Colthrop Village, Thatcham

Preliminary Ground Condition Assessment

On behalf of Colthrop Village Consortium

Project Ref: 30738/3501 | Rev: Rev2| Date: December 2016

Office Address: Caversham Bridge House, Waterman Place, Reading, RG1 8DN
T: +44 (0)1189 500 761 E: reading@peterbrett.com

Document Control Sheet

Project Name: Colthrop Village, Thatcham
Project Ref: 30738/3501
Report Title: Preliminary Ground Condition Assessment
Doc Ref: R001/Rev2
Date: December 2016

	Name	Position	Signature	Date
Prepared by:	Thomas Hunt	Undergraduate Engineer	[redacted]	8/12/2016
Reviewed by:	Arie Zamler	Senior Engineer	[redacted]	8/12/2016
Approved by:	Paul Jeffery	Senior Associate	[redacted]	8/12/2016
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
DRAFT	Mar 2015	Draft for Team Comments	TH	AZ	PJ
Rev1	June 2015	Final for Issue	TH	AZ	PJ
Rev2	Dec 2016	Amended Final after further comments	TH	AZ	PJ

Contents

Figures

Appendices

1 Introduction

1.1 Background Information

Peter Brett Associates LLP (PBA) has been instructed by Colthrop Village (the Client) to undertake a Preliminary Ground Condition Assessment to inform the client's overall development feasibility of a site known as Colthrop Village, Thatcham.

In 2013, the subject site was assessed by West Berkshire Council (WBC) as part of their Strategic Housing Land Availability Assessment (SHLAA) for the development of the site for residential use. The WBC 2013 SHLAA assessment concluded that as a result of a lack of site specific information the site was not be considered suitable for development and recommended that a contaminated land assessment be carried out to determine the potential for land contamination associated with current and previous land use.

1.2 Objective

This report presents an appraisal of the geotechnical and geoenvironmental conditions on the site to identify potential risks and hazards associated with ground contamination and geological/geotechnical hazards.

The assessment reviews readily available information in order to assess the existing ground conditions on the site and the potential for contamination to be present associated with previous and present uses of the site and the surrounding areas. Thereby to enable a qualitative assessment to be made of the geoenvironmental constraints such that informed decisions on the design of the proposed development can be made and the risk and hazards associated with existing or potential future contamination of the ground identified.

Attention is drawn to the Guidance Note in **Section 7** which provides advice for readers of this report.

1.3 Scope of Work / Terms of Reference

Guidance on ground condition assessment is given in CLR 11 Model Procedures for the Management of Contaminated Land (EA, 2004), which sets out a process based on a tiered risk assessment with increasing level of detail required to progress through the tiers.

The scope of work undertaken by PBA comprises:

- A review and collation of readily available geological, hydrogeological and aquifer vulnerability maps; geological information and historical Ordnance Survey maps together with any available ground investigation data and studies.
- A walkover survey to examine the existing condition of the site and surrounding area.
- Review of available previous studies and investigations carried out for the Grundon Sand and Gravel quarry and provided by the Client.

2 The Site

2.1 Site location

The site is located on land to the west of Kennetholme Quarry, Colthrop, approximately 2.5 km to the southeast of Thatcham town centre and is centred at National Grid Reference (NGR) SU 534 661. The site is situated immediately to the north and east of the River Kennet and to the south of the Avon & Kennet Canal.

A site location plan is presented as **Figure 1**. A site layout plan, annotated with features discussed in this report is presented as **Figure 2**.

2.2 Topography

The site is situated in the flood plain of the River Kennet with the natural ground level falls gently from north and west in general direction to southeast towards the river.

The ground level at the western corner of the site is about 67 m AOD falling gently to about 64 m AOD in the southeast corner of the site along the River Kennet.

The ground level in the north eastern part of the site was historically raised by up to about 2 to 3 m above the natural ground levels. The ground level in the north eastern part of the site is between about 66 and 68 m AOD.

2.3 Current Land Use

The current land use information is based on a walkover inspection undertaken by PBA on the 19th January 2015 to observe current site conditions. The main features noted during the site walkover and locations of photographs are marked on **Figure 2**. Photographs taken during the site walkover are presented in **Appendix 2**. A constraints plan showing the extent of the main areas at the site is presented as **Figure 3**.

The western and southern parts of the site are principally occupied by agricultural land. The north eastern part of the site is occupied by the former Colthrop Paper Mill. The eastern part of the site occupies part of the Kennetholme Quarry that is operated by Grundon Sand & Gravel Ltd.

For the purpose of this report the site has been be divided into three main areas: Kennetholme Sand and Gravel Quarry, the former Colthrop Paper Mill, and the Agricultural Land in the southern and western parts of the site.

2.3.1 Kennetholme Sand and Gravel Quarry

The Kennetholme Quarry is accessed via Colthrop Bridge located at the northern boundary of the site.

Terraced housing and a cottage labelled collectively as Colthrop Cottages are present at the parcel of land between Colthrop Bridge and the bridge leading onto Kennetholme Quarry. The terraced housing appeared to be in residential use and the cottage was derelict.

At the time of the walkover Kennetholme Quarry was an active Sand & Gravel Quarry operated by Grundon Sand & Gravel Ltd. The western part of the quarry (which is situated within the subject site boundary) comprises offices and a car parking area, and stockpiles of sands and gravel (Plate 2). The remainder of the quarry is located to the east of the subject site boundary and comprises sand and gravel processing plant (Plate 3).

A fuelling point was noted just outside the subject site boundary, albeit within the larger Kennetholme quarry site. No leaks of fuels or oils were observed from the plant during the walkover survey.

2.3.2 The former Colthrop Paper Mill

The former Colthrop Paper Mill occupies the north eastern part of the subject site and is accessed from Kennetholme Quarry. This area of the site is currently vacant. The area includes a large redundant building, former filter beds, settlement ponds/lagoon and open areas now covered with overgrown vegetation. Debris including: pipes; metal waste; and spoil heaps of crushed glass, were observed to be scattered across the site, and are all believed to be associated with the former Colthrop Paper Mill works.

The large redundant building, covered with corrugated cement sheeting is present at the centre of the site (Plate 6 & 7). The building was not accessed at the time of the visit. A former fuel oil tank is present adjacent to this vacant building (Plate 8). No evidence of leaks or spillages were noted.

The land at the former Colthrop Paper Mill is noted to be raised by about 1 to 2 m above the surrounding agricultural land ground to the south and west. (Plate 14). The former filter beds present within the site (see Figure 2 for location) appeared to be backfilled with an unknown material (Plate 10).

A pond/lagoon is present within the south west part of the former paper mill (Plate 9). The outline of further former settlement ponds, which have been subsequently infilled were observed during the walkover. See Figure 2 for approximate location.

An overhead pipeline crosses the Kennet and Avon Canal from the site to the north (Plate 12).

2.3.3 Agricultural Land

The agricultural land encompasses the majority of the site. This part of the site is accessed via Chamberhouse Mill Lane, to the immediate west of the site directly south of Thatcham train station. The Rainsford Farm site, a small portion of land in the north-west, has recently undergone development which has been completed with 13 residential units.

The agricultural fields can be split into two large fields, north and south, separated by hedgerow in the western most part of the site and a drainage ditch in the centre and the east. The ditch was observed to be filled with water (Plate 20) in the east while the ditch in the centre of the site was dry at the time of the site walkover. Livestock occupies the northern field which appears to be well maintained (Plate 16). The remainder of the agricultural land comprises open fields that are overgrown with grass (Plate 18, 19 & 21).

Overhead power lines cross the agricultural land from the northwest to southeast.

2.4 Current Use – Offsite

The site is surrounded mainly by agricultural land to the south and west, and by Thatcham football ground to the southwest of the site.

The land to the north of the site is primary occupied by light industrial premises including Kennet Park Industrial Estate, Colthorp Business Park and Pipers Industrial Estate all being located to the north of the Kennet and Avon Canal. Thatcham Railway Station is situated about 40 m north of the western part of the site.

Kennetholme Sand and Gravel Quarry occupies the northeast part of the site, but also extends to the east beyond the eastern boundary of the subject site. Sand and gravel extraction is carried out about 0.5 km to the east of the site.

2.5 Historical Land Use

The historical land use information is based primarily on the review of historical Ordnance Survey (OS) map extracts provided by Emapsite (Emap 2015) presented in **Appendix 3.** For ease of reference duplicates and blank maps has been omitted and the scale reduced from A3 to A4. Other sources of historical information from various sources have also been used to supplement the historical map extracts.

Particular attention is given to potentially contaminative land uses within or adjacent to the site boundary.

2.5.1 OS Historical Mapping

The earliest OS map available dated 1871, shows the site and surrounding area to be predominantly undeveloped agricultural land with a number of farms off site with the exception of Colthrop Paper Mill. Terraced Housing and a small building later labelled as Colthorp Cottages are recorded in the north eastern corner of the site. The site is surrounded by the Kennet and Avon Canal to the north and the River Kennet to the south. A number of sluices and small water courses/ditches cross the site and connect between the Kennet and Avon Canal and the River Kennet. The agricultural land to the south of the site is labelled as 'Liable to Floods'. Colthrop Paper Mill is shown immediately to the north of the Kennet and Avon Canal comprises several large buildings. Colthrop Bridge crosses the Kennet and Avon Canal between the Colthrop Paper Mill and the north eastern part of the site. Chamberhouse Corn Mill is located about 20 m to the southwest of the site boundary adjacent to the River Kennet. A railway line connecting between Newbury and Reading orientated from east to west is situated between about 50 and 130 m from the site northern boundary with Thatcham Station situated about 40 m to the north of the northwest corner of the site.

By the early 1910s, Colthrop Paper Mill has expanded to the west and north of its original location. Chamberhouse Mill, previously identified on the OS mapping as a "corn mill" has been relabelled as a "flour mill".

By the early 1930s Colthrop Paper Mill expanded significantly at the land to the north of the site between the Kennet and Avon Canal and the Reading and Newbury railway line. The paper mill is shown on the 1932 OS map includes "filter beds" and "sludge pits". A Linoleum Factory has been constructed to the east of the mill. A "Box Factory" is shown immediately to the west of Colthrop Paper Mill on the 1932 OS map. The Box Factory and Colthrop Paper Mill are now shown having the benefit of railway sidings leading from the Newbury to Reading main line. The remainder of the land surrounding the site appears to remain unchanged.

The 1956 OS map shows the construction of five circular structures (possibly tanks) on site. Three smaller structures on the northern boundary are now connected to the main Colthrop Paper Mill by a pipeline crossing over the Kennet and Avon Canal. Two large buildings constructed to the north of the railway line are labelled as 'Mills'.

By the mid-1960s the north eastern part of the site had been developed significantly by Colthrop Paper Mill, including construction of numerous ponds, filter beds and sludge pits extending to about 250 m east of the site. Power lines are shown to intersect the site from the southeast to the northwest corners of the site. A further large building was constructed to the north railway line as part of the Colthrop Paper Mill. A sewage treatment works is recorded about 100 m to the northwest of the site. Crookham Manor and Chamber Mill Cottages have both been constructed 100 m from the southern site boundary. Three large building shown previously to the east of the main Colthrop Paper Mill site are now labelled Floor Covering Factory. A large sludge pit to the east of the main Colthrop Paper Mill site.

By the late 1980s the majority of the Colthorp Paper Mill filter beds, ponds and sludge pits are no longer shown on and off-site. A large building at the Colthrop Paper Mill has been demolished to the north of Kennet and Avon Canal. Thatcham town centre has undergone substantial residential development some 250m to the northwest of the site.

By the early 2010s the majority of the building in the former Colthorp Paper Mill had been demolished with a limited number of structures remaining on-site. The latest OS map dated 2014 shows no further significant changes at the site or its immediate surroundings.

2.5.2 Colthrop Paper Mill

The history of the Colthrop Paper Mill has been has been obtained from various sources including reports carried out for the Grundon sand and gravel quarry. A summary of these reports and full reference details are presented in **Section 4** below.

According to the British History Online webpage (BHO, 2015), by the 15th century the former Colthrop Mill has already been developed as a corn and fulling mill. By early 1800s, Colthrop Paper Mill was established to the north of the Kennet and Avon Canal. It is understood that the mill was used mainly for paper sack manufacturing. The OS mapping from 1871 to 2014 confirms the layout and status of the mill over time and as discussed above.

In the 1950s the Paper Reed Group took ownership and operation of the Mill. The site was redeveloped and a new large building was completed in 1958, with the paper mill site used primarily for the production of carton and board materials (TSN, 1958).

Based on anecdotal information, it is know that paper sludge from the Colthorp Paper Mill was deposited in the north eastern part of the site from the 1930s and this operation ceased in 1992. Subsequently, between 1992 and 2002 demolition materials from the decommissioning of the Colthorp Paper Mill were deposited in the north-eastern part the site (SLR, 2007).

2.6 Propose d Dev elopm ent

It is understood that the current proposal for the re development of the site comprise the construction of circa 850 to 950 dwellings with private gardens, associated access roads, and landscaped areas.

3 Environmental Setting

3.1 Introd uction

Information about the environmental setting is used in the geotechnical and geoenvironmental appraisal of this report to identify potential pathways and receptors.

3.2 Geolog y

3.2.1 Published Information

The British Geological Survey (BGS) 1:50,000 scale, Solid and Drift Geology Map (BGS, 2000) indicates that the Site is underlain by superficial deposits comprising Alluvium overlying River Terrace Deposits at depth.

The underlying solid geology masked by the superficial deposits comprises the London Clay Formation and Lambeth Group, with the White Chalk Subgroup at depth. The London Clay is indicated as being present only in the eastern and southern parts of the site. The western and north eastern parts of the site are underlain by Lambeth Group and the Chalk (the overlying London Clay Formation being absent in this area).

“Made Ground“ is recorded above the natural soils at the north eastern part of the site associated with the former Colthorp Paper Mill works.

3.2.2 BGS Borehole Records

The British Geological Survey (BGS) archives contain records of a number of historical exploratory borehole and trial pit records on and in the near vicinity of the Site. Copies of these records have been are reproduced in **Appendix 5**.

A summary of the anticipated ground conditions based on the historical borehole records is presented in the table below

Strata	Approximate Depth to base (m)	Typical Description
Alluvium	3 to 4 Where present	Clay and silt locally with some peat
River Terrace Deposits	3 to 6	Sand and gravel in variable proportion locally with little clay
London Clay Formation	7 to 11 where present	Bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base. At the base, and at some other levels, thin beds of black rounded flint gravel occurs in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels.
Lambeth Group	27 to 28	Vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels
White Chalk Subgroup	> 65	White Chalk with flints. With discrete marl seams, nodular chalk, sponge-rich and flint seams throughout.
Note~ The descriptions are based on the exploratory hole records, the BGS geological map, and the BGS Lexicon of Named Rock Units		

3.3 Controlled Waters - Ground water

The published groundwater vulnerability map of the area (NRA, 1995) indicates that the superficial alluvial deposits, and where present across the eastern sections of the site, the Lambeth Group are both classified as being Secondary A (formerly minor) aquifers. Secondary A aquifers are defined as being permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The results of historical investigations undertaken to date across the site (see Section 3.5 below) suggest that groundwater is present at depths of approximately 2mbgl and that groundwater is likely to be in hydraulic continuity with the River Kennet with a hydraulic gradient flow direction recorded to be from the northwest to the southeast towards the river.

The London Clay Formation to the west is classified as unproductive strata (former non-aquifer), which is a formation that is generally regarded as containing insignificant quantities of groundwater. However, groundwater flow through such formations, although imperceptible, does take place and needs to be considered in assessing the risk associated with persistent pollutants.

The River Terrace Gravel is an unconfined aquifer that to some degree is protected by the overlying Alluvium. The Lambeth Group and the London Clay (where present) confines the Upper Chalk from the groundwater in the River Terrace Deposits.

Perched groundwater may be expected within Made Ground or worked ground, especially if confined as a result of either the constituent materials within the made ground or underlying geology.

Indicative maps included in the EnviroInsight Report (GS, 2014) indicate that the Site is located within a groundwater Total Catchment Source Protection Zone (SPZ) for a groundwater abstraction in the deeper chalk formation situated about 6 km to the southeast of the site. Groundwater source protection zones are defined as the groundwater catchment zones for significant public water supply and private wells or boreholes that supply water to potable or equivalent standards. The Hydrogeological map of the area (BGS, 1978) indicates that the groundwater level within the Chalk based on a 1976 record is about 70mAOD. The map indicates that the groundwater flow direction in the Chalk is from northwest to the southeast.

The soils on the Site are shown to be soils of high leaching potential (NRA, 1995), and therefore have little ability to attenuate diffuse source pollutants and in which non-absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater.

There are 13 active licences for groundwater abstraction within 500m of the site boundaries. The majority of the licences are related to commercial and industrial activities including mineral washing, process water. Four licences are for groundwater abstraction for drinking, and farming for the farms in the vicinity of the site.

3.4 Controlled Waters - Surface Water

The Site is surrounded by surface water bodies with the exception of the east boundary of the site. The site is bounded to the south and west by the River Kennet flowing in general direction to the west and northeast before joining the River Thames about 20 km to the northeast of the site.

The Kennet and Avon Canal exists along the northern boundary of the site. The Kennet and Avon Canal is in connectivity with the River Kennet about 0.3 km to the east of the site, where Aldershot Waters connects the two water bodies.

A number of small surface water bodies associated with the former Colthorp Paper Mill settlement ponds lagoons etc. are present in the northwest part of the site.

A small ditch crosses the agricultural fields flowing generally to the southwest before joining the River Kennet along the southeast boundary of the site.

3.5 Natural and Non-Coal Mining Cavity Records – Cavity Searches

A search of the PBA Natural and Non-Coal Mining Cavities Databases indicates that there are no known cavities within 2000m of the site boundary.

While there are no records pertaining to natural or mining cavities within the site footprint, we would draw your attention to the fact that the absence of existing records for the site should not be considered as conclusive.

3.6 Naturally Occurring Geological Hazards

An assessment of potential geological hazards that may give rise to instability or adverse foundation or construction conditions as supplied by the British Geological Survey (BGS) from their National Geoscience Information Service (NGIS) are presented in the GroundSure Report reproduced in **Appendix 3**. The generic assessment is generated automatically based on digital geological maps and the scope and the accuracy is limited by the methods used to create the dataset and is therefore only indicative for the search area.

The information contained in the GroundSure Report has been reviewed and where considered necessary reassessed considering the specific information available for the site. The modified assessment of the potential for geological hazards to be present on the site is summarised in Table 3.1 below.

Table 3.1 Summary of Geological Hazards from GroundSure Report

Hazard	BGS-NGIS Assessed Hazard Potential	PBA Assessment
Coal Mining Affected Areas	Not Affected	PBA agree with the assessment
Collapsible Ground Stability Hazards	Negligible	Agree
Compressible Ground Stability Hazards	Moderate	This hazard potential is likely to be related to the Alluvium that may be present across the site. However, the potential hazard for compressible ground is considered to be **High** associated with the landfill materials on the northeast part of the site and **Moderate** with respect to the naturally occurring Alluvium.
Dissolution Hazard	Negligible	PBA agree with the assessment
Landslide Ground Stability	Very Low	PBA agree with the assessment
Running Sand	Low	PBA agree with the assessment
Shrinking or Swelling Clay	Moderate	PBA agree with the assessment

PBA would generally agree with the above assessments indicating that the site has a low or very low potential for being affected by the majority of geological hazards. However, we consider that the hazard potential associated with the compressible ground in the former landfill at the north eastern part of the site is **High**, and is **Moderate** with respect to where alluvial deposits are present.

3.7 Radon

Radon is a naturally occurring radioactive gas and emanates from certain geological formations to varying degrees, depending on the type, porosity and permeability. The GroundSure Report indicates the site is located in an area where the property is in a lower probability radon area, as less than 1% of homes are above the action level'.

3.8 Environmental and Industrial Setting

Information on the environmental and industrial setting of the site is presented in a GroundSure report (GroundSure, 2014) and is reproduced in **Appendix 3**. The results of the database search are summarised on the following table and discussed in the following sections.

Table 3.5 - Summary of Environmental and Industrial Setting

Data Type	Number on Site (1)	Number within 500 m of Site (1)
Waste Regulation		
Landfill Sites	0 (1)	0 (1)
Licensed Waste Management Facilities	0 (3)	0 (5)
Statutory Permits/Authorisations		
Pollution Prevention and Control(2)	0 (0)	9 (0)
Radioactive Substance Authorisations	0 (0)	0 (0)
Planning Hazardous Substances	0 (0)	0 (0)
COMAH Sites(3) and NIHHS Sites(4)	0 (0)	0 (0)
Potential Contaminative Uses		
Fuel Stations	0 (0)	0 (0)
Industrial sites	8	61
Pollution Incidents		
Discharge to the Public Sewer	0	0
Discharge to Controlled Waters	0	0
List 1 Dangerous Substances Inventory Sites	0	1
List 2 Dangerous Substances Inventory Sites	0	0
Part A(2) and Part B Activities and Enforcements	1	5
Category 3 or 4 Radioactive Substances Authorisations	0	0
Licensed Discharge Consents	1 (5)	8 (45)
Environment Agency Recorded Pollution Incidents	1	9
Sites Determined as Contaminated Land	0	0

Note:

1) Numbers in brackets denotes number of authorisations, licences or permits that are lapsed, revoked, cancelled, superseded, defunct, surrendered, not applicable, withdrawn or not yet started.
2) Includes Integrated Pollution Controls, Integrated Pollution Prevention and Control, Local Authority Integrated Pollution Prevention and Control and Local Authority Pollution Prevention and Control permits.
3) COMAH denotes Control of Major Accident Hazards
4) NIHHS denotes Notification of Installations Handling Hazardous Substances

3.8.1 Landfill Records

The GroundSure report has a record of a landfill located on the site situated in the north eastern part of the site. The site was initially attributed a Waste Management Licence addressed to Colthrop Board Mill Ltd and referred to receipt of "industrial waste (factory curtilage)", however the status of that licence is recorded as being "in closure". An additional licence that is recorded as being "no longer in effect", for an "industrial waste landfill" documented as receiving 75,000 tonnes a year, is assigned to Grundon (Waste) Ltd between 1997 and 2002. It is understood that since 2002, Grundon (Waste) Ltd took ownership of the site and continue to manage the former landfill site.

The GroundSure Report identifies a further eight licensed waste sites within 500m of the study site. Three of these were historically located on site receiving industrial waste from Colthorp Board Mill Ltd.

3.8.2 Statutory Permits/Authorisations

There are six Part A (2) and Part B Activities located within 500m of the site boundary. These are activities listed under the Environmental Permit Regulations and subject to integrated pollution prevention and control by the Local Authority.

A single record is situated within the site relates to print / paint / ink /dyes processes in the northeast part of the site, however, this activity is no longer in place. The nearest active permit is for concrete batching situated about 70m to the north of the site.

3.8.3 Potential Contaminative Uses

The GroundSure report records several potentially contaminative land uses on and within 250m of the site.

On-site trade directory records relate to: electrical pylons crossing the site, and redundant infrastructure related to the former Colthorp Paper Mill comprising disused filter beds, pipelines and tanks remaining in the north eastern part of the site.

The majority of the off-site trades directory records are related to the light industrial activities principally in the Kennet Park Industrial Estate, Pipers Industrial Estate. The records include: general storage, vehicle repair and storage, fuel distributors and suppliers, medical equipment, supplies and pharmaceuticals, and metal works. In addition, electrical, water and railway infrastructure are recorded within 250 m of the site.

Current tenants in the adjacent Colthorp Business Park and include: electronics companies, motor vehicle companies, and storage and distribution firms.

3.8.4 Pollution Incidents

According to the GroundSure Report there are ten recorded pollution incidents within 500 m of the site boundary. All of the incidents are classified as category 3 (Minor) or 4 (no Impact). The closest pollution incident is located in the northwest corner of the site. The incident is classified as a category 3 (Minor) with respect to water impact, a category 4 (No Impact) to land and air impacts.

Given the type of pollution incidents and their distance from the site none of these records are considered to have an impact on the site or the proposed development.

3.8.5 Discharge Consents

There is one discharge consent that is in force shown to be within the site for the discharge of sewage effluent from Rainsford Farm via a ditch that crosses the site to the River Kennet.

In addition, there are five records of licensed discharge consents in the vicinity of the Site. The consents are related to discharging of sewage discharge, or surface water drainage to the River Kennet and its tributes or the Kennet and Avon Canal. In addition, there are three discharge consents of sewage into the groundwater.

3.9 Ecologic al Systems

The River Kennet is designated as a Site of Special Scientific Interest (SSSI) designated for its high quality and diverse habitats, supporting a range of aquatic vegetation, aquatic invertebrates, bird and fish species.

It should be noted the statement regarding ecological systems does not purport to be an ecological risk assessment. The presence of a protected species (if applicable) requires a site specific survey and is outside the scope of this report

3.10 Archaeolog y and Ancient Monuments

According to the MAGIC website (March, 2015) There are no records of scheduled or designated ancient monuments identified on or within 0.25km of the site boundary and therefore these have been eliminated as potential receptors for the purposes of ground condition assessment.

It should be noted the paragraph above does not purport to be an archaeological risk assessment and further studies may be needed, which are outside the scope of this report.

4 Previous Investigations and Studies

4.1 Background

The ground conditions in the former Colthorp Paper Mill area have been investigated previously on behalf of Grundon Sand & Gravel Ltd with a number of ground investigations and studies. These studies have primarily focussed on the area of worked ground and landfill associated with Colthorp Paper Mill. A summary of the relevant information is given below.

For ease of reference, the reports and studies listed below are presented in PDF format in **Appendix 6** of this report. These earlier reports and studies should be read in conjunction with this report.

4.2 Trial Pit Investigation at Colthorp Board Mill – South Side (Golder, 2003)

In 2003, a ground investigation was carried out at the former landfill within the Colthrop Paper Mill site by Golder Associates. The investigation comprised the excavation of nine trial pits of which five (TP1 to TP5) are located within the subject site boundary.

The five trial pits encountered "Made Ground / Waste" to depths of between 2.9 and 4.5 m below ground level (mbgl), comprising "black, odorous waste with rubble". The trial pit descriptions of this material included various man-made and natural materials; including paper pulp, brick, wood, timber, "Thermolite" blocks, rubber, cables, plastic sheets, steel wire, and concrete. Locally, large pockets containing large fragments of cement bound tiles suspected to contain asbestos were also found. However, the Golder 2003 report does not include laboratory testing certificates and does not refer specifically to any asbestos testing including identification or quantification testing.

River Terrace Deposits was encountered below the Made Ground in all the locations investigated and typically comprised flint gravel with some cobbles in matrix of sand and clay.

Groundwater in the River Terrace Gravel was encountered during the investigation between 4.0 and 4.5mbl. Local seepages were also noted at higher elevations in the waste materials between 1.5mbgl and 3.6mbgl. The groundwater was described as discoloured and locally with an oily sheen.

The Golder 2003 report states that soil samples were sent for geoenvironmental testing, however the laboratory testing certificates were are not available and the report contains only a summary of the results.

The report identified elevated concentrations of metals (copper, nickel and zinc), sulphide and phenols above the now redrawn 59/83 Interdepartmental Committee in the Redevelopment of Contaminated Land, (ICRCL) used at the time of reporting. The six results that are presented on the 2003 Golder report have been compared to the current PBA Tier 2 Risk Assessment Criteria for the protection of human health for a proposed "residential with plant uptake" land use. All the results were below the current guidelines with the exception of a single sample that exceeded the assessment criteria for nickel, with a concentration of 976 mg/kg compared to the Tier 2 assessment criteria of 130 mg/kg.

4.3 Colthorp Mill Closed Landfill Site – Landfill Gas Risk Assessment (SLR, 2007)

In 2007, a landfill gas risk assessment was carried out by SLR on behalf of Grundon Sand and Gravel Limited in the former Colthorp Paper Mill. Soil gas monitoring data was subsequently collected by Grundon Sand & Gravel Ltd from 14 gas monitoring wells, of which 9 are located

within the subject site boundary. The gas monitoring was carried out over 16 separate monitoring visits between 2002 and 2007.

The monitoring data recorded elevated concentrations of methane with a mean value of more than 5% (v/v) in five locations situated along the southern boundary of the landfill, with a maximum concentration of 65 % (v/v). Carbon dioxide with elevated mean concentration of > 5% (v/v) was recorded in six of the locations with maximum concentrations of to 44 % (v/v). The gas flow rates were recorded only on four occasions and were found to be generally negligible with the highest flow rate of 0.4 l/hr. Records of atmospheric pressure are not included within the SLR 2007 report.

The report concluded that the source of the soil gas was likely to be as a result of the biodegradation of the waste materials, being mainly the paper sludge, wood and cardboard deposited in the former ponds and lagoons of the former Colthorp Paper Mill.

4.4 Colthorp Landfill – Qualitative Ground Water Risk Assessment (Golder, 2010)

In 2010, Golder Associates carried out a groundwater risk assessment to primarily assess the risks from the Colthorp Paper Mill landfill site on the surface water bodies adjacent to the site. A total of seven groundwater monitoring wells were used to obtain groundwater samples of which four are situated within the site. Surface water samples were taken from the River Kennet and the Kennet and Avon Canal.

Groundwater levels were recorded to be circa 2mbgl with a hydraulic gradient recorded to be from the northwest to the southeast towards the River Kennet. The groundwater in the Alluvium and the River Terrace Gravel was considered to be in hydraulic continuity with the River Kennet.

The monitoring results indicated that the groundwater is affected by soil contamination and possible leachate from the overlying waste. In general, there is an increase in concentration for a number of contaminants in the downgradient wells compared to concentrations recorded in groundwater from the upgradient wells. Elevated ammoniacal nitrogen and iron concentrations in particular show increased concentrations in the down gradient boreholes compared to the upstream samples.

The Golder 2010 report identified that surface water samples show elevated concentrations of ammonical nitrogen upstream of the site compared with the downstream samples. In general however there was no discernible difference in contaminant concentrations between the upstream and downstream surface water samples. The report concluded that the impacted groundwater beneath the site did not appear to have a significant adverse impact on surface water quality of the River Kennet.

5 Geotechnical and Geoenvironmental Appraisal

5.1 Introduction

The methodology developed and adopted by PBA for the assessment of ground conditions is presented in Appendix 1. In accordance with guidance presented in CLR 11 (EA Model Procedures for the Management of Land Contamination) we adopt a staged approach to risk assessment and this report presents a Tier 1 assessment or first stage.

The underlying principle to ground condition assessment is the identification of pollutant linkages in order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences.

5.2 Conceptual Site Model

The Tier 1 Preliminary Risk Assessment includes the development of a conceptual site model (CSM). The CSM describes the types and locations of potential contamination sources, the identification of potential receptors and the identification of potential transport/migration pathways.

For a pollutant linkage to be identified a connection between all three elements (source-pathway-receptor) is required.

5.3 Summary of Natural Ground Conditions

The natural ground conditions comprise a veneer of Alluvium underlain by the River Terrace Deposits. The underlying solid geology in the eastern and southern parts of the site comprises the London Clay Formation over the Lambeth Group and Chalk at depth. The London Clay is absent from the western and north-eastern parts of the site where the superficial deposits underlain by the Lambeth Group and the Chalk.

The groundwater level is recorded to be circa 2mbgl with a groundwater flow direction from the northwest to the southeast towards the River Kennet with the groundwater in the Alluvium and the River Terrace Deposits is considered to be in hydraulic continuity with the River Kennet. The London Clay and to some degree the Lambeth Group confine the groundwater at the shallow aquifer form the groundwater within the Chalk.

5.4 Geoenvironmental Hazard Identification

Historically the north eastern part of the site was used by the former Colthorp Paper Mill. Surface water ponds and settlement lagoons were constructed at this part of the site for paper and board processing, with a number of associated structures used as part of the manufacturing process. The area to the north of the site was occupied by the main buildings of the Colthorp Paper Mill with other industrial activities also located further to the north of the Kennet and Avon Canal.

Paper pulp and other waste products from the paper manufacturing process were deposited at this part of the site from the 1930s until the early 1990s when the former Colthorp Paper Mill ceased to operate. Subsequently, between 1992 and 2002 demolition materials sourced from the decommissioning of the Colthorp Paper Mill were deposited at this part of the site. It is understood that the former ponds and lagoons were backfilled with variety of waste materials, however, it is understood that waste materials were also deposited at other portions of this part of the site.

Based on the limited historical ground investigation data the Made Ground was found to comprise a variety of man-made materials including a substantial proportion of paper pulp and

other biodegradable materials. The Made Ground was found to be between about 2.9 m and 4.5 m thick. The limited geoenvironmental soil testing data indicates limited elevated concentration of metals and materials suspected to contain asbestos (Golder, 2003).

The groundwater testing indicated that groundwater is impacted by the contaminants in the soils and possible leachate from the waste. According to the available information the water in the River Kennet is not adversely impacted by the elevated concentrations of various contaminants present in the groundwater at the site (Golder, 2010).

The ground gas data available indicates that significantly elevated concentrations of methane and carbon dioxide were recorded primarily along the southern boundary of the north eastern part of the site. The limited gas flows records were generally negligible. The source of the ground gas is likely to be related to the biodegradation of the waste materials deposited at this part of the site (SLR, 2007).

5.5 Geoenvironmental Hazard Assessment

Based on the historical land use and the available information the site can be divided into two main areas:

- The former Colthrop Paper Mill works including the Kennetholme Sand and Gravel Quarry and associated landfill in the north eastern part of the site; and
- The agricultural land at the western and southern parts of the site.

5.5.1 Former Colthorp Paper Mill Site (including Kennetholme Sand and Gravel Quarry)

The principal constraint identified within this area relates to the nature and condition of the materials contained within the north eastern part of the site, associated with the disposal of paper pulp and other man made materials from the former Colthrop Paper Mill. These are a consequence of the former paper manufacturing works, and the subsequent infilling of the former pond and lagoons, following the decommissioning of the paper mill. Furthermore, the former paper mill activities have the potential to give rise to localised contamination within soils and groundwater as a result of the paper manufacturing activities.

Based on the known history of the site and the historical ground investigation data available the overall potential for site wide significant contamination to be present at the north eastern part of the site is considered to be **Moderate**, with **High** potential for localised significant contamination. The potential for soil gas associated with biodegradation of the materials deposited at this part of the site is considered to be **High**.

5.5.2 Agricultural Land

Based on the known history of this area of the site, the overall potential for significant contamination to be present at the agricultural land is assessed to be **Very Low**. The potential for contamination to be present in the groundwater as a result of migration from the Former Colthorp Paper Mill Site is considered to be **Moderate**.

5.6 Geoenvironmental Risk Evaluation

Possible pollutant linkages are determined using professional judgement. If a linkage is considered possible, it is considered that this represents a potentially ‘unacceptable risk’ and therefore requires further consideration. This may be through remediation or mitigation or through further tiers of assessment.

Overall the geoenvironmental risk to the development of the site associated with the previous and current use of the site is considered to be **Moderate** to **High** in the former area of former Colthorp Paper Mill Site.

The geoenvironmental risk to the development is considered to be **Very Low** in the areas of the site currently used for agricultural use. Subject to confirmation through site investigation and monitoring it is recognised that due to the environmental setting of the site that there is a potential risk of land gas migration. At this stage it is recommended that the risk rating should be increased to **Moderate** within at least 250m of the former Colthorp Paper Mill site subject to further investigation in line with guidance given within CIRIA Report 152 "Risk assessment for methane and from other gases from the ground".

5.7 Additional Geoenvironmental Liabilities

The former Colthorp Paper Mill is a licensed landfill with Grundon (Waste) Ltd holding an Environmental Permit for this installation. In accordance with the Environment Agency guidance (EA, 2013) the environmental permit for a landfill cannot be surrounded until:

i) a surrender site condition report to show satisfactory state of the landfill site; and

ii) a completion report for the landfill to show the waste deposited will not cause an unacceptable risk of pollution or harm to human health or the environment.

The land owner will be liable for maintenance, monitoring and aftercare of the landfill until the environmental permit is surrounded back the Environment Agency.

5.8 Geotechnical Constraints

The geotechnical constraints to the development are those relating to the natural ground conditions and any geological hazards on the site, and also resulting from ground conditions that have arisen as a consequence of the sites previous and current uses.

5.8.1 Ground Conditions

The natural ground conditions are, in general, expected to form a suitable platform for the construction of a proposed residential development. Where Alluvium could be encountered, owing to its relatively low strength and high compressibility, would require either ground improvement, removal or suitable deeper foundation solutions such as piled foundations to allow construction of the proposed development.

Groundwater on the site is expected to be at a shallow depth and in some areas may be perched. Excavations for the proposed development may as extend below groundwater level and therefore require groundwater control measures to allow construction in dry conditions within the Made Ground, Alluvium and Terrace Deposits. Consideration will also need to be made with regard to the contaminated nature of groundwater in some areas which may limit or restrict pumping and discharge of water.

5.8.2 Historical and Current Site Use

Historically the north eastern part of the site has been used for by a series of settlement ponds and lagoons with a number of relatively small structures related to the former Colthorp Paper Mill site. Subsequently, the lagoons and the ponds were backfilled with waste materials arising from the paper manufacturing. Furthermore, it is understood that demolition materials from the former Colthorp Paper Mill site were deposited at this part of the site.

It is expected that Made Ground and waste associated with the previous and existing development of the site is present to about 3 to 5 m depth and is of variable composition with significant biodegradable material content.

It is expected that any foundations to former structures and building will be limited in extent and at a relatively shallow depth, albeit this would need confirmation via site investigation.

The Made Ground is not considered to be suitable as a founding medium for shallow spread foundations owing to their variability and potentially weak and compressible characteristics, which may result in excessive total and differential settlements.

There is a potential for significant total and differential settlement associated with the ongoing degradation and consolidation settlement of waste material within the landfill and the former sludge lagoon, filter beds and infilled ponds in the former Colthrop Paper Mill works.

Foundations and demolition materials present within the Made Ground and waste materials may also present obstructions to in ground infrastructure, pilling or groundworks.

5.9 Geotechnical Risk Evaluation

Overall the geotechnical risk to the development of the site associated with the natural ground conditions and geological hazards is considered to be **Low** overall, albeit where present as a result of the compressible nature of Alluvium this locally would be **Moderate**.

Overall the geotechnical constraint to the development of the site associated with the previous and current use of the site is considered to be **Low** in areas of the site used for agricultural use and, in general, **Moderate** to **High** in areas of the former Colthorp Paper Mill site.

6 Conclusions and Recommendations

6.1 Conclusions

In terms of ground conditions, the site comprises two main areas: (i) the agricultural land at the western and southern parts of the site; and (ii) the former Colthrop Paper Mill works and associated landfill in the north eastern part of the site.

(i) Agricultural Land:

It is considered that this study has not revealed significant geoenvironmental or ground stability risks within the agricultural land area for future development.

There is the potential for ground gas migration and groundwater potentially containing elevated concentrations of various contaminants from the adjacent Former Colthrop Paper Mill works.

The potential risks identified at this part of the site are relatively modest. The risks can be validated through future ground investigation work, risk assessments and controlled through appropriate risk mitigation measures, if required. At this stage it is envisaged that the mitigation measures might consist of ground gas protection measures to be incorporated in buildings constructed in the within about 250 metres around the former Colthrop Paper Mill works. These potential mitigation measures are not considered to be particularly onerous for a residential development.

(ii) Former Colthrop Paper Mill works (including Kennetholme Sand and Gravel Quarry):

The principal constraints identified within this part of the site relate to the nature and condition of the materials associated with the disposal of paper pulp and other man made materials associated with paper and board manufacturing from the former Colthorp Paper Mill and backfill to the former ponds and settlement lagoons. These activities may have given rise to soil and groundwater contamination and are a source to elevated concentrations of soil gas.

Given the expected significant thickness of Made Ground and Alluvium, the proposed structures are expected to be supported on piled foundations. Ground improvement techniques may be considered subject to contamination considerations.

It is possible that foundations for former structures and other sub-surface structures as part of the former works are still present in the ground. Allowance should be made for the removal of any existing concrete slabs, underground structures, foundations, hardstanding, and paving. Any voids left by removal of should be backfilled with an engineered fill.

It is likely that the potential risks from soil and water contamination and soils gas can be successfully managed by the implementation of appropriate mitigation and remediation measures. It is considered that health and safety measures for construction workers, protected water supply pipes, clean capping in landscape areas and gardens, and ground gas mitigation measures are likely to be required to be incorporated into the proposed development at this part of the site. It is considered that these actions and potential mitigation measures are typical for similar brownfield redevelopments and should not be considered onerous or unexpected.

Additional ground investigation will be required to verify the precise nature, extent and composition of Made Ground materials and associated contamination and land gas. The need for remediation of impacted soils or groundwater will be established through intrusive ground investigation, monitoring and further risk assessments.

A constraints plan showing the extent of the main areas at the site is presented as **Figure 3**.

6.2 Recommendations

6.2.1 Proposed Development

The study has identified a number of possible sources of contamination at the site. Whilst the collection of site specific data from an intrusive investigation is required to ascertain whether or not a potential source of contamination is present it is considered that given the site setting there are technical and financially viable solutions to manage the risks.

6.2.2 Future Ground Investigation Work

The need to establish the nature of the ground conditions, the extent of contamination and identify potential remediation and/or mitigation measures associated with impacted soil, groundwater and ground gas will need to be assessed through intrusive ground investigation, monitoring and further risk assessments.

It is expected that any supplementary ground investigation work will be required to principally establish the extent and nature of the landfill materials and the Made Ground associated with the former Colthrop Paper Mill works. The investigation will need to target the former sludge lagoons and ponds and any associated backfill materials. Furthermore, the investigation will be required to confirm the groundwater conditions including groundwater and surface water quality, and the gassing regime at the site and to establish the extent if any of any ground gas and contaminated groundwater migration.

The additional ground investigation should include the following:

- Cable percussion boreholes and installation of groundwater and gas monitoring wells;
- Trial pits across the site including the former Colthrop Paper Mill works to establish the extent and nature of the landfill materials and the Made Ground associated with the former Colthrop Paper Mill works, the infill to former ponds and confirm the presence and extent of underground structures and foundations to former buildings and other structures at the site.
- Soil, groundwater and surface water sampling for subsequent chemical laboratory testing to establish contamination risk and acceptability for reuse or disposal or site soils;
- In-situ and laboratory testing to establish geotechnical design parameters for building foundations, soils classification and compaction tests for earthworks and potential for aggressive ground conditions; and
- Carry out at least 24 return gas and groundwater monitoring visits over a period of not less than 12 months, the minimum specified by current guidance, CIRIA Report C655 (2007), to evaluate the risks associated with ground gas.

7 Essential Guidance for Report Readers

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints they are described in the report text.

The opinions and recommendations expressed in this report are based on statute, guidance, and best practice current at the time of its publication. Peter Brett Associates LLP (PBA) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and the report should be returned to us and reassessed if required for re-use after one year from date of publication. Following delivery of the report PBA has no obligation to advise the Client or any other party of such changes or their repercussions.

Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used. Historical maps and aerial photographs provide a “snap shot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the express written authorisation of PBA. Any such party relies upon the report at its own risk.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc, unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environment Agency, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

8 References

BGS (1978). Hydrogeological map of the South West Chilterns and the Berkshire and Marlborough Down including parts of hydrometric areas 39, 42, 43 and 53. 1000,000 Scale Map, Sheet 7. British Geological Survey, (former Institute of Geological Sciences), Keyworth, Notts.

BGS (2000) Geological Map Sheet 268: Reading, 1:50,000 Solid and Drift Edition. British Geological Survey, Keyworth, Notts.

BHO (2015) Parishes: Thatcham. http://www.british-history.ac.uk/vch/berks/vol3/pp311-329, 11 March 2015.

BRE (2007) Radon: Guidance on protective measures for new buildings. Report BR211, Building Council, Amersham, Buckinghamshire.

CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings. CIRIA Report C665 London.

DoE (1996) Pulp and Paper Manufacturing Works. Department of the Environment.

EA (2004) Model Procedures for the Management of Land Contamination Contaminated Land Report 11. Environment Agency, Bristol.

EA (2010) Guiding Principles for Land Contamination GPLC 1 to 3. Environment Agency, Bristol.

EA (2013) Groundwater protection: principles and practice V1.1 (GP3) Environment Agency, Bristol.

EA (2013) Regulatory Guidance Note, RGN 9: Surrender. LIT 8220, Version 3.0. Environment Agency, Bristol.

Emap (2014) GroundSure EnviroInsight. Report EMS-281295_381045, Emapsite™, Eversley, Hants

Golder (2003) Trial Pit Investigation at Colthorp Board Mill – South Side. Golder Associates (UK) Ltd, Maidenhead.

Golder (2010) Colthorp Landfill, Qualitative Ground Water Risk Assessment. Golder Associates (UK) Ltd, Maidenhead.

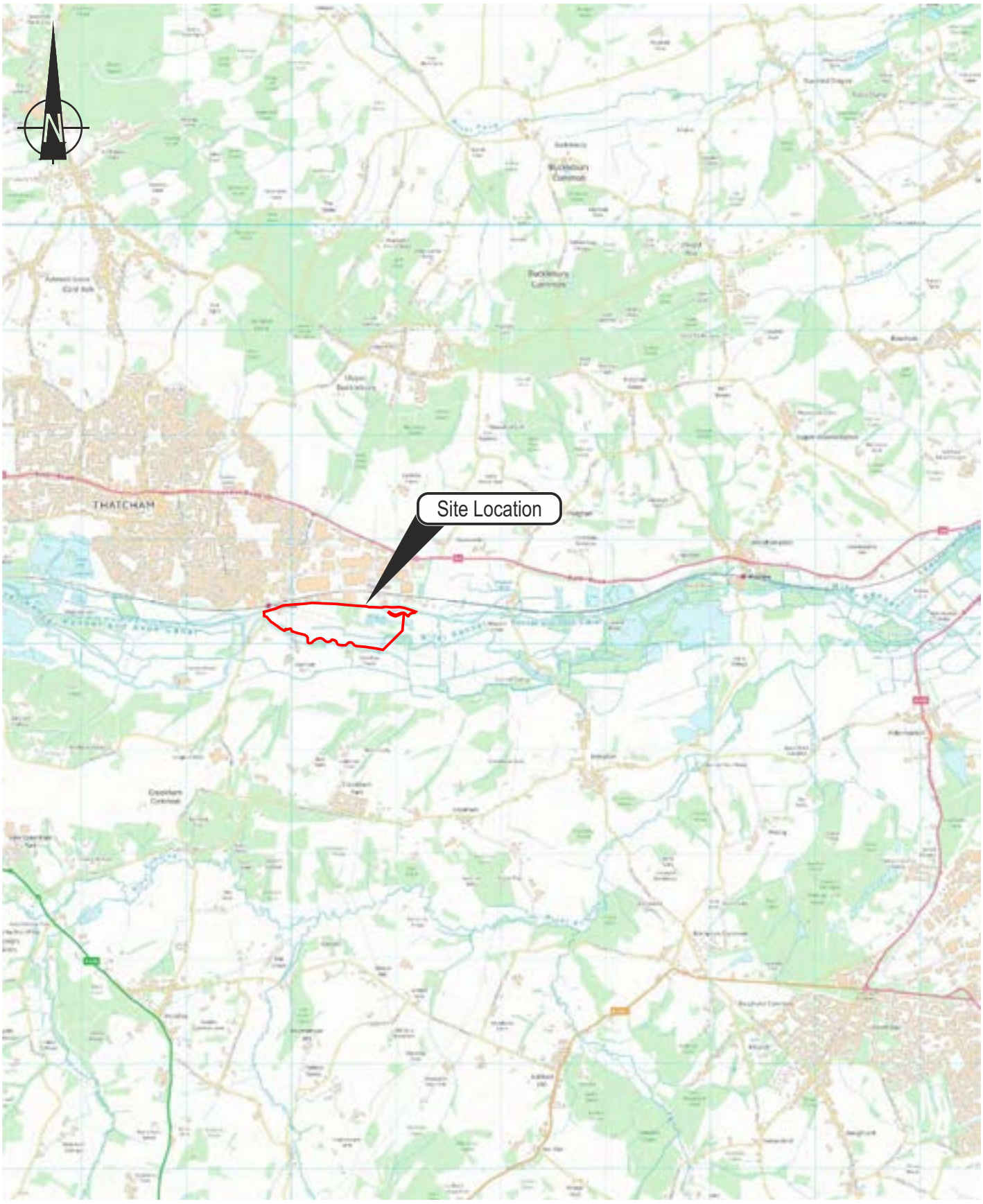
NHBC (2011) Part 4 Foundations, Standard Chapter 4.2, Building near trees. National House Building Research Establishment, Garston, Hertfordshire.

NRA (1995) Groundwater Vulnerability Map, West London, Sheet 39, 1:100,000, Environment Agency (Formerly National Rivers Authority), Bristol.

SLR (2007) Colthrop Mill Closed Landfill Site Landfill Gas Risk Assessment. Report Ref: 406.0013.00036. SLR Consulting, Warrington, Cheshire.

TNS (1958) Stepping up board production. The New Scientists, Vol 4, No 80, pp 66.

