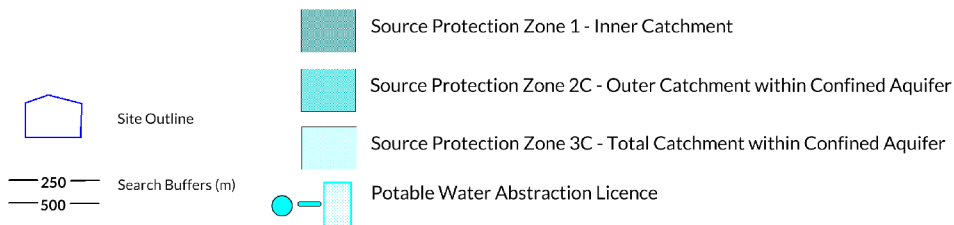
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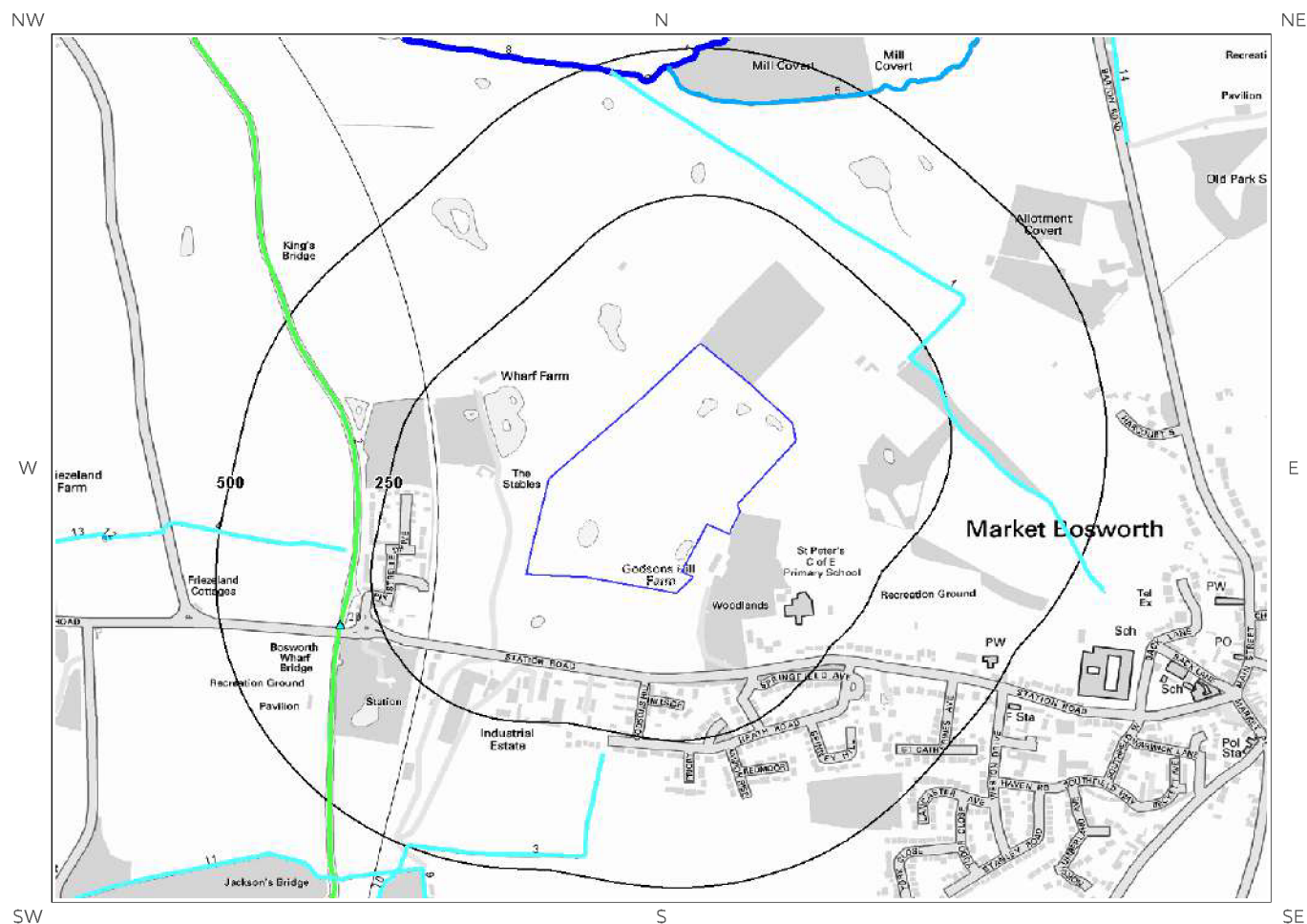
6d. Hydrogeology – Source Protection Zones within confined aquifer



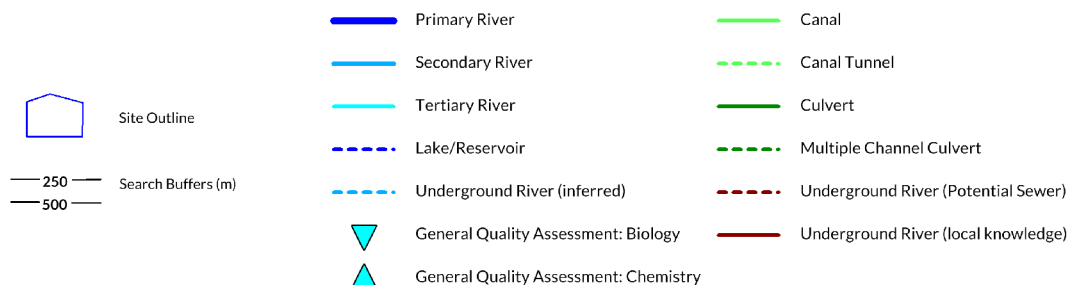
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there 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
5	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
6	107	E	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	139	SE	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	366	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