FIGURES



Site Grid Ref: SU 533 661

Approximate Site Boundary

pba peterbrett

Offices throughout the UK and continental Europe.

www.peterbrett.com

Client

COLTHROP VILLAGE

COLTHROP VILLAGE, THATCHAM

SITE LOCATION PLAN

Date	08.12.2016
Scale	1:50 000
Drawn by	davco
Checked by	AZ
Revision	0

FIGURE 1

pba peterbrett

Offices throughout the UK and continental Europe.

www.peterbrett.com

Client

Google Earth

Image © 2014 DigitalGlobe

Image Date: March 2014

COLTHROP VILLAGE, THATCHAM

SITE LAYOUT PLAN

Date	08.12.2016
Scale	1:5000
Drawn by	davco
Checked by	AZ
Revision	0

FIGURE 2

pba peterbrett
Offices throughout the UK and continental Europe.
www.peterbrett.com

Client

Google Earth

Image © 2014 DigitalGlobe

Image Date: March 2014

COLTHROP VILLAGE, THATCHAM

CONSTRAINTS PLAN

Date	08.12.2016
Scale	1:5000
Drawn by	davco
Checked by	AZ
Revision	0

FIGURE 3

APPENDIX 1

PBA Methodology for Assessment of Potentially Contaminated Land

1 Introduction

This document defines the approach adopted by PBA in relation to the assessment of potentially contaminated land in England. The aim is for the approach to (i) be systematic and objective, (ii) provide for the assessment of uncertainty and (iii) provide a rational, consistent, transparent framework.

When preparing our methodology we have made reference to various technical guidance documents and legislation referenced in Section 7 of which the principal documents are Contaminated Land Statutory Guidance (Defra 2012) the Model Procedures for the Management of Contamination (CLR 11) (EA 2004) Contaminated land risk assessment: A guide to good practice (C552) (CIRIA 2001) and the National Planning Policy Framework (DCLG 2012).

2 Dealing with Land Contamination

UK legislation aims to help address the problem of historic contamination of land and the risks it can pose to people's health, controlled water and the environment by determining if a contaminant linkage exists. This requires the three elements of receptor; pathway and source (hazard) to be present.

There are several ways in which land contamination can be addressed. For example, voluntarily where action is taken independently by landowners, when land is developed (or redeveloped) under the planning system, during the building control process using building regulations, or, forced remediation under the Part 2A regime. Other legislative regimes may also provide a means of dealing with land contamination issues, such as the regimes for waste, water, environmental permitting, and environmental damage. Further, the law of statutory nuisance may result in contaminants being unacceptable to third parties whilst not attracting action under Part 2A or other environmental legislation.

2.1 Part 2A

The Environment Act 1995 introduced Part 2A into the Environmental Protection Act 1990. Part 2A, its accompanying regulations and original Statutory Guidance came into force in England in April 2000. The legislation was extended in August 2006 to include radiological hazards.

Revised Statutory Guidance was issued April 2012. (Defra 2012) to clarify how the regime should operate. The guidance states that enforcing authorities should seek to use Part 2A only where no appropriate alternative solution exists.

Part 2A defines contaminated land as "*land which appears to the Local Authority in whose area it is situated to be in such a condition that, by reason of substances in, on or under the land that significant harm is being caused, or there is a significant possibility that such harm could be caused, or pollution of controlled waters is being, or likely to be, caused*".

Harm is defined as "*harm to the health of living organisms or other interference with the ecological systems of which they form part, and in the case of man, includes harm to his property*".

For the purposes of Part 2A, land is contaminated if it poses a significant possibility of significant harm (SPOSH).

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment, and under the guidance enforcing authorities should seek to find and deal with such land. It states that "*under Part 2A the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the Guidance, should be considered as meeting the Part 2A definition of contaminated land*". Further the guidance makes it clear that *"regulatory decisions should be based on what is reasonably likely, not what is hypothetically possible".*

The overarching objectives of the Government's policy on contaminated land and the Part 2A regime are:

"(a) To identify and remove unacceptable risks to human health and the environment.
(a) To seek to ensure that contaminated land is made suitable for its current use.
(b) To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development".

In accordance with the guidance, the enforcing authority may need to decide whether and how to act in situations where decisions are not straightforward, and where there is uncertainty. "*In so doing, the authority should use its judgement to strike a reasonable balance between: (a) dealing with risks raised by contaminants in land and the benefits of remediating land to remove or reduce those risks; and (b) the potential impacts of regulatory intervention including financial costs to whoever will pay for remediation, health and environmental impacts of taking action, property blight, and burdens on affected people".* The authority is required to "*take a precautionary approach to the risks raised by contamination, whilst avoiding a disproportionate approach given the circumstances of each case".* The aim is "*that the regime produces net benefits, taking account of local circumstances*".

The guidance recognises that *"normal levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise".*

Normal levels are quoted as:
"a) natural presence of contaminants' such as from underlying geology *'that have not been shown to pose an unacceptable risk to health and the environment*
b) …low level diffuse pollution, and common human activity…"

Similarly the guidance states that significant pollution of controlled waters is required for land to be considered contaminated and the "*fact that substances are merely entering water"* or "*where discharge from land is not discernible at a location immediately downstream"* does not constitute contaminated land.

The guidance considers four categorisations to establish if land is contaminated by either presenting an unacceptable risk to human health or significant pollution of controlled waters (Categories 1 and 2) or where not (Categories 3 and 4).

Category 1: "*unacceptably high probability, supported by robust scientific evidence, that significant harm or significant pollution would occur".* These situations can arise where similar land or exposures are known or strongly suspected to have caused harm.

Category 4: *"no risk or that the level of risk is low".* These situations can arise where no contaminant linkage is established or normal/background levels of contaminants are present, or where the exposure from soil is only a small proportion of what the receptors may be exposed to.

For land that cannot be readily placed into Categories 1 or 4 further assessment is required. If there is a sufficiently strong case that the risks are of sufficient concern to cause significant harm/pollution or have the significant possibility of significant harm/pollution the land is to be placed into Category 2. If the concern is not met land is considered Category 3.

The technical guidance clearly states that the currently published SGV and GAC's represent *"cautious estimates of level of contaminants in soils"* which should be considered *"no risk to health or, at most, a minimal risk"*. These values do not represent the boundary between categories 3 and 4 and "*should be considered to be comfortably within Category 4".*

2.2 Planning

The Local Planning Authority (LPA) is responsible for the control of development, and in doing so it has a duty to take account of all material considerations, including contamination.

Section 11, Paragraph 109 of the National Planning Policy Framework (NPPF) (DCLG 2012) states the planning system should contribute to and enhance the natural and local environment by *"preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water pollution"* and *"remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate"*. Paragraphs 120 and 121 describe the policy considerations the Government expects LPA to have in regard to land affected by contamination when preparing policies for development plans and in taking decisions on applications.

For planning purposes, the NPPF requires that the assessment of risks arising from contamination and remediation requirements should be considered on the basis of the current environmental setting, the current land use, and the circumstances of its proposed new use.

In most other respects, however, the underlying approach to identifying and dealing with risk, and the overall policy objective of safeguarding human health and the environment, are similar to that outlined in Part 2A.

However, the level at which contamination is deemed to be unacceptable, or, gives rise to adverse effects under a planning context has not been identified but is envisaged to be more precautionary than the level required to detrmine land as contaminated under Part 2A.

The current SGV and GAC are not considered target values for the planning regime. In paragraph 121 the developer is required to ensure that land, after development, is not capable of being determined as contaminated land under Part 2A of the EPA 1990.

The principal planning objective is to ensure that any unacceptable risks to human health, buildings and other property and the natural and historical environment from the contaminated condition of the land are identified so that appropriate action can be considered and taken to address those risks. In order to grant a planning permission the Local Planning Authority (LPA) has to be satisfied that there is sufficient information about the condition of the land, its impacts and the availability of viable remedial options. NPPF Paragraph 21 states that *"planning policies and decisions should also ensure that adequate site investigation information, prepared by a competent person, is presented".* Site investigation information is further defined in the NPPF Glossary page 56 and that also states that investigations should be carried out in accordance with established procedures, including BS10175 (BSI 2011) that in turn links procedure to the requirements of CLR11.

2.3 Building Control

The building control department of the local authority (along with the private sector approved inspectors) are responsible for the operation and enforcement of the Building Regulations 2010 (DCLG 2010) to protect the health, safety and welfare of people in and around buildings and Building Control Regulations Approved Document C. Specifically requires the protection of buildings and associated land from the effects of contamination, to be applied (non-exclusively) in all changes of use from commercial or industrial premises, to residential property.

3 Approach

CLR 11 recommends a phased or tiered approach to risk assessment with the three tiers being:-

- Tier 1 - preliminary – a qualitative assessment forming part of a Phase 1 report,
- Tier 2 - generic - a quantitative assessment using published criteria to screen site specific ground condition data forming part of a Phase 2 report
- Tier 3 - detailed – a quantitative assessment involving the generation of site specific assessment criteria

Each tier of risk assessment comprises the following four stages:-

1. Hazard Identification – identifying potential contaminant sources on and off site;
2. Hazard Assessment – assessing the potential for unacceptable risks by identifying what pathways and receptors could be present, and what pollutant linkages could result (forming the Conceptual Site Model (CSM));

3. Risk Estimation – estimating the magnitude and probability of the possible consequences (what degree of harm might result to a defined receptor and how likely); and

4. Risk Evaluation – evaluating whether the risk needs to be, and can be, managed.

A PBA Phase 1 report normally comprises a desk study, walkover and Tier 1 risk assessment (the project specific offer defines the actual scope of work). This is the minimum requirement as defined by the NPPF, pp56. At Tier 1 the PBA approach to risk estimation involves identifying the magnitude of the potential consequence (taking into account both the potential severity of the hazard and the sensitivity of the receptor) and the magnitude of the likelihood i.e. the probability (taking into account the presence of the hazard and the receptor and the integrity of the pathway). This approach is promoted in current guidance such as R&D 66 (NHBC 2008).

The PBA approach is that if a pollution linkage is identified then it represents a potential risk which requires further consideration and either (1) remediation / direct risk management or (2) further tiers of assessment.

A PBA preliminary Phase 2 report comprises an intrusive investigation to collect site specific information, a Tier 2 quantitative generic risk assessment and a refinement of the CSM using the site specific data. Depending on the findings further investigation and/or progression to Tier 3 risk assessment and the generation of site specific assessment criteria may be required.

The PBA methodology provides an estimate of the level of risk, it does not identify a risk level at which the risk is considered "significant" and/or "unacceptable" as this is dependant on the view of the individual / stakeholder. For example; to a risk adverse stakeholder even a risk level of "very low" may be considered unacceptable and as such this stakeholder may require risk management options to be implemented.

4 Identification of Pollutant Linkages and Conceptual Site Model (CSM)

For all Tiers the underlying principle to ground condition assessment is the identification of *pollutant linkages* in order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements:-

- A source/hazard – a substance or situation which has the potential to cause harm or pollution;

- A pathway – a means by which the hazard moves along / generates exposure; and

- A receptor/target – an entity which is vulnerable to the potential adverse effects of the hazard.

The *Conceptual Site Model* identifies the types and locations of potential contaminant sources/hazards and potential receptors and potential migration/transportation pathway(s). The CSM is refined as the assessment progresses through the Tiers.

4.1 Hazard Identification

A hazard is a substance or situation that has the potential to cause harm. Hazards may be chemical, biological or physical (e.g. explosive gases).

At Tier 1 the potential for hazards to be present is determined from consideration of the previous or ongoing activities on or near to the site in accordance with the criteria presented in the **Table 1**.

Based on the land use information Potential Contaminants of Concern (PCOC) are identified. The PCOC direct the scope of the collection of site specific data and the analytical testing selected for subsequent Tiers.

At Tier 2 the site specific data is screened using published assessment criteria (refer to PBA document entitled Rationale for the Selection of Tier 2 Assessment Criteria). In general, published criteria have been developed using highly conservative assumptions and therefore if the screening criterion is not exceeded then the PCOC is eliminated as a potential Hazard. It should be noted that exceedance does not necessarily indicate that a site is contaminated and/or unsuitable for use only that the PCOC is retained as a potential Hazard. Published criteria are generated using models based on numerous and complex assumptions. Whether or not these assumptions are appropriate in a site-specific context requires confirmation on a project by project basis and would form part of a Tier 3 assessment.

When reviewing or assessing site specific data PBA utilise published guidance on comparing contamination data with a critical concentration (CL:AIRE/CIEH 2008) which presents a structured process for employing statistical techniques for data assessment purposes. The benefit of the statistical tool is uncertainty is quantified and decisions are made knowing the strength of the evidence. Correct decision probability is a function of sample size, difference in the mean and the critical concentration, variation in measured values and the significance level.

4.2 Receptor and Pathway Identification

For all Tiers the potential receptors (for both on site and adjoining land) that will be considered are:

- Human Health – including current and future occupiers, construction and future maintenance workers, and neighbouring properties/third parties;
- Ecological systems; *[1]
- Controlled waters *[2] – including surface water and groundwater;
- Property, Animal or Crop (existing or proposed) - including buildings, service lines and pipes, crops, livestock, pets, woodland; and
- Archaeological sites and ancient monuments.

*[1] International or nationally designated sites (as defined in the statutory guidance (Defra Circular 04/12)) "in the local area" will be identified as potential ecological receptors. A search radius of 1, 2 or 5km will be utilised depending on the site specific circumstances (see also pathway identification). The Environment Agency has published an ecological risk assessment framework (EA 2008) which promotes (as opposed to statutorily enforces) consideration of additional receptors to include locally protected sites and protected or notable species. These additional potential receptors will only be considered if a Phase 1 habitat survey, undertaken in accordance with

guidance (JNCC 1993), is commissioned and the data provided to PBA. It should be noted that without such a survey the Tier 1 risk assessment may conclude that the identification of potential ecological receptors is inconclusive (see Specification).

*[2] the definition of "pollution of controlled water" was amended by the introduction of Section 86 of the Water Act 2003. For the purposes of Part 2A groundwater does not include waters above the saturated zone and our assessment does not therefore address perched water other than where development causes a pathway to develop.

If a receptor is taken forward for further assessment it will be classified in terms of its sensitivity, the criteria for which are presented in **Table 2**. Table 2 has been generated using descriptions of environmental receptor importance/value given in various guidance documents including R&D 66 (NHBC 2008) and Transport Analysis Guidance (based on DETR 2000). Human health and buildings classifications have been generated by PBA using the attribute description for each class.

The exposure pathway and modes of transport that will be considered are presented in **Table 3**.

4.3 Note regarding Ecological Systems

The Environment Agency (EA) has developed an ecological risk assessment framework which aims to provide a structured approach for assessing the risks to ecology from chemical contaminants in soils (EA 2008). In circumstances where contaminants in water represent a potential risk to aquatic ecosystems then risk assessors will need to consider this separately.

The framework consists of a three tiered process:-

- Tier 1 is a screening step where the site soils chemical data is compared to a soil screening value (SSV)
- Tier 2 uses various tools (including surveys and biological testing) to gather evidence for any harm to the ecological receptors
- Tier 3 seeks to attribute the harm to the chemical contamination

Tier 1 is preceded by a desk study to collate information about the site and the nature of the contamination to assess whether pollutant linkages are feasible. The framework presents ten steps for ecological desk studies and development of a conceptual site model as follows.

1 Establish Regulatory Context
2 Collate and Assess Documentary Information
3 Summarise Documentary Information
4 Identify Potential Contaminants of Concern
5 Identify Likely Fate Transport of Contaminants
6 Identify Potential Receptors of Concern
7 Identify Potential Pathways of Concern
8 Create a Conceptual Site Model
9 Identify Assessment and Measurement Endpoints
10 Identify Gaps and Uncertainties

The information in a standard PBA Phase 1 report covers Steps 1 to 4 inclusive. Step 5 considers fate and transport of contaminants and it should be noted that our standard report adopts a simplified approach considering only transport mechanisms. A simplified approach has also been adopted in respect of Steps 6 and 7 receptors (a detailed review of the ecological attributes has not been undertaken) and pathways (a food chain assessment has not been undertaken). Step 9 is outside the scope of our standard Phase 1 report.

The Tier 1 prepared by PBA as part of a Phase 1 report will assess the viability of the mode of transport given the site specific circumstances not specific pathways. As with receptor identification it should be noted that without a habitat survey the Tier 1 risk assessment may conclude that the risk to potential ecological receptors is inconclusive (see PBA Specification for Phase 1 Assessment of Potentially Contaminated Land).

4.4 Note regarding Water Framework Directive

The Water Framework Directive (WFD) (2000) aims to protect and enhance the quality of surface freshwater, groundwaters and dependent eco systems, estuaries and coastal waters. The WFD was transposed into UK law in 2003 (Statutory Instruments 2003). Member states must aim to reach good chemical and ecological status as defined in the Directive by 2015.

To address the WFD, a River Basin Management Plan (RBMP) has been developed for the 11 River Basin Districts in England and Wales. These were released by Defra in 2009 (Defra 2009).

These RBMP's establish the current status of waters within the catchments of the respective Districts and the current status of adjoining waters identified. As part of a Tier 2 risk assessment water quality data is screened against the WFD assessment criteria. Compare to the RBMP's current status of waters for the catchment under consideration would form part of a Tier 3 assessment.

5 Risk Estimation

Risk estimation classifies what degree of harm might result to a receptor (defined as consequence) and how likely it is that such harm might arise (probability).

At Tier 1 the consequence classification is generated by multiplying the hazard classification score and the receptor sensitivity score. This approach follows that presented in the republished R&D 66 (NHBC 2008).

The criteria for classifying probability are set out in **Table 4** and have been taken directly from Table 6.4 CIRIA C552 (CIRIA 2001). Probability considers the integrity of the exposure pathway.

The consequence classifications detailed in **Table 5** have been adapted from Table 6.3 presented in C552 and R&D 66 (Annex 4 Table A4.3).

The Tier 1 risk classification is estimated for each pollutant linkage using the matrix given in **Table 6** which is taken directly from C552 (Table 6.5). Subsequent Tiers refine the CSM through retention or elimination of potential hazards and pollutant linkages.

6 Risk Evaluation

In order to put the Tier 1 risk classification into context the likely actions are described in **Table 7** which is taken directly from C552 (Table 6.6). Subsequent Tiers identify potential risk management options through remediation and/or mitigation measures.

7 References

BSI 2007 BS 8485 Code of Practice for characterisation and remediation from ground gas in affected developments.

BSI 2011 BS 10175 (2011) Code of practice - Investigation of potentially contaminated sites

CIRIA 2001: Contaminated land risk assessment – a guide to good practice C552.

CIRIA 2008: Assessing risks posed by hazardous ground gases to buildings C655

CL:AIRE/EIH 2008 Guidance on Company Soil Contamination Data with a Critical Concentration

DCLG 2010 Building Regulations 2010 Approved Document C Site preparation and resistance to contaminants and moisture.

DCLG March 2012. National Planning Policy Framework.

DETR 2000 Methodology for Multi Modal Studies. Volume 2 Section 4. The Environmental Objective.

Defra Circular 01/2006

Defra Circular 04/2012 Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance.

Defra '2009 Water for Life and Livelihoods. River Basin Management Plan. (11 Districts: Anglia, Dee, Humber, Northumbria, Northwest, Severn, Solway and Tweed, Southeast, Thames, Western Wales) December 2009

EA 2004: The Model Procedures for the Management of Land Contamination CRL 11 published by the Environment Agency (EA).

EA 2008 Ecological Risk Assessment Science Report Series SC070009 published by the Environment Agency (EA).

European Community 2000 Water Framework Directive (2000/60/EC)

JNCC 1993 Handbook for Phase 1 Habitat Survey – A Technical for Environmental Audit prepared by the Joint Nature Conservancy Council (JNCC)

NHBC/EA/CIEH 2008: R&D Publication 66 Guidance for the safe development of housing on land affected by contamination.

Statutory Instrument 2003 No. 3242 Water Resources, England and Wales. The Water Environment (Water Framework Directive) Regulations 2003.

Table 1: Criteria for Classifying Hazards / Potential for Generating Contamination

Classification/Score	Potential for generating contamination/gas based on land use
Very Low 1	Land Use: agriculture, residential, allotment, recent retail or office use Contamination: None or low level residual concentrations. Gas generation potential : Inert Made Ground
Low 2	Land Use: recent small scale industrial, railway tracks, small scale fuel storage (heating). Contamination: Locally or slightly elevated concentrations. Gas generation potential : Shallow thickness of Alluvium
Moderate 3	Land Use: railway yards, collieries, scrap yards, light industry, engineering works. Contamination: Locally elevated concentrations. Gas generation potential : Dock silt and substantial thickness of organic alluvium/peat
High 4	Land Use: gas works, chemical works, heavy industry, non-hazardous landfills. Contamination: Possible widespread elevated concentrations. Gas generation potential : Shallow mine workings Pre 1960's landfill
Very High 5	Land Use: hazardous waste landfills. Contamination: Likely widespread elevated concentrations. Gas generation potential : Domestic landfill post 1960

"Greenfield" is land which has not been developed including not used for crop production or animal husbandry and no contamination source therefore no pollutant linkages.

Table 2: Criteria for Classifying Receptor Sensitivity/Value

Classification/Score	Definition
Very Low 1	Receptor of limited importance Groundwater: Unproductive Surface water: None and/or >250m hydraulically down gradient Ecology: No local designation Buildings: Replaceable Human health: Unoccupied/limited access
Low 2	Receptor of local or county importance with potential for replacement Groundwater: Secondary B Surface water: Tertiary <100m hydraulically down gradient Ecology: local habitat resources Buildings: Local value Human health: Minimum score of 4
Moderate 3	Receptor of local or county importance with potential for replacement Groundwater: Secondary A Surface water: Tertiary <50m or Secondary <100m hydraulically down gradient Ecology: County wildlife sites, Areas of Outstanding Natural Beauty (AONB) Buildings: Area of Historic Character Human health: Commercial
High 4	Receptor of county or regional importance with limited potential for replacement Groundwater: Principal Surface water: Secondary <50m or Primary <100m hydraulically down gradient Ecology: SSSI, National or Marine Nature Reserve (NNR or MNR) Buildings: Conservation Area Human health: Minimum score where human health identified as potential receptor
Very High 5	Receptor of national or international importance Groundwater: Source Protection Zone Surface water: Primary <50m hydraulically down gradient Ecology: Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR) Buildings: World Heritage site Human health: Residential, open spaces and uses where children are present

Table 3: Exposure Pathway and Modes of Transport

Receptor	Pathway	Mode of transport
Human health	Ingestion	Fruit or vegetable leaf or roots
		Contaminated water
		Soil/dust indoors
		Soil/dust outdoors
	Inhalation	Particles (dust / soil) – outdoor
		Particles (dust / soil) - indoor
		Vapours – outdoor - migration via natural or anthropogenic pathways
		Vapours - indoor - migration via natural or anthropogenic pathways
	Dermal absorption	Direct contact with soil
		Direct contact with waters (swimming / showering)
		Irradiation
Groundwater	Leaching	Gravity / permeation
	Migration	Natural – groundwater as pathway Anthropogenic (e.g. boreholes, culverts, pipelines etc.)
Surface Water	Direct	Runoff or discharges from pipes
	Indirect	Recharge from groundwater
	Indirect	Deposition of wind blown dust
Buildings	Direct contact	Sulphate attack on concrete, hydrocarbon corrosion of plastics
	Gas ingress	Migration via natural or anthropogenic paths
Ecological systems	See Notes	Runoff/discharge to surface water body
	See Notes	Windblown dust
	See Notes	Groundwater migration
	See Notes	At point of contaminant source
Animal and crop	Direct	Wind blown or flood deposited particles / dust / sediments
	Indirect	Plants via root up take or irrigation. Animals through watering
	Inhalation	By livestock / fish - gas / vapour / particulates / dust
	Ingestion	Consumption of vegetation / water / soil by animals

Table 4: Classification of Probability

Classification	Definition
High likelihood	There is a pollution linkage and an event either appears very likely in the short-term and almost inevitable over the long-term, or there is already evidence at the receptor of harm / pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter-term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table 5: Classification of Consequence (score = magnitude of hazard Table 1 and sensitivity of receptor Table 2)

Classification / Score	Examples
Severe **20-25**	Human health effect - exposure likely to result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Equivalent to EA Category 1 incident (persistent and/or extensive effects on water quality leading to closure of potable abstraction point or loss of amenity, agriculture or commercial value. Major fish kill. Ecological effect - short-term exposure likely to result in a substantial adverse effect. Catastrophic damage to crops, buildings or property
Medium **10-16**	Human health effect - exposure could result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - equivalent to EA Category 2 incident requiring notification of abstractor Ecological effect - short-term exposure may result in a substantial adverse effect. Damage to crops, buildings or property
Mild **6-9**	Human health effect - exposure may result in "significant harm". Significant harm to humans is defined in circular 01/2006 as death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. Controlled water effect - equivalent to EA Category 3 incident (short lived and/or minimal effects on water quality). Ecological effect - unlikely to result in a substantial adverse effect. Minor damage to crops, buildings or property. Damage to building rendering it unsafe to occupy (for example foundation damage resulting in instability).
Minor **1-5**	No measurable effect on humans. Protective equipment is not required during site works. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects to crops, buildings or property. The loss of plants in a landscaping scheme. Discolouration of concrete.

Table 6: Classification of Risk (Combination of Consequence Table 5 and Probability Table 4)

	Consequence			
Probability	***Severe***	***Medium***	***Mild***	***Minor***
High likelihood	Very high	High	Moderate	Low
Likely	High	Moderate	Moderate/low	Low
Low likelihood	Moderate	Moderate/low	Low	Very low
Unlikely	Moderate/low	Low	Very low	Very low

Table 7: Description of Risks and Likely Action Required

Risk Classification	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation is likely to be required in the short term.
High risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.
Moderate risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

APPENDIX 2

Plate 1: Bellway Residential Development at Rainsford Farm

peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

JSA Planning

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	
Figure	**3A**

Plate 2: Stock Piles of Sand and Gravel in the east of the site

Plate 3: Possible fuelling station based off-site within Kennetholme Quarry

pba peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 4: Man-hole with inactive drains at the base

Plate 5: Stock pile of glass adjacent to the east of relict machinery

pba peterbrett Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7498	Client **Grundon Waste Management Ltd & The Henry Family**	**SITE WALKOVER PHOTOGRAPHS** **Land West of Kennetholme Quarry**	Date Jan 2015 A4 Scale nts Drawn TH Checked

Plate 6: Overview of relict machinery

Plate 7: Cemented asbestos clad building, possible control room

pba peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 8: Oil tank positioned to the west of the control room

Plate 9: Deep water feature in the south west of the landfill

pba peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 10: Infilled filter beds adjacent to the west of the control room

Plate 11: Hopper located along the northern boundary of the landfill

pba peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 12: Overhead pipe / conveyor belt leading to an off-site location

Plate 13: Evidence of and infilled pond

peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 14: Boundary between landfill on the right and agricultural land on the west

Plate 15: Overview of agricultural land with pylons running through the site

pba peterbrett
Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 16: View of fields with livestock

Plate 17: View of diverted stream along the western boundary

peterbrett

Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 18: General view of vacant fields (south)

Plate 19: General view of vacant fields (north)

pba peterbrett

Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

Plate 20: Ditch/stream filled with water

Plate 21: General view of vacant fields (north)

peterbrett

Caversham Bridge House, Waterman Place, Reading, RG1 8DN
Tel 0118 950 0761 Fax 0118 959 7498

Client

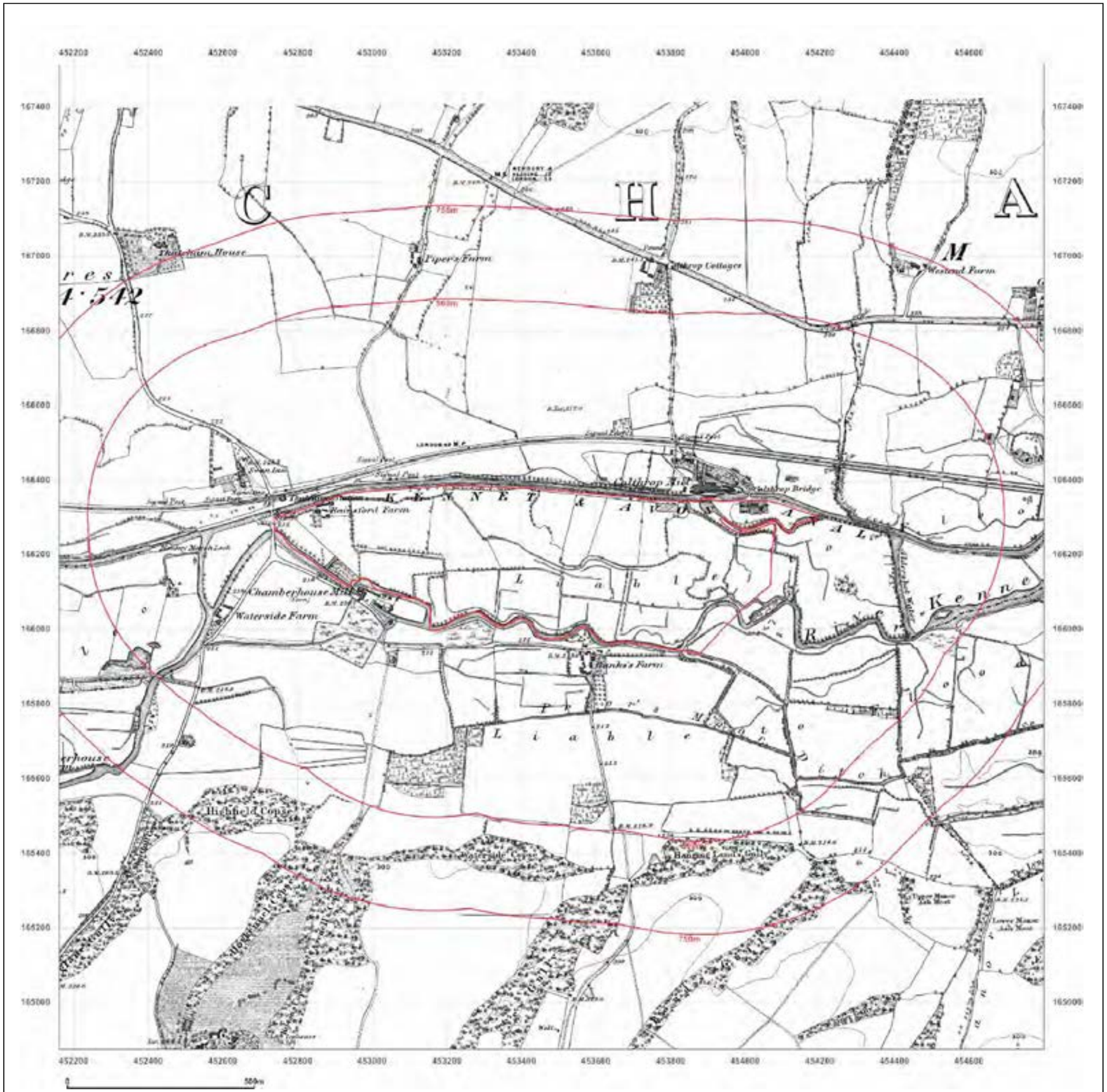
Grundon Waste Management Ltd & The Henry Family

SITE WALKOVER PHOTOGRAPHS

Land West of Kennetholme Quarry

Date	Jan 2015
A4 Scale	nts
Drawn	TH
Checked	

APPENDIX 3



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: County Series

Map date: **1871**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

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

GroundSure

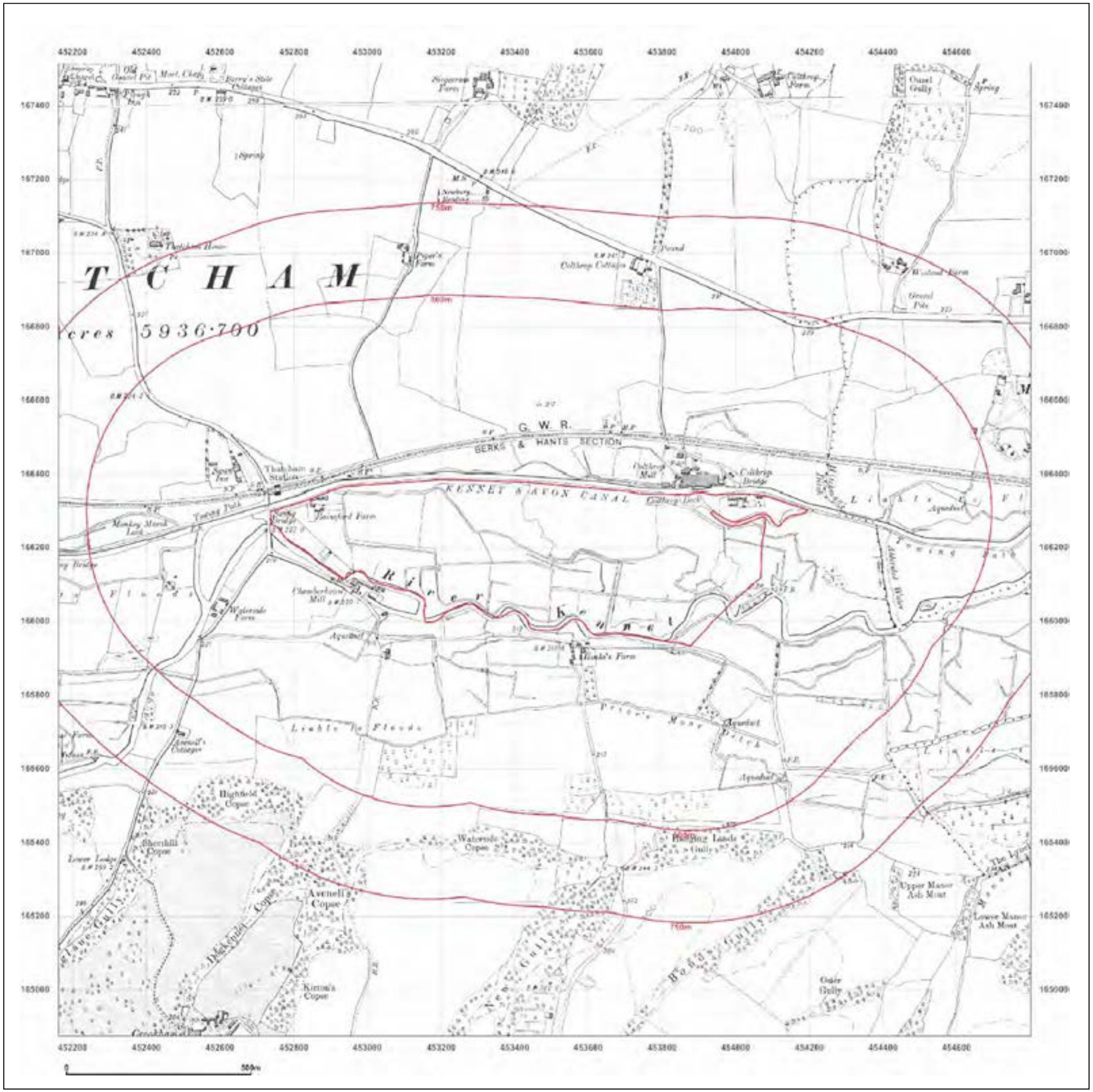
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

N
W
E
S

Surveyed 1876
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

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

GroundSure

Ordnance Survey Licensed Partner

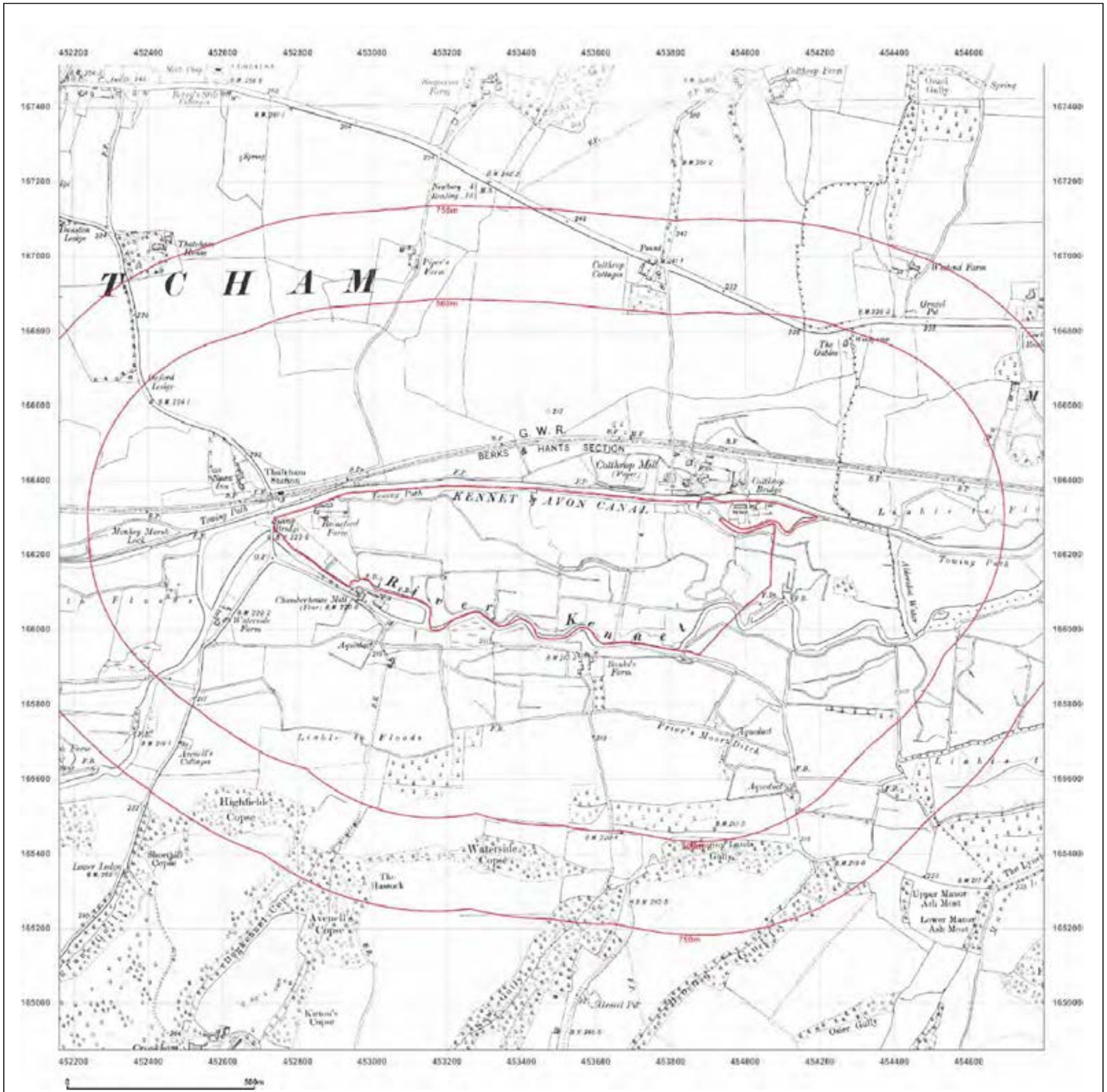
Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™



Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: County Series

Map date: **1909-1910**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1878
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

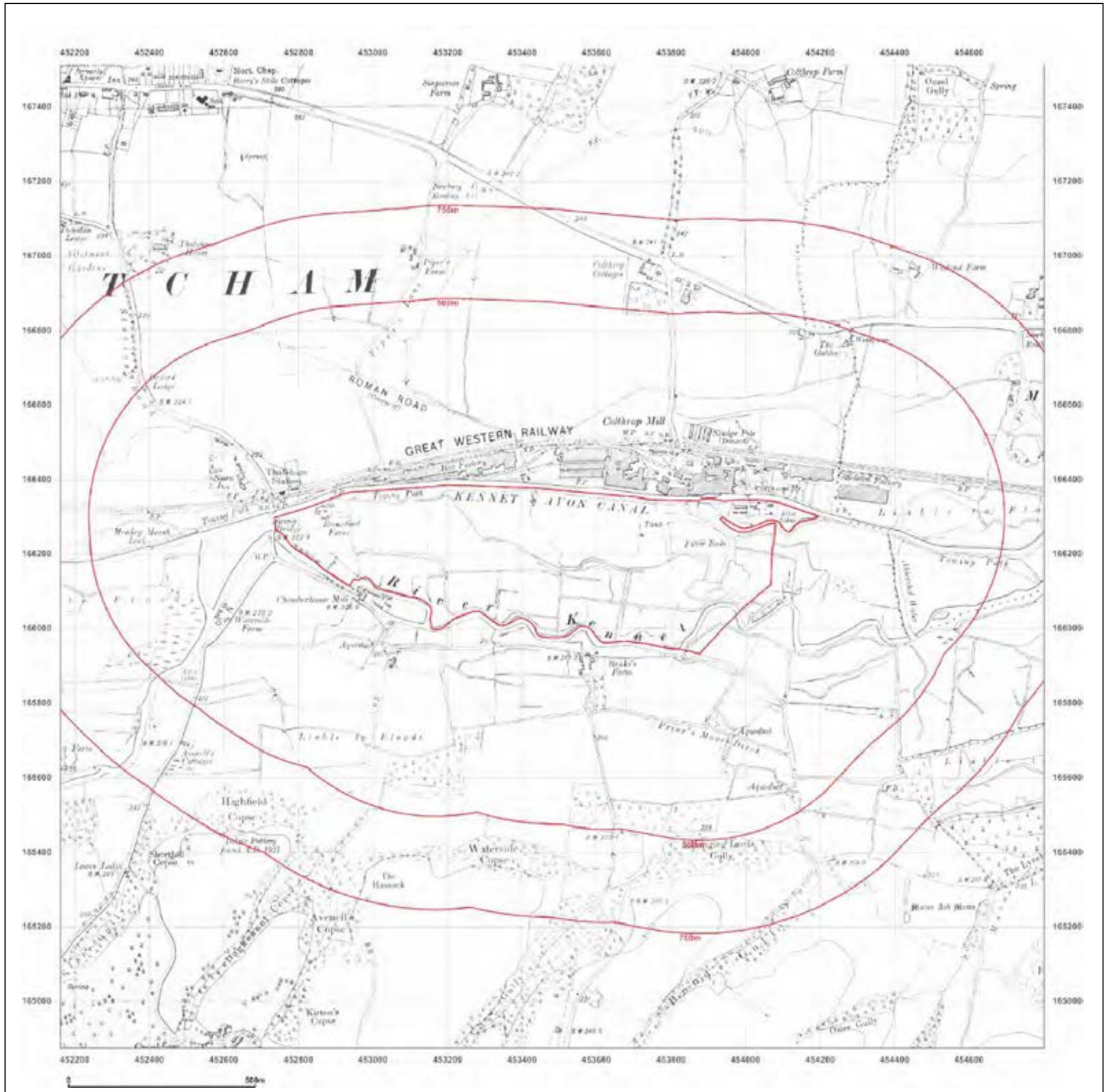
Surveyed 1874
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: County Series

Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W
E
S

Surveyed 1876
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

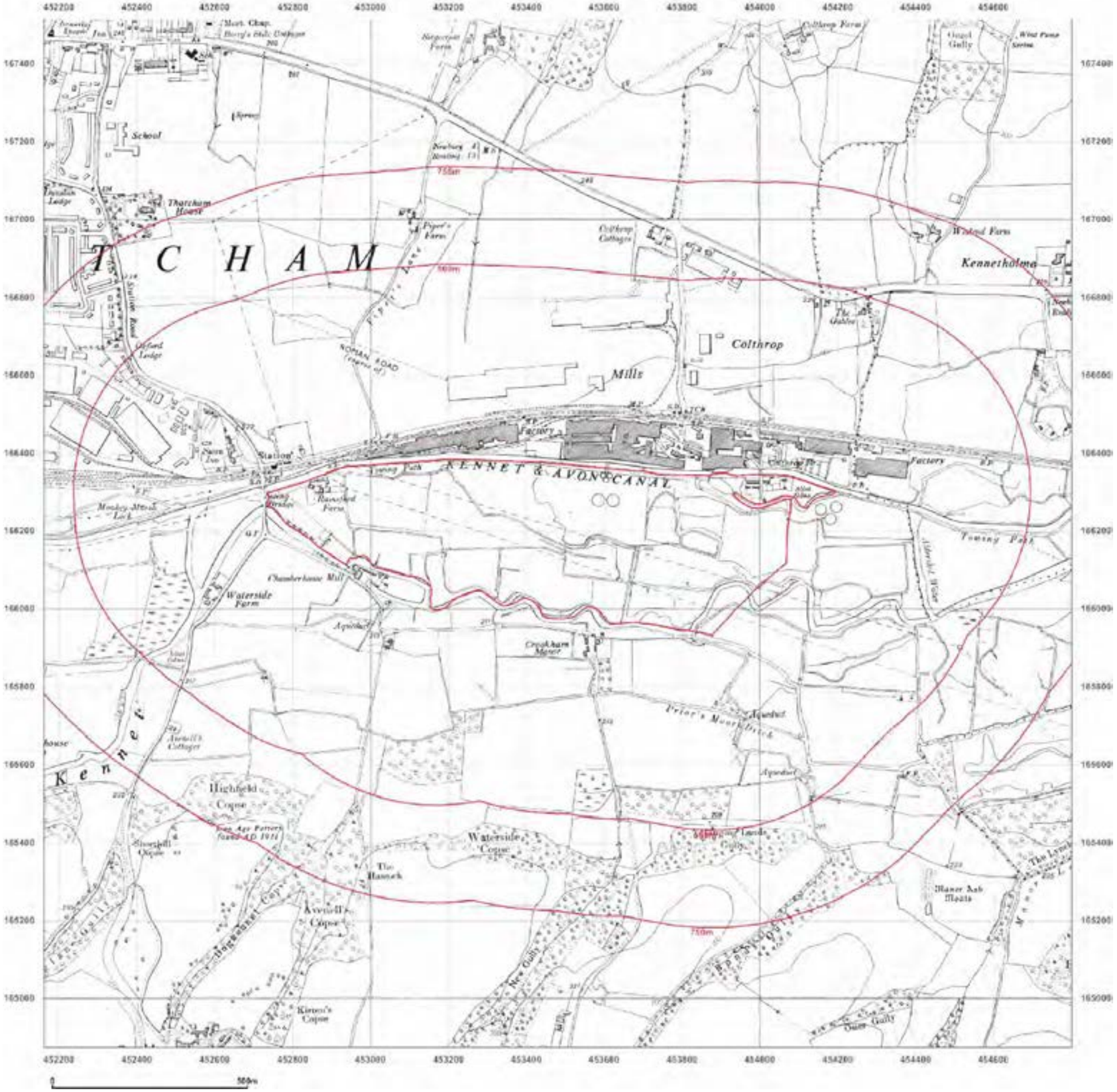
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: Provisional

Map date: **1956**

Scale: 1:10,560

Printed at: 1:10,560

N
W
E
S

Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

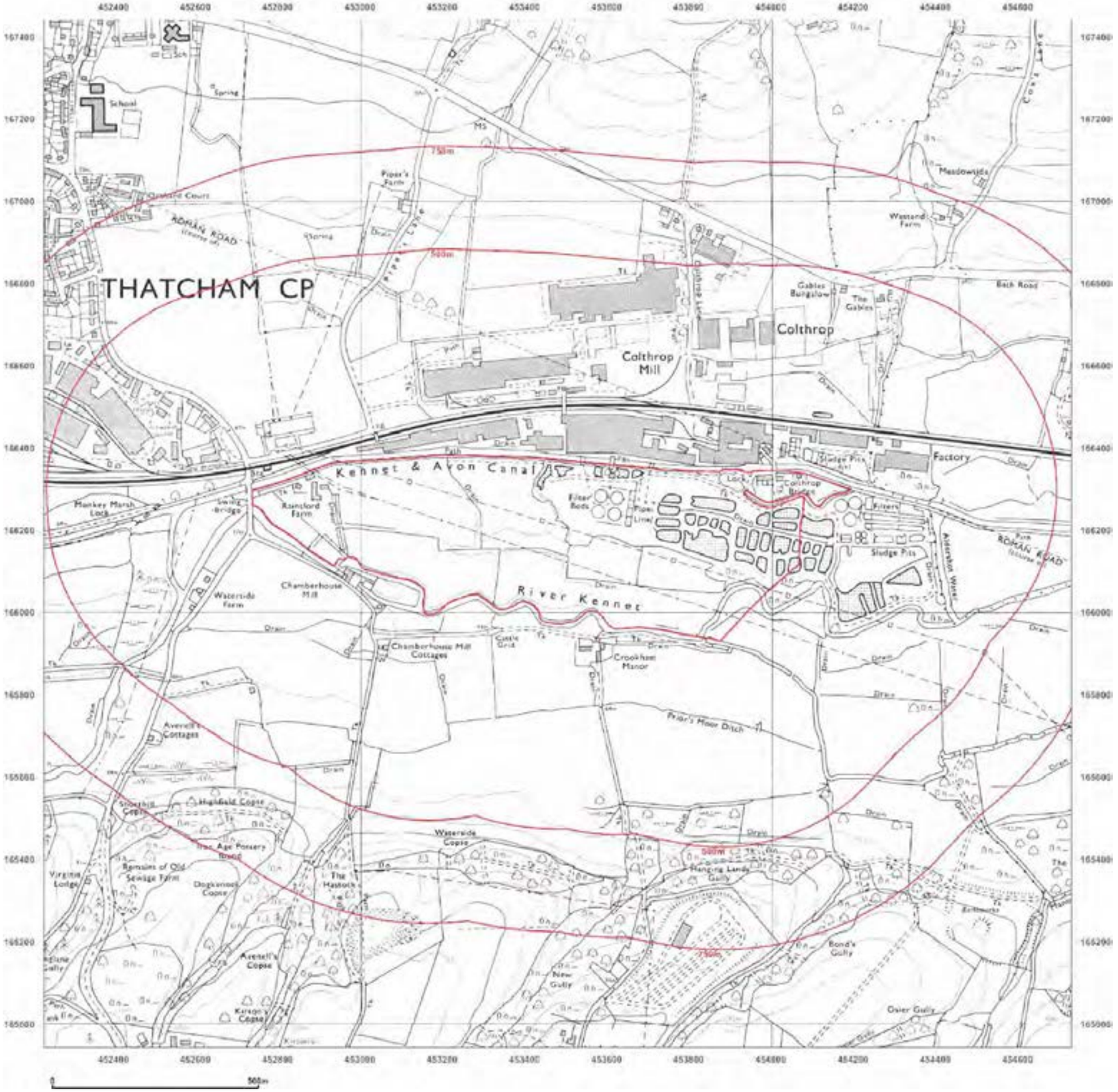
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: National Grid

Map date: **1970-1974**

Scale: 1:10,000

Printed at: 1:10,000

N
W
E
S

Surveyed 1970
Revised 1970
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1970
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

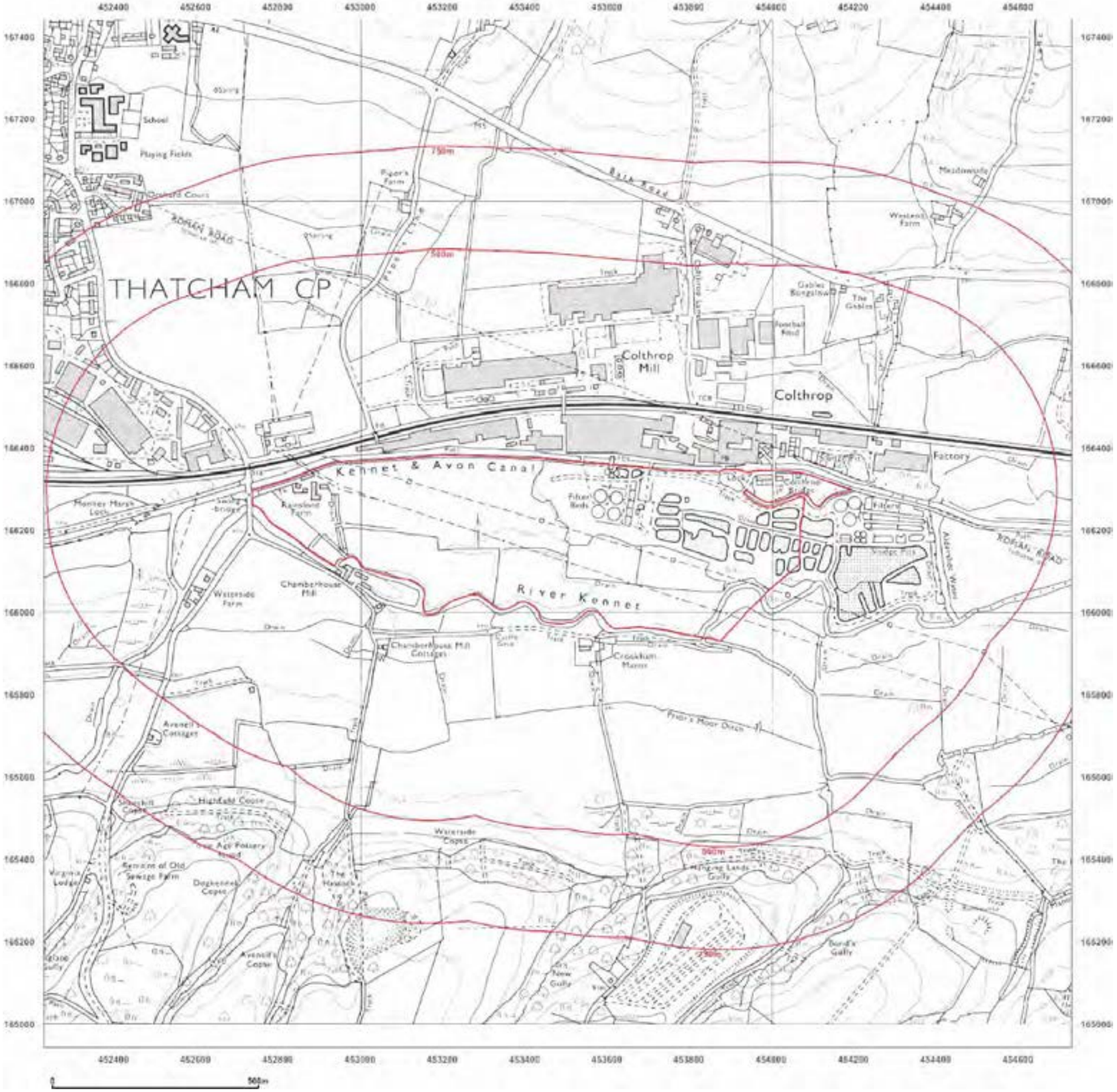
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: National Grid

Map date: **1981**

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1981
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: National Grid

Map date: **1991**

Scale: 1:10,000

Printed at: 1:10,000

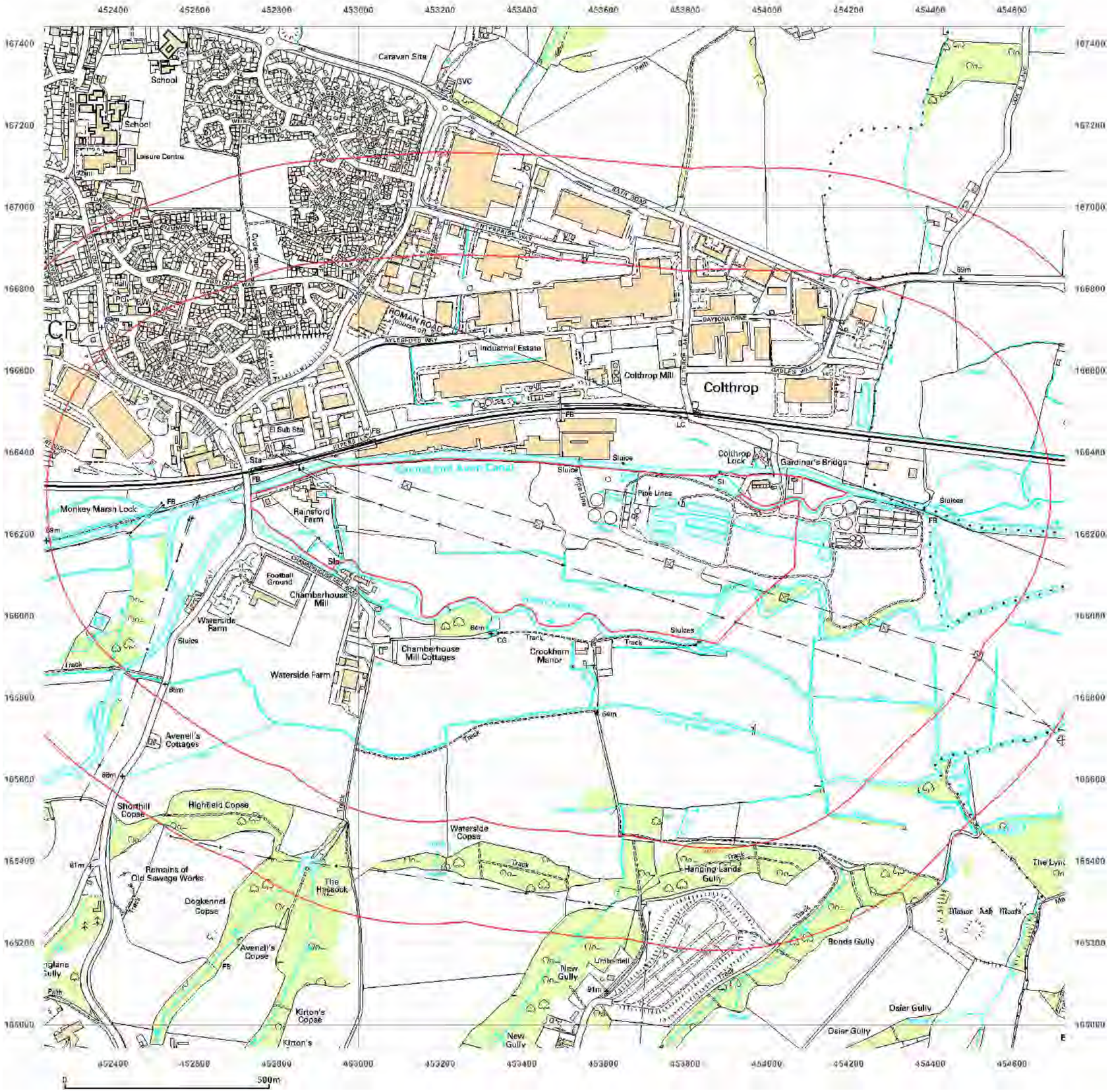
Surveyed 1990
Revised 1991
Edition N/A
Copyright N/A
Levelled N/A

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
W
E
S

2002

GroundSure

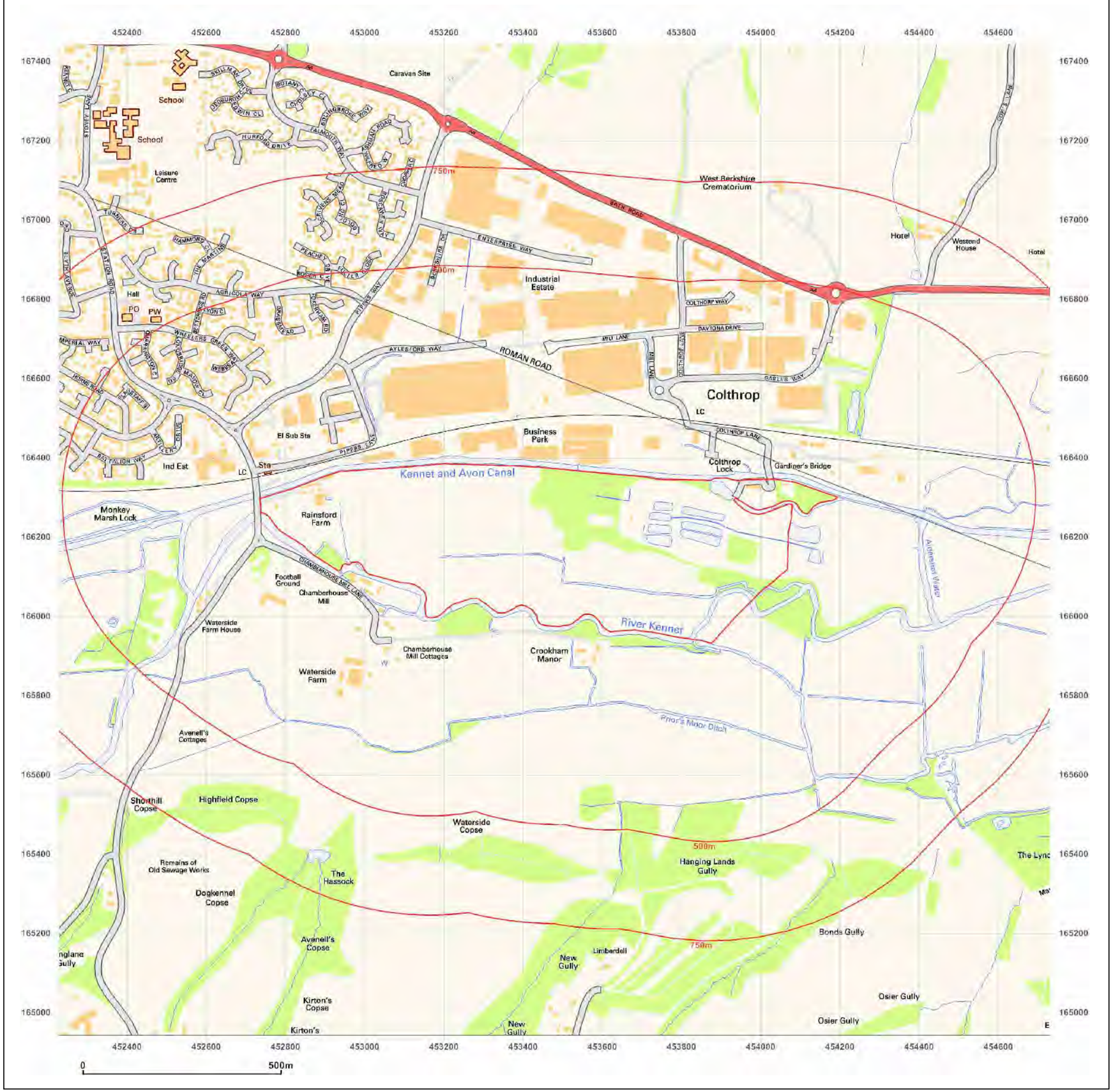
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

GroundSure

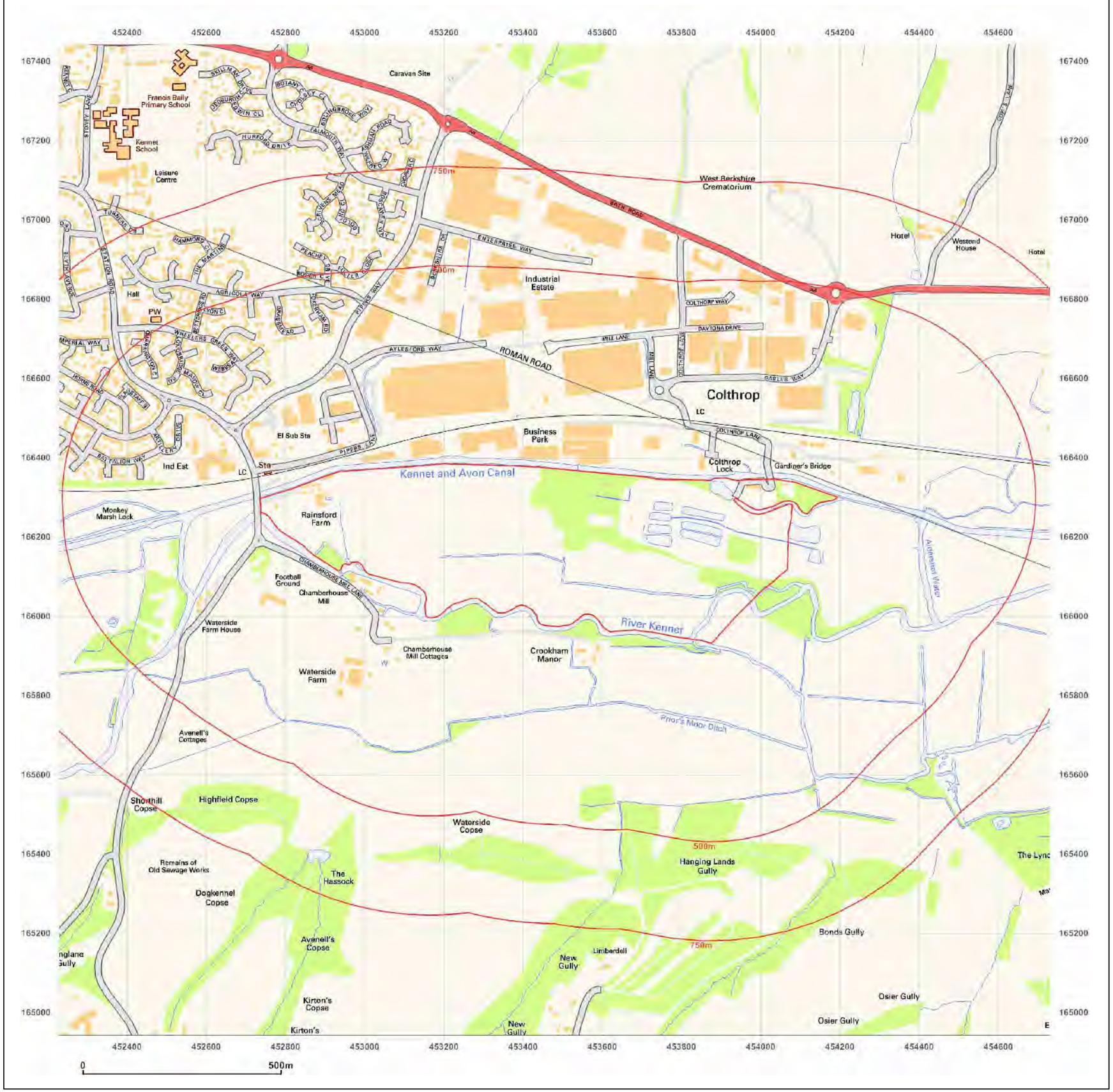
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044
Grid Ref: 453480, 166193

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

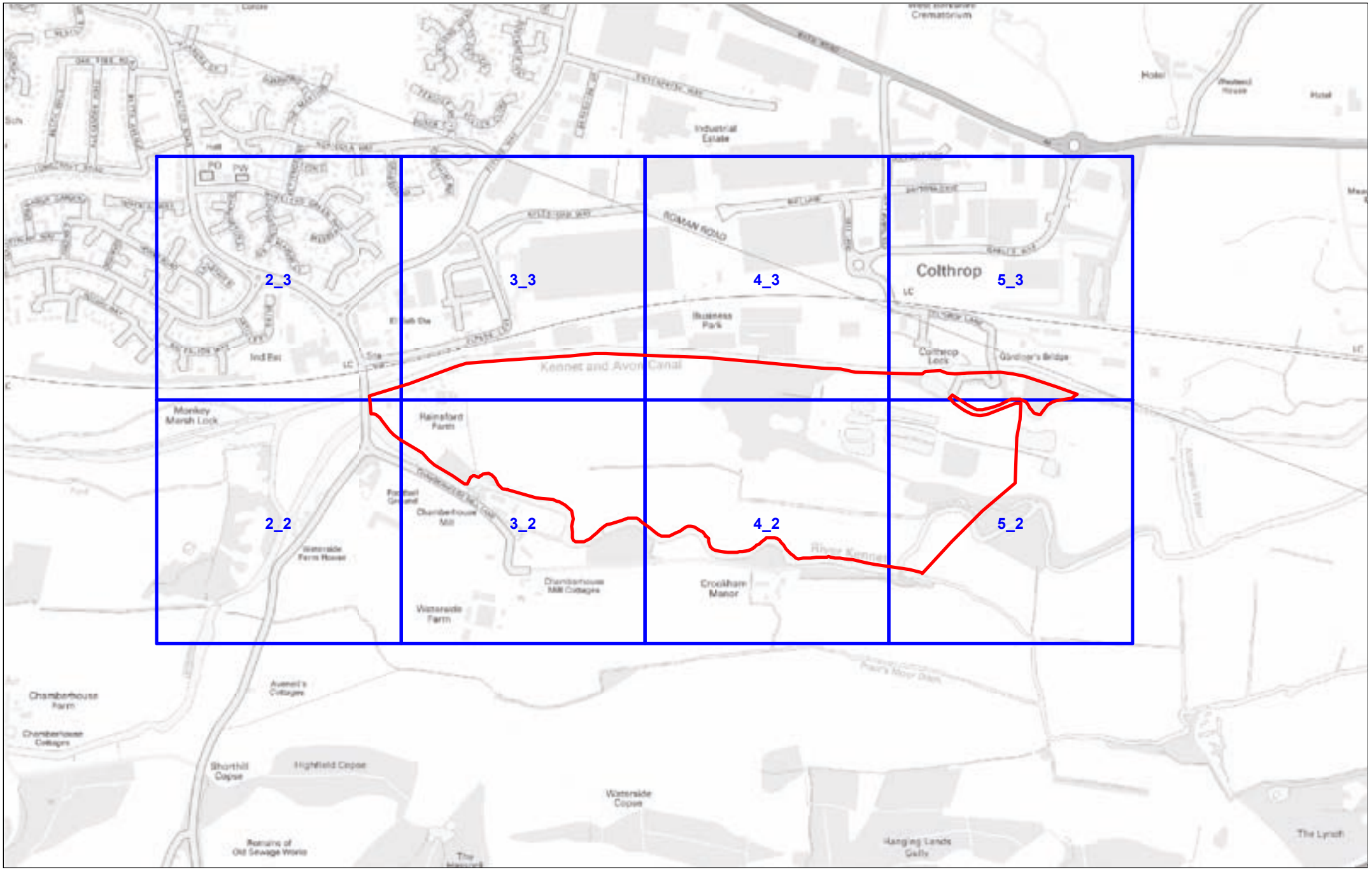
Printed at: 1:10,000

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*


2_3
3_3
4_3
5_3
2_2
3_2
4_2
5_2
Colthrop
ROMAN ROAD
Kennet and Avon Canal
Monkey Marsh Lock
Rainsford Farm
Chamberhouse Mill
Waterside Farm
Chamberhouse Farm
Shorthill Copse
Highfield Copse
Waterside Copse
Hanging Lands Gully
The Lynch

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_2_2
Grid Ref: 452548, 166038

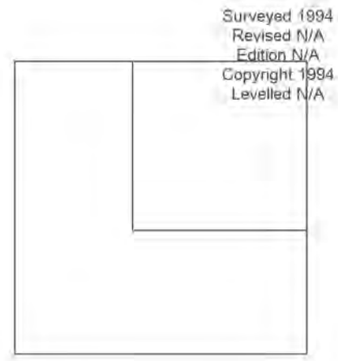
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_2_3
Grid Ref: 452548, 166541

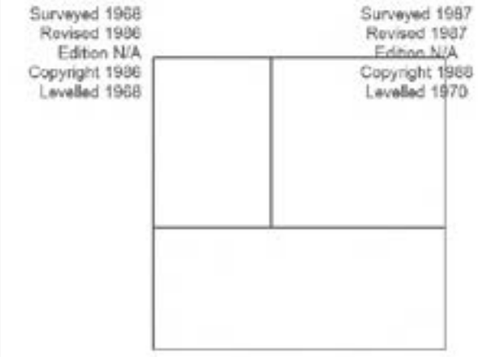
Map Name: National Grid

Map date: **1986-1988**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_2_3
Grid Ref: 452548, 166541

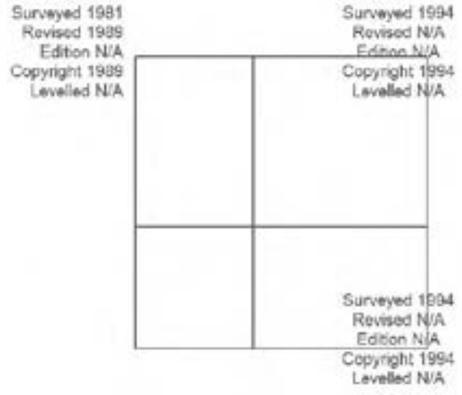
Map Name: National Grid

Map date: **1989-1994**

Scale: 1:1,250

Printed at: 1:2,000

N W E S



GroundSure

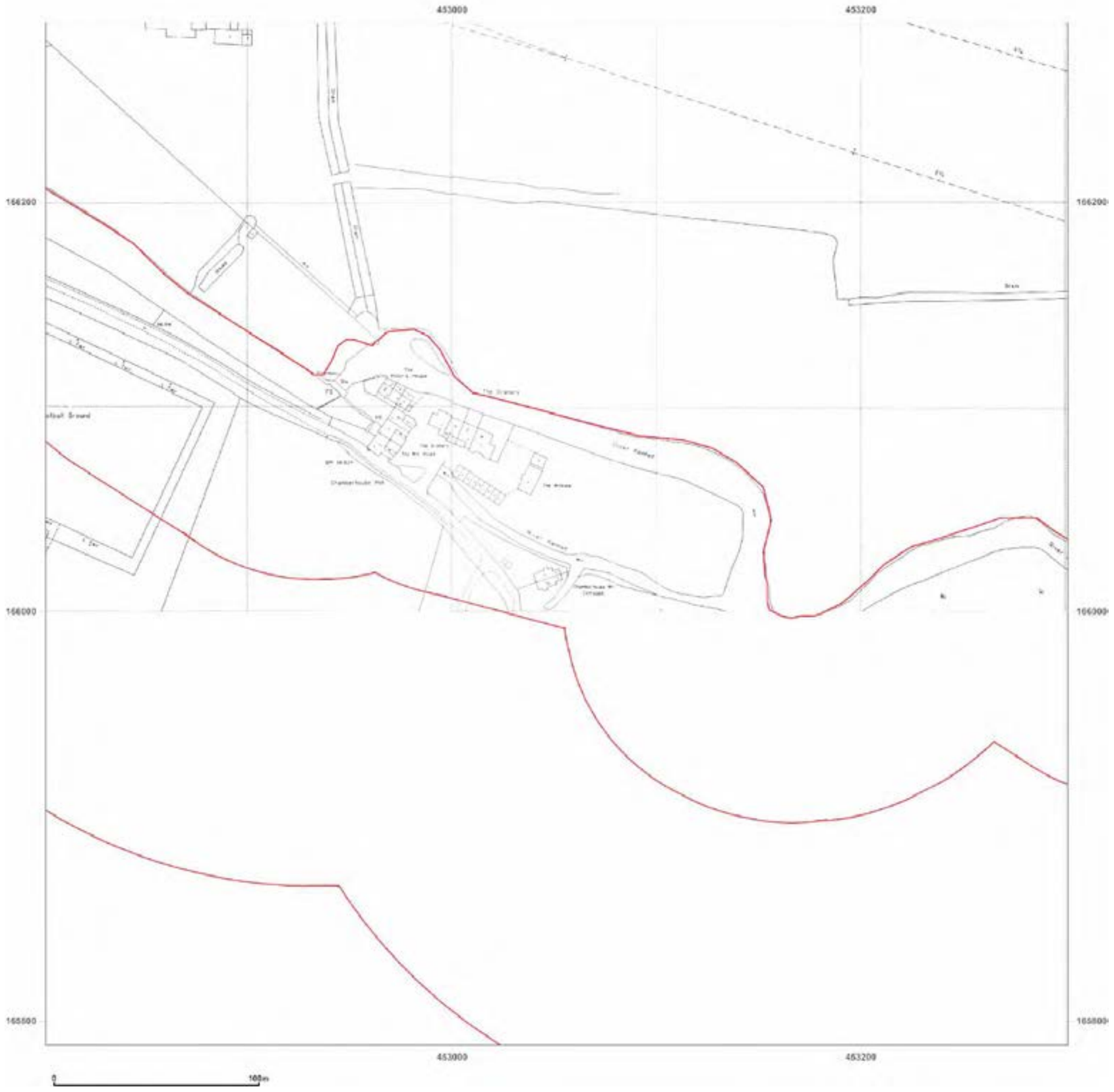
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_3_2
Grid Ref: 453051, 166038

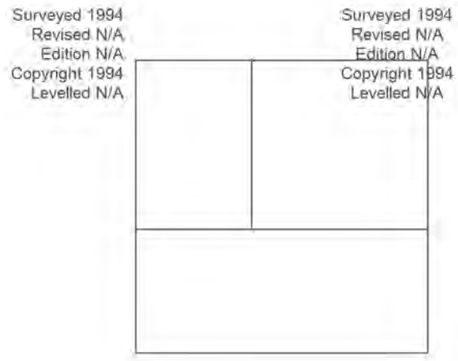
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_3_3
Grid Ref: 453051, 166541

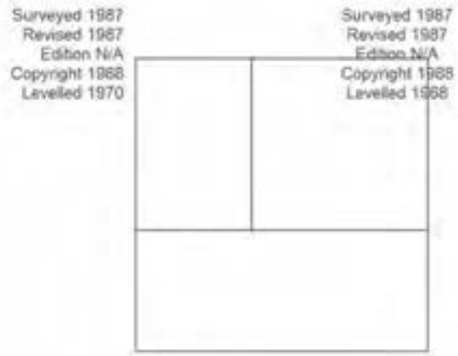
Map Name: National Grid

Map date: **1988**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

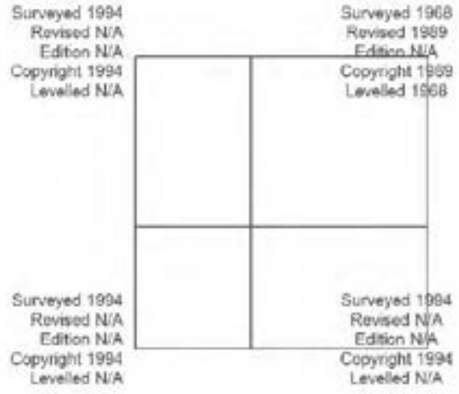
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_3_3
Grid Ref: 453051, 166541

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:1,250

Printed at: 1:2,000



GroundSure

Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

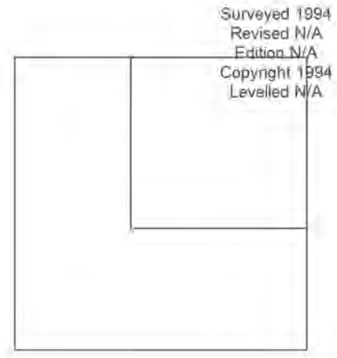
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_3_3
Grid Ref: 453051, 166541

Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000



GroundSure

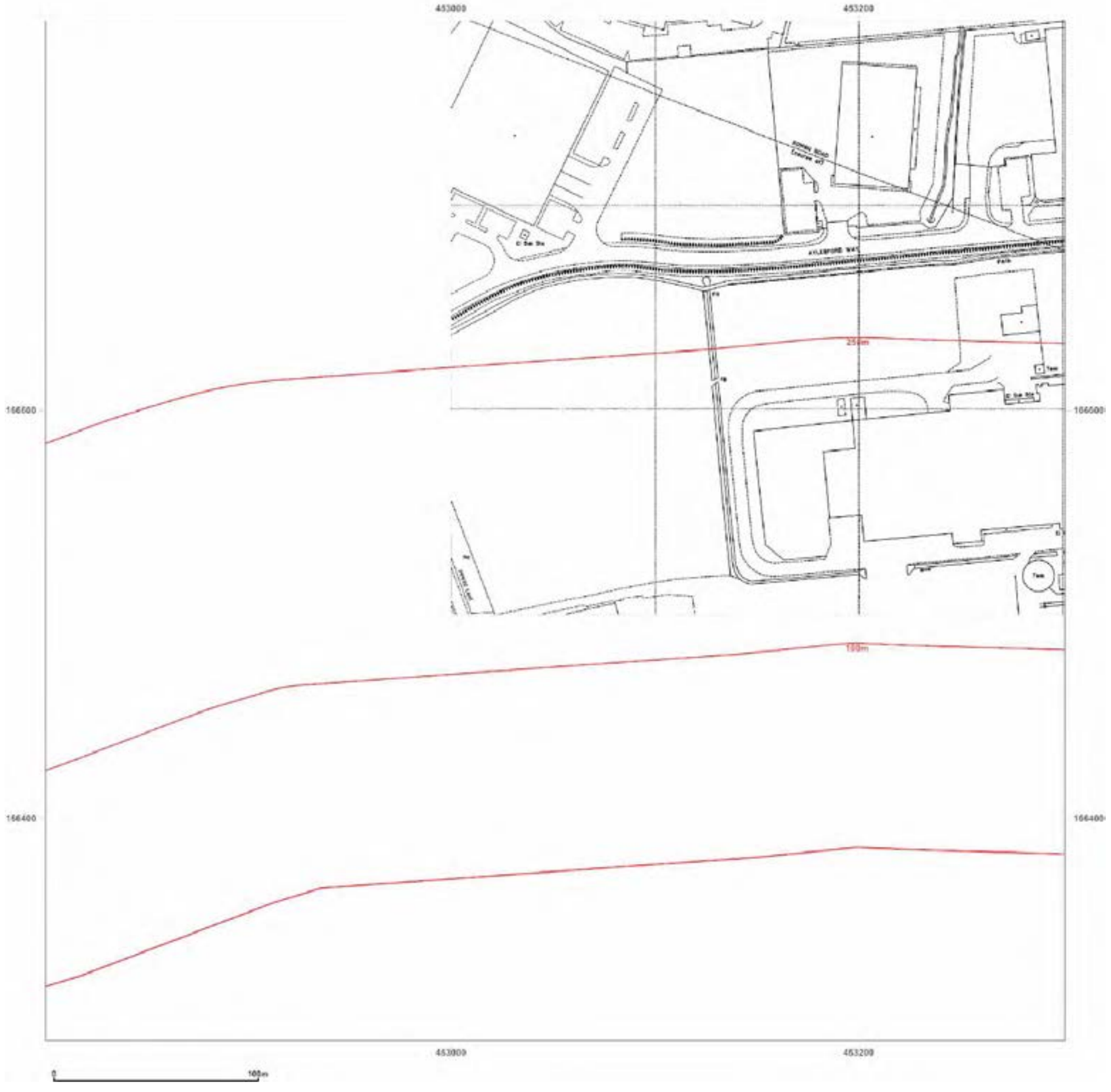
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_3_3
Grid Ref: 453051, 166541

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N W E S

GroundSure

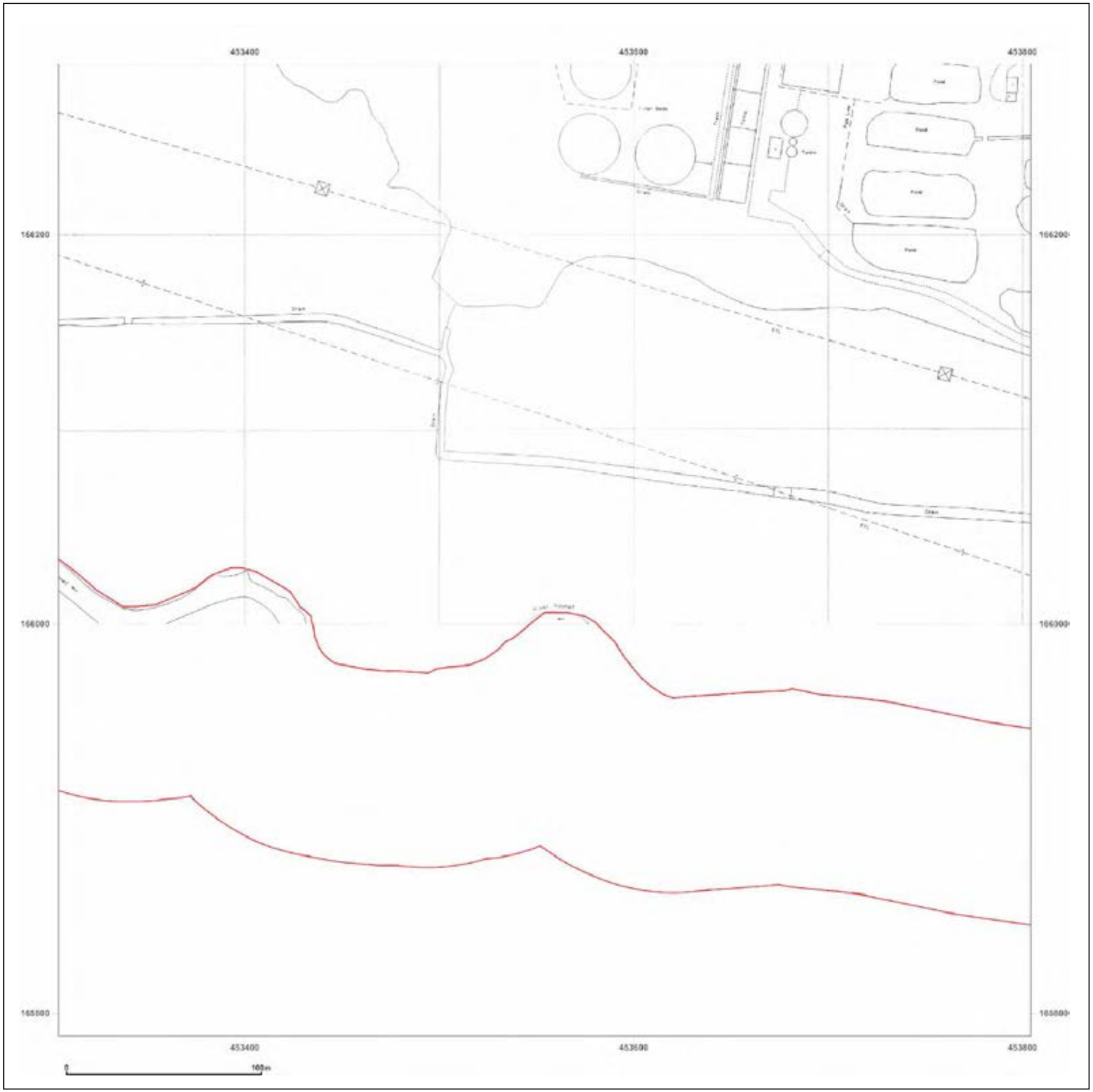
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref:	EMS_281295_381044
Report Ref:	EMS-281295_381044_1250scale_4_2
Grid Ref:	453554, 166038

Map Name:	National Grid
Map date:	**1994**
Scale:	1:1,250
Printed at:	1:2,000

GroundSure
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey
Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_4_3
Grid Ref: 453554, 166541

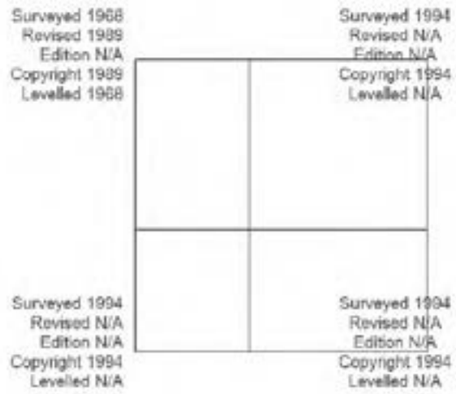
Map Name: National Grid

Map date: **1989-1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

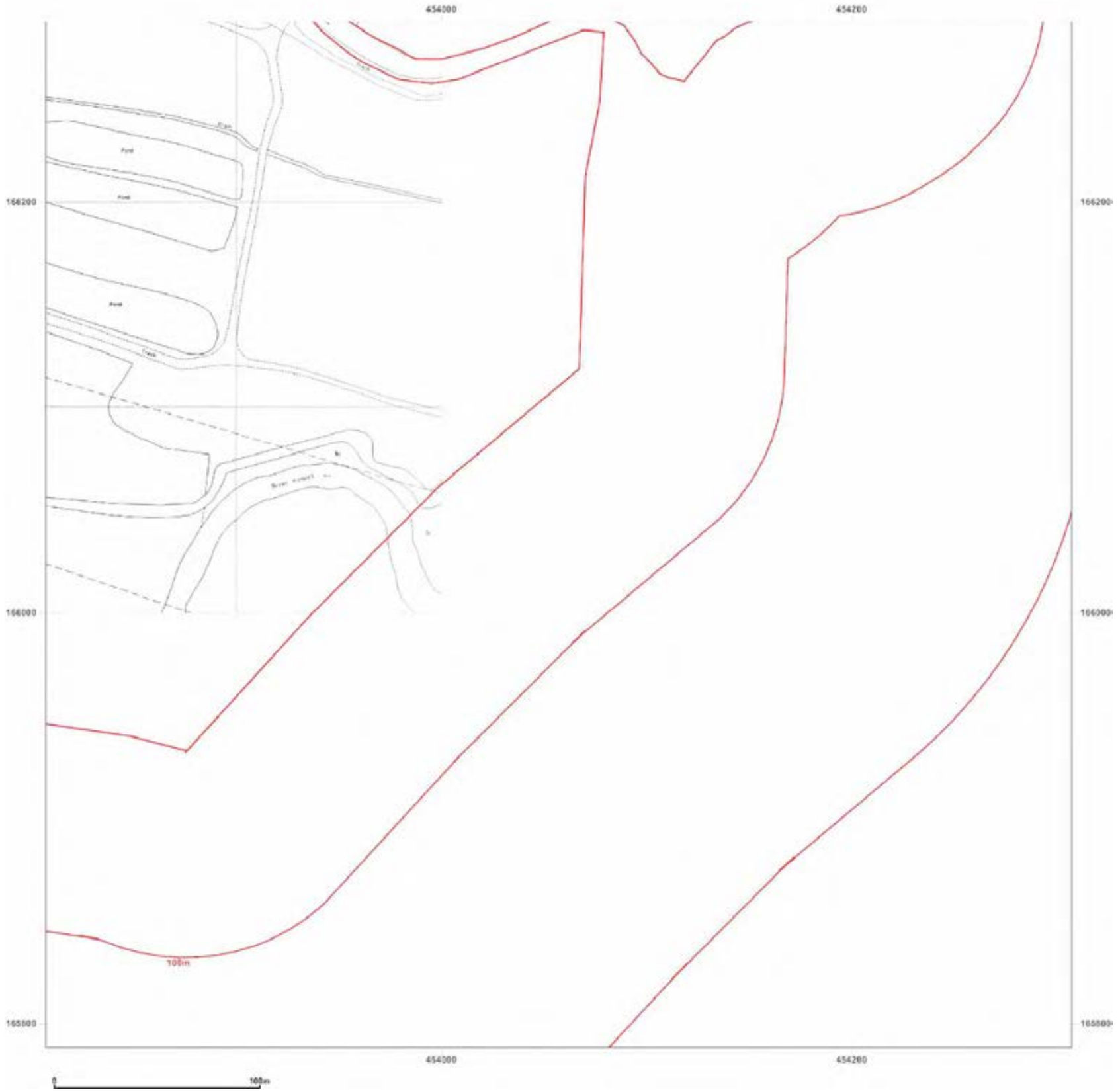
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_5_2
Grid Ref: 454057, 166038

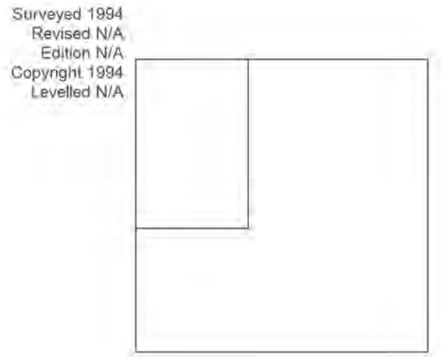
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W
E
S



GroundSure

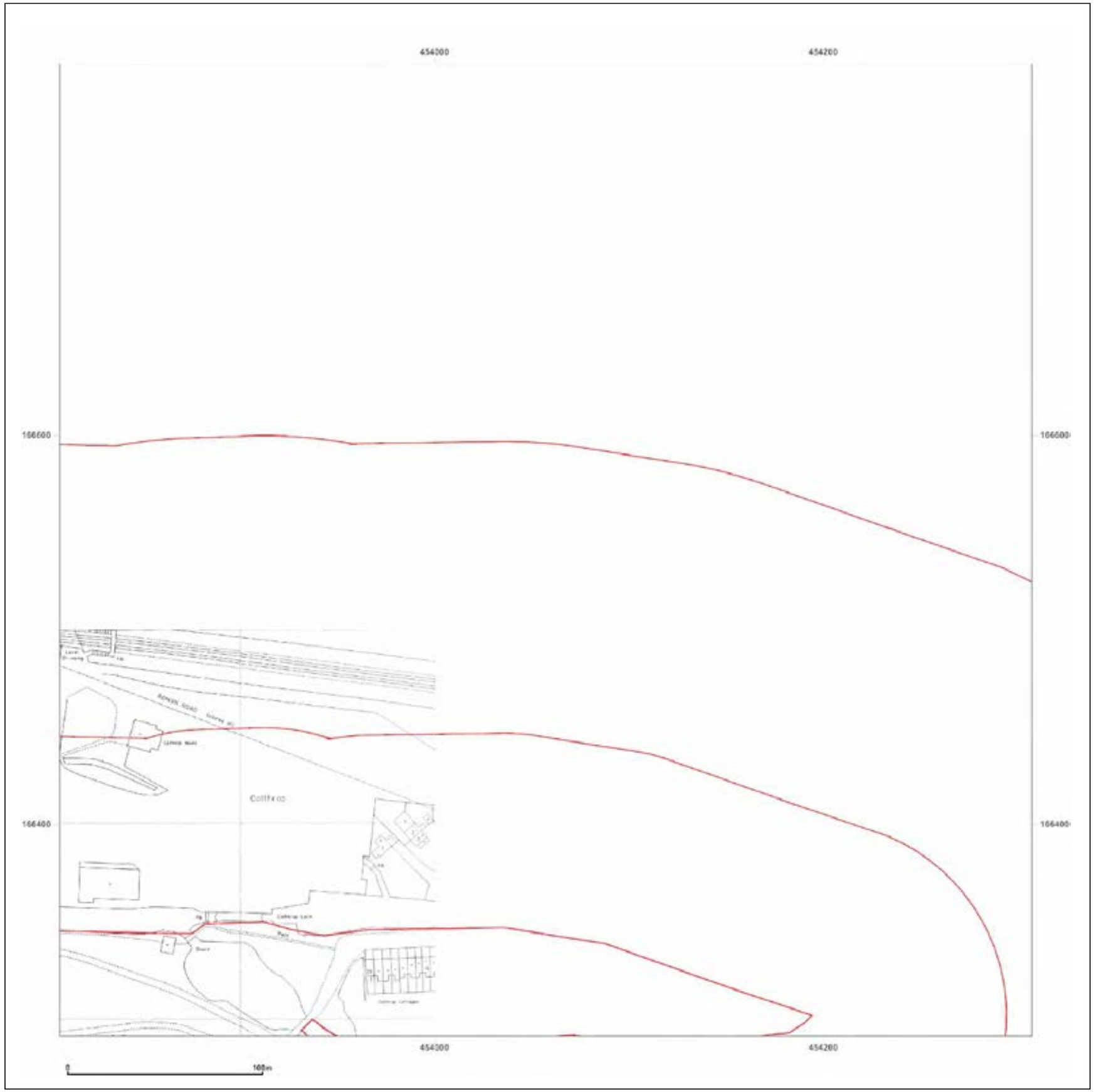
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_1250scale_5_3
Grid Ref: 454057, 166541

Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

GroundSure

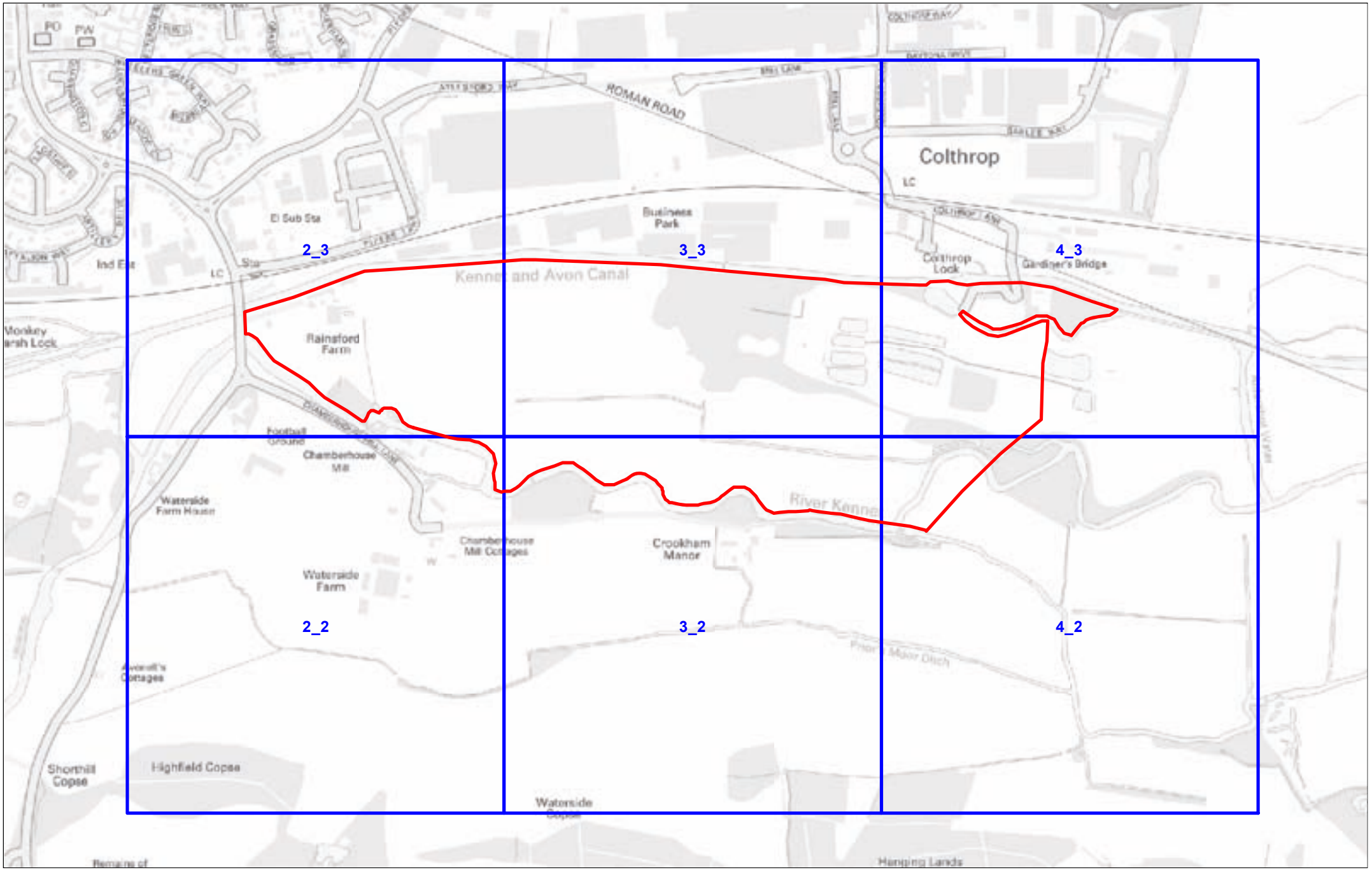
Produced by
GroundSure Environmental Insight
www.groundsure.com