6.2 Aquifer within Bedrock Deposits

Are there 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 B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
2	107	E	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

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	
3	763	SE	440300 302800	Status: Historical Licence No: 03/28/20/0066 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: South Farm, Well 3 Data Type: Point Name: S H AND T E PERRY	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 24/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1966 Version End Date:
Not shown	905	SE	440400 302700	Status: Historical Licence No: 03/28/20/0066 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: South Farm, Well 2 Data Type: Point Name: S H AND T E PERRY	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 24/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1966 Version End Date:
Not shown	966	SW	438600 302870	Status: Active Licence No: 03/28/20/0098 Details: Make-Up Or Top Up Water Direct Source: Groundwater Midlands Region Point: Friezeland Farm,market Bosworth - Borehole Data Type: Point Name: RYLEY	Annual Volume (m³): 30000 Max Daily Volume (m³): 750 Original Application No: - Original Start Date: 30/7/1990 Expiry Date: - Issue No: 100 Version Start Date: 12/5/1994 Version End Date:
Not shown	1022	S	440000 302300	Status: Historical Licence No: 03/28/20/0066 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: South Farm, Well 1 Data Type: Point Name: S H AND T E PERRY	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 24/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1966 Version End Date:
Not shown	1855	NW	438200 304800	Status: Historical Licence No: 03/28/20/0011 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: Lineage Farm, Well Data Type: Point Name: ANDERSON	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 11/11/1965 Expiry Date: - Issue No: 100 Version Start Date: 11/11/1965 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

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
8	360	W	439100 303300	Status: Historical Licence No: 03/28/20/0001 Details: Process water Direct Source: Surface Water Midlands Region Point: Bosworth Wharf - The Ashby Canal Data Type: Point Name: BRITISH WATERWAYS BOARD Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 30/9/1965 Expiry Date: - Issue No: 100 Version Start Date: 29/6/1992 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

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

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	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.
167	W	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
177	SE	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.
326	N	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.
412	NE	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

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Database searched and no data found.

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAH). 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
20	313	W	439160 303222	River Name: Ashby Canal Reach: Sutton Cheney Wharf To End At Snarestone End/Start of Stretch: Sample Point NGR	E	E	D	D	D
Not shown	1222	NW	438700 304400	River Name: Carlton Bk Reach: B582 Barlestone To Conf R Sence End/Start of Stretch: Sample Point NGR	B	B	A	A	A

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	219	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	278	W	River Name: Ashby de la Zouch Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
3	290	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	293	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	412	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
6	453	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
7	473	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
8	483	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

6.11 Surface Water Features

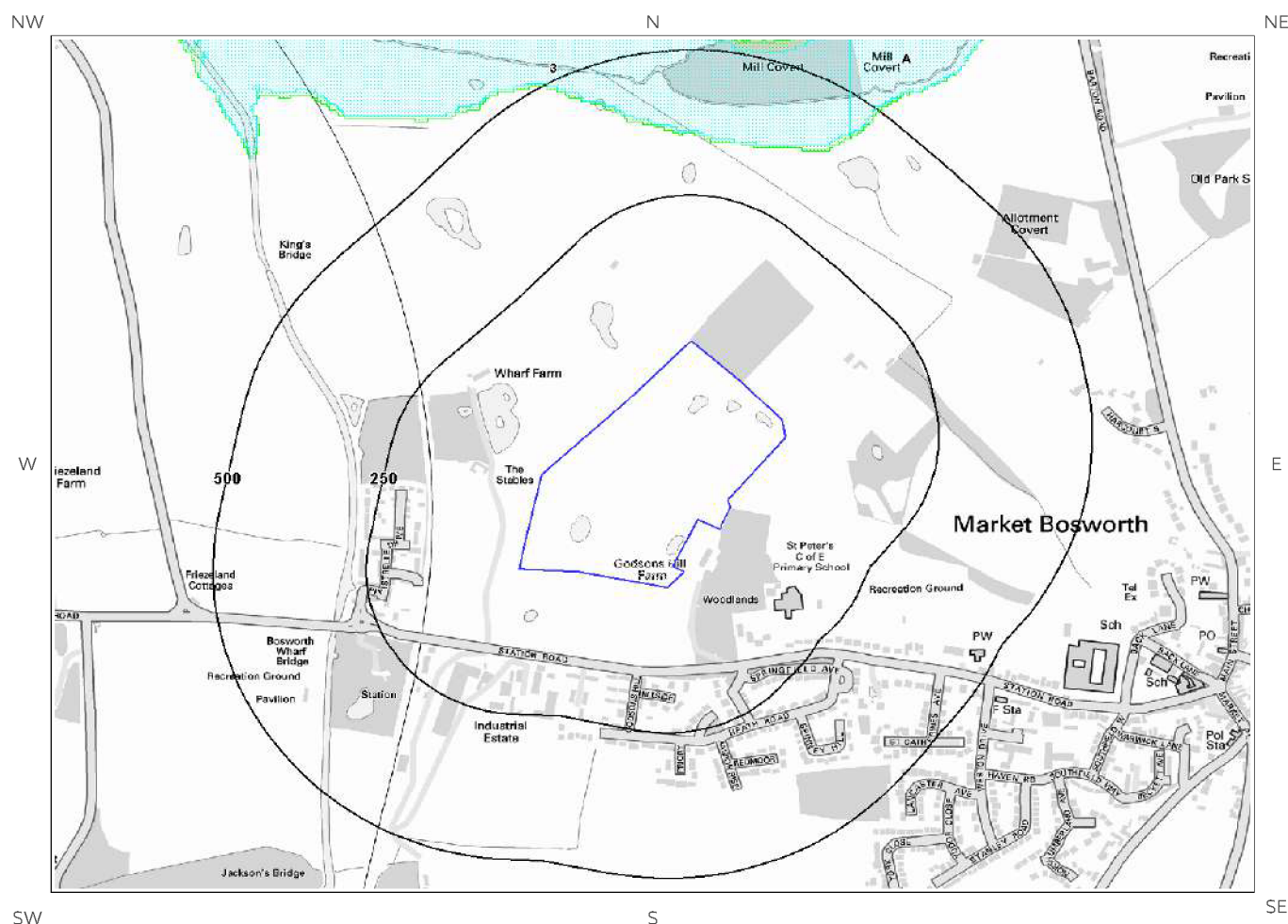
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
0	On Site
0	On Site
74	NW
79	NW
157	NW
219	NE
244	NW