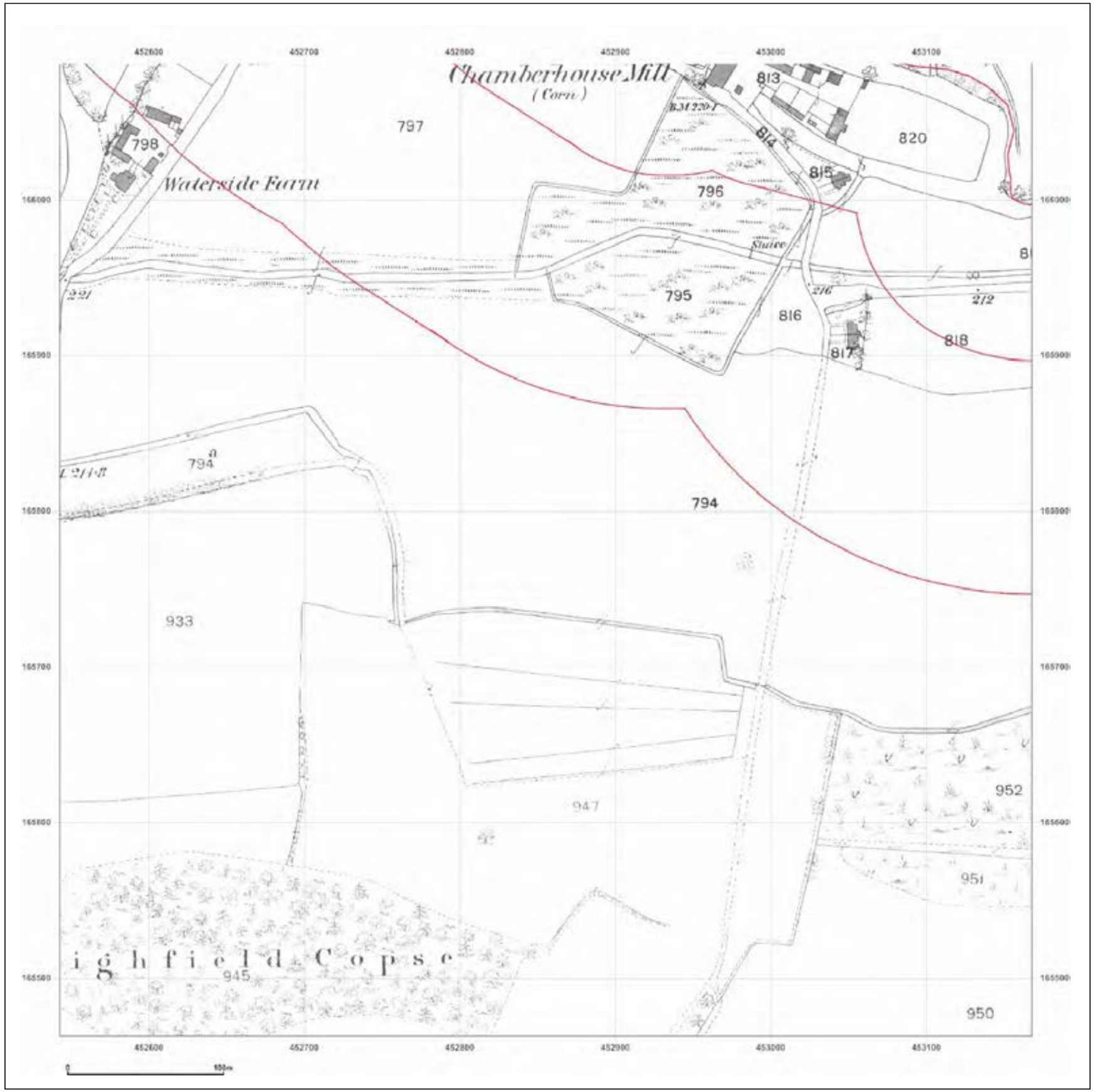
Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*


2_3
3_3
4_3
2_2
3_2
4_2
ROMAN ROAD
Colthrop
Business Park
Colthrop Lock
Gardiner's Bridge
Rainsford Farm
Chamberhouse Mill
Waterside Farm House
Waterside Farm
Crookham Manor
Chamberhouse Mill Cottages
Highfield Copse
Shorthill Copse
Waterside
Hanging Lands



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: County Series

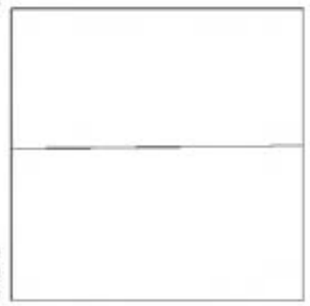
Map date: **1880**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

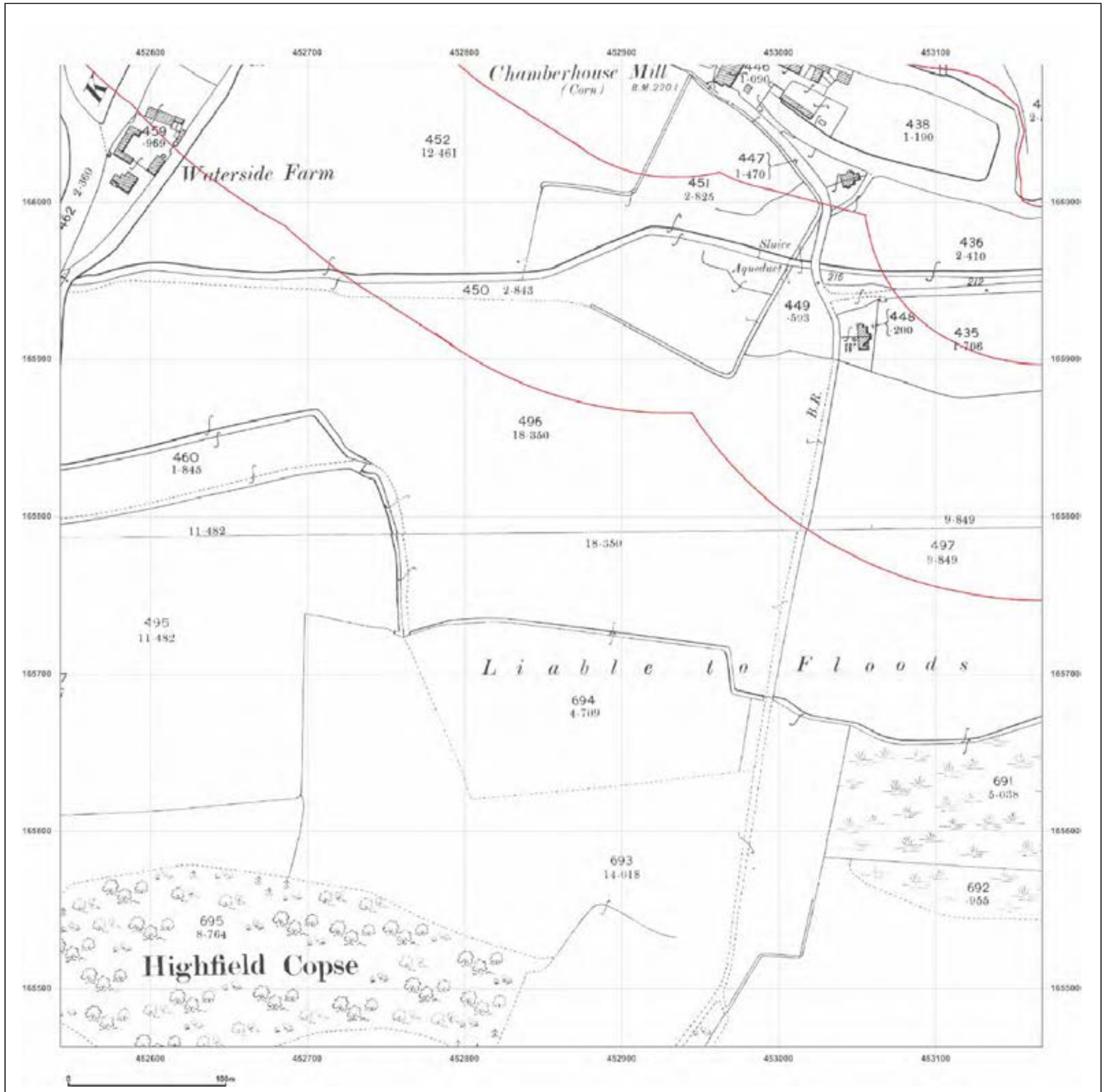
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N W E S

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

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

GroundSure

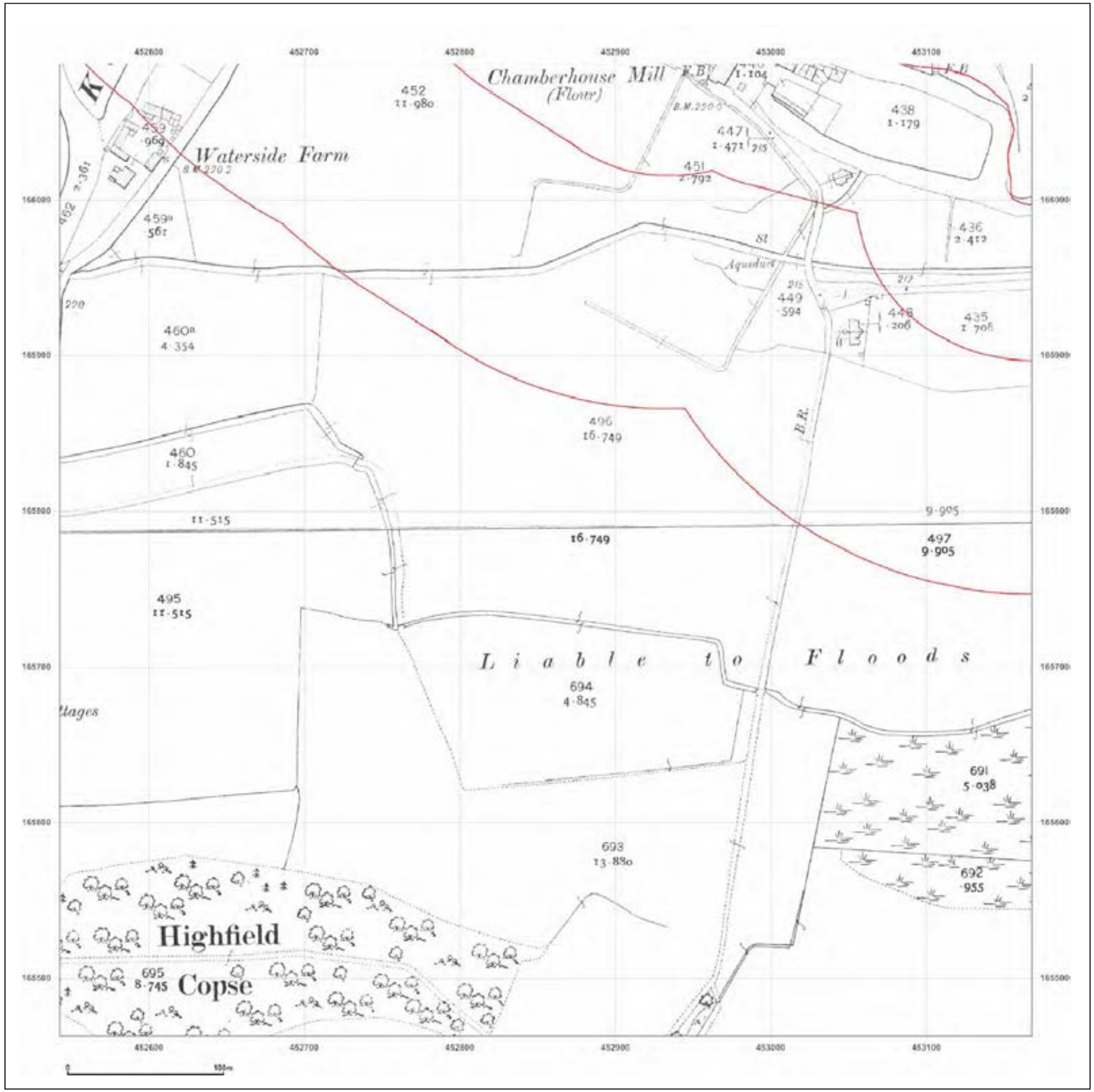
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: County Series

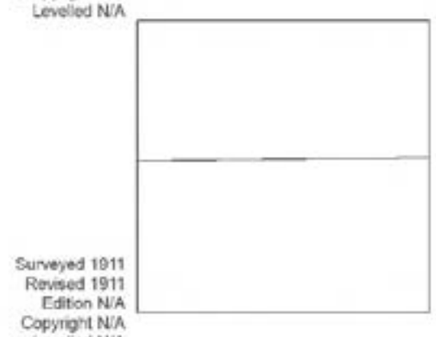
Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

N W E S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

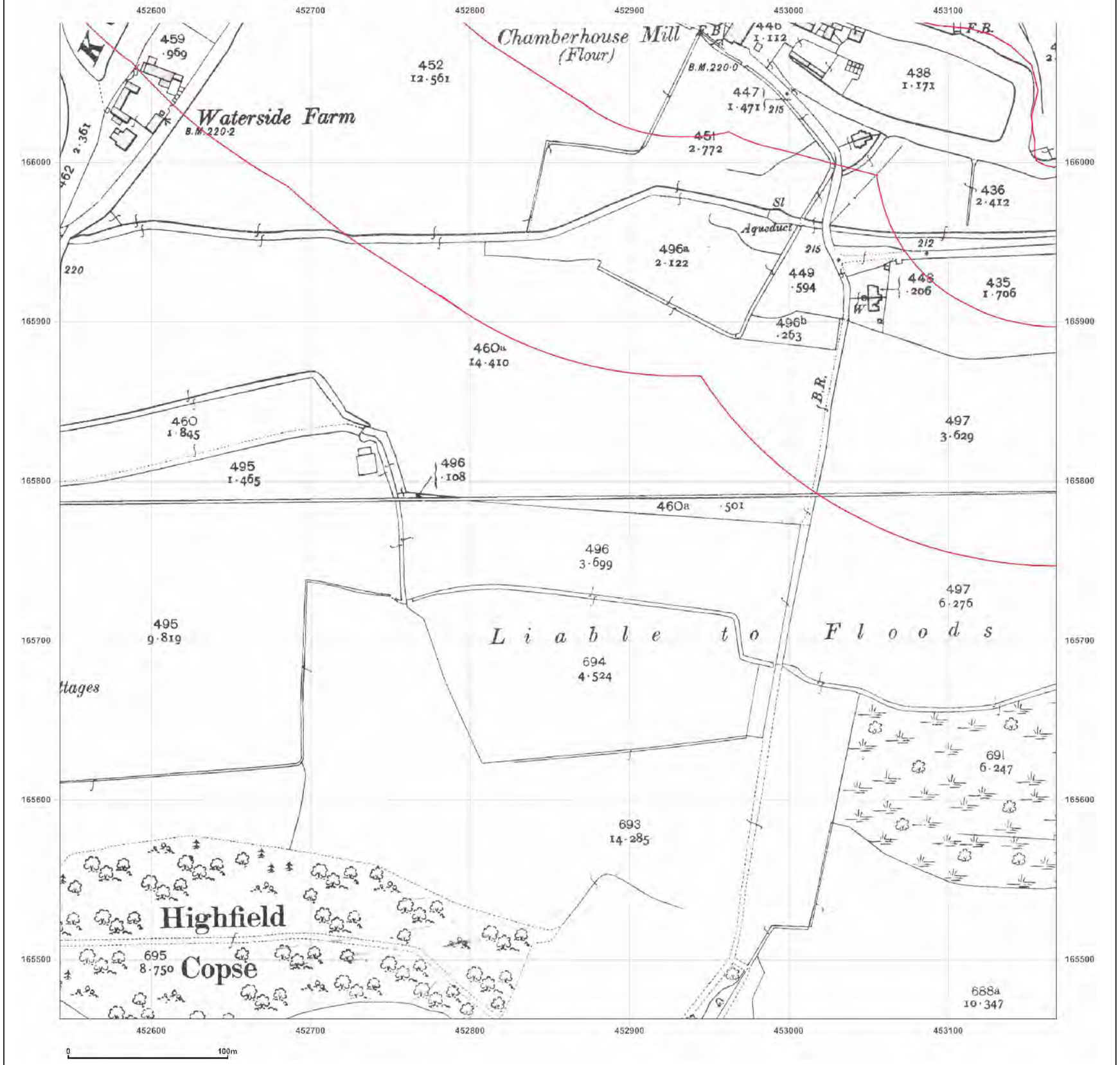
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

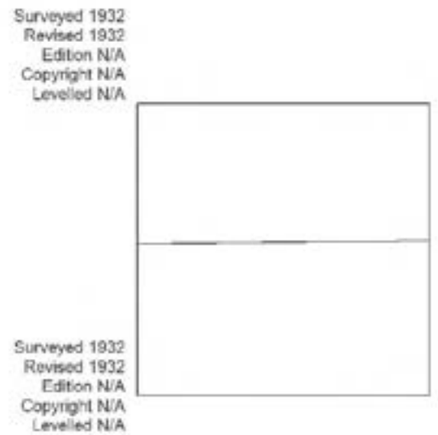


emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: County Series
Map date: **1932**
Scale: 1:2,500
Printed at: 1:2,500



GroundSure

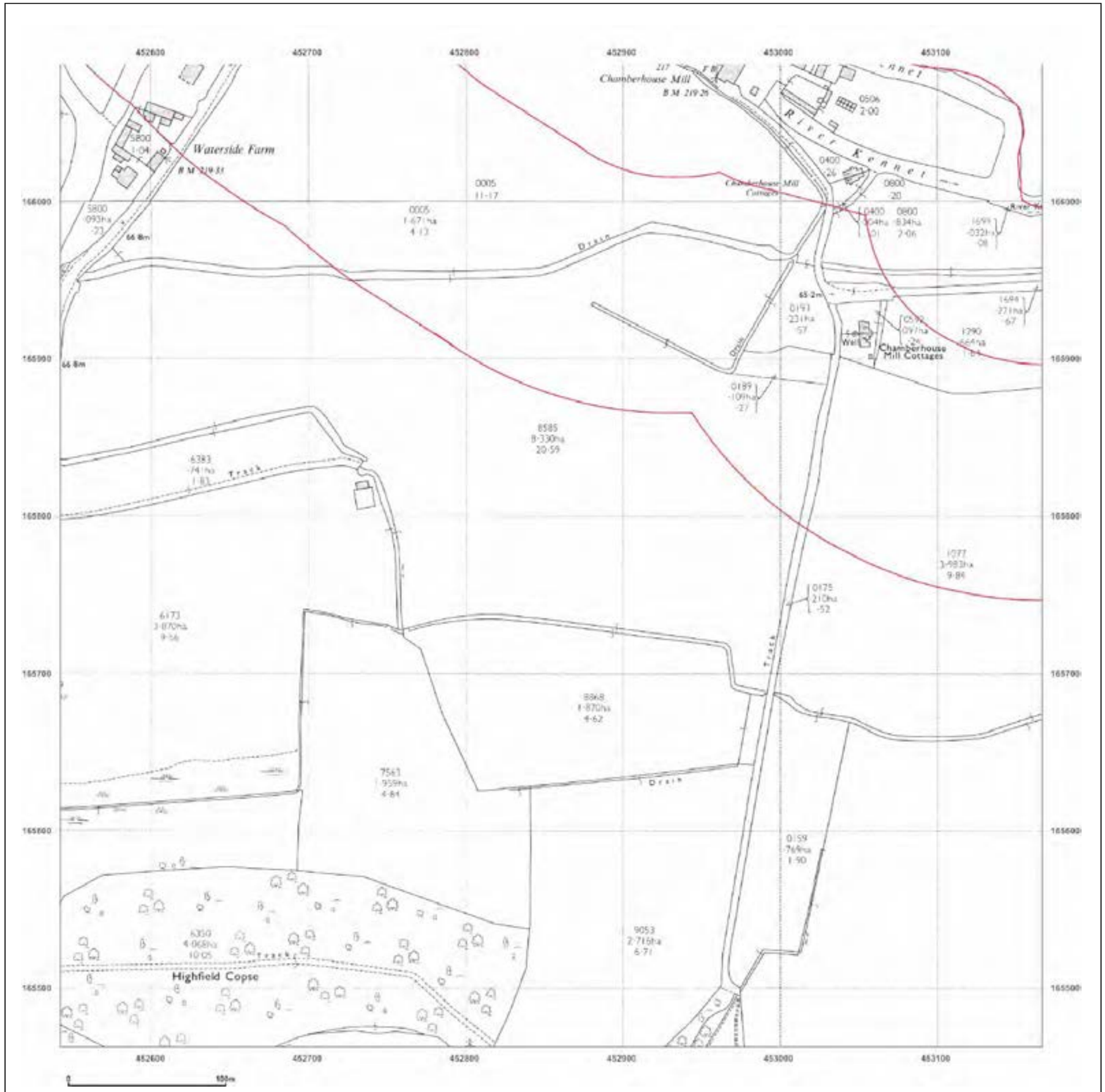
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: National Grid

Map date: **1966-1968**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1950

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1970
Levelled 1950

GroundSure

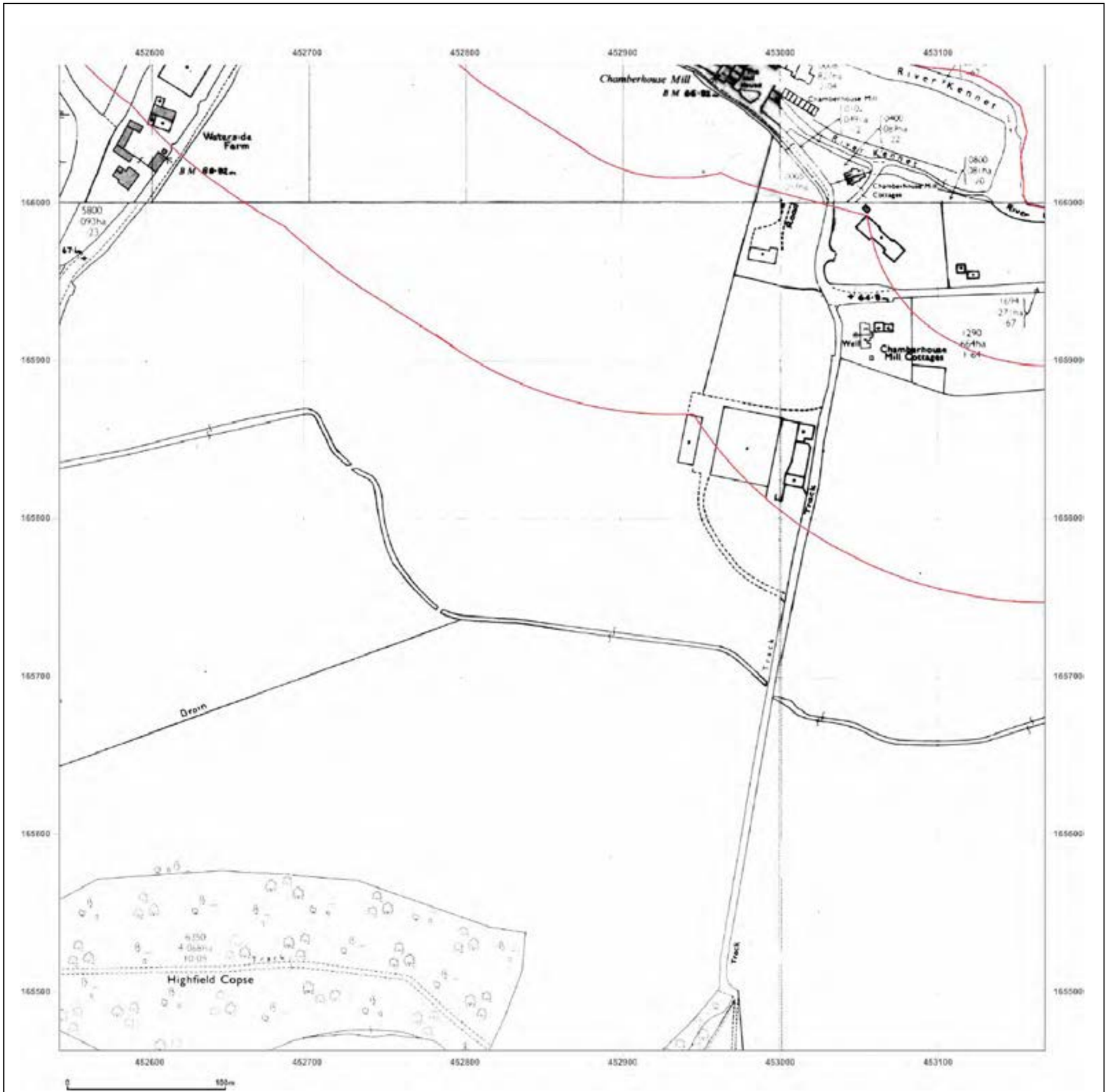
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: National Grid

Map date: **1988-1989**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

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

Surveyed 1989
Revised 1989
Edition N/A
Copyright 1989
Levelled 1989

Surveyed 1970
Revised 1989
Edition N/A
Copyright 1989
Levelled 1970

GroundSure

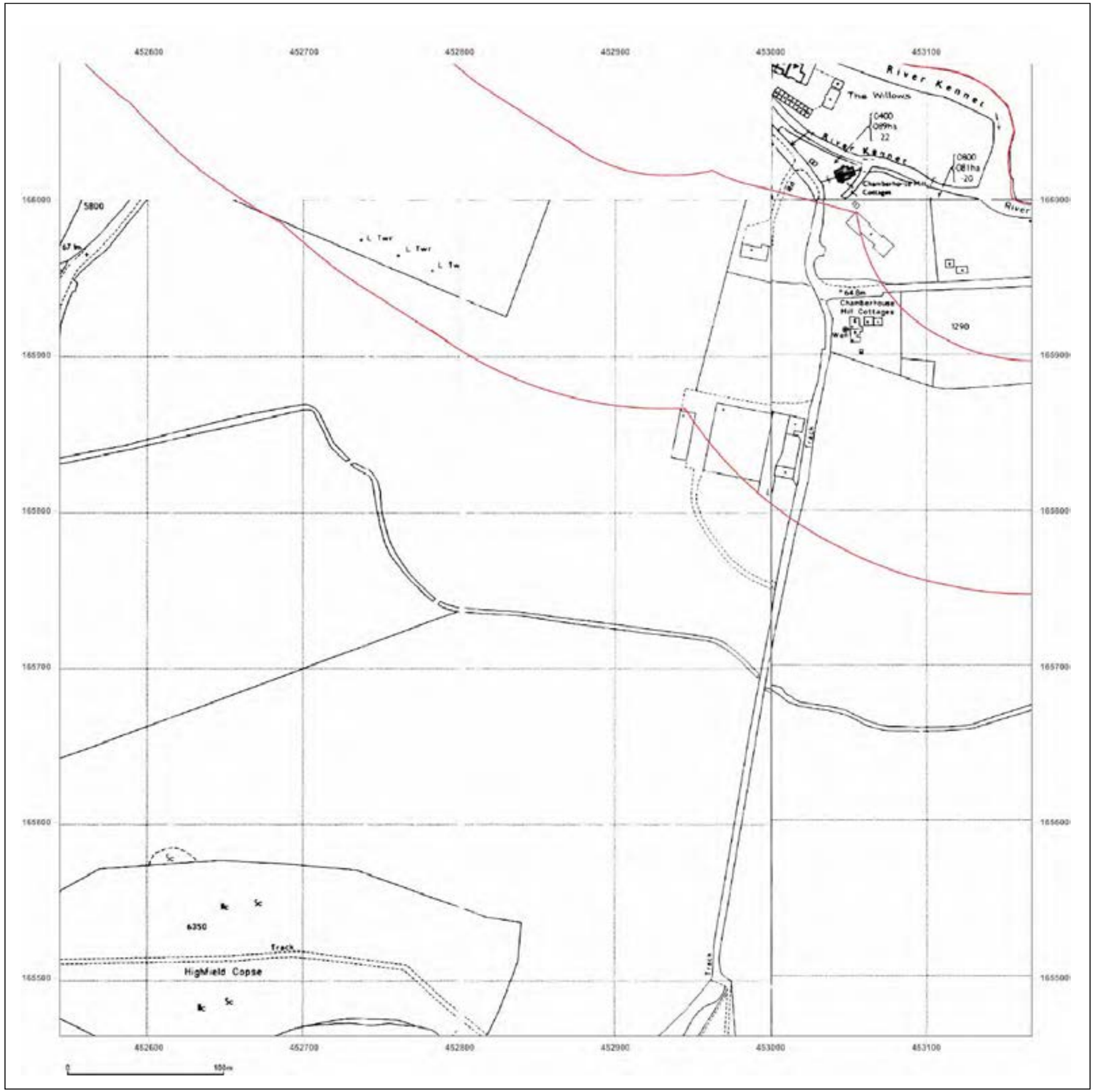
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_2
Grid Ref: 452855, 165775

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

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

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

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

GroundSure

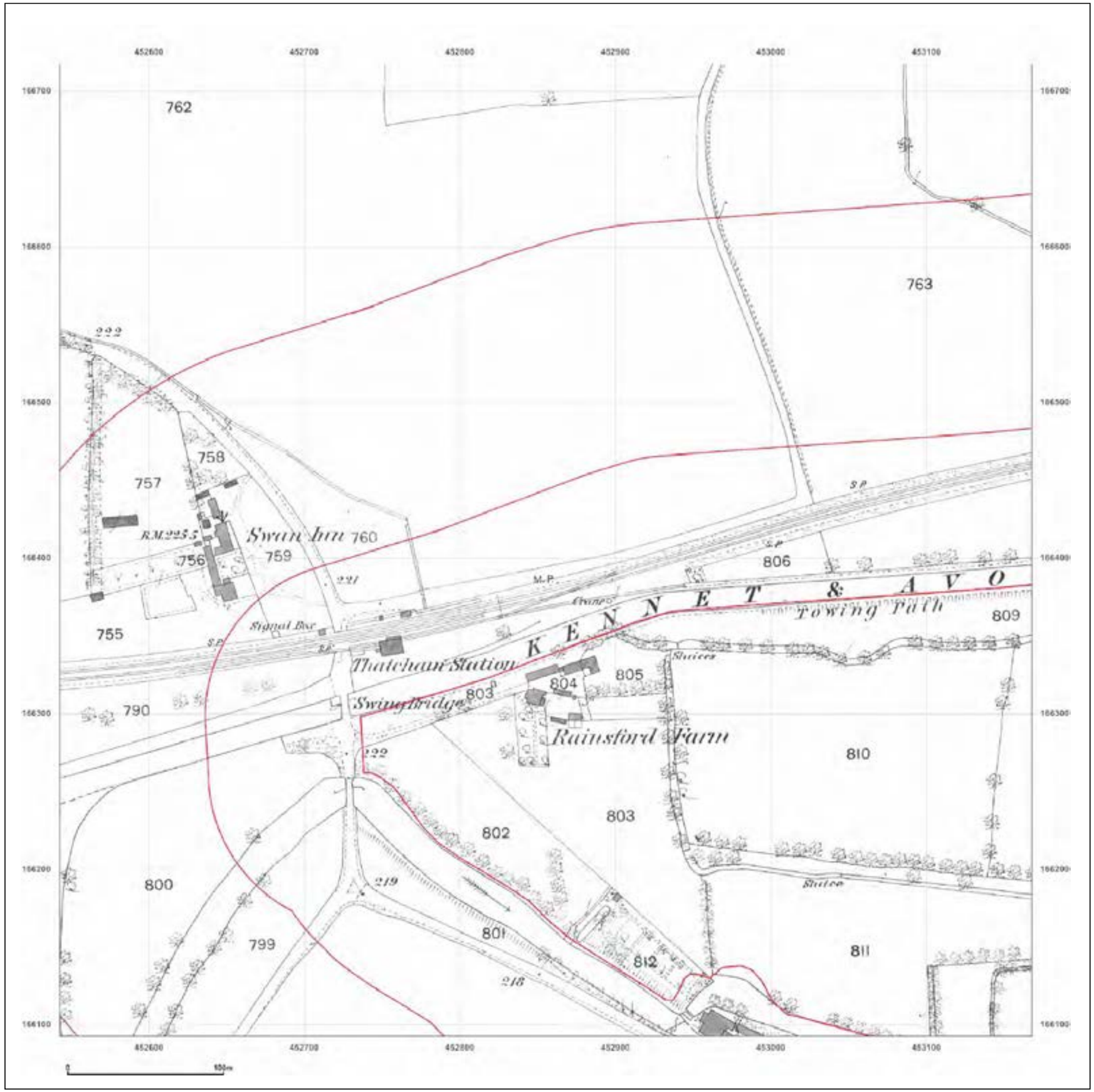
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: County Series

Map date: **1880**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

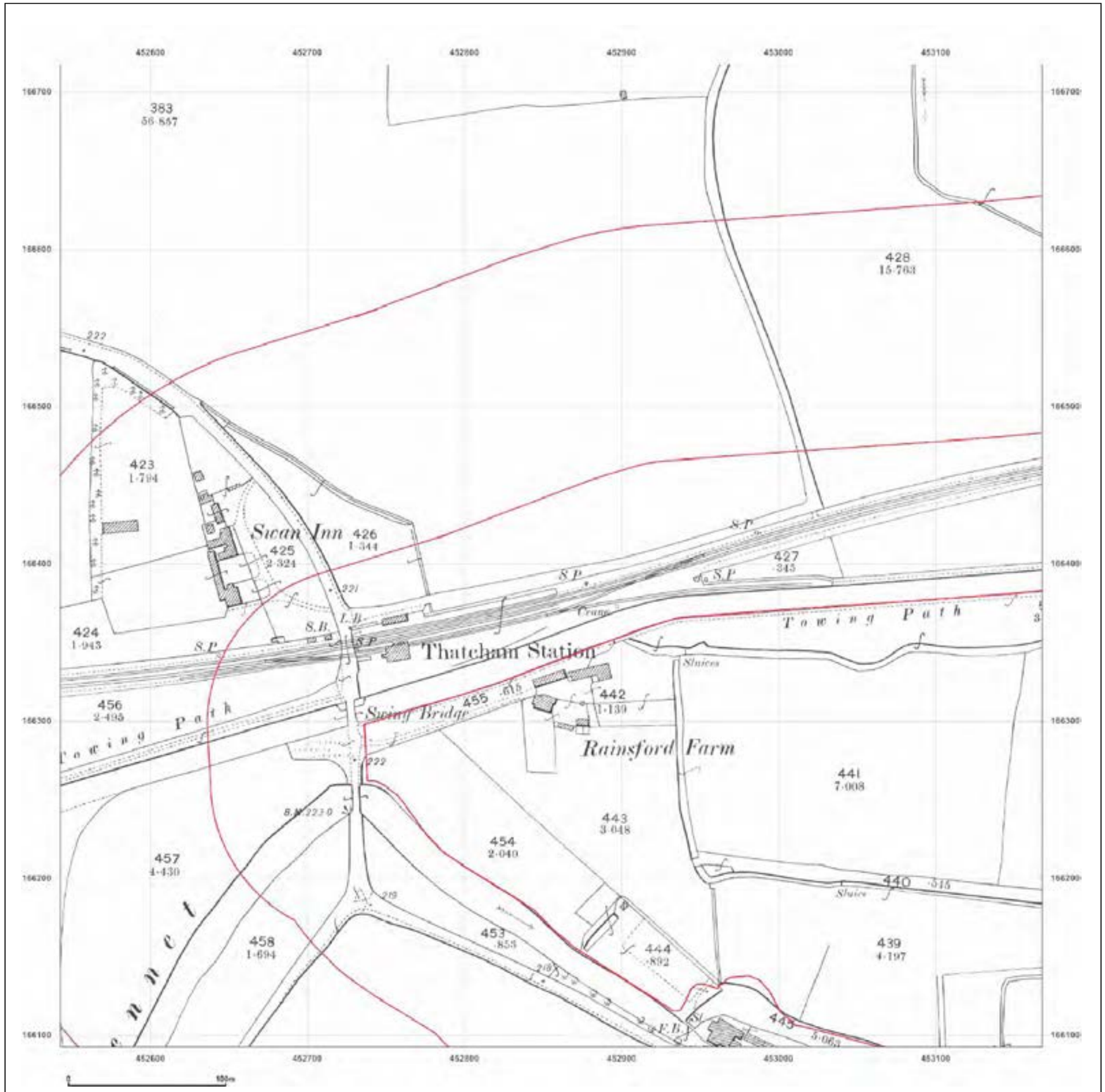
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

GroundSure

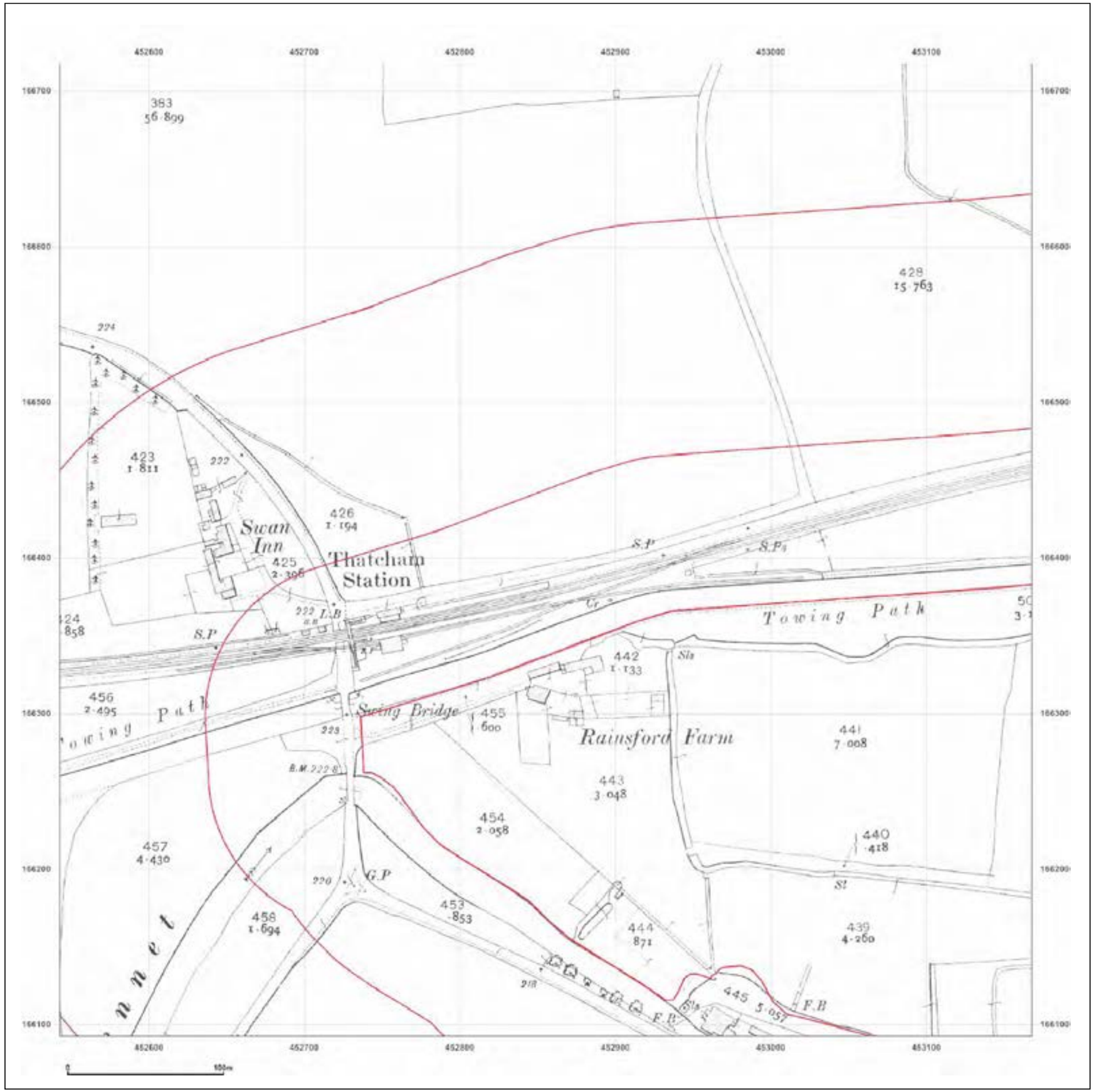
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: County Series

Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

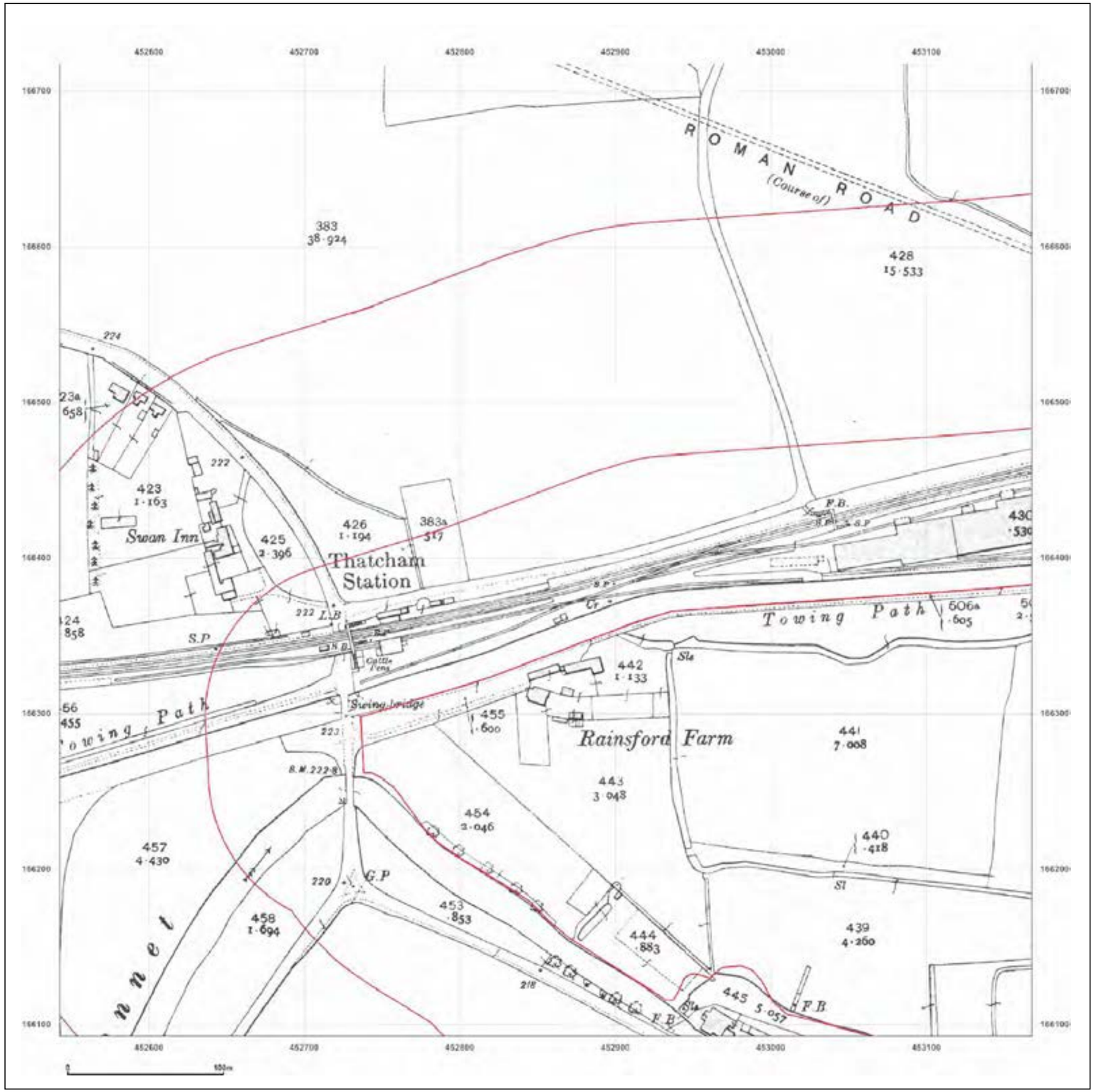
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1932
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

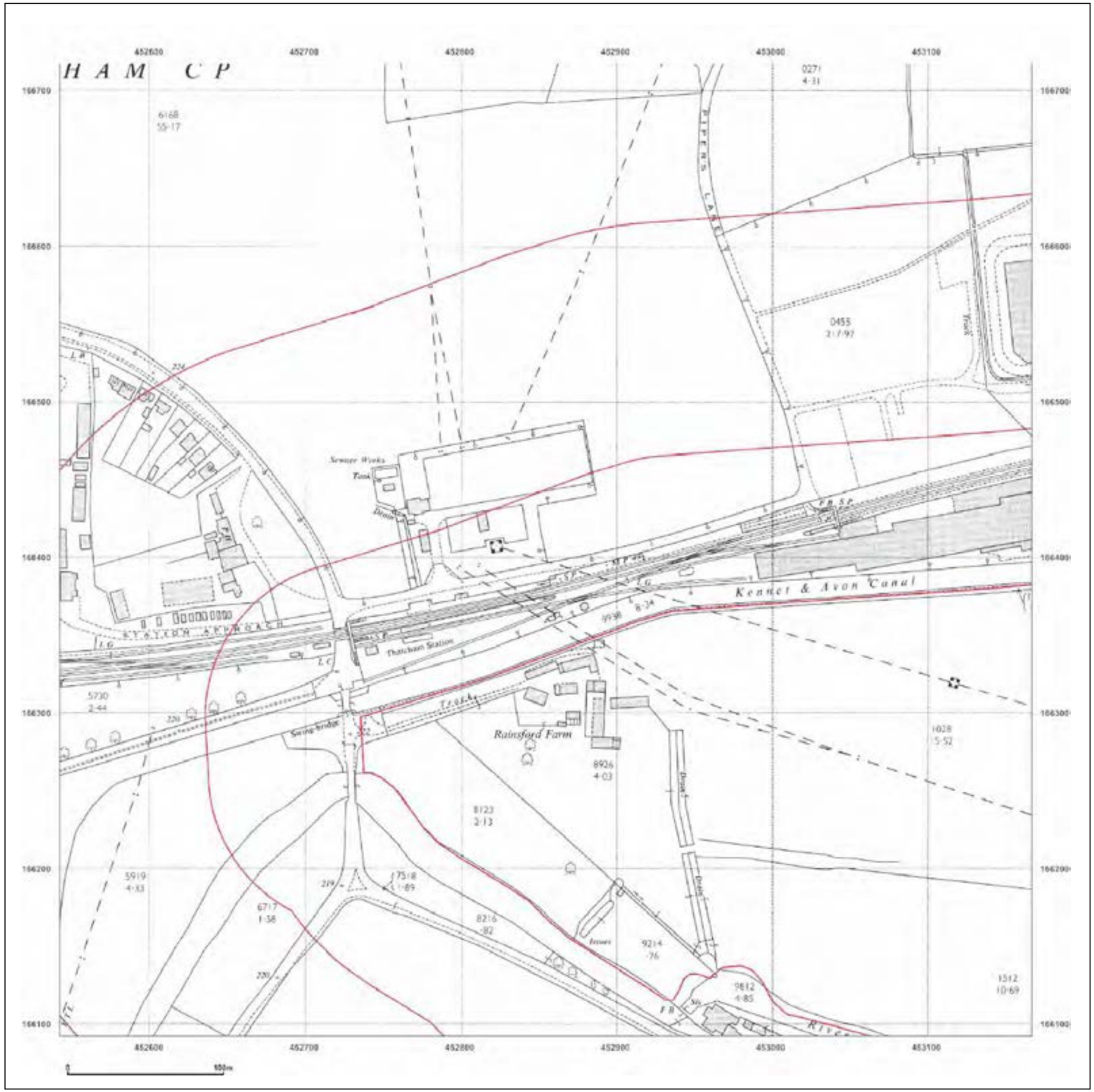
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: National Grid

Map date: **1966**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1950

GroundSure

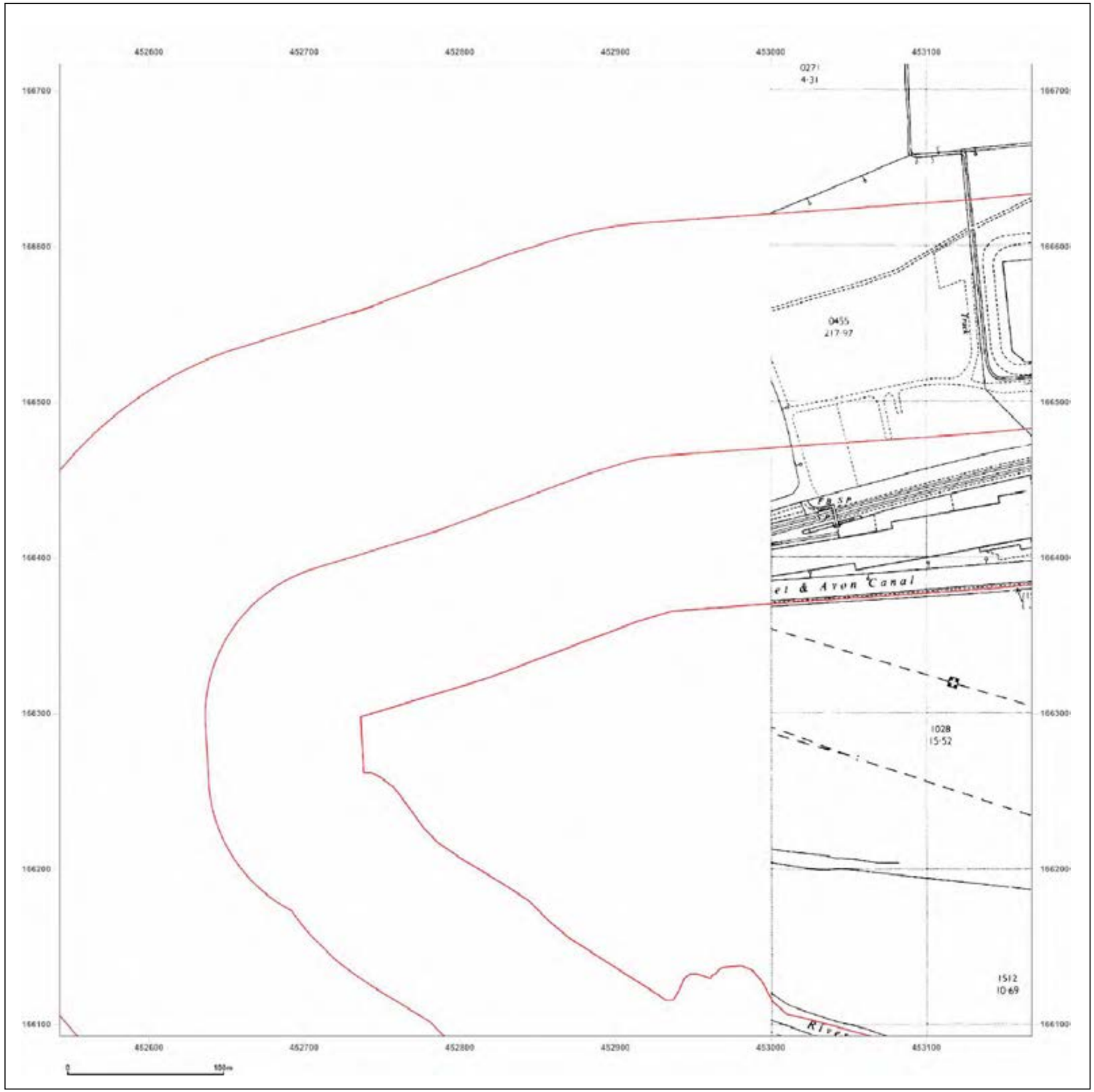
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: National Grid

Map date: **1975**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

GroundSure

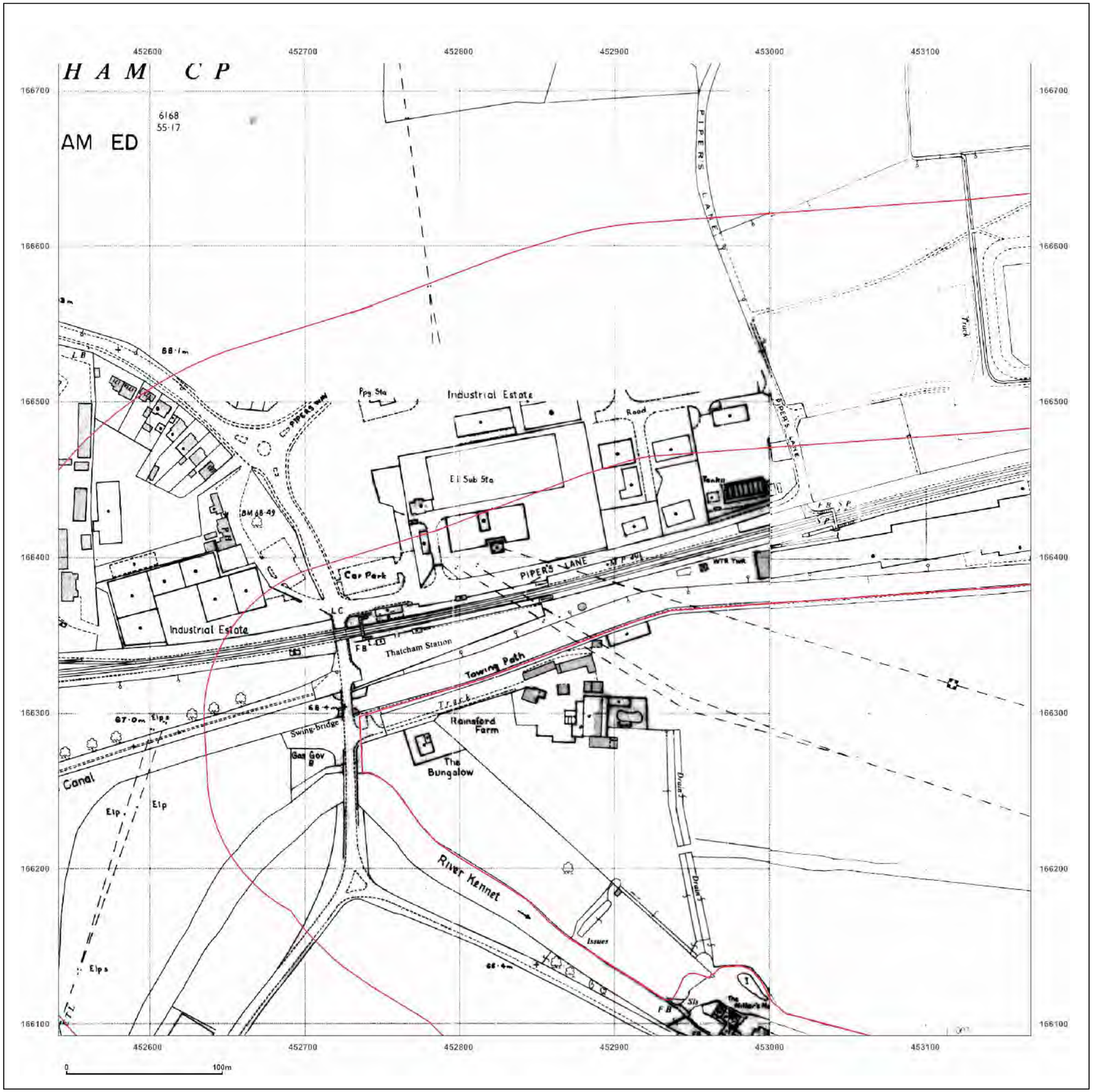
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

Map Name: National Grid

Map date: **1988**

Scale: 1:2,500

Printed at: 1:2,500

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

GroundSure

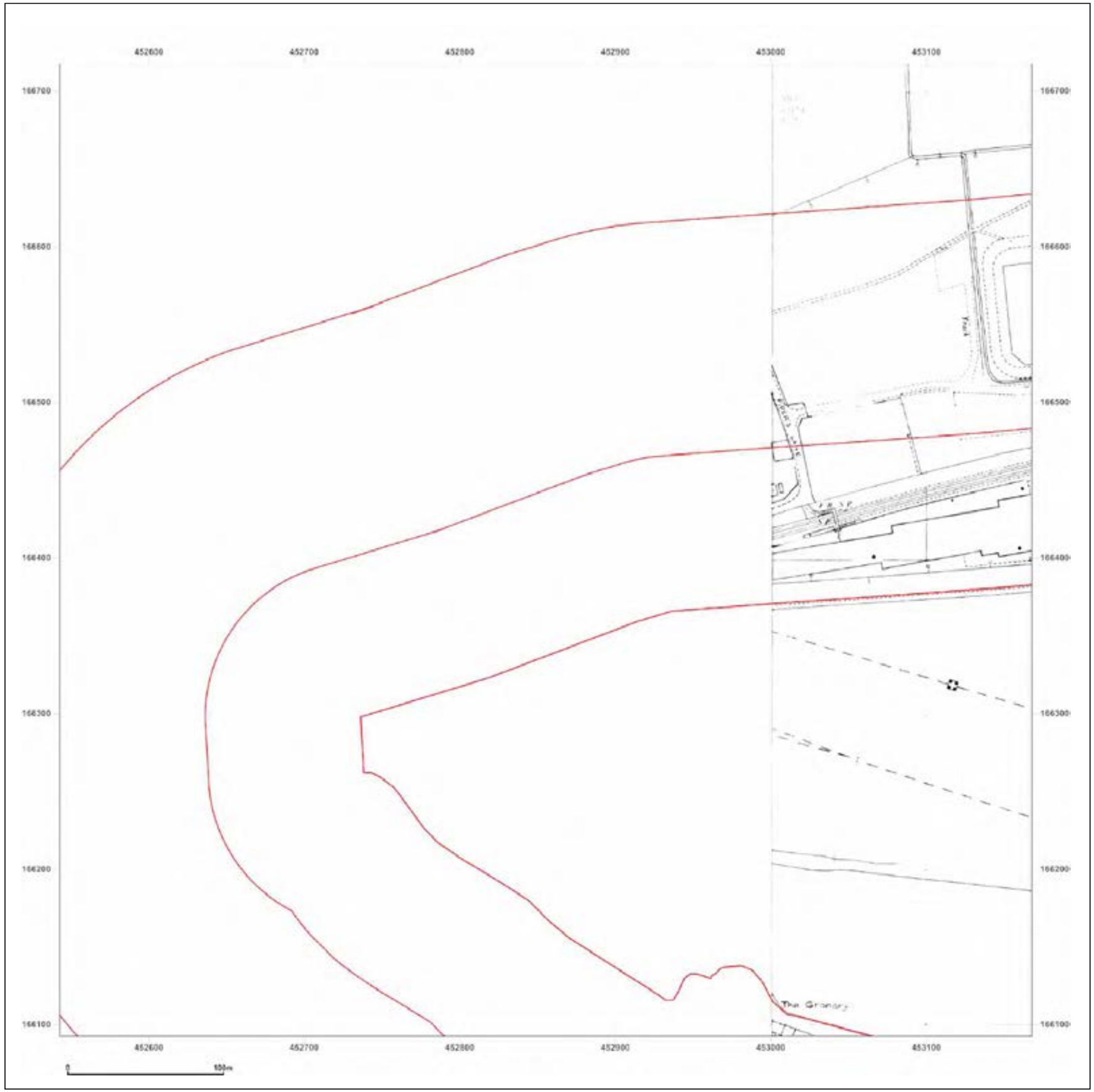
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_2_3
Grid Ref: 452855, 166405

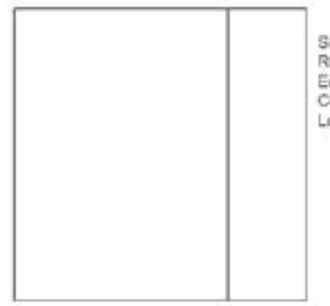
Map Name: National Grid

Map date: **1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S



GroundSure

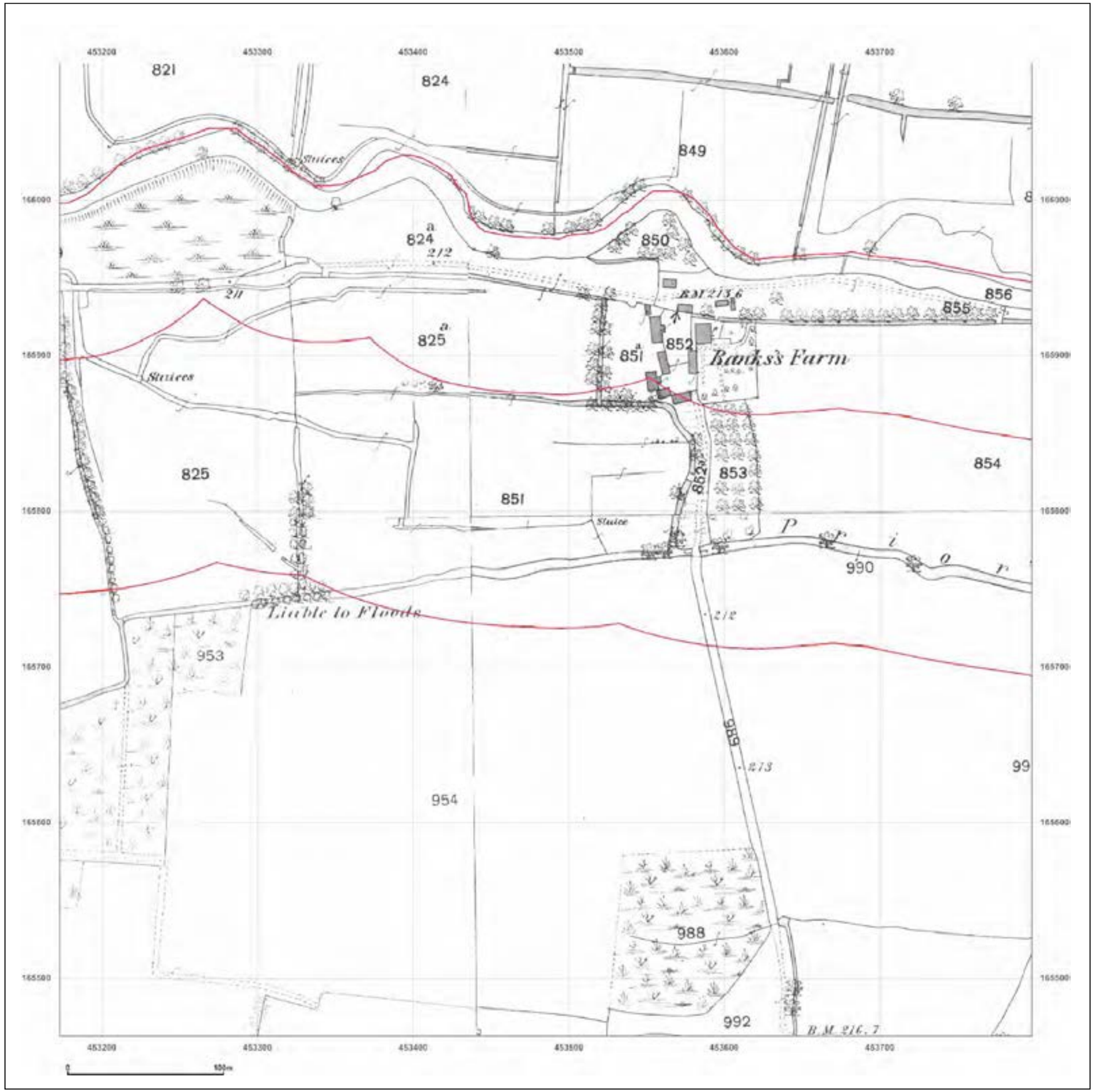
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

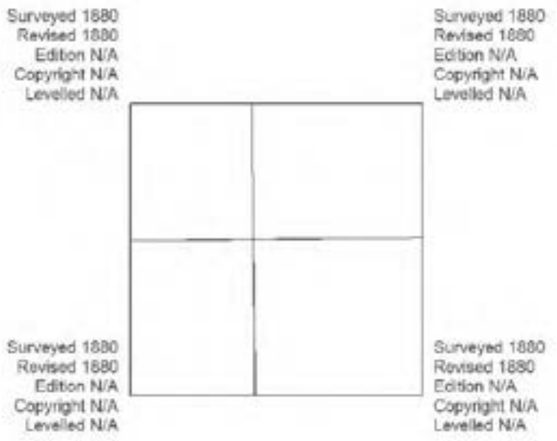


emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: County Series
Map date: 1880
Scale: 1:2,500
Printed at: 1:2,500



GroundSure

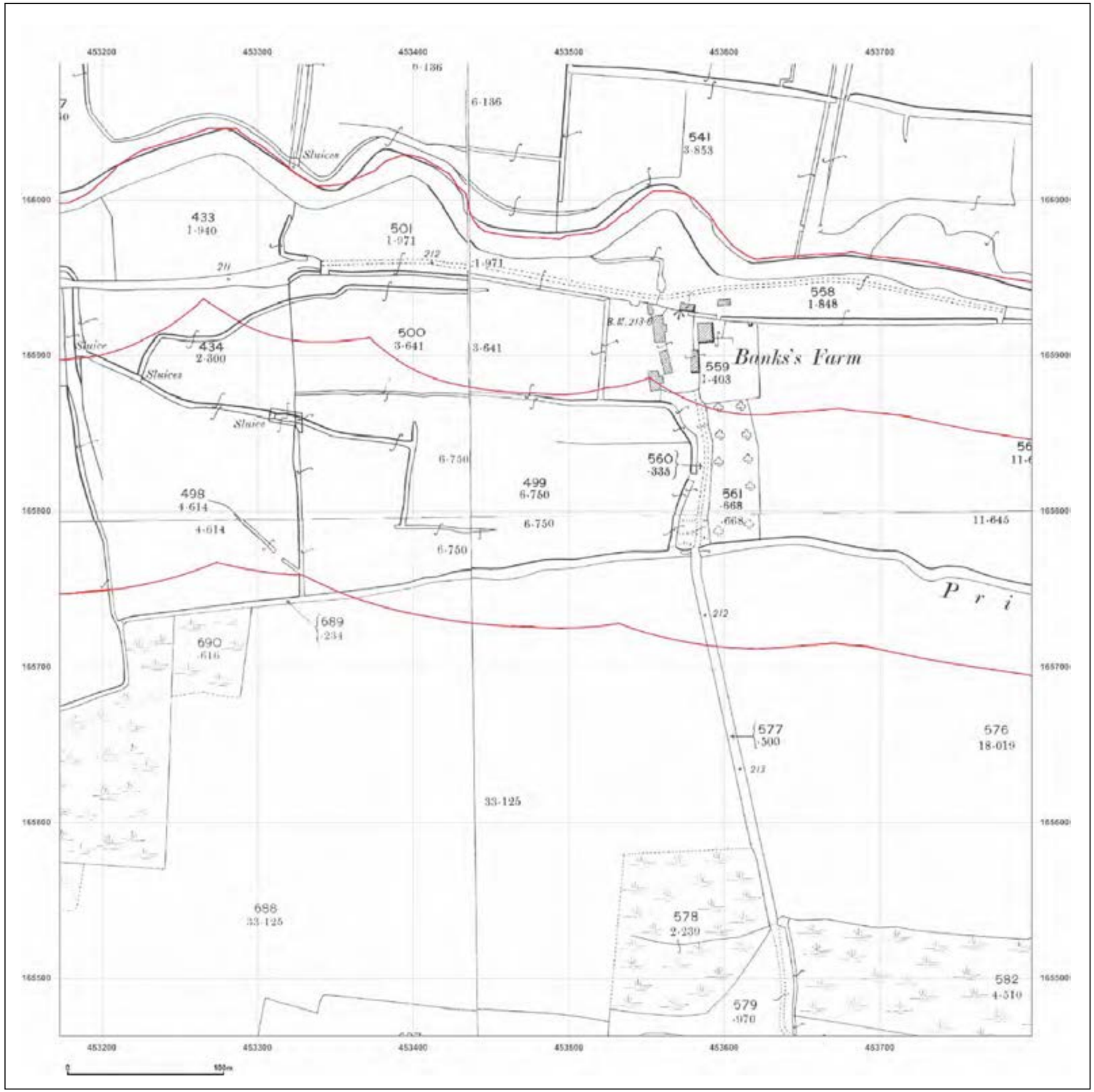
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: County Series
Map date: **1900**
Scale: 1:2,500
Printed at: 1:2,500

N
W
E
S

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

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

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

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

GroundSure

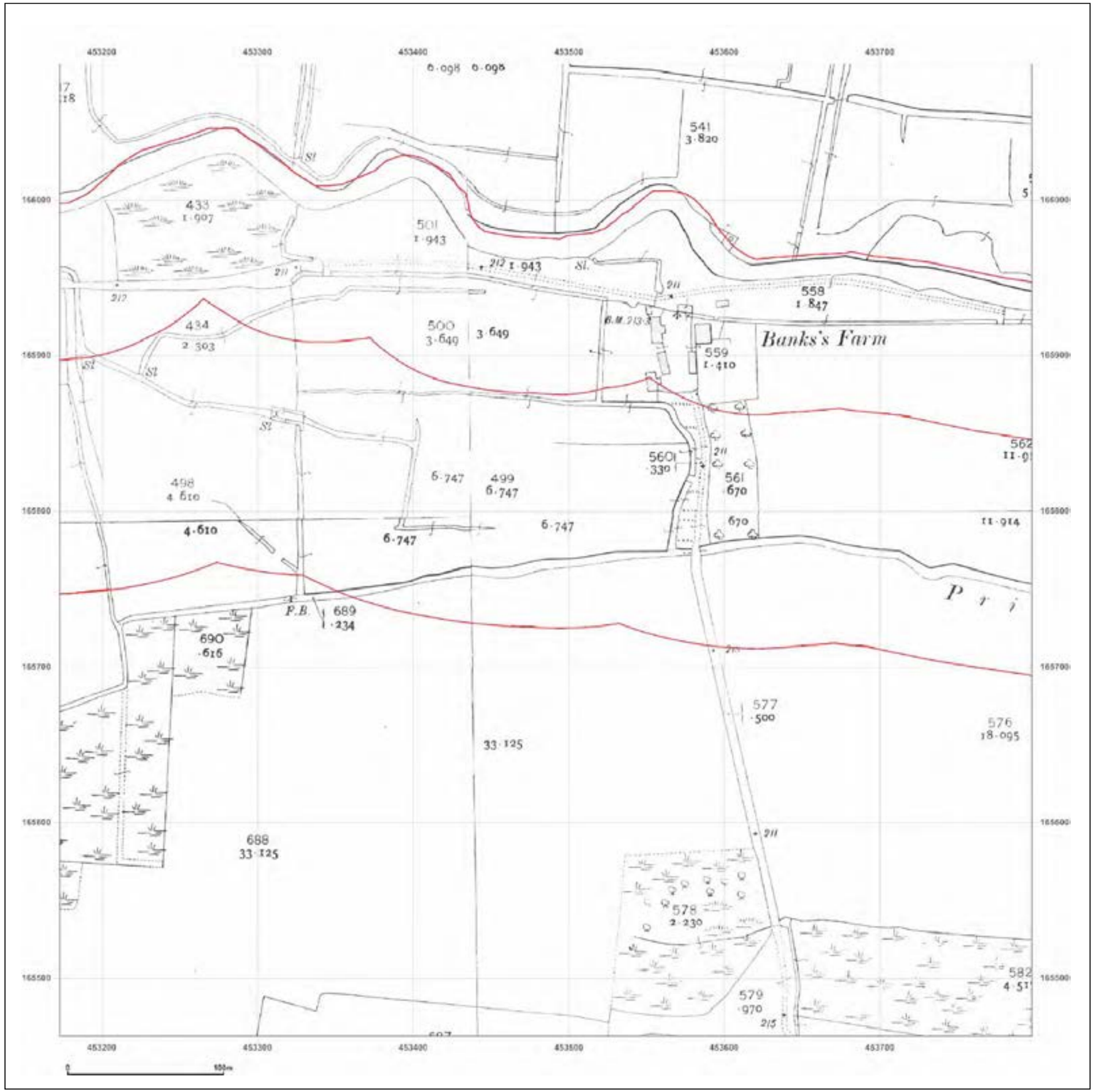
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

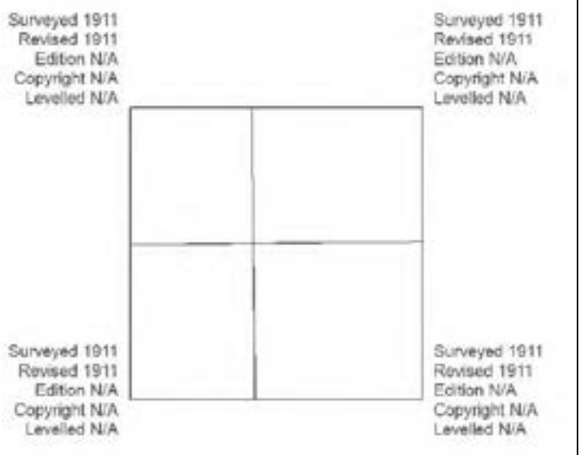
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: County Series

Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500



GroundSure

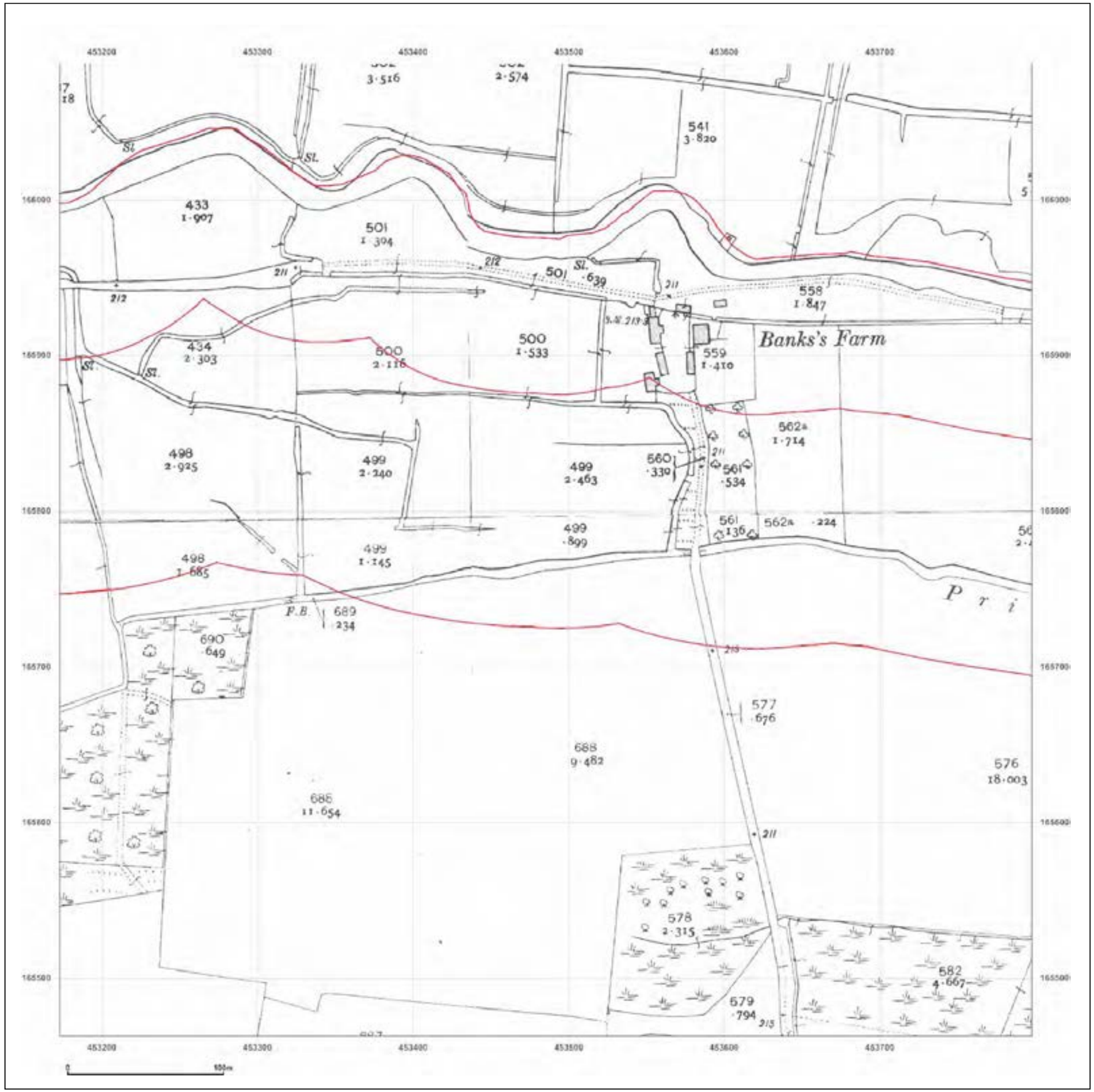
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



Site Details:

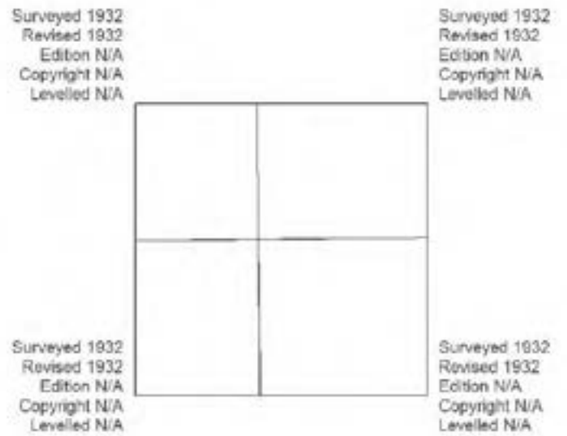
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500



GroundSure

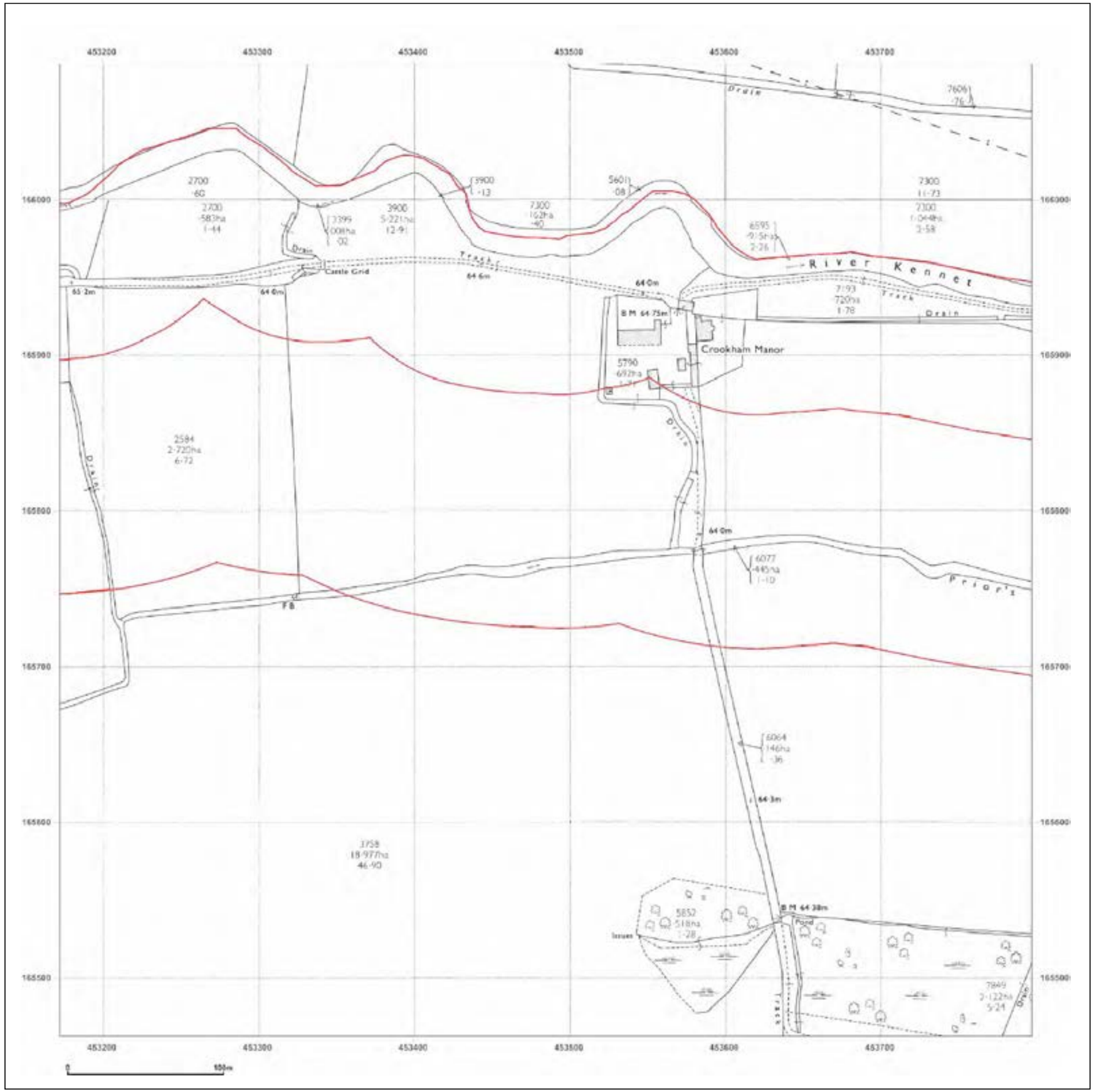
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: National Grid

Map date: **1966-1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1950

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1970
Levelled 1950

GroundSure

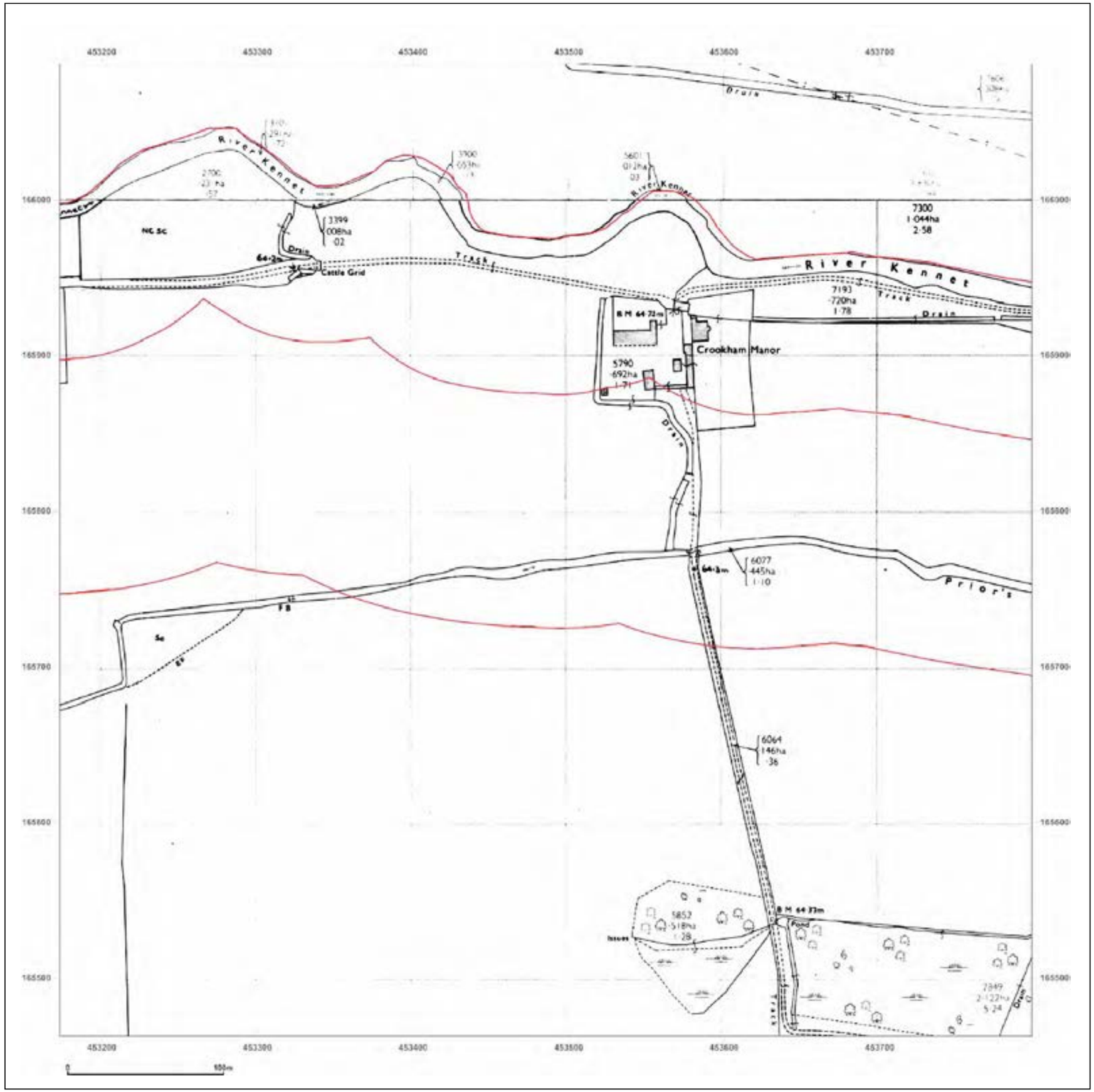
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: National Grid

Map date: **1988-1989**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

Surveyed 1970
Revised 1989
Edition N/A
Copyright 1989
Levelled 1970

GroundSure

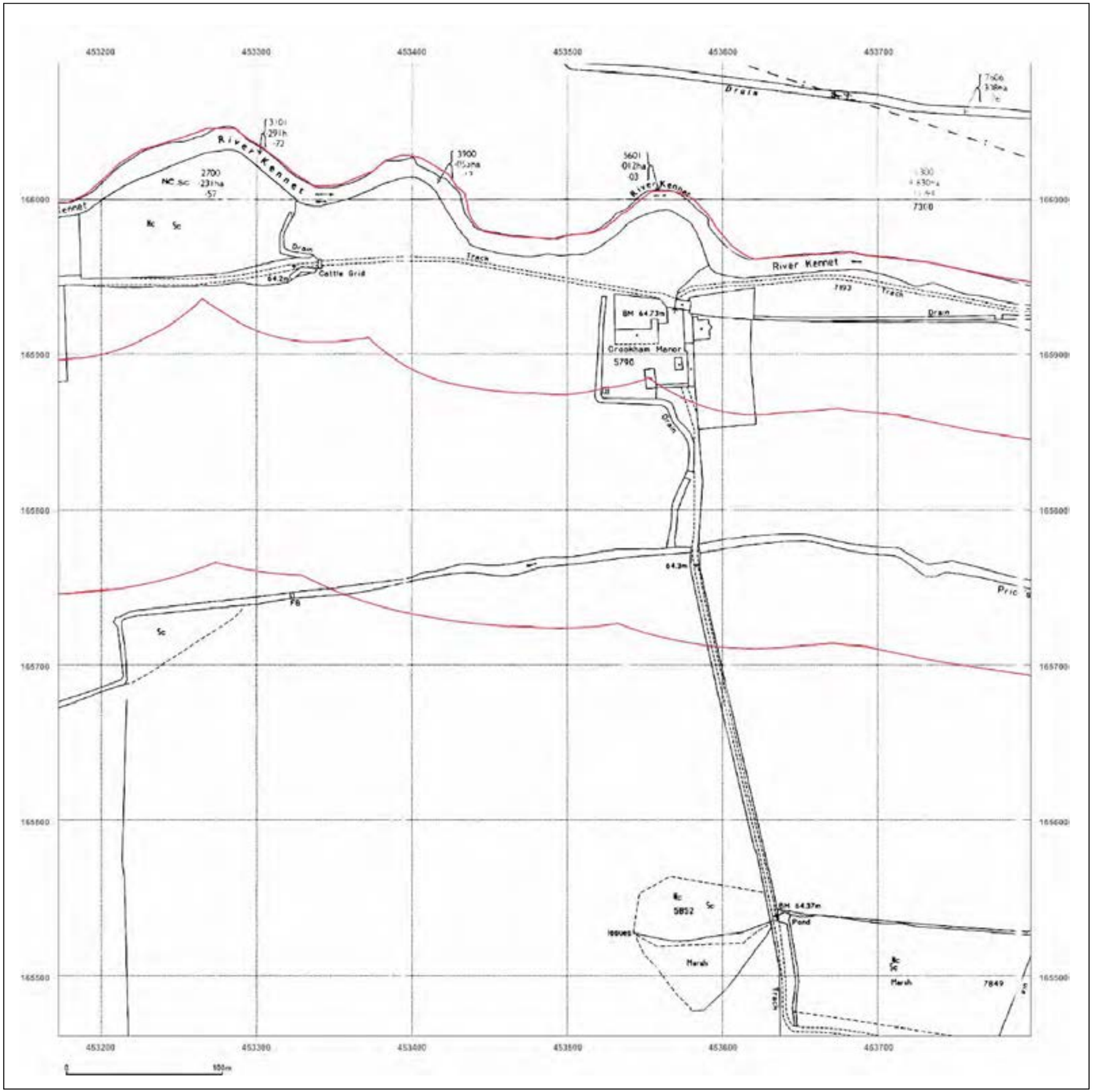
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_2
Grid Ref: 453485, 165775

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

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

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

GroundSure

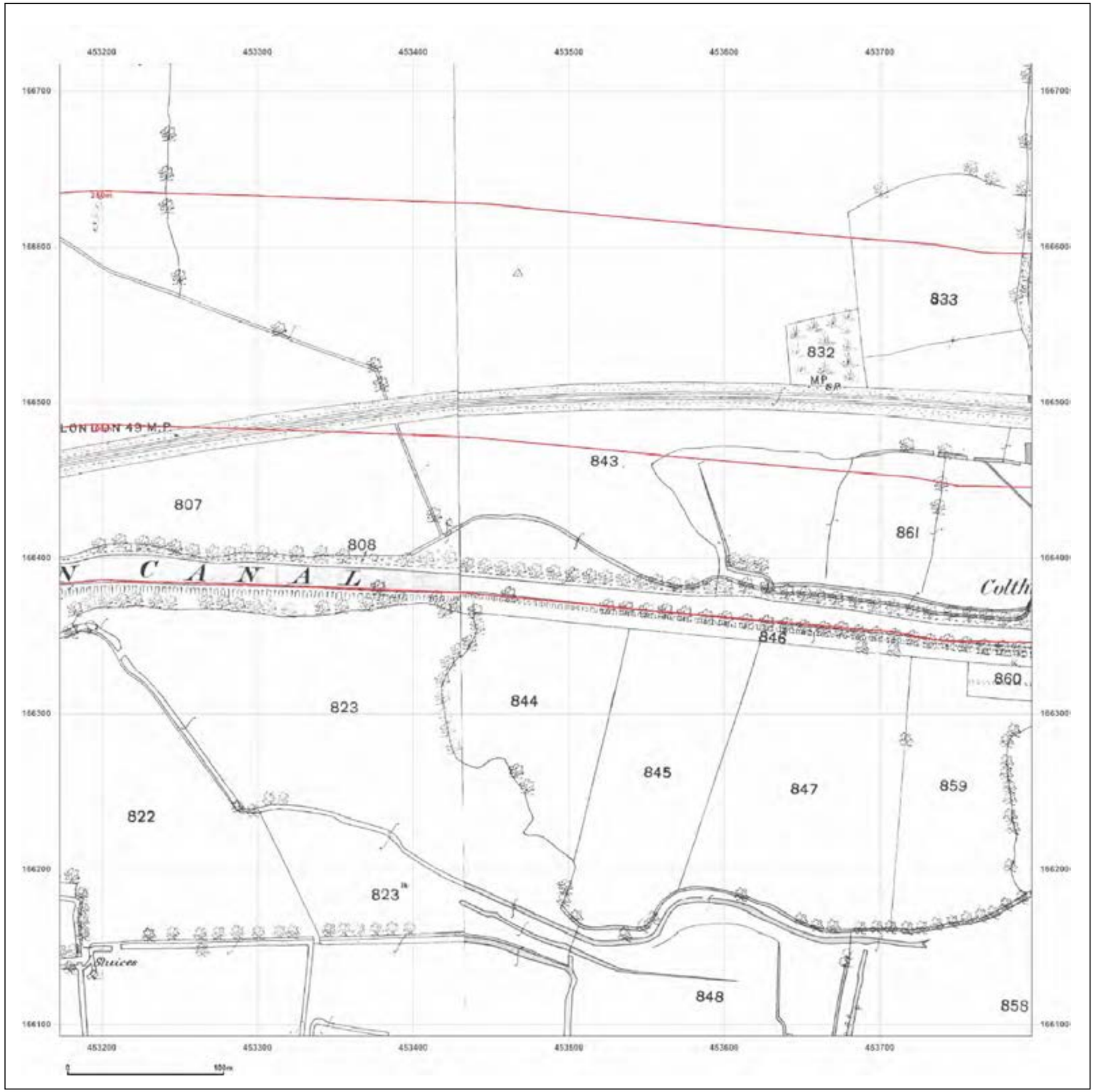
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

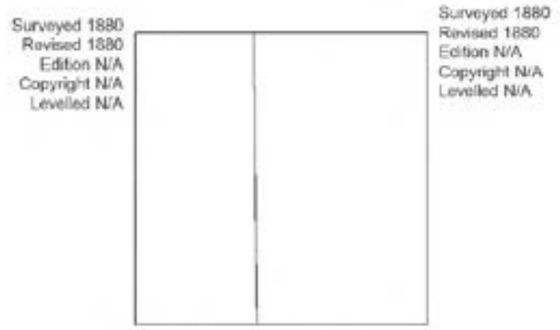
Map Name: County Series

Map date: **1880**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



GroundSure

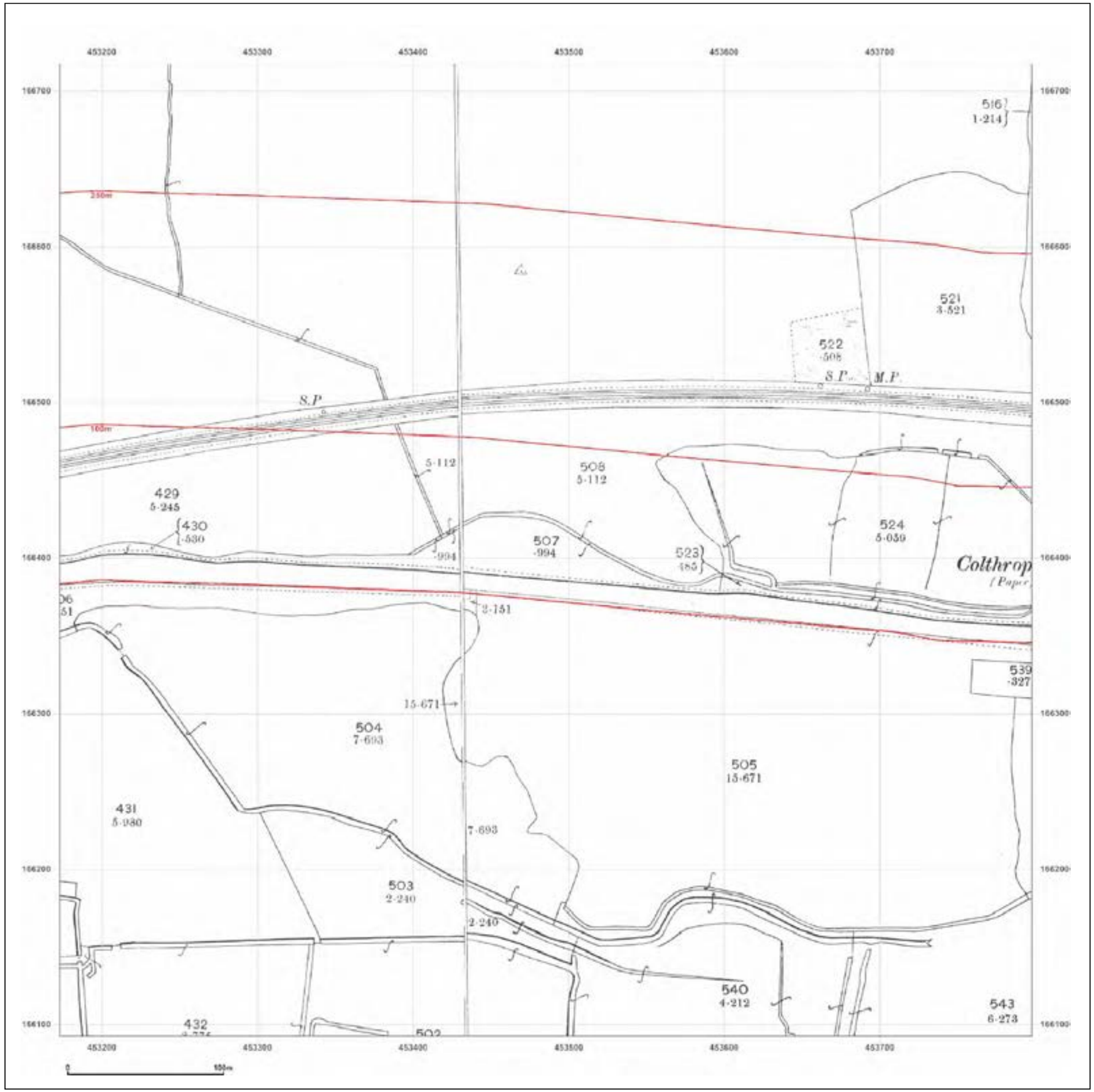
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