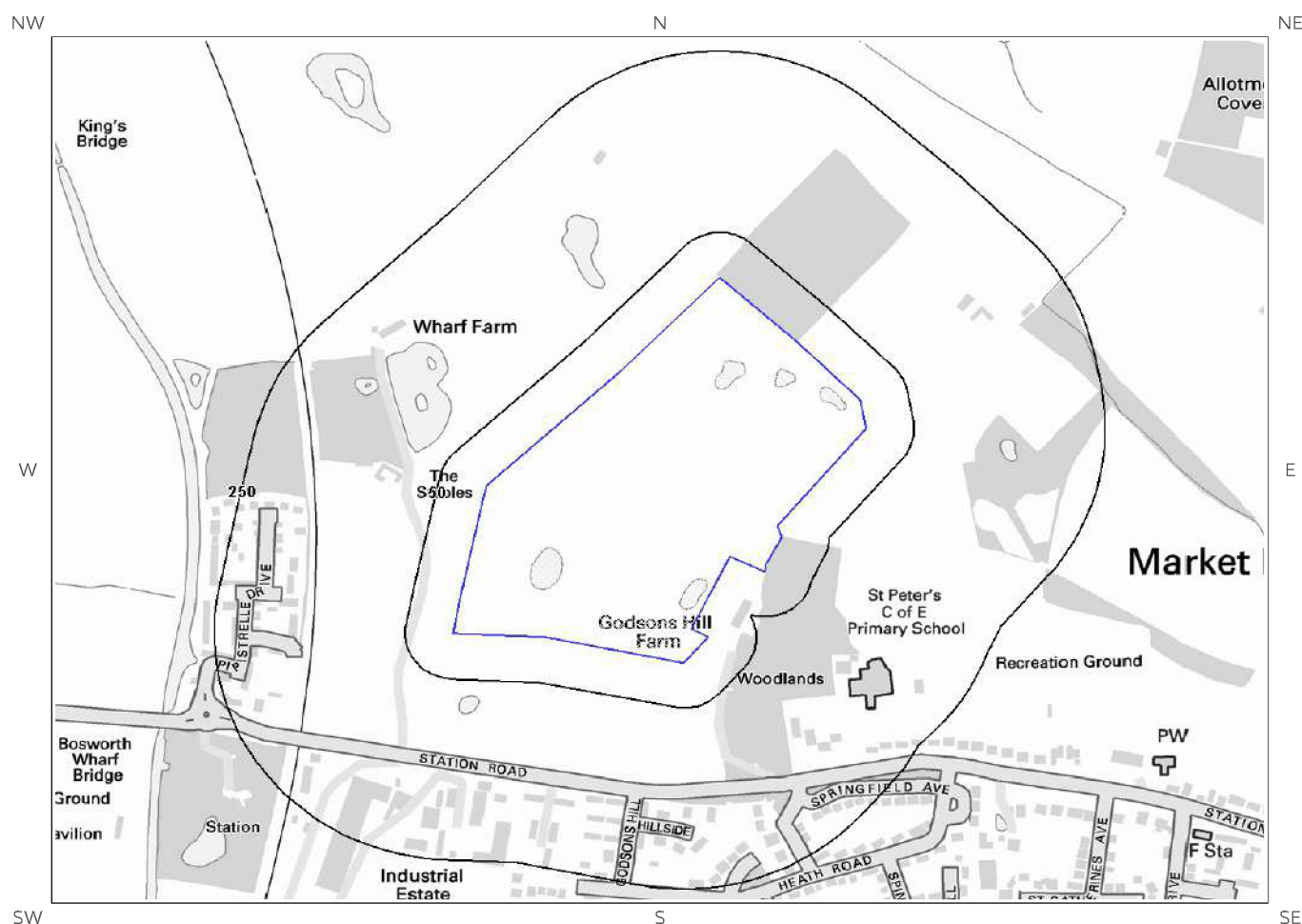
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



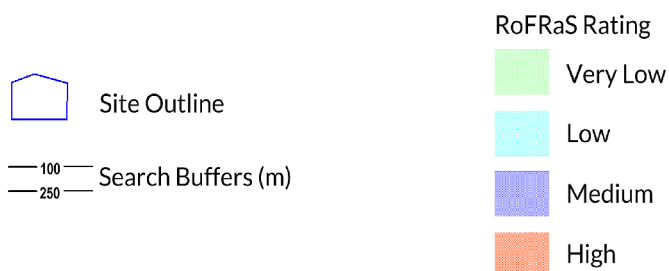
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

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:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

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.

Database searched and no data found.