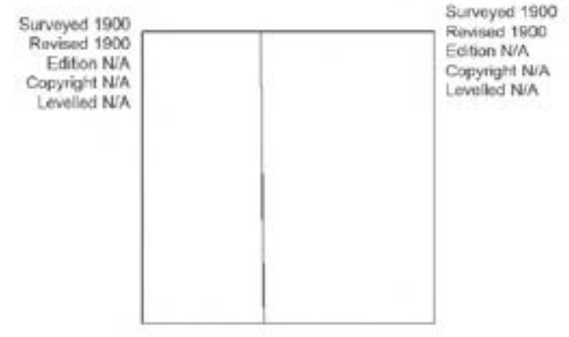
Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S



GroundSure

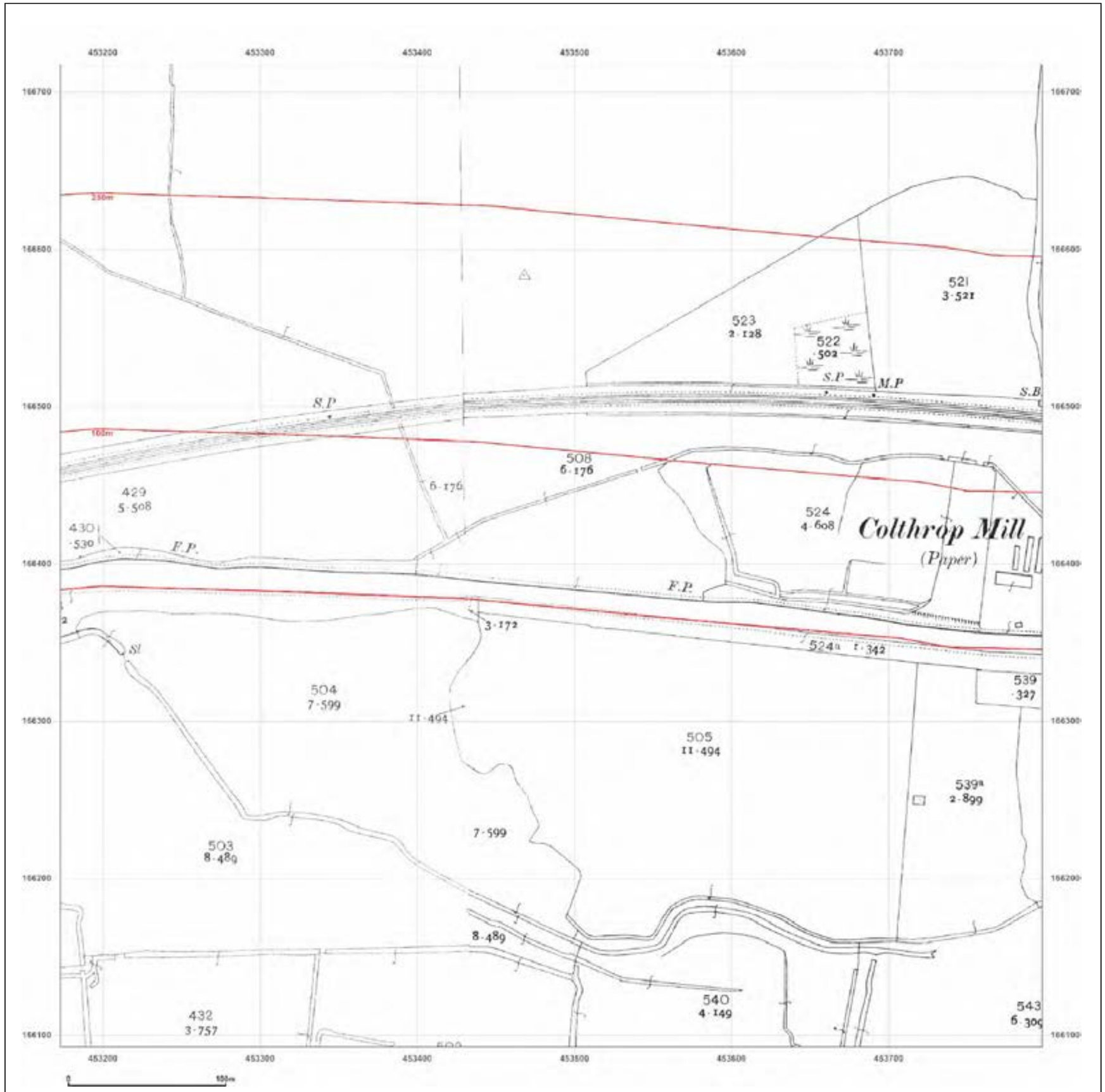
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: County Series

Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

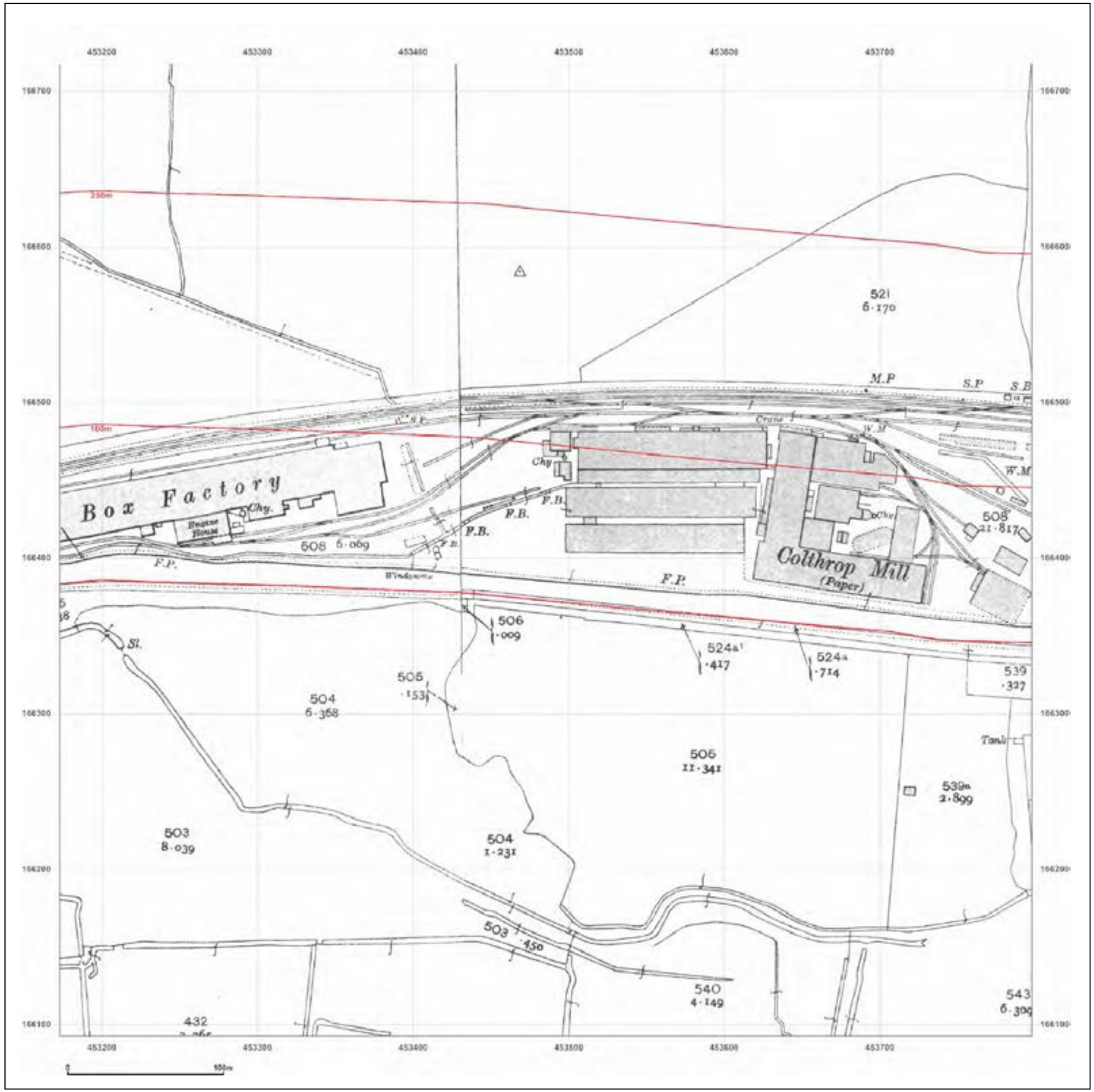
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



Site Details:

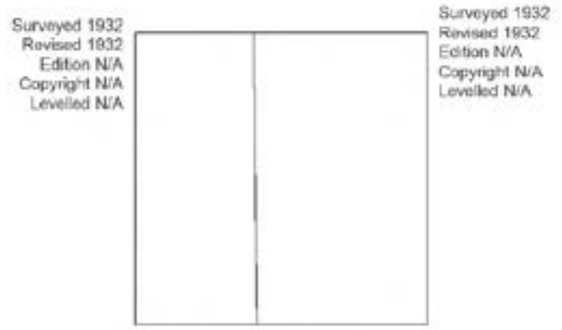
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

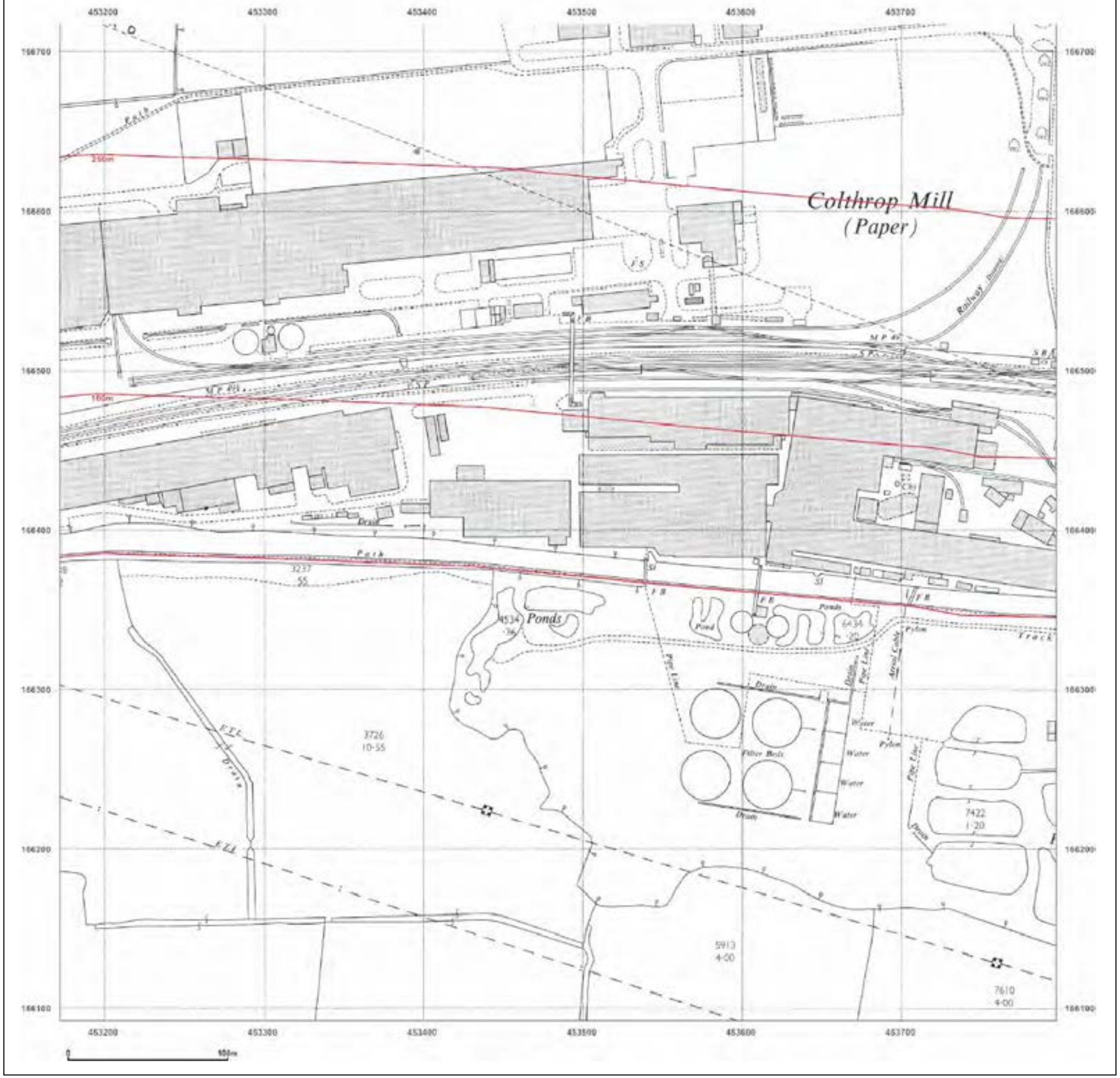


Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1950

GroundSure

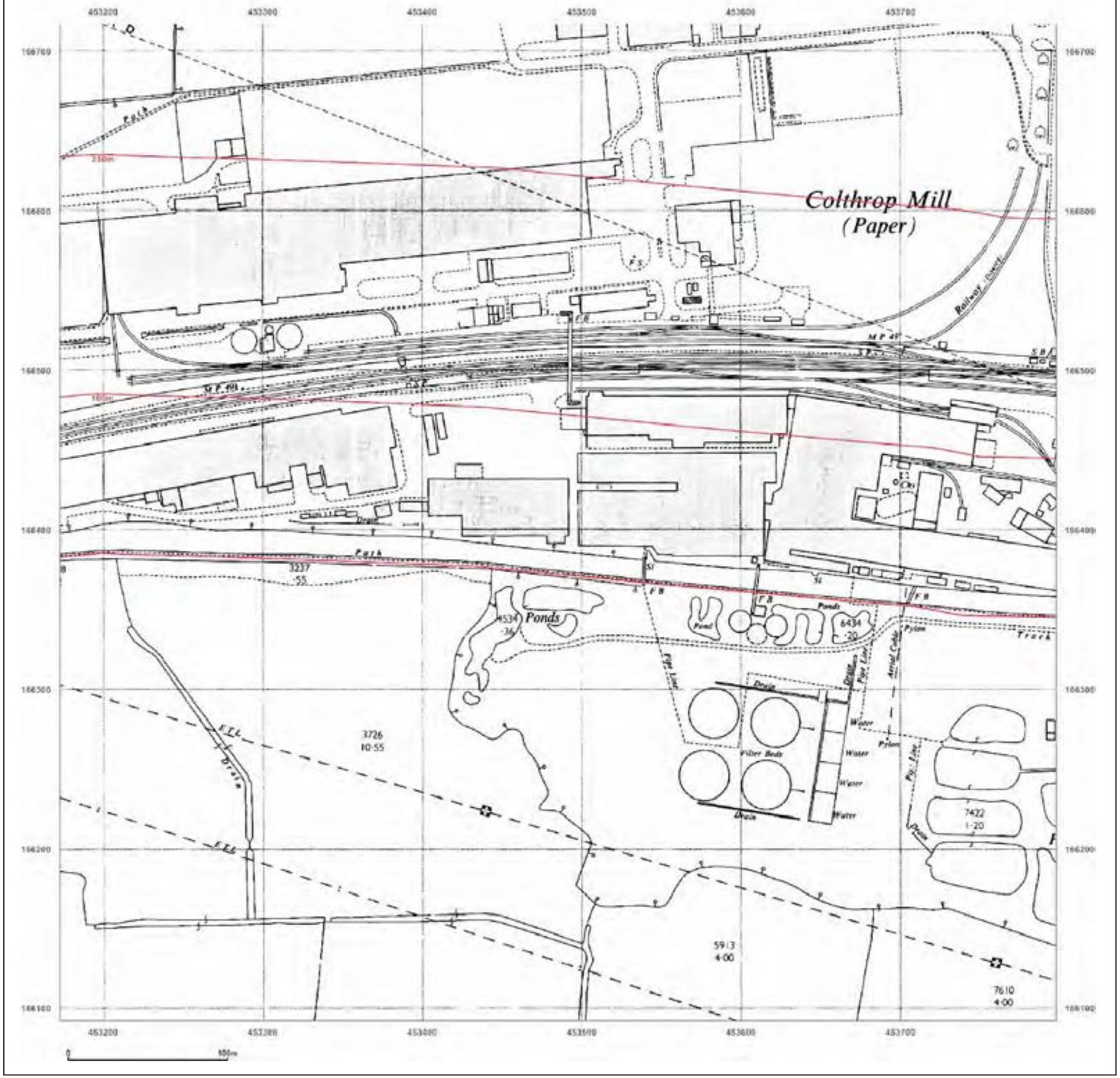
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: National Grid

Map date: **1975**

Scale: 1:2,500

Printed at: 1:2,500

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

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1966
Revised 1978
Edition N/A
Copyright 1967
Levelled 1949

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: National Grid

Map date: **1989**

Scale: 1:2,500

Printed at: 1:2,500

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

GroundSure

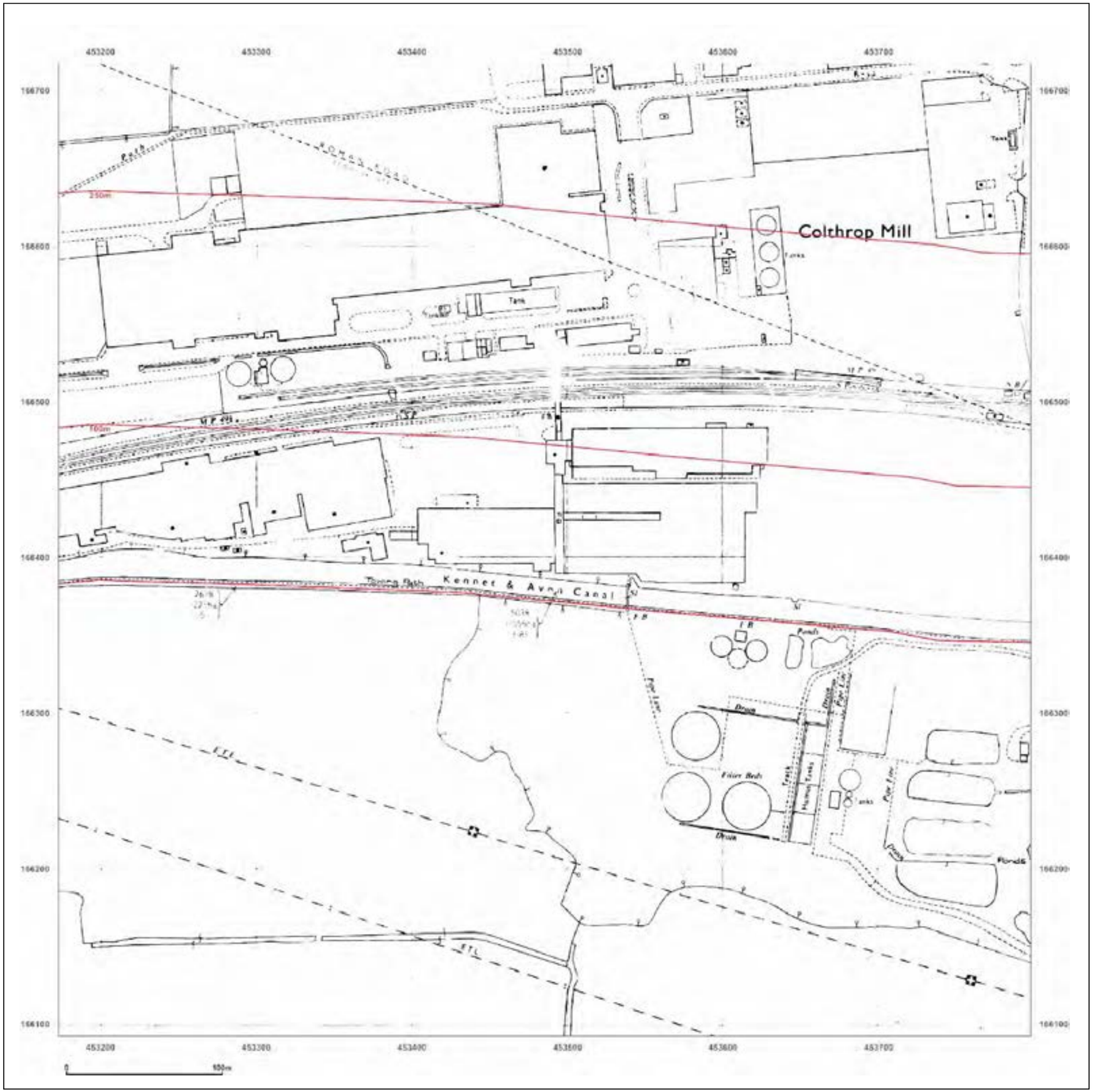
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_3_3
Grid Ref: 453485, 166405

Map Name: National Grid

Map date: **1991**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

GroundSure

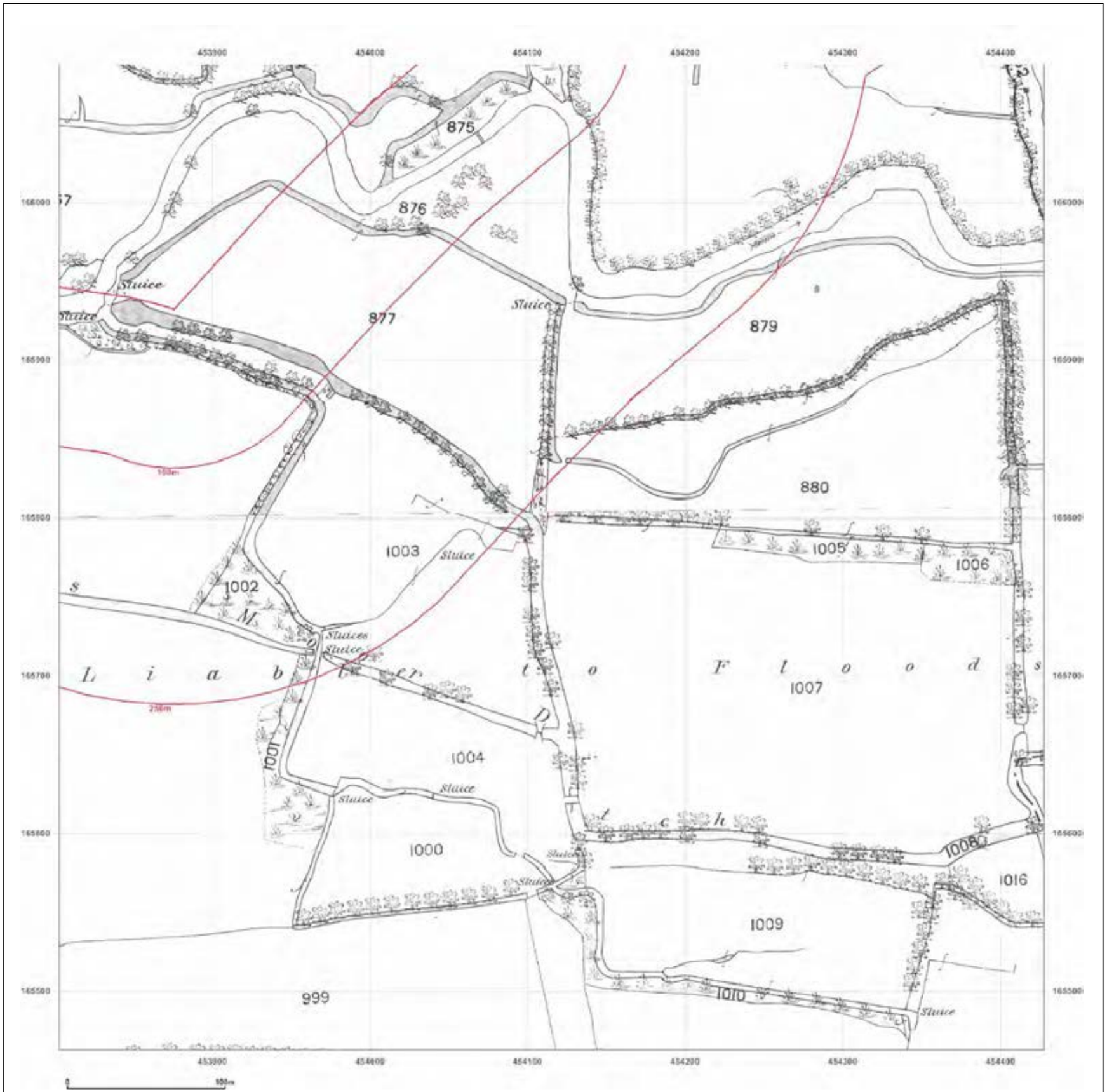
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: County Series

Map date: **1880**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

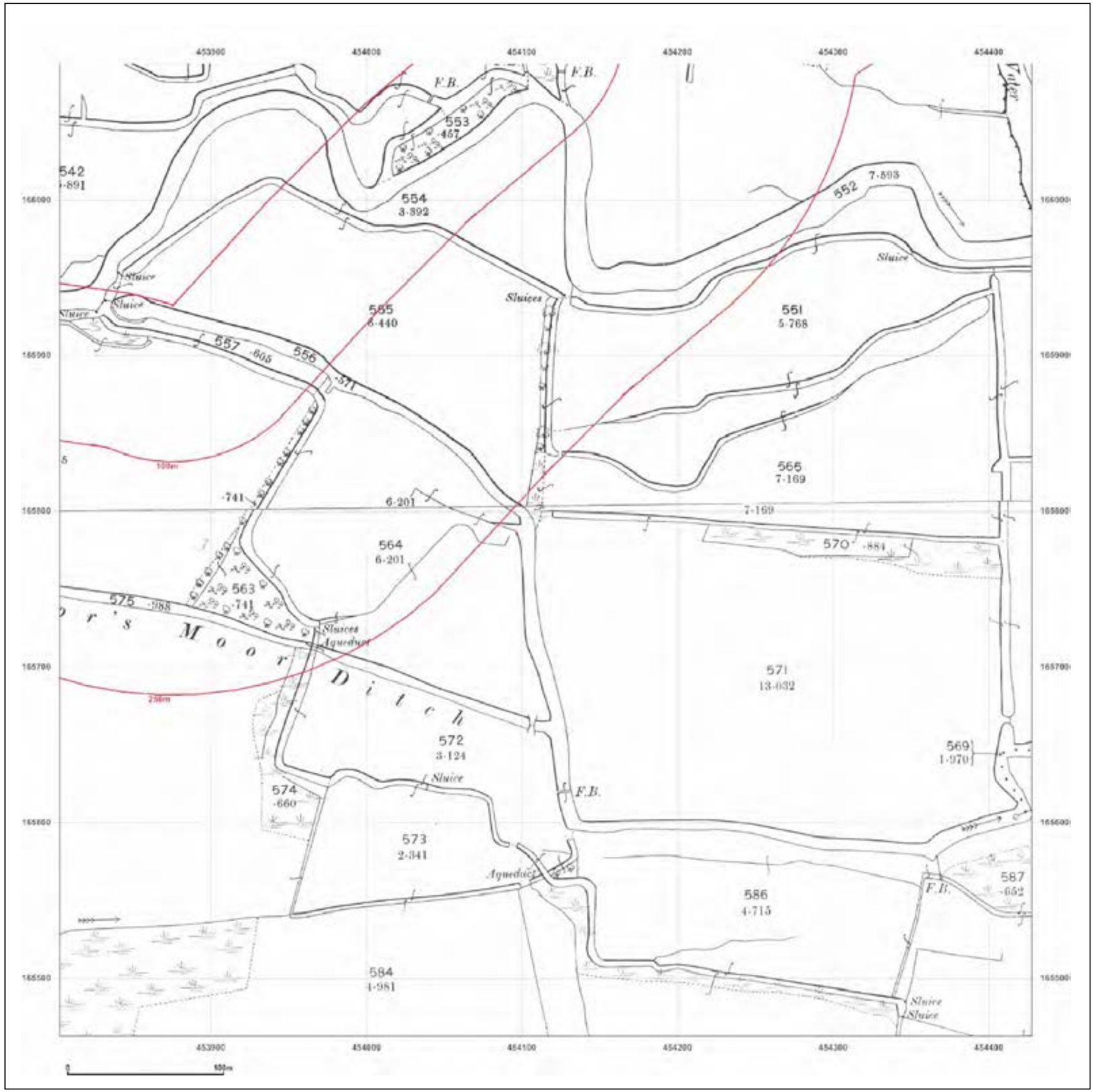
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

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

GroundSure

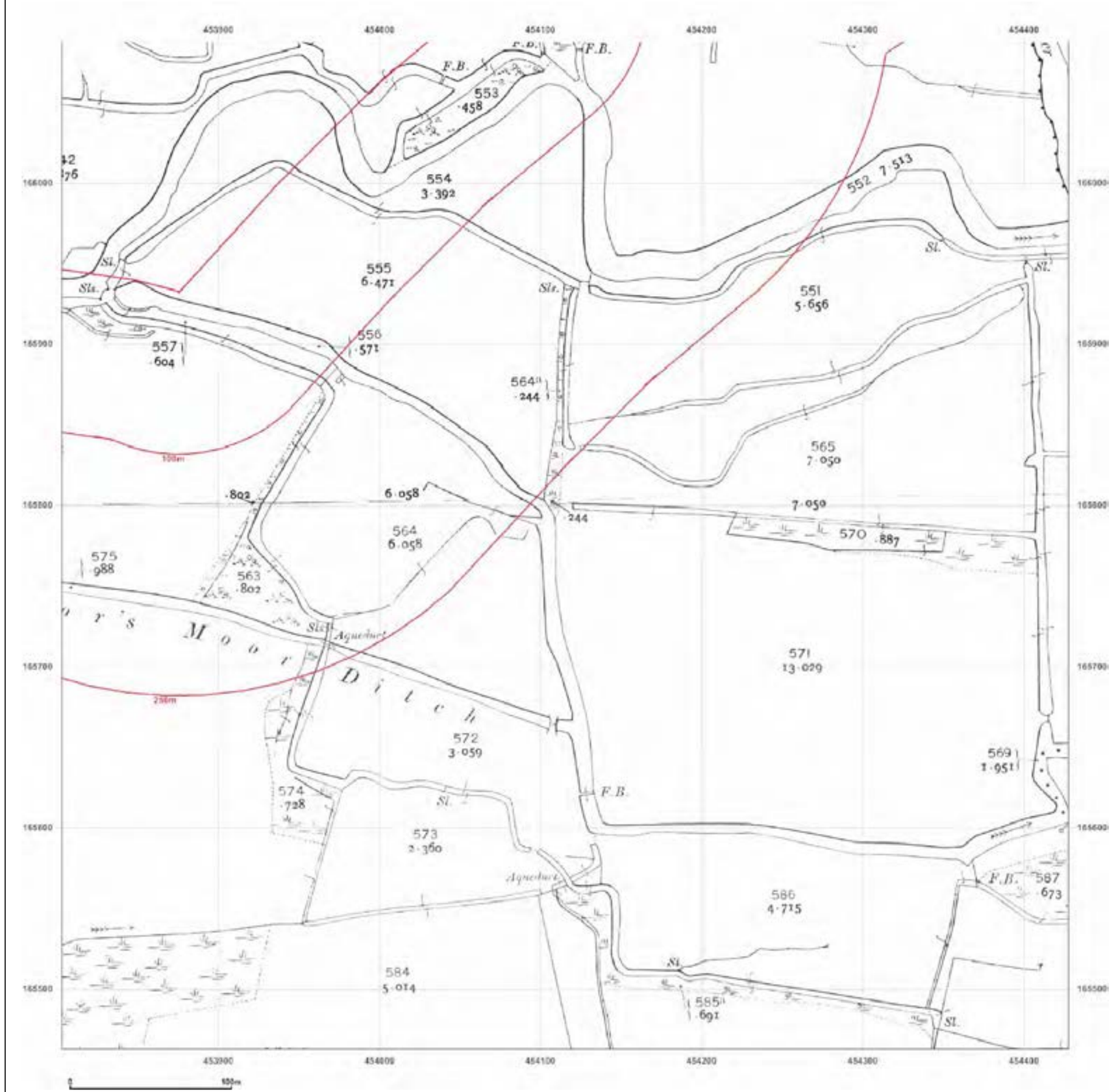
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: County Series

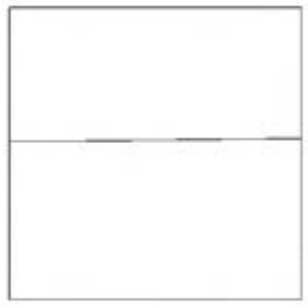
Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

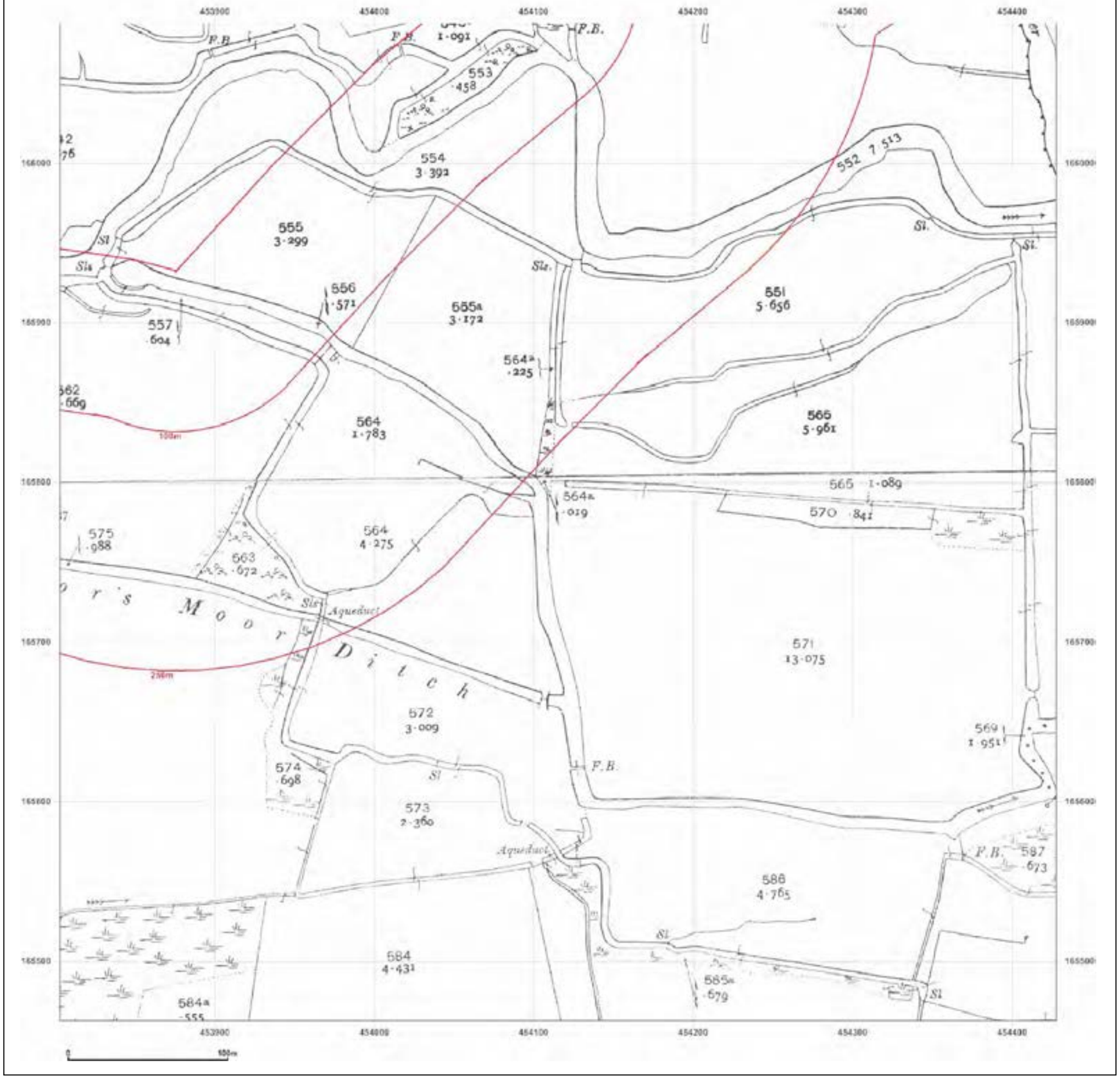
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

GroundSure

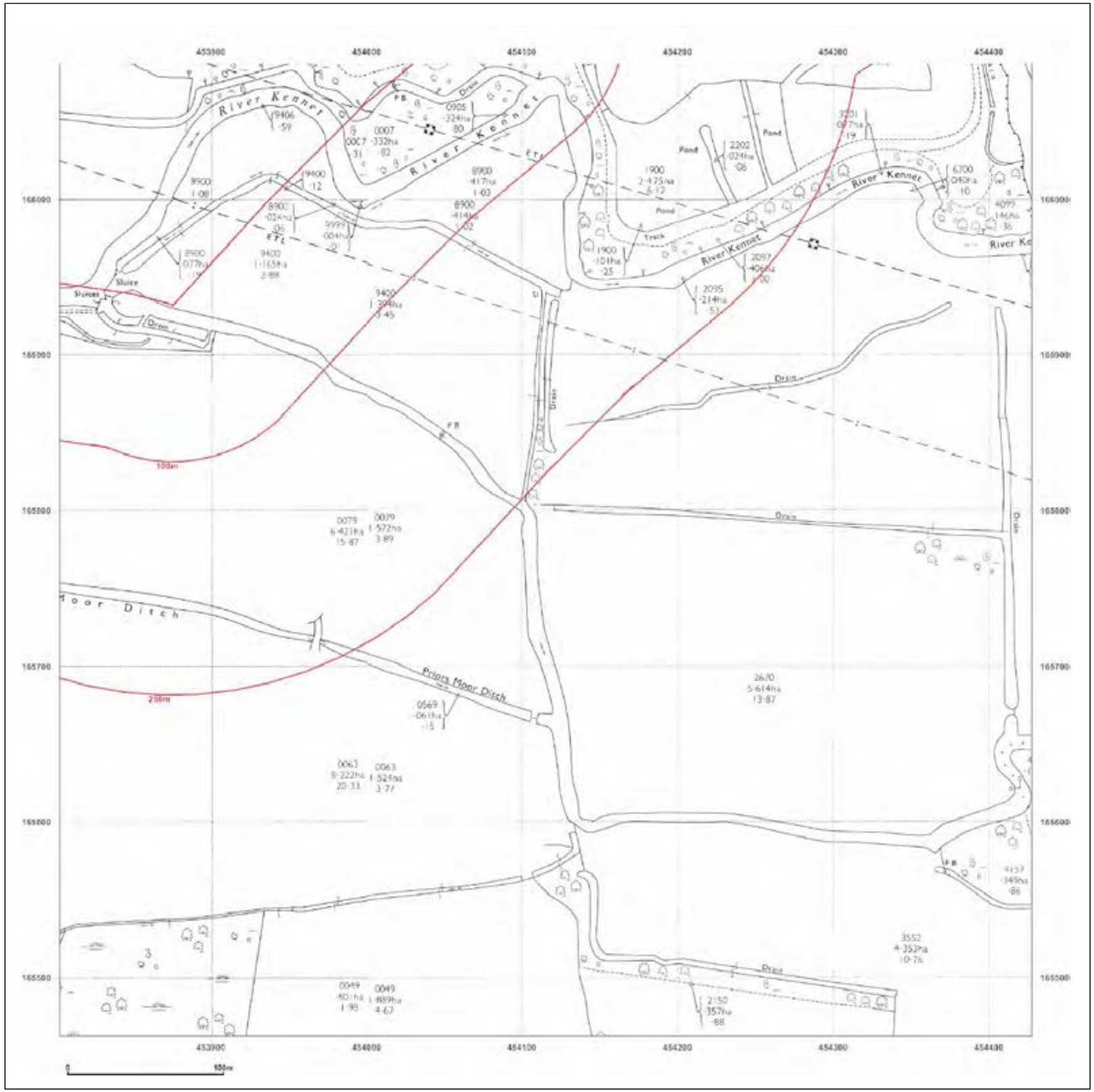
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: National Grid

Map date: **1966-1969**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1950

Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1968

Surveyed 1988
Revised 1988
Edition N/A
Copyright 1970
Levelled 1950

Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1950

GroundSure

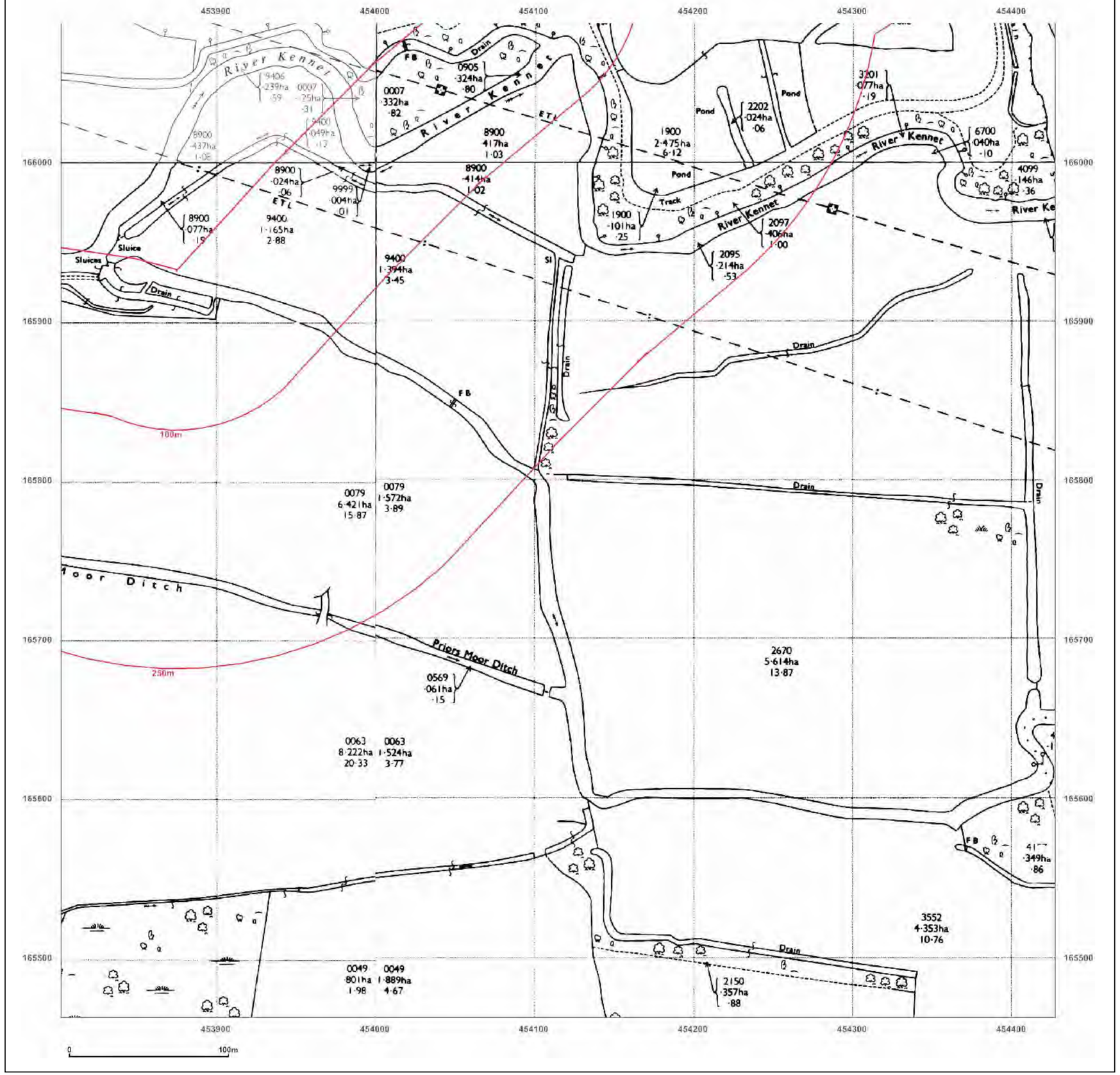
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: National Grid

Map date: **1966-1970**

Scale: 1:2,500

Printed at: 1:2,500

N W E S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1949

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

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

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

GroundSure

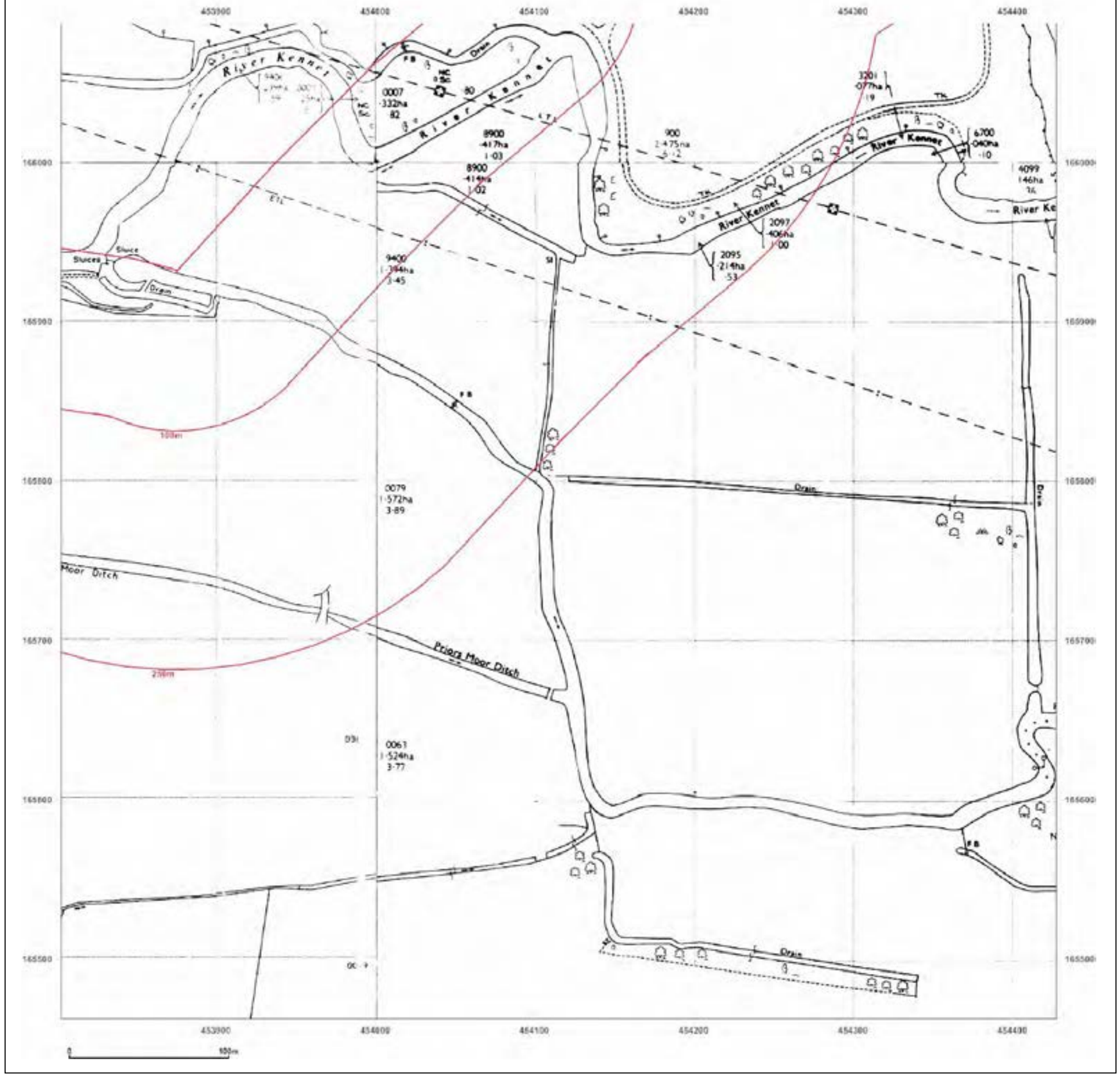
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_2
Grid Ref: 454115, 165775

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

Surveyed 1968
Revised 1989
Edition N/A
Copyright 1989
Levelled 1968

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

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

GroundSure

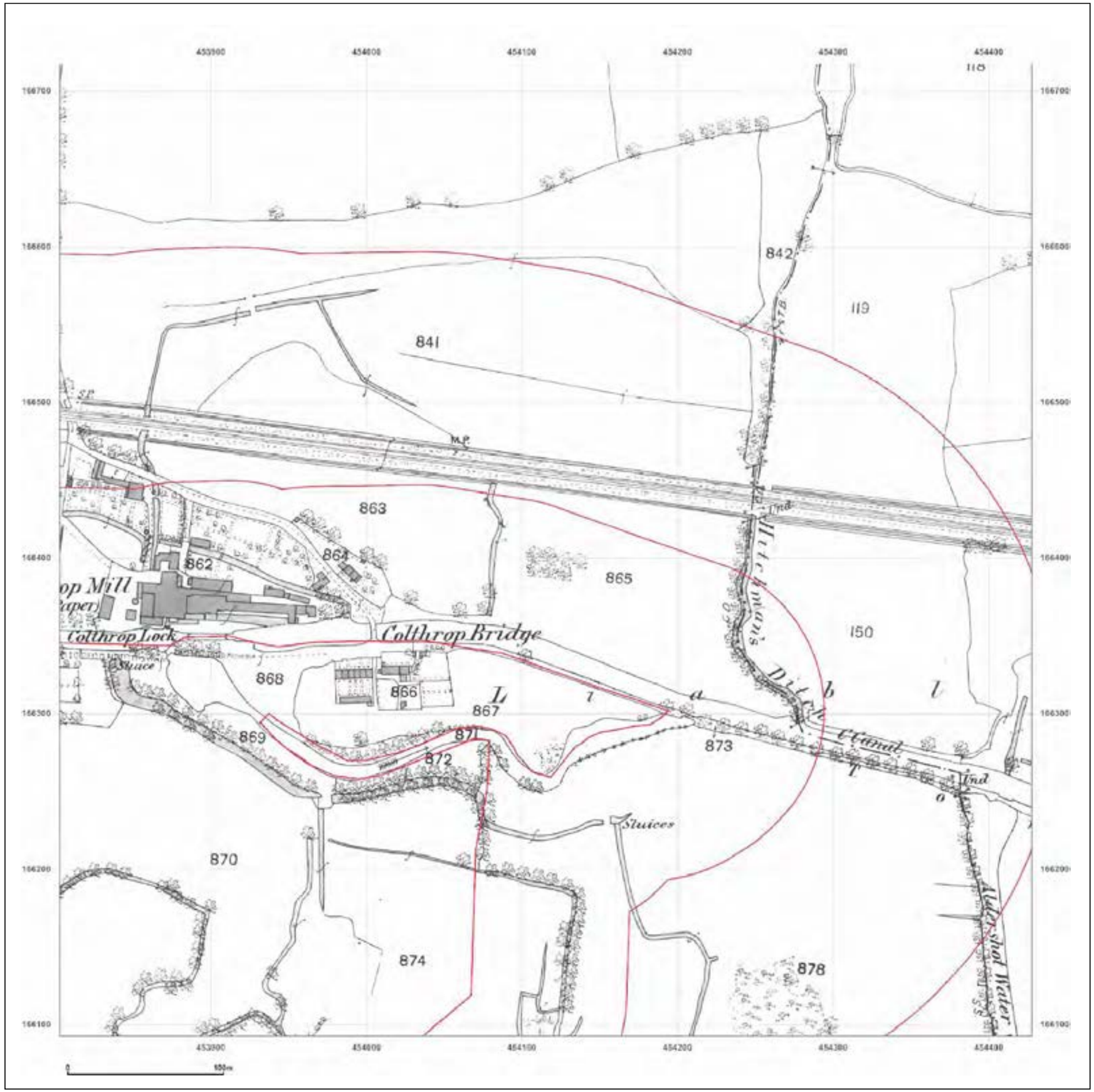
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: County Series

Map date: **1880**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1880
Revised 1880
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

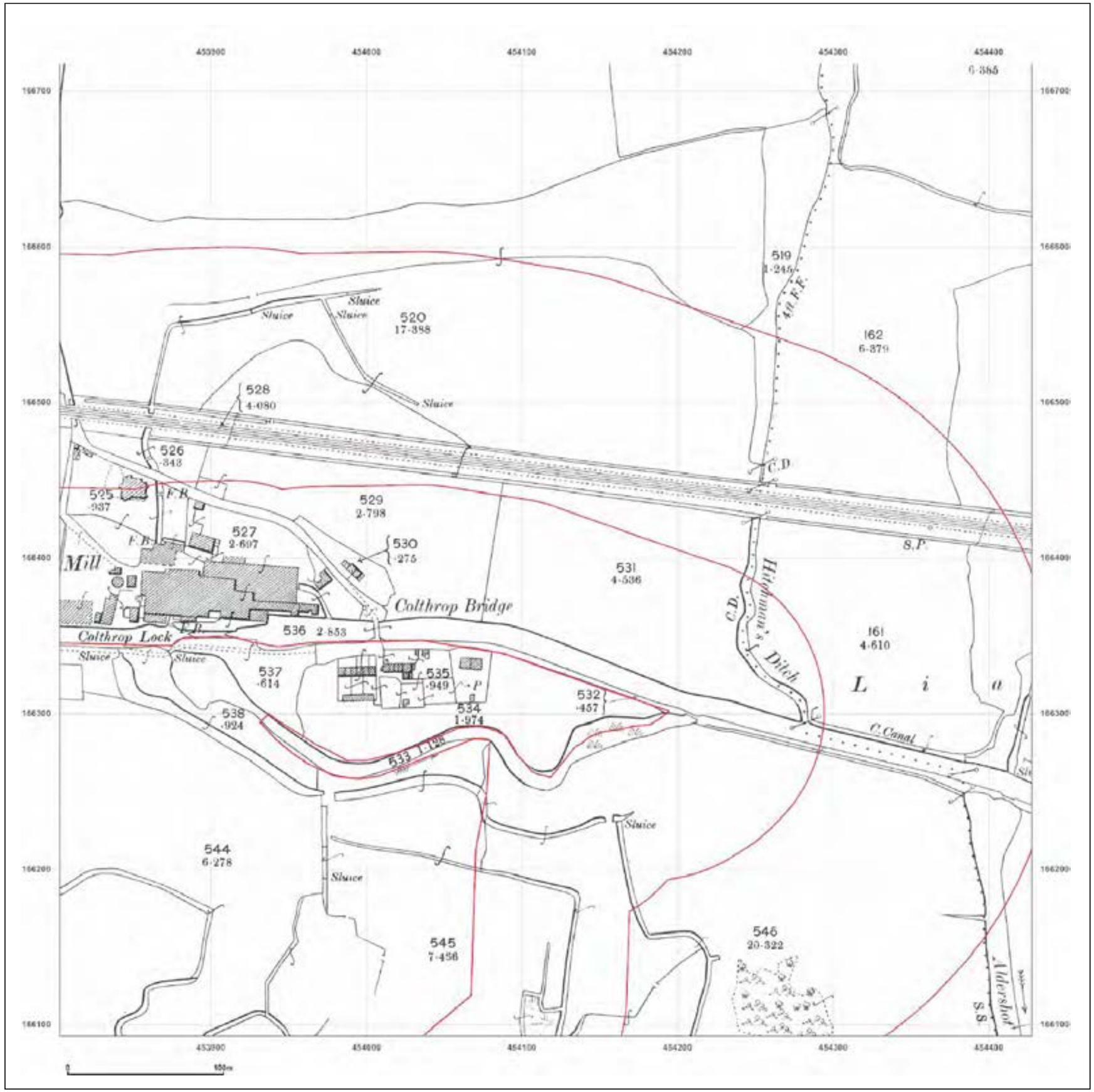
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

GroundSure

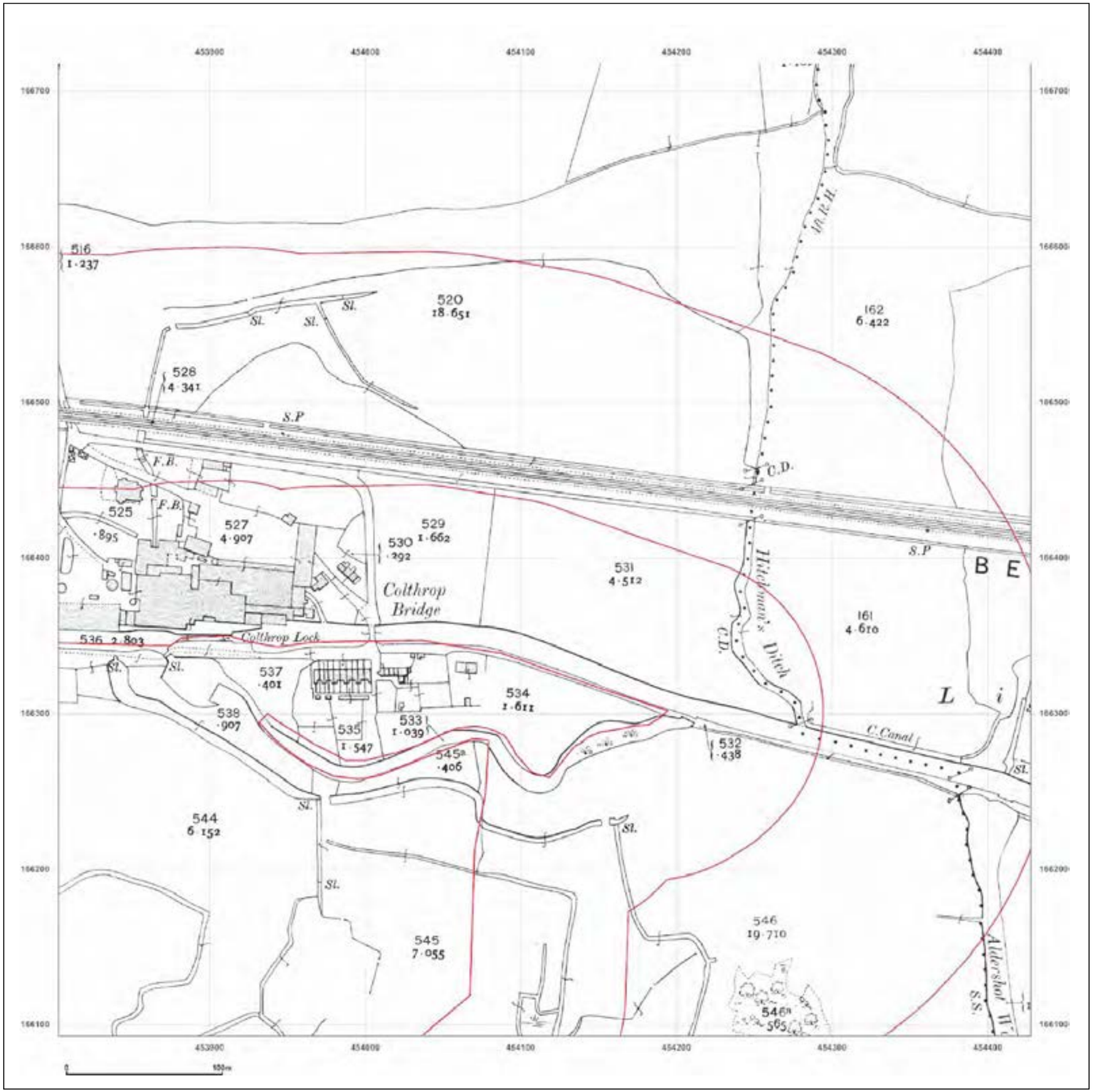
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: County Series

Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

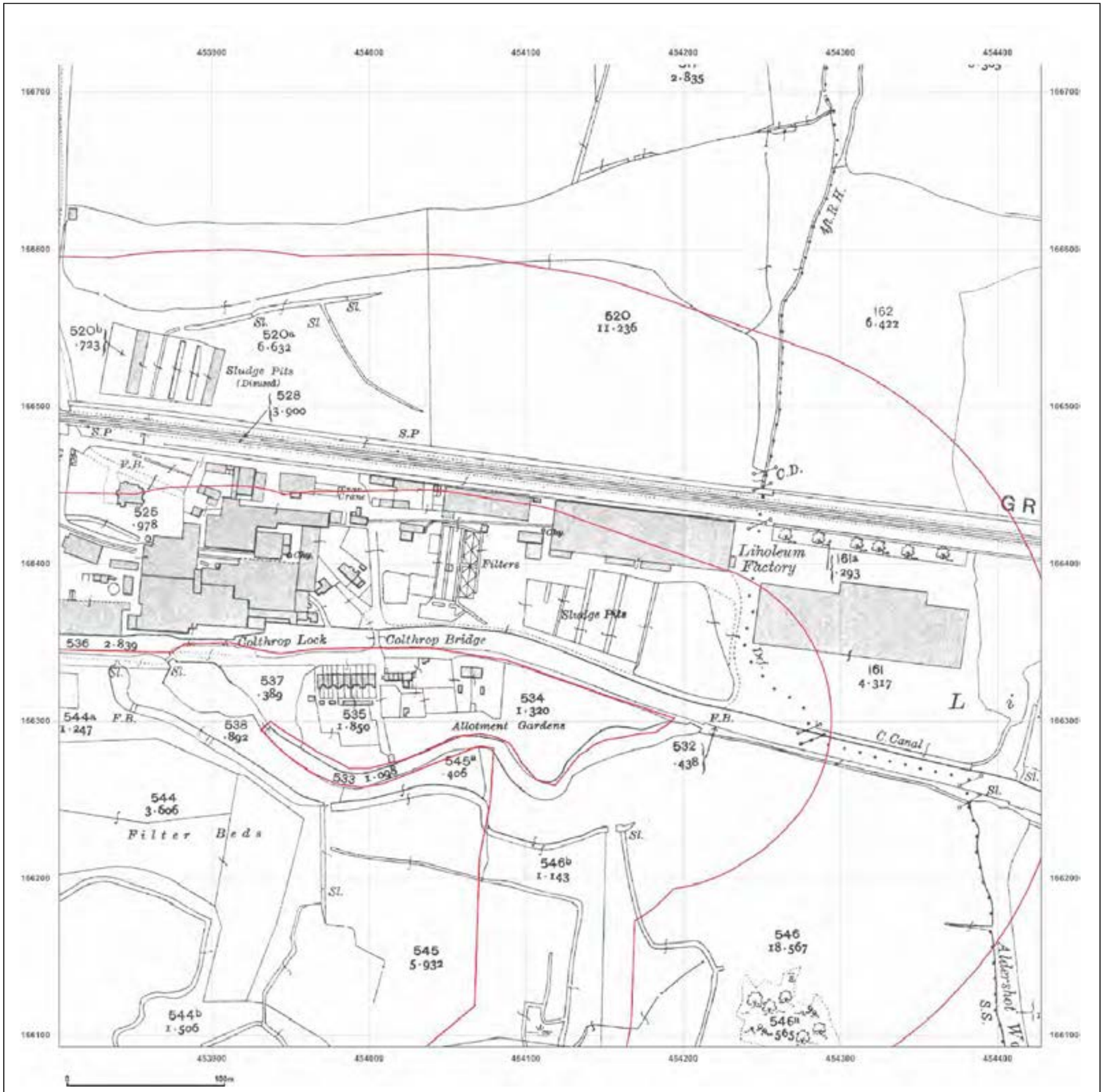
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

Surveyed 1932
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

GroundSure

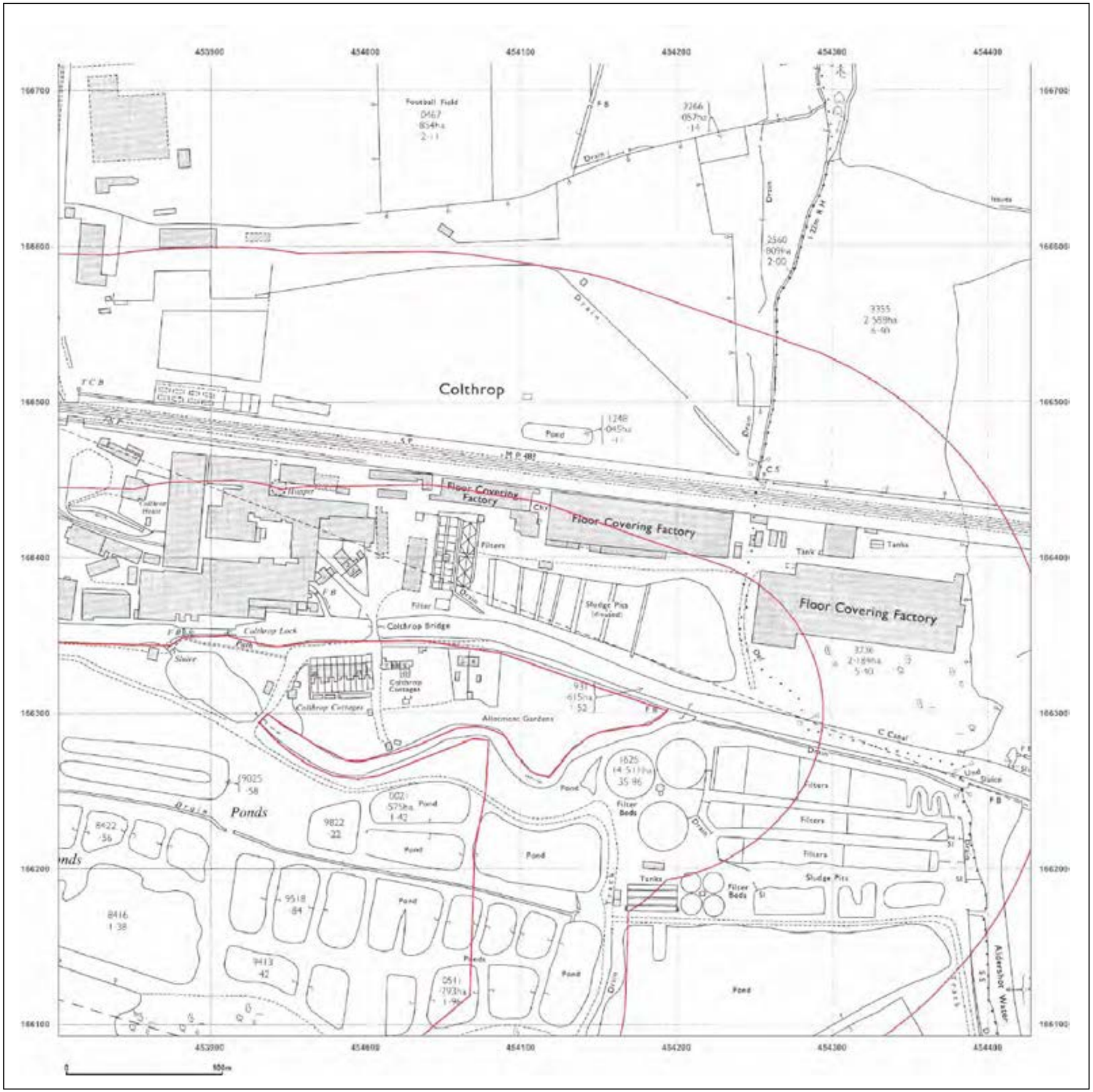
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

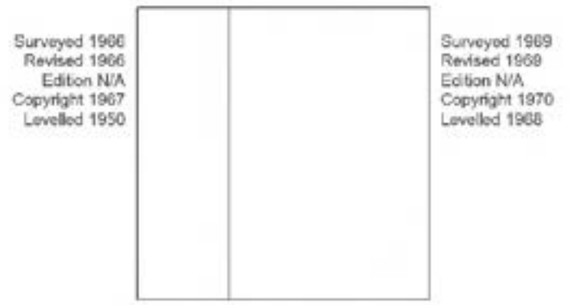
Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: National Grid

Map date: **1966-1969**

Scale: 1:2,500

Printed at: 1:2,500



GroundSure

Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: National Grid

Map date: **1975**

Scale: 1:2,500

Printed at: 1:2,500

N
W
E
S

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

GroundSure

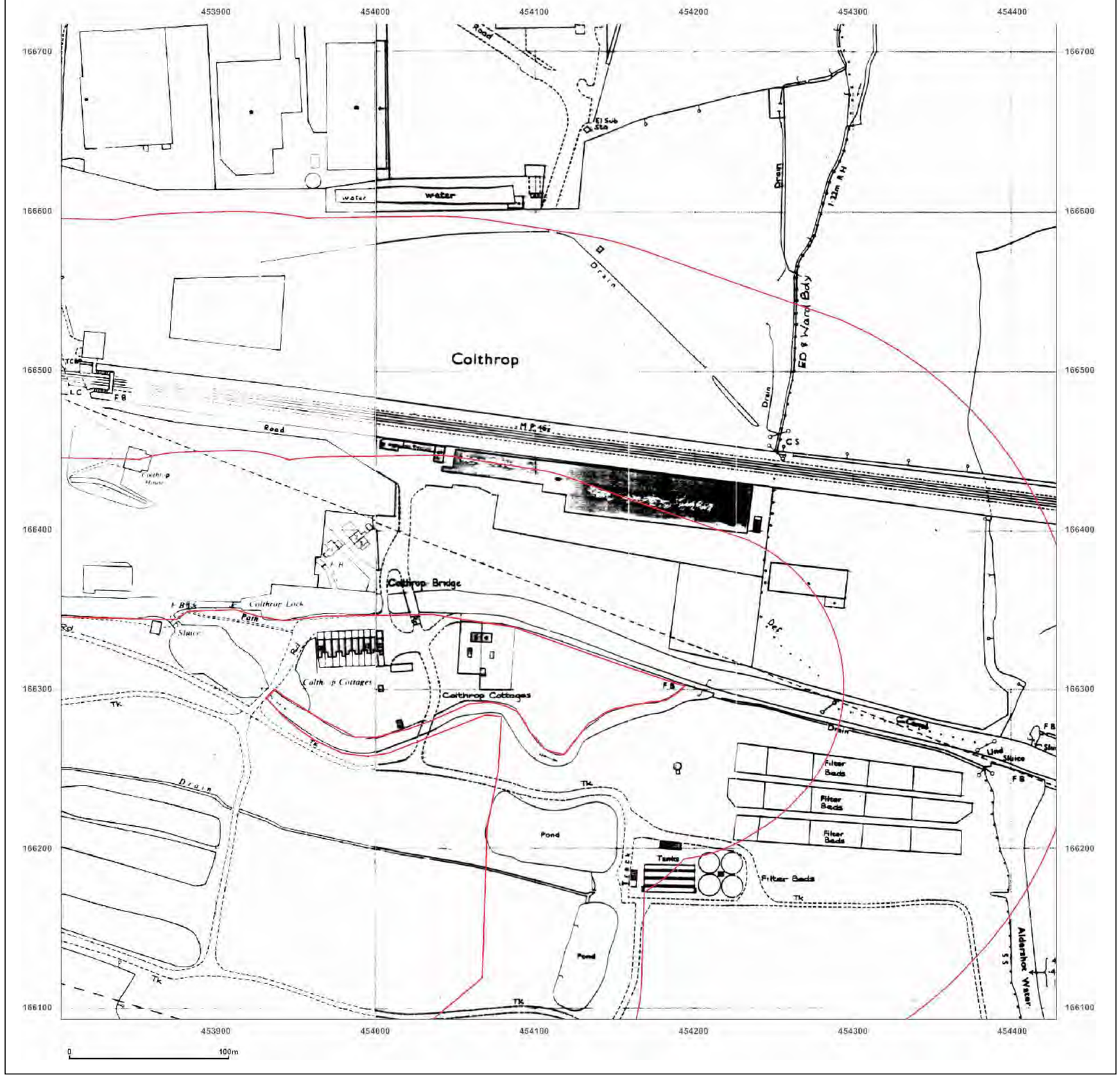
Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



emapsite™

Site Details:

Client Ref: EMS_281295_381044
Report Ref: EMS-281295_381044_LS_4_3
Grid Ref: 454115, 166405

Map Name: National Grid

Map date: **1989**

Scale: 1:2,500

Printed at: 1:2,500

GroundSure

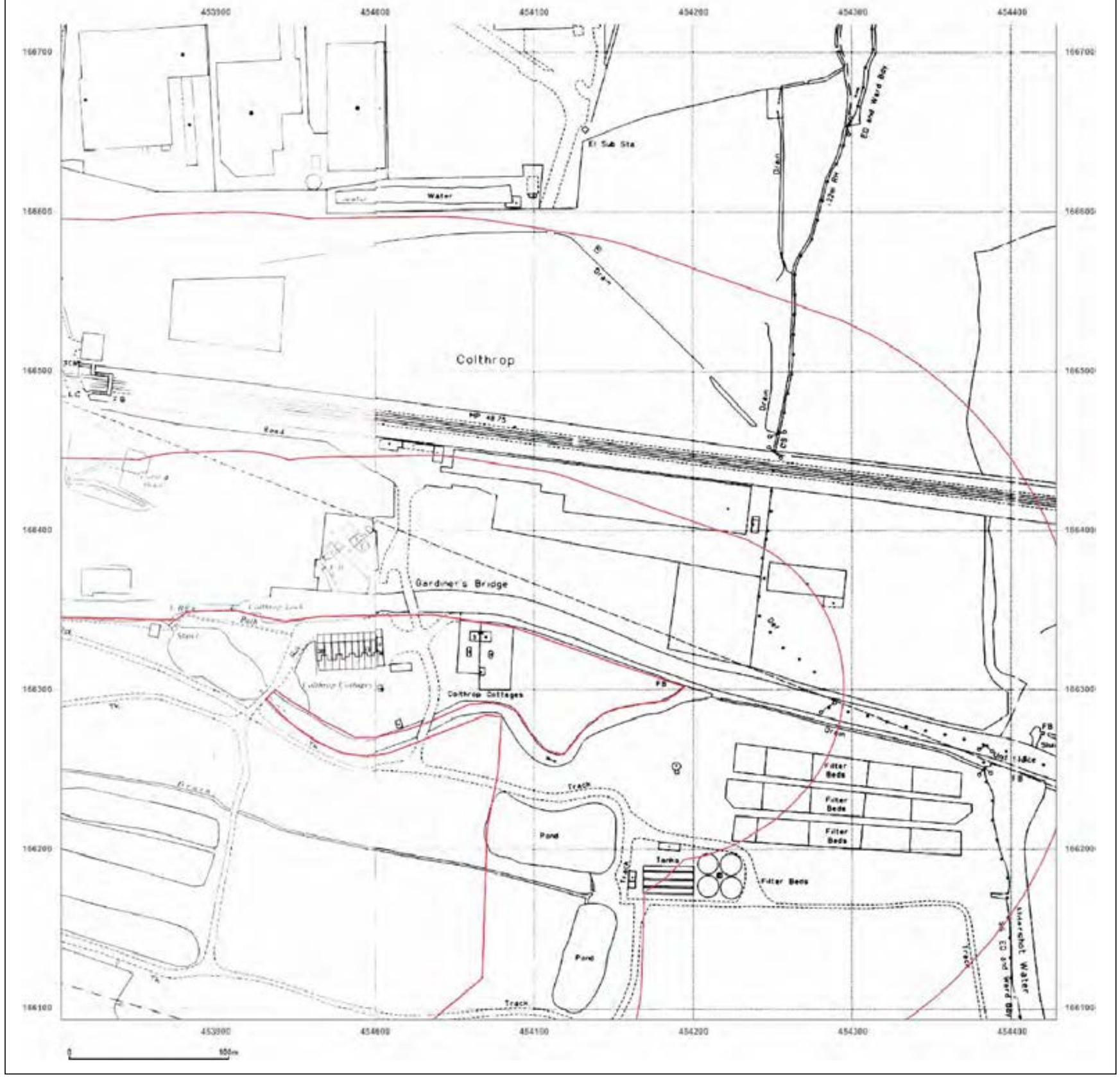
Ordnance Survey Licensed Partner

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*



Site Details:

Client Ref:	EMS_281295_381044
Report Ref:	EMS-281295_381044_LS_4_3
Grid Ref:	454115, 166405

Map Name:	National Grid
Map date:	**1990-1994**
Scale:	1:2,500
Printed at:	1:2,500

N
W
E
S

Surveyed 1968
Revised 1990
Edition N/A
Copyright 1990
Levelled 1968

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

Produced by
GroundSure Environmental Insight
www.groundsure.com

Licensed Partner

Supplied by:
www.emapsite.com
sales@emapsite.com

Production date: 22 December 2014

To view map legend click here *Legend*

APPENDIX 4

EmapSite

Masdar House, ,
Eversley, RG27 0RP

GroundSure Reference:	EMS-281295_381045
Your Reference:	EMS_281295_381045
Report Date	22 Dec 2014
Report Delivery Method:	Email - pdf

GroundSure EnviroInsight

Address: ,

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Enviroinsight** as requested.

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

Yours faithfully,

emapsite customer services team

Enc.
GroundSure EnviroInsight

GroundSure EnviroInsight

Address:	,
Date:	**22 Dec 2014**
Reference:	**EMS-281295_381045**
Client:	**EmapSite**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	25-Sep-2010
Grid Reference:	453480,166193
Site Size:	42.64ha

Contents Page

Overview of Findings

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

Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	7	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	2	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	1	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	1	0	2	3
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	5	7	23	15
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0
1.2 Records of COMAH and NIHHS sites	0	0	0	0
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	1	4	3	2
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	1	0	0	0	0	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	1	0	1	4
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	1
2.1.4 GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	3	1	3	1	0	7

Section 3: Current Land Use

	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	8	8	53	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology

4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology

	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 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
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	1	1	5	8	2	2
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	2	0	1	2	2	1
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	2	1	0	0
5.6 Source Protection Zones (within 500m of the study site)	1	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	1	0	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	Yes	No	Yes	Yes	No
5.10 Detailed River Network entries within 500m of the site	14	17	22	36	Not searched	Not searched
5.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	1	0	0	0	0	9
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	1
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	1	8	14
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	1
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	1	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Moderate
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Negligible
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Low

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 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. 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.

2. 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.

3. 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 underground oil and gas pipelines.

4. Geology

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

5. 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.

6. Flooding

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

7. 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.

8. 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.

9. Mining

Provides information on areas of coal and shallow mining.

10. 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.

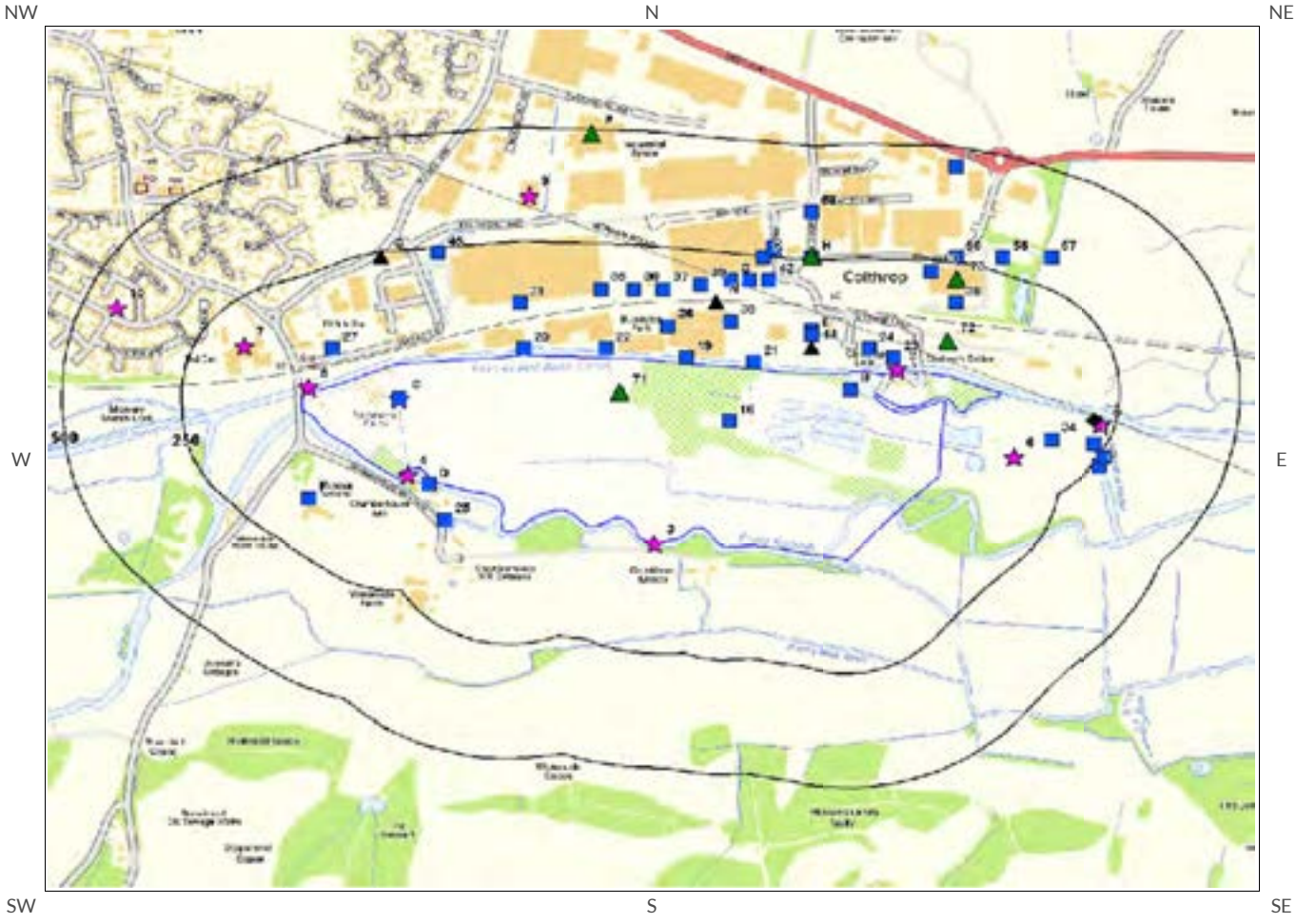
Note: Maps

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. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from Ordnance Survey

- Site Outline
- Search Buffers (m) — 250 — 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

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

7

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
79M	54.0	N	453800 166400	Operator: Colthrop Board Mill Ltd Address: Colthrop Lane, Thatcham, Newbury, Berkshire, RG19 4NJ Process: Paper And Pulp Manufacturing Processes	Permit Number: AU8423 Original Permit Number: IPCAPP Date Approved: 29-11-1996 Effective Date: 30-11-1996 Status: Superseded By Variation
80M	54.0	N	453800 166400	Operator: Colthrop Board Mill Ltd Address: Colthrop Lane, Thatcham, Newbury, Berkshire, RG19 4NJ Process: Paper And Pulp Manufacturing Processes	Permit Number: BD4961 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked
81N	137.0	N	453600 166500	Operator: Colthrop Board Mill Ltd Address: Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4TJ Process: Combustion Processes	Permit Number: AA3891 Original Permit Number: IPCAIRAPP Date Approved: 7-2-1992 Effective Date: 7-2-1992 Status: Superseded By Variation
82N	137.0	N	453600 166500	Operator: Colthrop Board Mill Ltd Address: Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4TJ Process: Combustion Processes	Permit Number: AU9560 Original Permit Number: IPCMINVAR Date Approved: 29-2-1996 Effective Date: 20-3-1996 Status: Superseded By Variation
83N	137.0	N	453600 166500	Operator: Colthrop Board Mill Ltd Address: Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4TJ Process: Combustion Processes	Permit Number: AF2507 Original Permit Number: IPCMINVAR Date Approved: 30-4-1992 Effective Date: 30-4-1992 Status: Superseded By Variation
84N	137.0	N	453600 166500	Operator: Colthrop Board Mill Ltd Address: Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4TJ Process: Combustion Processes	Permit Number: AF2493 Original Permit Number: IPCMINVAR Date Approved: 29-4-1992 Effective Date: 29-4-1992 Status: Superseded By Variation
85N	137.0	N	453600 166500	Operator: Colthrop Board Mill Ltd Address: Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4TJ Process: Combustion Processes	Permit Number: BD5160 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked

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

2

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

ID	Distance	Direction	NGR	Details	
77O	237.0	N	452900 166600	Operator: Southern Biofuels Limited Installation Name: Thatcham Biodiesel Process: ORGANIC CHEMICALS; OXYGEN CONTAINING COMPOUNDS EG ALCOHOLS	Permit Number: AP3138UJ Original Permit Number: AP3138UJ EPR Reference: - Issue Date: 30/10/2007 Effective Date: 30/10/2007 Last date noted as effective: 2014-10-01 Status: Effective
78O	237.0	N	452900 166600	Operator: Southern Biofuels Limited Installation Name: Thatcham Biodiesel Process: ORGANIC CHEMICALS; OXYGEN CONTAINING COMPOUNDS EG ALCOHOLS	Permit Number: UP3235HB Original Permit Number: AP3138UJ EPR Reference: - Issue Date: - Effective Date: - Last date noted as effective: 2014-10-01 Status: Refused

1.1.3 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.

1.1.4 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.

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

1

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
11A	206.0	E	454390 166240	Name: Colthrop Board Mill, Thatcham Status: Not Active Receiving Water: Aldershot Water, Kennet	Authorised Substances: Mercury (other), Cadmium, Pentachlorophenol

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

0

Database searched and no data found.

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

6

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

ID	Distance	Direction	NGR	Details	
71	0.0	On Site	453400 166300	Address: Field Packaging, Colthrop Lane Process: Print/paint/ink/dyes Process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
72	71.0	N	454082 166412	Address: KRM Concrete Ltd, Kennetholme Quarry, Colthrop Lane, Thatcham, Berks, RG19 4NT Process: Concrete Batching Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
73	210.0	N	454102 166549	Address: Xtrac Ltd, Gable Way, Kennet Park, Thatcham, RG19 4ZA Process: petrol vapour recovery process Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
74H	254.0	N	453800 166600	Address: Motor Insurance Repair Centre, Colthrop Lane Process: Vehicle Re-spray Process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
75P	488.0	N	453341 166870	Address: Hanson Thermalite Ltd, Enterprise Way, Thatcham, Berkshire, RG19 4AN Process: Storage Of Cement Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
76P	488.0	N	453341 166870	Address: Hanson Building Products Ltd, Enterprise Way, Thatcham, Berkshire, RG19 4AN Process: Manufacture of concrete blocks Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

---

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

50

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

ID	Distance	Direction	NGR	Details	
12 B	0.0	On Site	453880 166310	Address: Colthrop Board Mill, Thatcham, Newb, Colthrop Board Mill, Thatcham, N, Ewbury, Berks Effluent Type: Trade Discharges - Unspecified Permit Number: CTCR.1728 Permit Version: 1	Receiving Water: Kennet & Avon Canal Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986
13 B	0.0	On Site	453880 166310	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Unspecified Permit Number: CTCR.1724 Permit Version: 1	Receiving Water: Kennet & Avon Canal Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986
14 B	0.0	On Site	453880 166310	Address: Colthrop Board Mill, Thatcham, Newb, Colthrop Board Mill, Thatcham, N, Ewbury, Berks Effluent Type: Sewage Discharges - Unspecified - Not Water Company Permit Number: CTWC.0799 Permit Version: 1	Receiving Water: Colthrop Loop: Kennt & Avn Can Status: Revoked - Unspecified Issue date: 24/4/1986 Effective Date: 24/4/1986 Revocation Date: -
15 C	0.0	On Site	452939 166289	Address: Rainsford Farm, Crookham Hill, Thatcham, Berkshire, Berkshire, RG19 4NU Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: EPRAB3194RZ Permit Version: 1	Receiving Water: River Kennet Status: New Issued Under Epr 2010 Issue date: 3/3/2014 Effective Date: 3/3/2014 Revocation Date: -
16	0.0	On Site	453628 166240	Address: Former Water Treatment Works, Former Water Treatment Works, Colthrop, Thatcham, Berkshire, RG19 4NT Effluent Type: Trade Discharges - Process Effluent - Not Water Company Permit Number: CAWM.1338 Permit Version: 1	Receiving Water: Colthrop Lagoon Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 19/7/2006 Effective Date: 1/1/2007 Revocation Date: 5/8/2010
17 D	12.0	SW	453000 166100	Address: Extended Aeration Plant, Chamberhou, Extended Aeration Plant, Chamber, House Hill, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1396 Permit Version: 1	Receiving Water: Kennet Status: Transferred From R(pp)a 1951-1961 Issue date: 11/3/1974 Effective Date: 11/3/1974 Revocation Date: 2/3/1992
18 D	12.0	SW	453000 166100	Address: Extended Aeration Plant, Chamberhou, Extended Aeration Plant, Chamber, House Hill, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1396 Permit Version: 2	Receiving Water: Kennet Status: Varied By Application - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 11/3/1974 Effective Date: 3/3/1992 Revocation Date: -
19	12.0	N	453540 166380	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Cooling Water Permit Number: CTCR.1731 Permit Version: 1	Receiving Water: Kennet & Avon Canal Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 30/6/1993

ID	Distance	Direction	NGR	Details	
20	14.0	N	453200 166400	Address: Bridge Farm, The Street, Old Basing, Bridge Farm, The Street, Old Bas, Ing, Basingstoke, Hants, Rg24 7b, Y Effluent Type: Agriculture - Fish Farming - Not Water Company Permit Number: CNTW.0954 Permit Version: 1	Receiving Water: River Loddon Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 28/2/1991 Effective Date: 28/2/1991 Revocation Date: 15/5/2005
21	15.0	N	453680 166370	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Cooling Water Permit Number: CTCR.1727 Permit Version: 1	Receiving Water: Kennet & Avon Canal Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986
22	20.0	N	453370 166400	Address: Field Packaging Factory, Colthrop, Thatcham, Berkshire, RG19 4NL Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CAWM.0342 Permit Version: 1	Receiving Water: The Kennet And Avon Canal Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: - Effective Date: 26/7/2001 Revocation Date: -
23	34.0	N	453970 166380	Address: 1 To 3 Colthrop Cottages, Colthrop, 1 To 3 Colthrop Cottages, Colthr, Op, Thatcham, Berks, Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTWC.0497 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 6/1/1986 Effective Date: 6/1/1986 Revocation Date: 9/9/1986
24	51.0	N	453920 166400	Address: Paper Mill Turbine, Reed Board Mill, Paper Mill Turbine, Reed Board M, Ills, Thatcham, Berks Effluent Type: Trade Discharges - Cooling Water Permit Number: CTCR.1730 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986
25	75.0	S	453034 166023	Address: 1 & 2 The Cottages, Chamberhouse Mill Lane, Thatcham, Berkshire, RG19 4NG Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CAWM.1246 Permit Version: 1	Receiving Water: Grndwater Via Sub Irr System Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 5/1/2006 Effective Date: - Revocation Date: -
26	78.0	N	453500 166450	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Cooling Water Permit Number: CTCR.1732 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 2/2/1993
27	78.0	N	452800 166400	Address: Thatcham Railway Station, Station R, Thatcham Railway Station, Statio, N Road, Thatcham, Near Newbury, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTWC.1796 Permit Version: 1	Receiving Water: Alluvium Status: Revoked - Unspecified Issue date: 4/8/1987 Effective Date: 4/8/1987 Revocation Date: -
28 E	84.0	N	453800 166430	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Cooling Water Permit Number: CTCR.1729 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986

ID	Distance	Direction	NGR	Details	
29 E	94.0	N	453800 166440	Address: South Mill Site, Colthrop Board Mil, South Mill Site, Colthrop Board, Mills, Thatcham, Newbury, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTWC.0923 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 3/6/1986 Effective Date: 3/6/1986 Revocation Date: 11/1/1989
30	100.0	N	453630 166460	Address: South Mill Site, Colthrop Board Mil, South Mill Site, Colthrop Board, Mills, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Unspecified Permit Number: CTCR.1967 Permit Version: 1	Receiving Water: Nightingalestream Status: Revoked - Unspecified Issue date: 20/4/1983 Effective Date: 20/4/1983 Revocation Date: 1/8/1986
31	114.0	N	453190 166500	Address: Swmh26, Unit C, Colthrop Ind Est, Mill Park, Thatcham, Newbury, Berkshire, RG19 4MJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0536 Permit Version: 1	Receiving Water: The Nightingale Stream Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 7/1/2003 Effective Date: 6/9/2002 Revocation Date: -
32 F	143.0	SW	452750 166070	Address: Football Club Stadium, Waterside Fa, Football Club Stadium, Waterside, Farm, Crookham Road, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CNTM.0814 Permit Version: 1	Receiving Water: Gravel Status: New Consent, By Application (wra 91, Section 88) Issue date: 26/4/1993 Effective Date: 26/4/1993 Revocation Date: -
33 F	143.0	SW	452750 166070	Address: Football Club Stadium, Waterside Fa, Football Club Stadium, Waterside, Farm, Crookham Road, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CNTM.0814 Permit Version: 2	Receiving Water: Gravel Status: Varied Under Epr 2010 Issue date: - Effective Date: - Revocation Date: -
34	147.0	SE	454300 166200	Address: Florco Industrial Estate, Colthrop, Florco Industrial Estate, Colthr, Op, Thatcham, Berks Effluent Type: Sewage Discharges - Unspecified - Not Water Company Permit Number: CTCR.2016 Permit Version: 1	Receiving Water: Kennet & Avon Canal Status: Revoked - Unspecified Issue date: 8/7/1983 Effective Date: 8/7/1983 Revocation Date: 16/7/1986
35	149.0	N	453360 166530	Address: Between North Board Mill & Main Rai, Between North Board Mill & Main, Railway Line, Colthrop, Thatcham Effluent Type: Miscellaneous Discharges - Unspecified Permit Number: CTWC.0580 Permit Version: 1	Receiving Water: Gravel Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 6/1/1986 Effective Date: 6/1/1986 Revocation Date: -
36	152.0	N	453430 166530	Address: Swmh34, Unit C, Colthrop Ind Est, Mill Park, Thatcham, Newbury, Berkshire, RG19 4MJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0534 Permit Version: 1	Receiving Water: The Goddards Stream Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 7/1/2003 Effective Date: 6/9/2002 Revocation Date: -
37	157.0	N	453490 166530	Address: Colthrop Industrial Estate, Mill Park, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0954 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Surrendered Under Epr 2010 Issue date: 4/1/2005 Effective Date: - Revocation Date: 1/2/2011
38	161.0	N	454100 166500	Address: Colthrop East Industrial Estate, Th, Colthrop East Industrial Estate, Thatcham, Berks Effluent Type: Miscellaneous Discharges - Unspecified Permit Number: CTCR.2178 Permit Version: 1	Receiving Water: Goddards Stream Status: Revoked - Unspecified Issue date: 7/9/1984 Effective Date: 7/9/1984 Revocation Date: 24/8/1998

ID	Distance	Direction	NGR	Details	
39	175.0	N	453570 166540	Address: Colthrop Industrial Estate, Mill Park, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0953 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Surrendered Under Epr 2010 Issue date: 4/1/2005 Effective Date: - Revocation Date: 1/2/2011
40 G	190.0	N	453630 166550	Address: Colthrop Industrial Estate, Mill Park, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0952 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Surrendered Under Epr 2010 Issue date: 4/1/2005 Effective Date: - Revocation Date: 1/2/2011
41 G	193.0	N	453670 166550	Address: Colthrop Industrial Estate, Mill Park, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0951 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Surrendered Under Epr 2010 Issue date: 4/1/2005 Effective Date: - Revocation Date: 1/2/2011
42	197.0	N	453710 166550	Address: Colthrop Industrial Estate, Mill Park, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0955 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Surrendered Under Epr 2010 Issue date: 4/1/2005 Effective Date: - Revocation Date: 1/2/2011
43	223.0	N	454050 166570	Address: Swift Transport, Kennet Park, Colth, Swift Transport, Kennet Park, Co, Lthrop, Thatcham, Berkshire Effluent Type: Trade Discharges - Site Drainage Permit Number: CATM.3110 Permit Version: 1	Receiving Water: Goddards Stream Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 6/4/1998
44I	226.0	SE	454390 166190	Address: Colthrop Board Mill, Thatcham, Newb, Colthrop Board Mill, Thatcham, N, Ewbury, Berks Effluent Type: Sewage Discharges - Unspecified - Not Water Company Permit Number: CTWC.0798 Permit Version: 1	Receiving Water: Aldershot Water Status: Revoked - Unspecified Issue date: 24/4/1986 Effective Date: 24/4/1986 Revocation Date: -
45	237.0	N	453020 166610	Address: Unit C, Colthrop Ind Estate, Mill Park, Thatcham, Newbury, Berkshire, RG19 4NJ Effluent Type: Trade Discharges - Site Drainage Permit Number: CAWM.0535 Permit Version: 1	Receiving Water: The Nightingale Stream Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 7/1/2003 Effective Date: 6/9/2002 Revocation Date: -
46 K	246.0	N	453700 166600	Address: Vehicle Depot, Colthrop Lane, Thatc, Vehicle Depot, Colthrop Lane, Th, Atcham, Newbury, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.2121 Permit Version: 1	Receiving Water: Goddards Stream Status: Transferred From R(pp)a 1951-1961 Issue date: 9/4/1984 Effective Date: 9/4/1984 Revocation Date: -
47 H	254.0	N	453800 166600	Address: Volpoint Ltd, Factory Site (A), C, Volpoint Ltd, Factory Site (A), Colthrop Lane, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1130 Permit Version: 1	Receiving Water: Goddard's Strm, Trib Of Kennet Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 19/1/1992
48 H	254.0	N	453800 166600	Address: Motor Repair Research Centre, Colth, Motor Repair Research Centre, Co, Lthrop Lane, Thatcham, Berkshire, Rg19 4np Effluent Type: Trade Discharges - Site Drainage Permit Number: CNTM.1521 Permit Version: 1	Receiving Water: Goddards Stream Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 4/8/1994 Effective Date: 4/8/1994 Revocation Date: 23/4/2001
49 H	254.0	N	453800 166600	Address: Motor Repair Research Centre, Colth, Motor Repair Research Centre, Co, Lthrop Lane, Thatcham, Berkshire, Rg19 4np Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CNTM.0026 Permit Version: 1	Receiving Water: Goddards Stream Status: Consent Revoked - Discharge Ceased (section 37(1)) Issue date: 20/1/1992 Effective Date: 20/1/1992 Revocation Date: 1/12/1998