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

What is the highest risk of flooding onsite? Very Low

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 Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to 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 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential below Surface

Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard. If there are records of previous incidences of groundwater flooding, then is recommended that other information e.g. rainfall history, property type, and land drainage information in addition to previous records of flooding be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

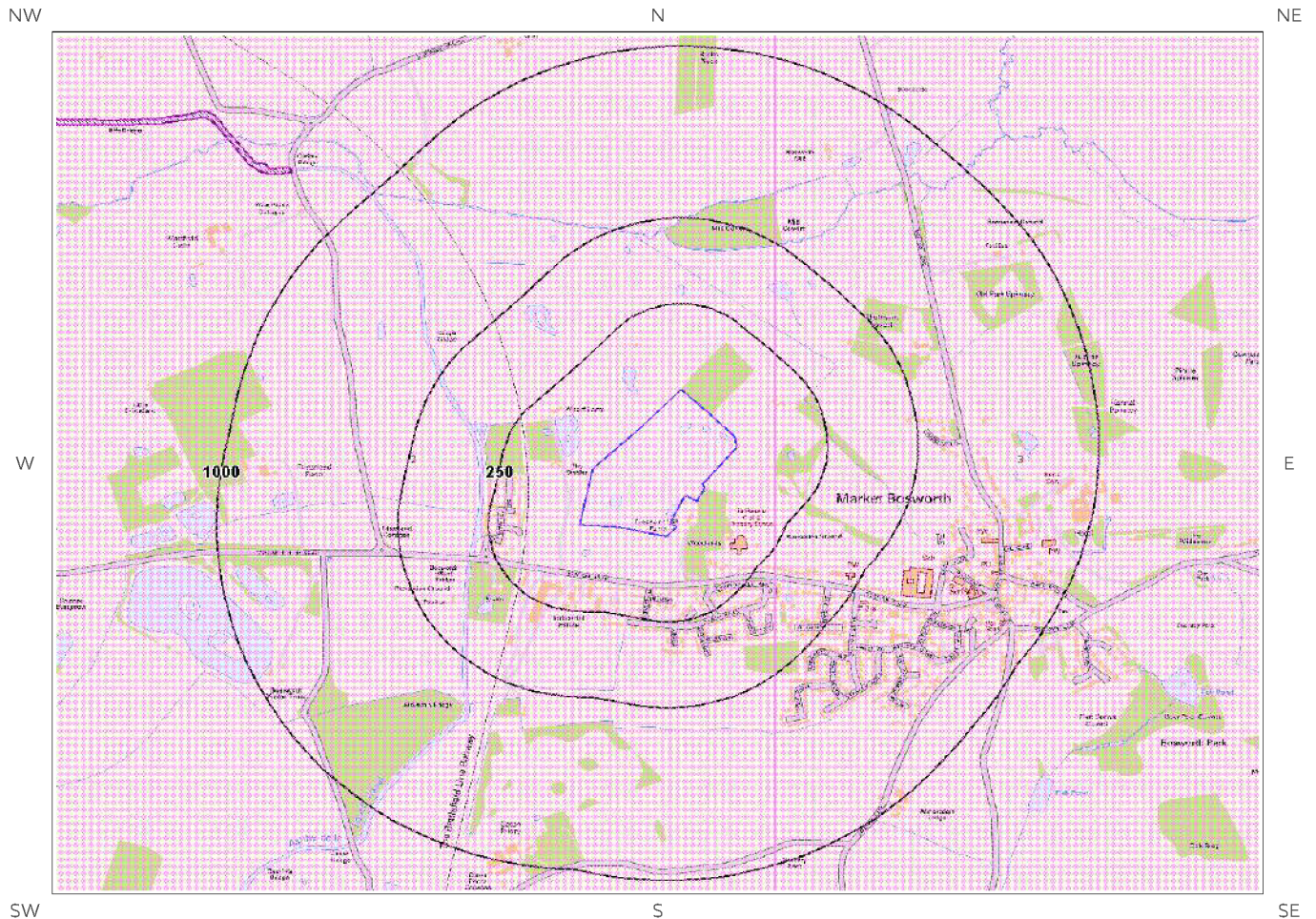
What is the British Geological Survey confidence rating in this result?

High

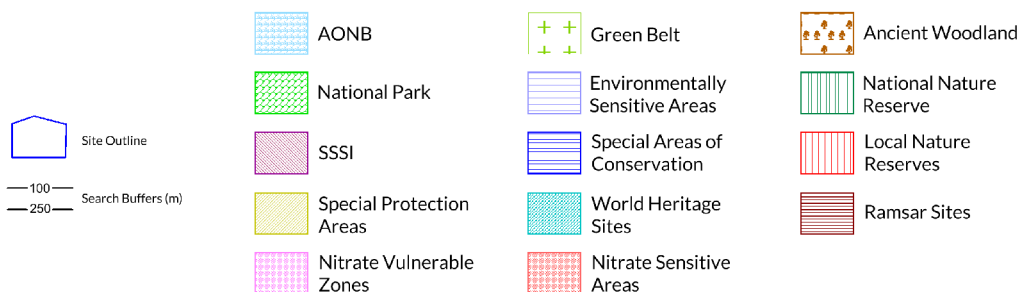
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

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

1

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	1196	NW	Ashby Canal	Natural England

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
Not shown	1660	SE	UNKNOWN	Ancient Replanted 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:

0

Database searched and no data found.

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:

2

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
2	0	On Site	Existing	DEFRA
3	107	E	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

What is the maximum Shrink-Swell* 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
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. 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 possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

What is the 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

What is the 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

What is the 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

What is the 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

What is the maximum Running Sand** 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
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.

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 property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

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

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

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Fax: 0115 936 3276.
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BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk



**British
Geological Survey**

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Rotherham, S60 1BY
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Web: www.environment-agency.gov.uk

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Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



**The Coal
Authority**

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



Local Authority

Authority: Hinckley and Bosworth Borough Council
Phone: 01455 238 141

Web: <http://www.hinckley-bosworth.gov.uk/>

Address: Hinckley Hub, Rugby Road, Hinckley, Leicestershire, LE10

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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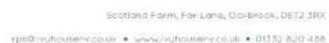
This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-sept-2016>

APPENDIX D





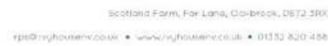
Mr G Denny

Market Bosworth Golf Course

Dimensions:

IV.149.17

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.									Logged By:	Checked By:	Date	Scale
									JH	SH	19.09.17	NTS



Mr G Denny

Market Bosworth Golf Course

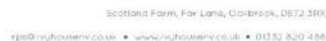
Dimensions:

IV.149.17

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.									Logged By:	Checked By:	Date	Scale
									JH	SH	19.09.17	NTS

 Scotland Farm, Far Lane, Colbrook, DE12 2BX info@ivyhouse.co.uk • www.ivyhouse.co.uk • 01332 820 456			Date: 30th August 2017 Ground Level: Orientation: Coordinates: Plant: JCB Dimensions:										TRIAL PIT NO. TP3	
CLIENT Mr G Denny													Sheet No. 1 of 1	
SITE LOCATION Market Bosworth Golf Course													Job No. IV.149.17	
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results					N Value	Installation	Test Sample Details
				Depth	No	Type	Seating		Test Drive					
							75mm	75mm	75mm	75mm	75mm			
MADE GROUND: Hardcore.	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45		0.45 (0.45)	0.25	1	ES								
Firm brown mottled grey slightly sandy CLAY.	0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90		0.90 (0.45)	0.50	2	ES								
Firm bluish grey mottled brown CLAY	0.95 1.00 1.05 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95		2.90 (2.00)	1.00	1	D								
Becoming stiff from 2.0mbgl.	2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90			2.50	2	D								
End of trial pit at 2.90mbgl.	2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50 3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00													

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.								Logged By:	Checked By:	Date	Scale
								JH	SH	19.09.17	NTS



CLIENT

Mr G Denny

SITE LOCATION

Market Bosworth Golf Course

Date: 30th August 2017

Ground Level:

Orientation:

Coordinates:

Plant: JCB

Dimensions:

TRIAL PIT NO.

TP4

Sheet No. 1 of 1

Job No.

IV.149.17

[illegible]

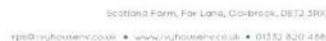
Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.									Logged By:	Checked By:	Date	Scale
									JH	SH	19.09.17	NTS

 IVY HOUSE environmental Scottish Farm, For Lona, Colbrook, DE12 2BX ip@ivyhouse.co.uk • www.ivyhouse.co.uk • 01332 820 455				Date: 30th August 2017 Ground Level: Orientation: Coordinates: Plant: JCB Dimensions:										TRIAL PIT NO. TP5	
CLIENT Mr G Denny														Sheet No. 1 of 1	
SITE LOCATION Market Bosworth Golf Course														Job No. IV.149.17	
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results					N Value	Installation	Test Sample Details	
				Depth	No	Type	Seating		Test Drive						
							75mm	25mm	75mm	25mm	75mm				25mm
MADE GROUND: Hardcore.	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50		0.50 (0.50)	0.10	1	ES									
Firm brown mottled grey slightly sandy CLAY.	0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 1.05 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50		1.50 (1.00)	0.70 1.20	2 1	ES D									
Firm bluish grey mottled brown CLAY Becoming stiff from 2.0mbgl.	1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80		2.80 (1.30)	2.10 2.70	2 3	D D									
End of trial pit at 2.80mbgl.	2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50 3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00														

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.								Logged By:	Checked By:	Date	Scale
								JH	SH	19.09.17	NTS

 SCOTTSD Farm, Far Lane, Colbrook, DE12 2BX info@ivyhouse.co.uk • www.ivyhouse.co.uk • 01332 820458			Date: 30th August 2017 Ground Level: Orientation: Coordinates: Plant: JCB Dimensions:										TRIAL PIT NO. TP6		
CLIENT Mr G Denny													Sheet No. 1 of 1		
SITE LOCATION Market Bosworth Golf Course													Job No. IV.149.17		
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						N Value	Installation	Test Sample Details
				Depth	No	Type	Seating		Test Drive						
							75mm	75mm	75mm	75mm	75mm	75mm			
TOPSOIL	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50		0.50 (0.50)	0.40	1	ES									
Firm orangish brown sandy very gravelly CLAY. Gravel is fine to coarse angular to subrounded quartz and flint.	0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90		0.90 (0.40)	0.70	2	ES									
Firm bluish grey and brown CLAY.	0.95 1.00 1.05 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90		2.90 (2.00)	1.20 1.30 2.00	3 1 2	ES D D									
Becoming stiff from 1.50mbgl.															
End of trial pit at 2.90mbgl.	2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50 3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00 4.05														

Casing record			Chiselling records							
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.							Logged By:	Checked By:	Date	Scale
							JH	SH	19.09.17	NTS



CLIENT

Mr G Denny

SITE LOCATION

Market Bosworth Golf Course

Date: 30th August 2017

Ground Level:

Orientation:

Coordinates:

Plant: JCB

Dimensions:

TRIAL PIT NO.

TP7

Sheet No. 1 of 1

Job No.

IV.149.17

[illegible]

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.									Logged By:	Checked By:	Date	Scale
									JH	SH	19.09.17	NTS

 Scotlands Farm, For Lona, Colbrook, DE12 2BX info@ivyhouseenv.co.uk • www.ivyhouseenv.co.uk • 01332 820 458			Date: 30th August 2017 Ground Level: Orientation: Coordinates: Plant: JCB Dimensions:										TRIAL PIT NO. TP8	
CLIENT Mr G Denny													Sheet No. 1 of 1	
SITE LOCATION Market Bosworth Golf Course													Job No. IV.149.17	
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results					N Value	Installation	Test Sample Details
				Depth	No	Type	Seating		Test Drive					
							75mm	75mm	75mm	75mm	75mm			
Grass over soft orangish brown sandy very gravelly CLAY. Gravel is fine to coarse angular to subrounded quartz and flint.	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70		0.70 (0.70)	0.20	1	ES								
Firm bluish grey and brown CLAY.	0.75 0.80 0.85 0.90 0.95 1.00 1.05 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00		3.00 (2.30)	0.90 1.10 										

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.								Logged By:	Checked By:	Date	Scale
								JH	SH	19.09.17	NTS



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CLIENT

Mr G Denny

SITE LOCATION

Market Bosworth Golf Course

Date: 30th August 2017

Ground Level:

Orientation:

Coordinates:

Plant: JCB

Dimensions:

TRIAL PIT NO.

TP9

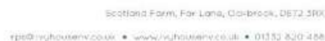
Sheet No. 1 of 1

Job No.

IV.149.17

Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						N Value	Installation	Test Sample Details
				Depth	No	Type	Seating			Test Drive					
							75mm	75mm	75mm	75mm	75mm	75mm			
MADE GROUND: Dark brownish black SAND and GRAVEL of brick, concrete, patio slabs, asphalt and plastic bags. High cobble content of brick and concrete.	0.05		2.80 (2.80)	0.80	1	ES									
	0.10														
	0.15														
	0.20														
	0.25														
	0.30														
	0.35														
	0.40														
	0.45														
	0.50														
	0.55														
	0.60														
	0.65														
	0.70														
	0.75														
	0.80														
	0.85														
	0.90														
	0.95														
	1.00														
	1.05														
	1.10														
	1.15														
	1.20														
	1.25														
	1.30														
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1.45															
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2.25															
2.30															
2.35															
2.40															
2.45															
2.50															
2.55															
2.60															
2.65															
2.70															
2.75															
2.80															
Stiff bluish grey and brown CLAY.	2.85		3.40 (0.60)	3.20	2	ES									
2.90															
2.95															
3.00															
3.05															
3.10															
3.15															
3.20															
3.25															
3.30															
3.35															
3.40															
End of trial pit at 3.40mbgl.	3.45														
3.50															
3.55															
3.60															
3.65															
3.70															
3.75															
3.80															
3.85															
3.90															
3.95															
4.00															

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.									Logged By:	Checked By:	Date	Scale
									JH	SH	19.09.17	NTS



CLIENT

Mr G Denny

SITE LOCATION

Market Bosworth Golf Course

Date: 30th August 2017

Ground Level:

Orientation:

Coordinates:

Plant: JCB

Dimensions:

TRIAL PIT NO.

TP10

Sheet No. 1 of 1

Job No.

IV.149.17

Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results					N° Value	Installation	Test Sample Details
				Depth	No	Type	Sealing		Test Drive					
							75mm	75mm	75mm	75mm	75mm			
MADE GROUND: Reddish brown gravelly SAND. Gravel is fine to coarse angular brick and concrete.	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 1.05 1.10 1.15 1.20 1.25		2.90 (2.90)	1.00	1	ES								
Becoming greyish black from 1.30mbgl and with gravel of asphalt.	1.30 1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90			1.70	2	ES								
MADE GROUND: Soft dark brown CLAY with a low cobble content of bricks and concrete and stagnant odour. (Possible pond waste/ground from pond creation).	2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50				3.50 (0.60)	3.30	3	ES						
End of trial pit at 3.50mbgl. Not possible to reach natural, mound higher than excavator could dig.	3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00													

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
Remarks: 1. Trial pit reinstated with arisings upon completion. 2. Trial pit remained stable during excavation. 3. Groundwater not encountered.								Logged By:	Checked By:	Date	Scale
								JH	SH	19.09.17	NTS



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CLIENT

Mr G Denny

SITE LOCATION

Market Bosworth Golf Course

Date: 30th August 2017

Ground Level:

Orientation:

Coordinates:

Plant: JCB

Dimensions:

TRIAL PIT NO.

TP11

Sheet No. 1 of 1

Job No.

IV.149.17

Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						N Value	Installation	Test Sample Details
				Depth	No	Type	Seating		Test Drive						
							75mm	75mm	75mm	75mm	75mm	75mm			
MADE GROUND: Brown gravelly SAND. Gravel is coarse subangular and subrounded brick, flint and quartz.	0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 1.05 1.10 1.15 1.20 1.25 1.30		1.30 (1.30)	0.40	1	ES									
MADE GROUND: Greyish black gravelly SAND. Gravel is coarse brick and concrete with electrical cable and plastic sheeting.	1.35 1.40 1.45 1.50 1.55 1.60 1.65 1.70 1.75 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30		3.30 (2.00)	2.90	2	ES									
Firm orangish brown CLAY.	3.35 3.40 3.45 3.50		3.50 (0.20)	3.40	3	ES									
End of trial pit at 3.50mbgl.	3.55 3.60 3.65 3.70 3.75 3.80 3.85 3.90 3.95 4.00 4.05														

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks

Remarks:

1. Trial pit reinstated with arisings upon completion.

2. Trial pit remained stable during excavation.

3. Groundwater not encountered.

Logged By:	Checked By:	Date	Scale
JH	SH	19.09.17	NTS

APPENDIX E





Josh Hagger
Ivy House Environmental Ltd
Scotland Farm
Ockbrook
Derby
DE72 3RX



QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN

QTS Environmental Report No: 17-63923

Site Reference: Market Bosworth Golf Course

Project / Job Ref: IV.149.17

Order No: None Supplied

Sample Receipt Date: 04/09/2017

Sample Scheduled Date: 06/09/2017

Report Issue Number: 1

Reporting Date: 12/09/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
QTS Environmental Report No: 17-63923	Date Sampled	30/08/17	30/08/17	30/08/17	30/08/17	30/08/17
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Market Bosworth Golf Course	TP / BH No	TP1	TP2	TP3	TP4	TP7
Project / Job Ref: IV.149.17	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.30	0.50	1.00	0.70	1.50
Reporting Date: 12/09/2017	QTSE Sample No	289306	289307	289308	289309	289310

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected		Not Detected	
pH	pH Units	N/a	MCERTS	8.3	7.8	7.8	7.7	7.9
Total Cyanide	mg/kg	< 2	NONE	< 2	2		< 2	
Total Sulphate as SO ₄	mg/kg	< 200	NONE	1803	876		< 200	
Total Sulphate as SO ₄	%	< 0.02	NONE	0.18	0.09		< 0.02	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	357	112	163	31	325
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.36	0.11	0.16	0.03	0.33
Organic Matter	%	< 0.1	MCERTS	2	2.9		0.5	
Arsenic (As)	mg/kg	< 2	MCERTS	10	7		5	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2		< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	19	19		16	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	25	20		10	
Lead (Pb)	mg/kg	< 3	MCERTS	91	35		9	
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1		< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	15	14		16	
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3		< 3	
Vanadium (V)	mg/kg	< 2	NONE	34	39		24	
Zinc (Zn)	mg/kg	< 3	MCERTS	81	83		33	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2		< 2	
EPH (C10 - C40)	mg/kg	< 6	MCERTS	131	50		< 6	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
 Subcontracted analysis (S)



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
QTS Environmental Report No: 17-63923	Date Sampled	30/08/17				
Ivy House Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Market Bosworth Golf Course	TP / BH No	TP11				
Project / Job Ref: IV.149.17	Additional Refs	None Supplied				
Order No: None Supplied	Depth (m)	2.90				
Reporting Date: 12/09/2017	QTSE Sample No	289311				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	9.9			
Total Cyanide	mg/kg	< 2	NONE	< 2			
Total Sulphate as SO ₄	mg/kg	< 200	NONE	505			
Total Sulphate as SO ₄	%	< 0.02	NONE	0.05			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	125			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.12			
Organic Matter	%	< 0.1	MCERTS	1.3			
Arsenic (As)	mg/kg	< 2	MCERTS	4			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	12			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	15			
Lead (Pb)	mg/kg	< 3	MCERTS	22			
Mercury (Hg)	mg/kg	< 1	NONE	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	12			
Selenium (Se)	mg/kg	< 3	NONE	< 3			
Vanadium (V)	mg/kg	< 2	NONE	19			
Zinc (Zn)	mg/kg	< 3	MCERTS	59			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			
EPH (C10 - C40)	mg/kg	< 6	MCERTS	128			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
 Subcontracted analysis (S)



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-63923	Date Sampled	30/08/17	30/08/17	30/08/17	30/08/17	
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Market Bosworth Golf Course	TP / BH No	TP1	TP2	TP4	TP11	
Project / Job Ref: IV.149.17	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	0.30	0.50	0.70	2.90	
Reporting Date: 12/09/2017	QTSE Sample No	289306	289307	289309	289311	

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.15
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.56	0.28	< 0.1	0.57
Anthracene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	< 0.1	0.13
Fluoranthene	mg/kg	< 0.1	MCERTS	1.90	0.67	< 0.1	0.95
Pyrene	mg/kg	< 0.1	MCERTS	1.78	0.62	< 0.1	0.85
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.10	0.44	< 0.1	0.35
Chrysene	mg/kg	< 0.1	MCERTS	1.09	0.48	< 0.1	0.39
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.84	0.78	< 0.1	0.52
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.63	0.31	< 0.1	0.21
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.47	0.54	< 0.1	0.34
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.16	0.45	< 0.1	0.24
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.96	0.37	< 0.1	0.19
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	12.6	4.9	< 1.6	4.9

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Sample Descriptions

QTS Environmental Report No: 17-63923

Ivy House Environmental Ltd

Site Reference: Market Bosworth Golf Course

Project / Job Ref: IV.149.17

Order No: None Supplied

Reporting Date: 12/09/2017

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
289306	TP1	None Supplied	0.30	11.7	Brown sandy clay with stones
289307	TP2	None Supplied	0.50	11.6	Brown sandy clay with stones
289308	TP3	None Supplied	1.00	19.5	Brown clay
289309	TP4	None Supplied	0.70	12.2	Brown sandy clay
289310	TP7	None Supplied	1.50	16.9	Brown clay
& 289311	TP11	None Supplied	2.90	15	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

& samples received in inappropriate containers for hydrocarbon analysis



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 17-63923

Ivy House Environmental Ltd

Site Reference: Market Bosworth Golf Course

Project / Job Ref: IV.149.17

Order No: None Supplied

Reporting Date: 12/09/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 dphenylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

APPENDIX F



Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN



TEST REPORT

Report No:
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XTE 25778

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 25778
CUSTOMER/SITE SAMPLE REF | 289312

CLIENT | QTS Environmental Ltd
SITE | Market Bosworth Golf Course
SOIL DESCRIPTION | Brown Clay
SUPPLIER/SOURCE | Insitu
SAMPLING LOCATION | TP3 @ 1m

SAMPLED BY | Client
TYPE OF SAMPLE | Bulk
DATE SAMPLED | 30 August 2017
DATE RECEIVED | 06 September 2017
DATE TESTED | 07 September 2017
PREPARATION METHOD | Tested by Wet Sieving

TEST RESULTS	
Percentage Retained 425um (%)	3
Liquid Limit	84
Plastic Limit	31
Plasticity Index	53

REMARKS:

ISSUE TO: QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 12 September 2017

AUTHORISED BY: A Schofield Quality
Manager

Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN



TEST REPORT

Report No:
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XTE 25778

TEST REPORT OF MOISTURE CONTENT OF SOILS

Method: BS 1377-2:1990, Method 3.2.3.3. Oven Drying

XTRATEC SAMPLE REF | XTE 25778
CUSTOMER/SITE SAMPLE REF | 289312

CLIENT	QTS Environmental Ltd
SITE	Market Bosworth Golf Course
TYPE OF MATERIAL	For Classification
SOIL DESCRIPTION	Brown Clay
SPECIFICATION	For Classification
SUPPLIER/SOURCE	Site Won
SAMPLING LOCATION	TP3 @ 1m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	30 August 2017
DATE RECEIVED	06 September 2017
DATE TESTED	07 September 2017
PREPARATION METHOD	BS 1377-1. 7.3.5.2 (Sub dividing)

TEST RESULTS	
Moisture Content (%)	27.3

REMARKS:

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XTE 25779

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 25779
CUSTOMER/SITE SAMPLE REF | 289313

CLIENT | QTS Environmental Ltd
SITE | Market Bosworth Golf Course
SOIL DESCRIPTION | Brown grey Clay
SUPPLIER/SOURCE | Insitu
SAMPLING LOCATION | TP7 @ 1.5m

SAMPLED BY | Client
TYPE OF SAMPLE | Bulk
DATE SAMPLED | 30 August 2017
DATE RECEIVED | 06 September 2017
DATE TESTED | 07 September 2017
PREPARATION METHOD | Tested in Natural State

TEST RESULTS	
Percentage Retained 425um (%)	0
Liquid Limit	68
Plastic Limit	27
Plasticity Index	41

REMARKS:

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TEST REPORT

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TEST REPORT OF MOISTURE CONTENT OF SOILS

Method: BS 1377-2:1990, Method 3.2.3.3. Oven Drying

XTRATEC SAMPLE REF | XTE 25779
CUSTOMER/SITE SAMPLE REF | 289313

CLIENT	QTS Environmental Ltd
SITE	Market Bosworth Golf Course
TYPE OF MATERIAL	For Classification
SOIL DESCRIPTION	Brown grey Clay
SPECIFICATION	For Classification
SUPPLIER/SOURCE	Site Won
SAMPLING LOCATION	TP7 @ 1.5m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	30 August 2017
DATE RECEIVED	06 September 2017
DATE TESTED	07 September 2017
PREPARATION METHOD	BS 1377-1. 7.3.5.2 (Sub dividing)

TEST RESULTS	
Moisture Content (%)	21.6

REMARKS:

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Rose Lane, Lenham Heath
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DATE: 12 September 2017

AUTHORISED BY: A Schofield Quality
Manager

APPENDIX G



Tier 1 Generic Assessment Criteria

	Residential With Produce	Residential Without Produce	Allotments	Commercial (office)	Commercial (warehouse)
Arsenic	32.40	35.00	43.00	635.00	635.00
Cadmium	5.17	17.70	1.05	230.00	230.00
Mercury, elemental	1.02	1.02	316.00	109.00	83.40
Mercury, inorganic	169.00	238.00	80.30	3640.00	3640.00
Mercury, methyl	11.40	14.10	7.97	407.00	409.00
Selenium	350.00	595.00	121.00	13000.00	13000.00
Phenol	415.00	519.00	282.00	37600.00	38000.00
Toluene	611.00	2710.00	118.00	189000.00	166000.00
Lead	210.00	210.00	84.00	2300.00	2300.00
Nickel	130.00	130*	180.00	980.00	980.00
Total Cyanide	34.00	34.00			
Benzo(a)pyrene	3.00	3.20	3.50	36.00	14.40
Dibenzo(a,h)anthracene	0.30	0.32	0.43	3.60	13.00
Acenaphthene	1100.00	6000.00	200.00	100000.00	103000.00
Acenaphthylene	920.00	6000.00	160.00	100000.00	103000.00
Anthracene	11000.00	37000.00	2200.00	540000.00	542000.00
Benzo(a)anthracene	13.00	15.00	13.00	180.00	97.50
Benzo(b)fluoranthene	3.70	4.00	3.90	45.00	103.00
Benzo(g,h,i)perylene	350.00	360.00	640.00	4000.00	661.00
Benzo(k)fluoranthene	100.00	110.00	130.00	1200.00	144.00
Chrysene	27.00	32.00	19.00	350.00	143.00
Fluoranthene	890.00	1600.00	290.00	23000.00	22700.00
Fluorene	860.00	4500.00	160.00	71000.00	70700.00
Indeno(1,2,3-c,d)pyrene	41.00	46.00	39.00	510.00	61.70
Phenanthrene	440.00	1500.00	90.00	23000.00	22600.00
Pyrene	2000.00	3800.00	620.00	54000.00	54500.00
Napthalene	13.00	13.00	24.00	1100.00	875.00
Chromium VI	3.38	4.12	2.11	34.20	34.20
Chromium III	627.00	627.00	15300.00	8840.00	8840.00
Copper	2330.00	6200*	524.00	71700.00	71700.00
Vanadium	79.00	226.00	17.90	5590.00	5590.00
Zinc	3750.00	40400*	618.00	665000.00	665000.00

Note:

All figures are in mg/kg

Values calculated using CLEA v1.071

Soil type chosen is sandy loam, pH 7

All organic determinands calculated using 6% SOM

PAH = S4UL (except warehouse model - CLEAv1.071)

* Phytotoxic assessment based on pH range of <6.0 to >7.0

Copper = 100 - 200mg/kg

Nickel = 60 - 110mg/kg

Zinc = 200 - 300mg/kg