ID	Distance	Direction	NGR	Details	
50	260.0	N	454100 166600	Address: Stw, Colthrop Industrial Estate, Th, Stw, Colthrop Industrial Estate, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1739 Permit Version: 1	Receiving Water: Trib Of Goddards Stream Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: -
51I	260.0	SE	454412 166160	Address: Former Water Treatment Works, Former Water Treatment Works, Colthrop, Thatcham, Berkshire, RG19 4NT Effluent Type: Trade Discharges - Process Effluent - Not Water Company Permit Number: CAWM.1338 Permit Version: 2	Receiving Water: Aldershot Water Status: Varied Under Epr 2010 Issue date: 6/8/2010 Effective Date: 6/8/2010 Revocation Date: -
52J	262.0	SE	454400 166140	Address: Reed Board Mills Ltd, Thatcham, New, Reed Board Mills Ltd, Thatcham, Newbury, Berks Effluent Type: Trade Discharges - Unspecified Permit Number: CTCR.1725 Permit Version: 1	Receiving Water: Aldershot Water Status: Revoked - Unspecified Issue date: 21/1/1981 Effective Date: 21/1/1981 Revocation Date: 1/8/1986
53J	262.0	SE	454400 166140	Address: Colthrop Board Mill, Thatcham, Newb, Colthrop Board Mill, Thatcham, N, Ewbury, Berks Effluent Type: Sewage Discharges - Unspecified - Not Water Company Permit Number: CTWC.0797 Permit Version: 1	Receiving Water: Aldershot Water Status: Revoked - Unspecified Issue date: 24/4/1986 Effective Date: 24/4/1986 Revocation Date: -
54 K	267.0	N	453720 166620	Address: Vehicle Depot, Colthrop Lane, Thatc, Vehicle Depot, Colthrop Lane, Th, Atcham, Newbury, Berks Effluent Type: Trade Discharges - Process Effluent - Not Water Company Permit Number: CTCU.1706 Permit Version: 1	Receiving Water: Gravel Overlondon Claystrata Status: Transferred From Wra 1963 Issue date: 9/4/1984 Effective Date: 9/4/1984 Revocation Date: -
55 K	267.0	N	453720 166620	Address: Vehicle Depot, Colthrop Lane, Thatc, Vehicle Depot, Colthrop Lane, Th, Atcham, Newbury, Berks Effluent Type: Trade Discharges - Process Effluent - Not Water Company Permit Number: CTCU.1706 Permit Version: 2	Receiving Water: Gravel Overlondon Claystrata Status: Surrendered Under Epr 2010 Issue date: - Effective Date: - Revocation Date: 25/4/2013
56	284.0	N	454200 166600	Address: Swift Transport, Kennet Park, Colth, Swift Transport, Kennet Park, Co, Lthrop, Thatcham, Berkshire Effluent Type: Trade Discharges - Site Drainage Permit Number: CATM.3111 Permit Version: 1	Receiving Water: Goddards Stream Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 6/4/1998
57	316.0	N	454300 166600	Address: Factory Site (B), Colthrop Lane, Factory Site (B), Colthrop Lan, E, Thatcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1115 Permit Version: 1	Receiving Water: Trib Of Kennet Status: Revoked - Unspecified Issue date: 16/7/1969 Effective Date: 16/7/1969 Revocation Date: 31/5/1991
58	354.0	N	453800 166700	Address: Land Adjoining Colthrop Lane, Thatc, Land Adjoining Colthrop Lane, Th, Atcham, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCR.1907 Permit Version: 1	Receiving Water: Culverted Section Of Goddards Status: Revoked - Unspecified Issue date: 5/11/1982 Effective Date: 5/11/1982 Revocation Date: 1/8/1990
59 L	458.0	N	454100 166800	Address: Colthrop Lane, Colthrop, Thatcham, Colthrop Lane, Colthrop, Thatcha, M, Berks Effluent Type: Miscellaneous Discharges - Unspecified Permit Number: CTCU.0850 Permit Version: 1	Receiving Water: Gravel Strata Status: Revoked - Unspecified Issue date: 24/1/1979 Effective Date: 24/1/1979 Revocation Date: 13/6/1988

ID	Distance	Direction	NGR	Details	
60 L	458.0	N	454100 166800	Address: Colthrop Lane, Colthrop, Thatcham, Colthrop Lane, Colthrop, Thatcha, M, Berks Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CTCU.0849 Permit Version: 1	Receiving Water: Gravel Strata Status: Revoked - Unspecified Issue date: 24/1/1979 Effective Date: 24/1/1979 Revocation Date: 13/6/1988
61 L	458.0	N	454100 166800	Address: Office, Sayers Yard, Daytona Drive, Office, Sayers Yard, Daytona Dri, Ve, Colthrop Lane, Thatcham, Ber, Kshire Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: CATM.2349 Permit Version: 1	Receiving Water: Alluvium Status: New Consent, By Application (wra 91, Section 88) Issue date: 27/6/1996 Effective Date: 27/6/1996 Revocation Date: -

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site: 10

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

ID	Distance	Direction	NGR	Details	
1C	0.0	On Site	452937 166288	Incident Date: 08/10/2003 Incident Identification: 195004 Pollutant: Contaminated Water Pollutant Description: Suspended Solids	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2	7.0	N	453977 166353	Incident Date: 22/10/2002 Incident Identification: 116136 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3	7.0	S	453470 165969	Incident Date: 17/10/2001 Incident Identification: 37220 Pollutant: Agricultural Materials and Wastes Pollutant Description: Other Agricultural Material or Waste	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance	Direction	NGR	Details	
4	9.0	S	452955 166122	Incident Date: 15/07/2003 Incident Identification: 173763 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Natural Organic Material	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
5	13.0	N	452748 166315	Incident Date: 29/12/2002 Incident Identification: 127917 Pollutant: Specific Waste Materials Pollutant Description: Vehicles and Vehicle Parts	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	138.0	S	454220 166160	Incident Date: 25/09/2002 Incident Identification: 110506 Pollutant: Oils and Fuel Pollutant Description: Hydraulic Oils	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7	162.0	NW	452614 166405	Incident Date: 24/05/2002 Incident Identification: 80981 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
8A	219.0	E	454402 166232	Incident Date: 01/07/2003 Incident Identification: 170370 Pollutant: Contaminated Water Pollutant Description: Suspended Solids	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
9	349.0	N	453209 166735	Incident Date: 23/08/2003 Incident Identification: 184495 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
10	432.0	NW	452349 166489	Incident Date: 29/04/2003 Incident Identification: 154803 Pollutant: Contaminated Water Pollutant Description: Suspended Solids	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site: 0

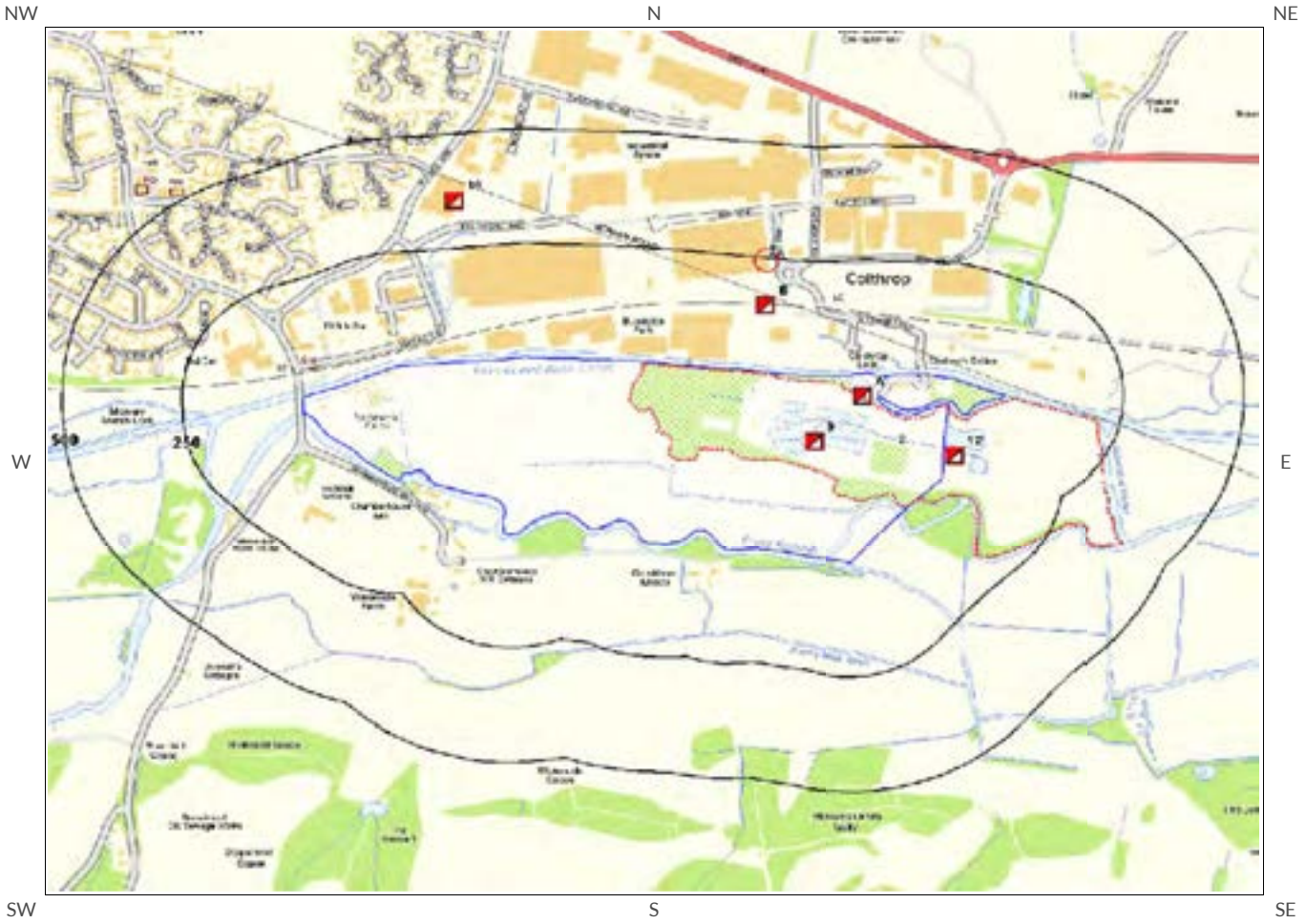
Database searched and no data found.

1.4 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

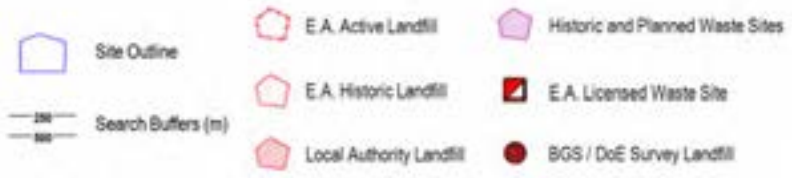
Database searched and no data found.

2. Landfill and Other Waste Sites Map



Landfill and Other Waste Sites Legend

Mapping sourced from Ordnance Survey



2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
2	0.0	On Site	453900 166300	Address: Colthrop Board Mill Ltd, Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4NJ Landfill Reference: 86026.0 Environmental Permitting Regulations (Waste) Reference: GRU012 Landfill Type: A7 : Industrial Waste Landfill (Factory curtilage)	Operator: S Grundon (Waste) Ltd Status: Closure IPPC Reference: EPR Reference:

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

6

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	
3	219.0	N	453700 166500	Site Address: Colthrop Mills, Thatcham Waste Licence: Yes Site Reference: 54/12/4/5 Waste Type: Industrial, Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 17-Dec-1976 Licence Surrendered: 01-Jan-1987 Licence Hold Address: - Operator: -
Not shown	931.0	S	453500 165000	Site Address: Bonds Gully, Crookham, Berkshire Waste Licence: - Site Reference: NEW145, TP0308 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1004.0	SW	452500 165000	Site Address: Crookham Manor, Crookham, Berkshire Waste Licence: - Site Reference: WDA221, TP0341, NEW177 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

ID	Distance (m)	Direction	NGR	Details	
Not shown	1050.0	S	453300 164800	Site Address: Limberlost Farm, Crookham, Newbury, Berkshire Waste Licence: Yes Site Reference: NEW54, TP0443, 54/12/4/2 Waste Type: Inert, Industrial, Commercial, Household, Liquid sludge, Environmental Permitting Regulations (Waste) Reference: TF1/L/BRA002	Licence Issue: 10-Jan-1978 Licence Surrendered: Licence Hold Address: C/o Brooking Knowles and Lawrence, Staple House, Staple Gardens, Winchester, Hampshire Operator: D Brant Estates Limited
Not shown	1055.0	S	453300 164800	Site Address: Limbercast Farm, Thatcham, Newbury, Berkshire Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1221.0	N	452300 167400	Site Address: Dunstan Green, Thatcham, Berkshire Waste Licence: - Site Reference: TP0361, NEW53 Waste Type: Inert, Industrial, Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

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

1

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1178.0	S	453400.0 164800.0	Address: Limbercast Farm, Thatcham, Newbury, Berks BGS Number: 2520.0	Risk: No risk to aquifer Waste Type: N/A

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

0

Database searched and no data found.

2.2 Other Waste Sites

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

0

Database searched and no data found.

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

15

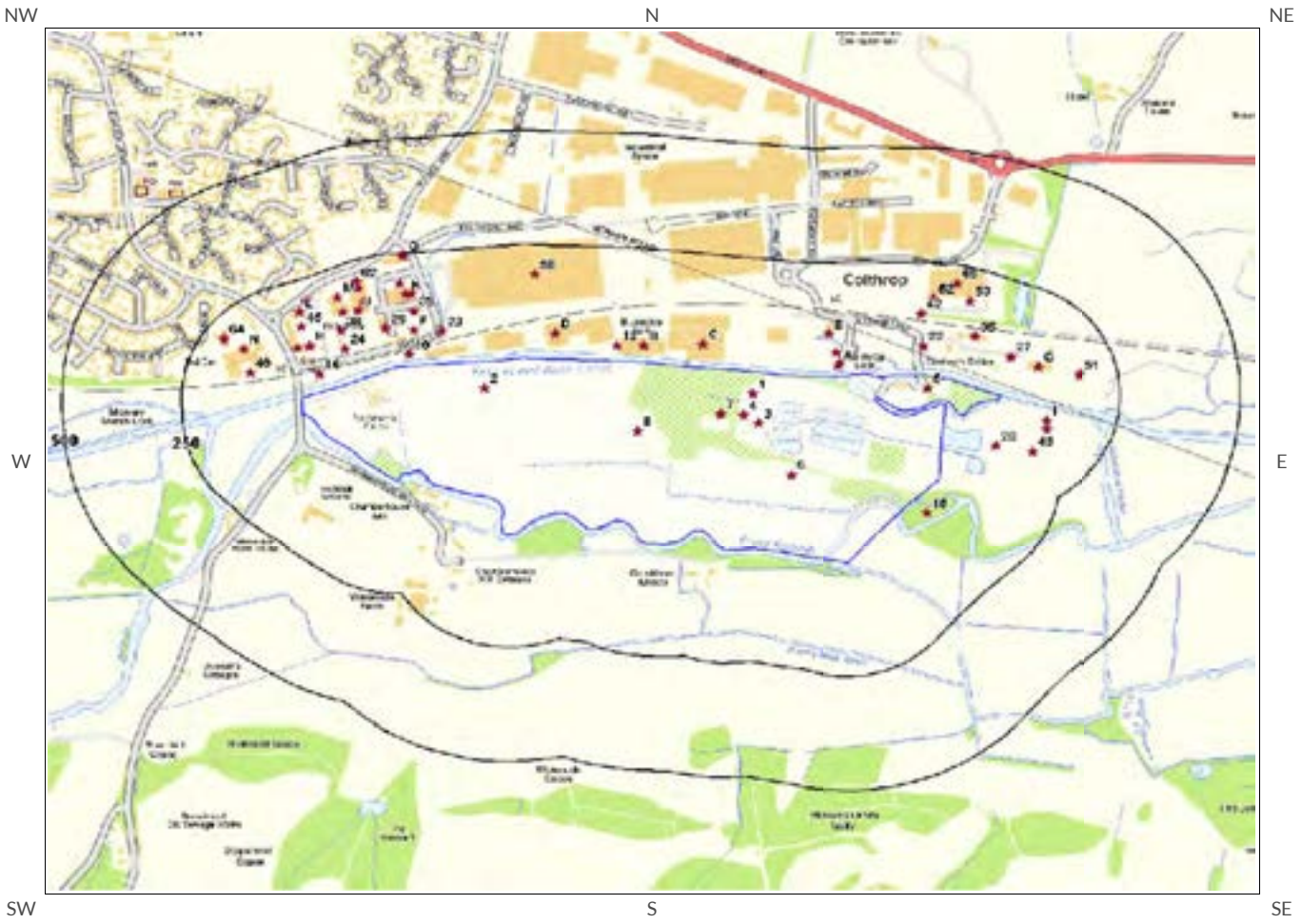
The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
9	0.0	On Site	453800 166200	Site Address: Colthrop Board Mill Ltd, Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4NJ Type: Industrial Waste Landfill (Factory curtilage) Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU012 EPR reference: - Operator: S Grundons (waste) Limited Waste Management licence No: 86026 Annual Tonnage: 24999.0	Issue Date: 23/12/1986 Effective Date: 03/09/2002 Modified: 24/03/1997 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Colthrop Board Mill Landfill Correspondence Address: -, Estates Office, Grange Lane, Beenham, Reading, Berkshire, RG7 5PY
10A	0.0	On Site	453900 166300	Site Address: Colthrop Board Mill Ltd, Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4NJ Type: Industrial Waste Landfill (Factory curtilage) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU012 EPR reference: - Operator: S Grundons (wste) Limited Waste Management licence No: 86026 Annual Tonnage: 24999.0	Issue Date: 23/12/1986 Effective Date: 03/09/2002 Modified: 24/03/1997 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Colthrop Board Mill Landfill Correspondence Address: -, Estates Office, Grange Lane, Beenham, Reading, Berkshire, RG7 5PY
11A	0.0	On Site	453900 166300	Site Address: Colthrop Board Mill Ltd, Colthrop Board Mill, Thatcham, Newbury, Berkshire, RG13 4NJ Type: Industrial Waste Landfill (Factory curtilage) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU012 EPR reference: EA/EPR/UP3499EV/T003 Operator: S Grundon (Waste) Ltd Waste Management licence No: 86026 Annual Tonnage: 24999.0	Issue Date: 23/12/1986 Effective Date: 03/09/2002 Modified: 24/03/1997 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Colthrop Board Mill Landfill Correspondence Address: -, -
12	21.0	E	454090 166170	Site Address: Kennetholme Quarry, Colthrop Lane, Thatham, Berkshire, RG19 4NT Type: Physical Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU031 EPR reference: EA/EPR/BB3103MJ/A001 Operator: Grundon Sand & Gravel Limited Waste Management licence No: 401090 Annual Tonnage: 15000.0	Issue Date: 18/02/2014 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Kennetholme Quarry Recycling Facility Correspondence Address: -, -
13B	146.0	N	453700 166500	Site Address: Unit 19, Colthrop Business Park, Colthrop Lane, Thatcham, Berkshire, RG19 4NB Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: UNI539 EPR reference: EA/EPR/SP3296EM/T001 Operator: United Asphalt Ltd Waste Management licence No: 86301 Annual Tonnage: 93000.0	Issue Date: 08/09/2006 Effective Date: 26/01/2011 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Colthrop Transfer Station Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
14B	146.0	N	453700 166500	Site Address: Unit 19, Colthrop Business Park, Colthrop Lane, Thatcham, Berkshire, RG19 4NB Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAD005 EPR reference: BP3595EE/A001 Operator: Alan Hadley Limited Waste Management licence No: 86301 Annual Tonnage: 25000.0	Issue Date: 08/09/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Colthrop Business Park Correspondence Address: -, -
15B	146.0	N	453700 166500	Site Address: Unit 1 Colthrop Business Park, Colthrop Lane, Thatcham, Berkshire, RG19 4NB Type: Physical Treatment Facility Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: UNI539 EPR reference: EA/EPR/SP3296EM/V002 Operator: United Asphalt Ltd Waste Management licence No: 86301 Annual Tonnage: 93000.0	Issue Date: 08/09/2006 Effective Date: 26/01/2011 Modified: 21/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Colthrop Waste Transfer Station Facility Correspondence Address: -, -
16	355.0	N	453050 166730	Site Address: 48, Aylesford Way, Thatcham, Berkshire, RG19 4ND Type: WEEE treatment facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: COM172 EPR reference: EA/EPR/WP3794VG/A001 Operator: Computer Salvage Specialists (Special Waste) Limited Waste Management licence No: 102675 Annual Tonnage: 74999.0	Issue Date: 15/04/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Computer Salvage Specialists Correspondence Address: -, -
Not shown	1049.0	E	455200 166600	Site Address: S Grundon (Waste) Ltd, Brimpton Road, Midgham, Berkshire, RG7 5UU Type: Landfill taking Non-Biodegradeable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU003 EPR reference: - Operator: S Grundon (Waste) Ltd Waste Management licence No: 86036 Annual Tonnage: 100000.0	Issue Date: 17/07/1996 Effective Date: - Modified: 24/03/1997 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Midgham Landfill Site Correspondence Address: S Grundon (Waste) Ltd, Grundon Estate Office, Grange Lane, Beenham, Reading, Berkshire, RG7 5PY
Not shown	1049.0	E	455200 166600	Site Address: S Grundon (Waste) Ltd, Midgham Landfill Site, Brimpton Road, Midgham, Berkshire, RG7 5UU Type: Landfill taking Non-Biodegradeable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU003 EPR reference: EA/EPR/XP3499ER/V002 Operator: S Grundon (Waste) Ltd Waste Management licence No: 86036 Annual Tonnage: 75000.0	Issue Date: 17/07/1996 Effective Date: - Modified: 24/03/1997 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Midgham Landfill Site Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
Not shown	1081.0	E	455260 166120	Site Address: Kennetholme Quarry, Colthrop Lane, Thatcham, Berkshire, RG19 4NT Type: Deposit of waste to land as a recovery operation Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU022 EPR reference: EA/EPR/AB3730DY/A001 Operator: Grundon Waste Management Ltd Waste Management licence No: 103081 Annual Tonnage: 100000.0	Issue Date: 27/01/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Kennetholme Quarry Correspondence Address: -, -
Not shown	1081.0	E	455260 166120	Site Address: Kennetholme Quarry, Colthrop Lane, Thatcham, Berkshire, RG19 4NT Type: Management of inert or extractive waste at mine Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRU025 EPR reference: EA/EPR/BB3134RK/A001 Operator: Grundon Sand & Gravel Ltd Waste Management licence No: 103186 Annual Tonnage: 0.0	Issue Date: 13/09/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Kennetholme Quarry Correspondence Address: -, -
Not shown	1188.0	S	453300 164800	Site Address: D Brant Estates Ltd, Limberlost Farm, Crookham Common, Newbury, Berks, RG19 8DH Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRA002 EPR reference: - Operator: D Brant Estates Ltd Waste Management licence No: 86027 Annual Tonnage: 0.0	Issue Date: 15/07/1980 Effective Date: - Modified: - Surrendered Date: - Expiry Date: 09/05/2000 Cancelled Date: - Status: Expired Site Name: Limberlost Farm Correspondence Address: D Brant Estates Ltd, C/o Brooking Knowles & Lawrence, Staple House, Staple Gardens, Winchester, Hants, SO23 9EJ
Not shown	1188.0	S	453300 164800	Site Address: D Brant Estates Ltd, Limberlost Farm, Crookham Common, Newbury, Berkshire, RG19 8DH Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRA002 EPR reference: EA/EPR/UP3299EC/A002 Operator: D Brant Estates Ltd Waste Management licence No: 86027 Annual Tonnage: 250000.0	Issue Date: 15/07/1980 Effective Date: - Modified: - Surrendered Date: - Expiry Date: 09/05/2000 Cancelled Date: - Status: Expired Site Name: Limberlost Farm Correspondence Address: -, -
Not shown	1310.0	E	455500 166400	Site Address: Midgham Quarry, Bath Road, Midgham, Berkshire, RG7 5UK Type: Deposit of waste to land as a recovery operation Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JSS001 EPR reference: EA/EPR/BB3132AF/A001 Operator: John Stacey & Sons Limited Waste Management licence No: 103173 Annual Tonnage: 208000.0	Issue Date: 17/02/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Midgham Quarry Correspondence Address: -, -

3. Current Land Use Map



Current Land Use Legend

Mapping sourced from Ordnance Survey

Site Outline

Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 69

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0.0	On Site	Pipeline	453677 166308	RG19	Pipelines	Industrial Features
2	0.0	On Site	Pylon	453117 166320	RG19	Electrical Features	Infrastructure and Facilities
3	0.0	On Site	Tanks	453690 166242	RG19	Tanks (Generic)	Industrial Features
4	0.0	On Site	Tanks	453657 166260	RG19	Tanks (Generic)	Industrial Features
5	0.0	On Site	Pipeline	454042 166320	RG19	Pipelines	Industrial Features
6	0.0	On Site	Pylon	453758 166129	RG19	Electrical Features	Infrastructure and Facilities
7	0.0	On Site	Filter Beds (Disused)	453610 166263	RG19	Waste Storage, Processing and Disposal	Infrastructure and Facilities
8	0.0	On Site	Pylon	453438 166225	RG19	Electrical Features	Infrastructure and Facilities
9A	25.0	N	Electricity Sub Station	453855 166369	RG19	Electrical Features	Infrastructure and Facilities
10	26.0	N	Water Tower	452959 166394	RG19	Water Pumping Stations	Industrial Features
11A	32.0	N	Adbro Controls	453858 166376	Unit 3 Avon Park, Colthrop Lane, Thatcham, RG19 4NT	Electronic Equipment	Industrial Products
12	35.0	N	Chesapeake Ltd	453394 166414	14 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	Packaging	Industrial Products
13B	37.0	N	Freightshield the Truck Body Specialists Ltd	453448 166413	12 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	Vehicle Bodybuilders	Industrial Products
14B	37.0	N	Ibis Packaging Solutions Ltd	453448 166413	10 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	Packaging	Industrial Products
15	39.0	SE	Pylon	454040 166045	RG19	Electrical Features	Infrastructure and Facilities
16	40.0	N	Thatcham Rail Station	452772 166351	RG19	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure
17C	51.0	N	United Asphalt	453572 166416	1 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	Road Maintenance Equipment	Industrial Products
18C	51.0	N	Premier Logistics	453572 166416	4 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	Distribution and Haulage	Transport, Storage and Delivery

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
19A	54.0	N	Locators Ltd	453850 166398	Unit 1 Avon Park, Colthrop Lane, Thatcham, RG19 4AJ	Lifting and Handling Equipment	Industrial Products
20D	56.0	N	Takeuchi M F G	453264 166439	20 Colthrop Business Park, Colthrop Lane, Thatcham, RG19 4NB	General Purpose Machinery	Industrial Products
21D	56.0	N	Reading Freight Forwarding Service Ltd	453264 166440	Unit 2 Field Packaging Colthrop Lane, Thatcham, RG19 4NL	Distribution and Haulage	Transport, Storage and Delivery
22	66.0	N	P T M International Ltd	454032 166412	Colthrop Lane, Thatcham, RG19 4NT	Distribution and Haulage	Transport, Storage and Delivery
23	72.0	N	Electricity Sub Station	453028 166445	RG19	Electrical Features	Infrastructure and Facilities
24	75.0	N	Pylon	452825 166406	RG19	Electrical Features	Infrastructure and Facilities
25F	78.0	N	Tanks	452969 166447	RG19	Tanks (Generic)	Industrial Features
26	88.0	N	Central Conveyer Belting Services Ltd	452910 166450	Unit 16 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Lifting and Handling Equipment	Industrial Products
27	89.0	N	Dawson Rentals Ltd	454215 166388	Colthrop Lane, Thatcham, RG19 4NT	Vehicle Hire and Rental	Hire Services
28	93.0	SE	Tanks	454184 166193	RG19	Tanks (Generic)	Industrial Features
29E	94.0	N	Clive Barford Ltd	453835 166439	C B L House, Colthrop Lane, Thatcham, RG19 4NT	Construction and Tool Hire	Hire Services
30E	94.0	N	Clive Barford Ltd	453835 166439	C B L House, Colthrop Lane, Thatcham, RG19 4NT	Construction Plant	Construction Services
31F	101.0	N	S P McAuley Ltd	452938 166467	Unit 19a-19d Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Vehicle Repair, Testing and Servicing	Repair and Servicing
32G	101.0	NE	Berkshire Commercial Repairs Ltd	454272 166366	Colthrop Lane, Thatcham, RG19 4NN	Vehicle Repair, Testing and Servicing	Repair and Servicing
33G	102.0	NE	DX	454272 166367	Unit 12 Nursing Industrial Estate, Colthrop Lane, Thatcham, RG19 4NH	Distribution and Haulage	Transport, Storage and Delivery
34H	105.0	N	Ensys Ltd	452751 166412	Unit 10, Rivermead, Thatcham, RG19 4EP	Construction Completion Services	Construction Services
35	106.0	N	Marwood Group Ltd	454139 166433	Colthrop Lane, Thatcham, RG19 4NT	Construction and Tool Hire	Hire Services
36H	108.0	N	Crescent Lighting Ltd	452726 166408	Unit 8, Rivermead, Thatcham, RG19 4EP	Lampshades and Lighting	Consumer Products
37I	110.0	SE	Filter Beds	454290 166249	RG19	Waste Storage, Processing and Disposal	Infrastructure and Facilities
38	114.0	N	Electricity Sub Station	452818 166445	RG19	Electrical Features	Infrastructure and Facilities
39	120.0	N	Pinnock Brothers Ltd	452968 166488	Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
40	120.0	NW	Station Road Industrial Estate	452629 166353	RG19	Business Parks and Industrial Estates	Industrial Features
41I	121.0	SE	Filter Beds	454290 166228	RG7	Waste Storage, Processing and Disposal	Infrastructure and Facilities
42	136.0	N	Electricity Sub Stations	454027 166483	RG19	Electrical Features	Infrastructure and Facilities
43	137.0	SE	Filter Beds	454260 166180	RG7	Waste Storage, Processing and Disposal	Infrastructure and Facilities

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
44J	143.0	N	Externiture	452852 166489	Unit 14 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Vehicles	Industrial Products
45	151.0	N	Rivermead Industrial Estate	452734 166455	RG19	Business Parks and Industrial Estates	Industrial Features
46J	152.0	N	Lancaster Landrover	452821 166486	Rivermead, Thatcham, RG19 4EP	Vehicle Repair, Testing and Servicing	Repair and Servicing
47J	158.0	N	Matrix Precision Engineering	452864 166509	Unit 13 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Precision Engineers	Engineering Services
48K	158.0	N	Freeway Medical	452950 166525	Unit 7 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
49K	159.0	N	Taylor Made Fabrication	452964 166527	Unit 6 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Metalworkers Including Blacksmiths	Construction Services
50N	162.0	NW	Thatcham Tyre Centre	452614 166405	Unit 5 Crown Yard, Station Road, Thatcham, RG19 4PL	Vehicle Parts and Accessories	Motoring
51	171.0	E	Ryder	454358 166348	Colthrop Lane, Thatcham, RG19 4NT	Vehicle Hire and Rental	Hire Services
52	171.0	N	Electricity Sub Station	454054 166517	RG19	Electrical Features	Infrastructure and Facilities
53	177.0	N	Electricity Sub Station	454130 166511	RG19	Electrical Features	Infrastructure and Facilities
54L	182.0	N	Condomania	452730 166486	Unit 1, Rivermead, Thatcham, RG19 4EP	Distribution and Haulage	Transport, Storage and Delivery
55L	182.0	N	Sutherland Health Ltd	452730 166486	Unit 1, Rivermead, Thatcham, RG19 4EP	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
56L	182.0	N	Reprographic Facilities Management Ltd	452730 166486	Unit 1, Rivermead, Thatcham, RG19 4EP	Office and Shop Equipment	Industrial Products
57K	183.0	N	Industrial Estate	452940 166550	RG19	Business Parks and Industrial Estates	Industrial Features
58	186.0	N	Depot	453220 166571	RG19	Container and Storage	Transport, Storage and Delivery
59M	186.0	N	Depot	452809 166519	RG19	Container and Storage	Transport, Storage and Delivery
60M	191.0	N	ATS Euromaster Ltd	452852 166540	Unit 11 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Vehicle Parts and Accessories	Motoring
61L	203.0	N	Pumping Station	452744 166513	RG19	Water Pumping Stations	Industrial Features
62	205.0	N	Stacker Truck	452848 166553	Unit 10 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Lifting and Handling Equipment	Industrial Products
63N	208.0	NW	Quick Light Ltd	452573 166428	Crown House, Crown Yard, Thatcham, RG19 4PL	Construction Completion Services	Construction Services
64	209.0	NW	Alan Geater Coach Trimmers	452572 166427	Unit 2 Crown Yard, Station Road, Thatcham, RG19 4PL	Vehicle Repair, Testing and Servicing	Repair and Servicing
65	211.0	N	Xtrac Ltd	454102 166549	Gables Way, Thatcham, RG19 4ZA	Motorsport Services	Sport and Entertainment Support Services
66O	244.0	N	I T E	452944 166610	Unit 8 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Cooling and Refrigeration	Industrial Products
67O	244.0	N	D K Car Sales	452944 166610	Unit 1 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	New Vehicles	Motoring
68O	244.0	N	C & S Car Sales	452944 166610	Unit 1 Pipers Industrial Estate, Pipers Lane, Thatcham, RG19 4NA	Secondhand Vehicles	Motoring

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
69O	244.0	N	Hanem Ltd	452945 166611	Unit 1 Pipers Lane, Thatcham, RG19 4NA	Metals Manufacturers, Fabricators and Stockholders	Industrial Products

3.2 Petrol and Fuel Sites

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

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: 0

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

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

Lex Code	**Description**	**Rock Type**
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

4.2 Superficial Ground and Drift Geology

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

Lex Code	**Description**	**Rock Type**
ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

4.3 Bedrock and Solid Geology

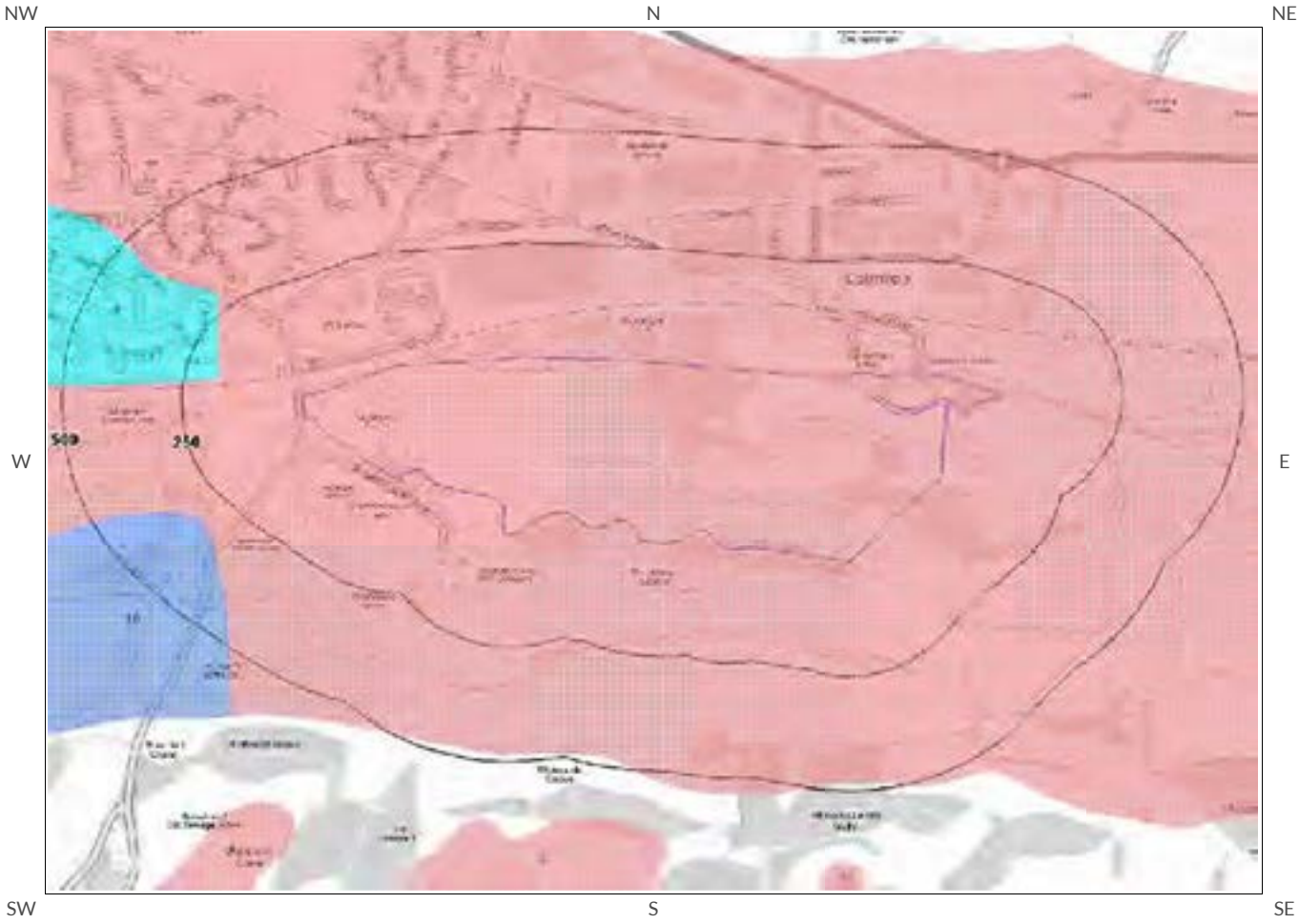
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LMBE-CLSS	LAMBETH GROUP	CLAY, SILT AND SAND
LC-CLSS	LONDON CLAY FORMATION	CLAY, SILT AND SAND

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

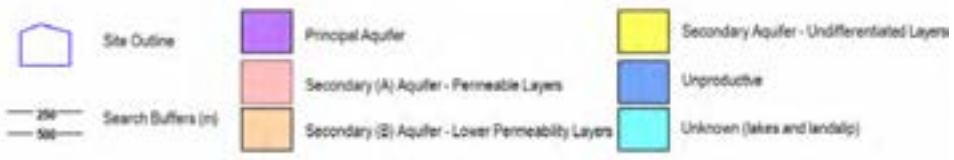
5. Hydrogeology and Hydrology

5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology

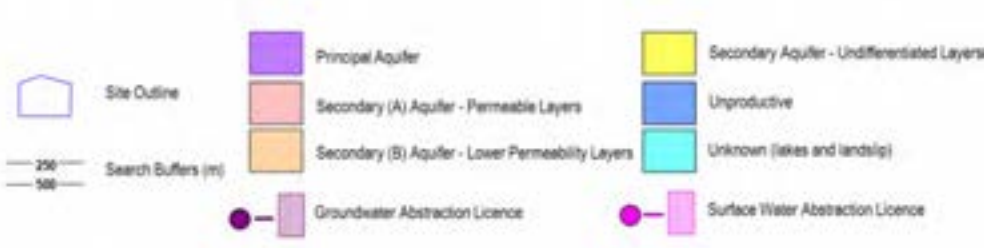
Mapping sourced from Ordnance Survey®



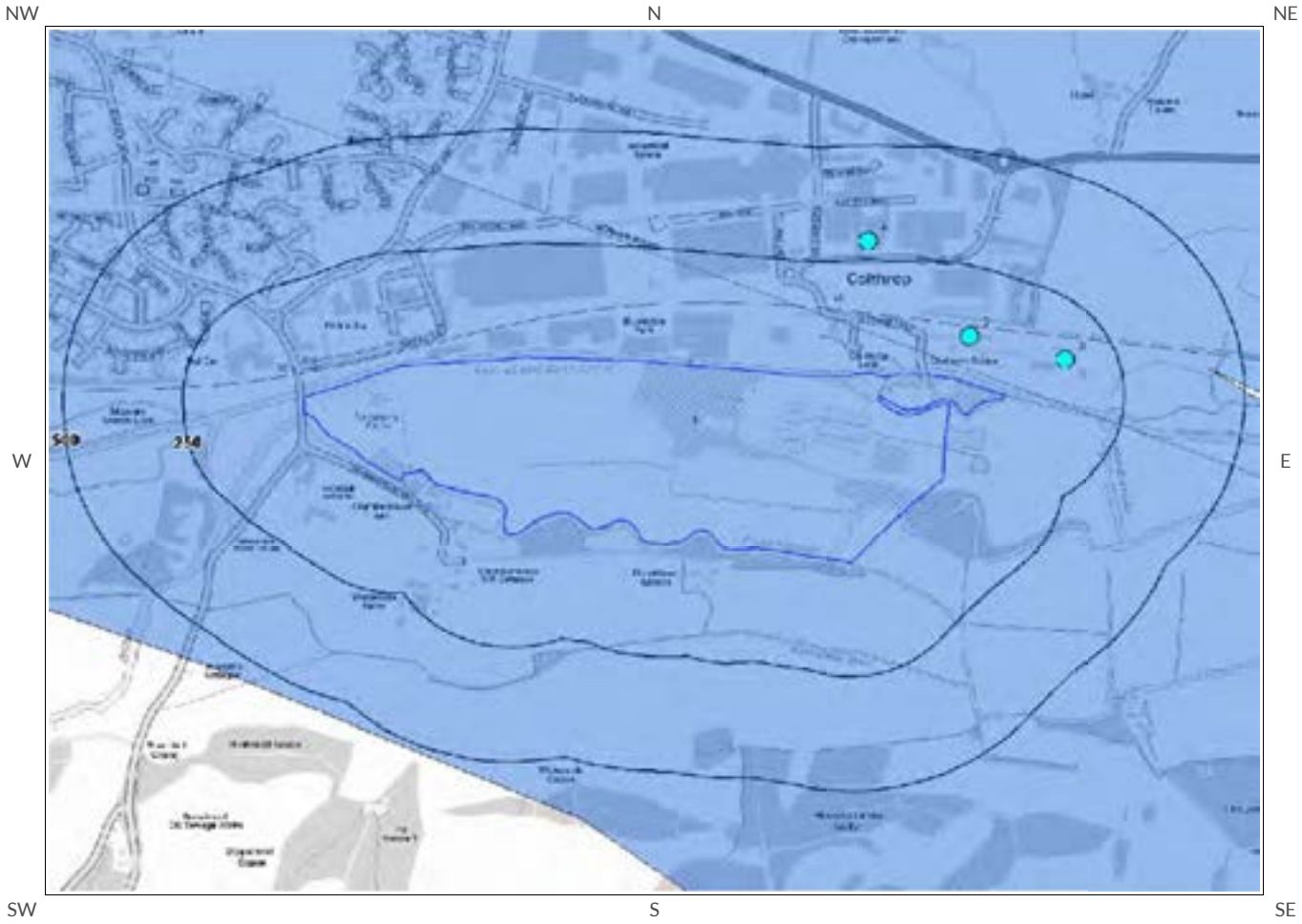
5b. Aquifer Within Bedrock Geology and Abstraction Licenses

Aquifer Within Bedrock Geology and Abstraction Licenses

Mapping sourced from Ordnance Survey®

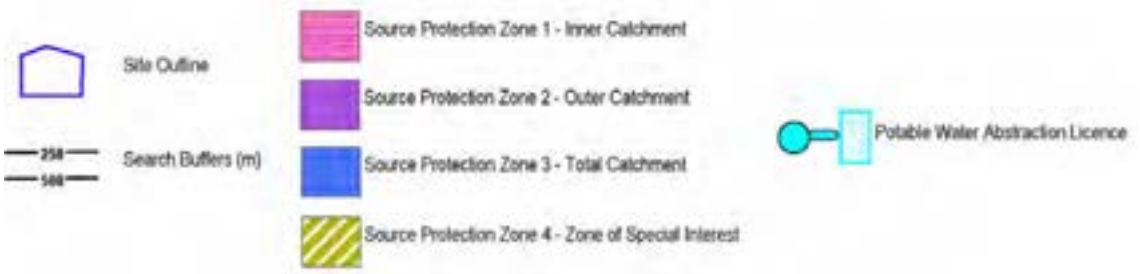


5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

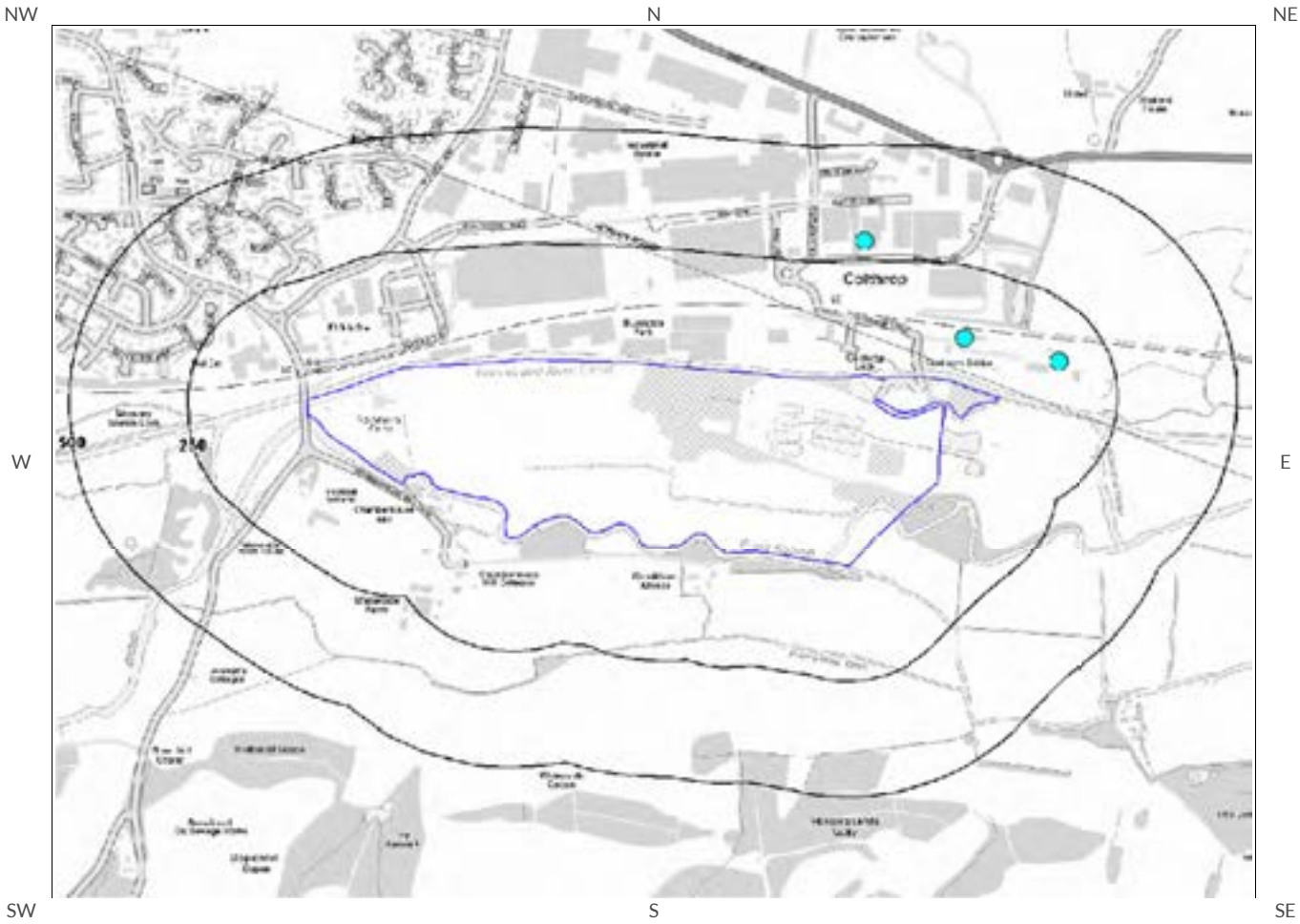


Map LegendSource Protection Zonesand PotableWater Abstraction Licenses

Mapping sourced from Ordnance Survey

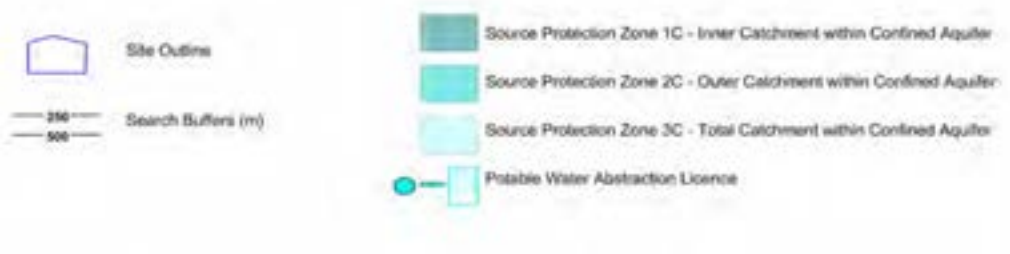


5d. Hydrology Source Protection Zones within confined aquifer



Hydrology Source Protection Zones

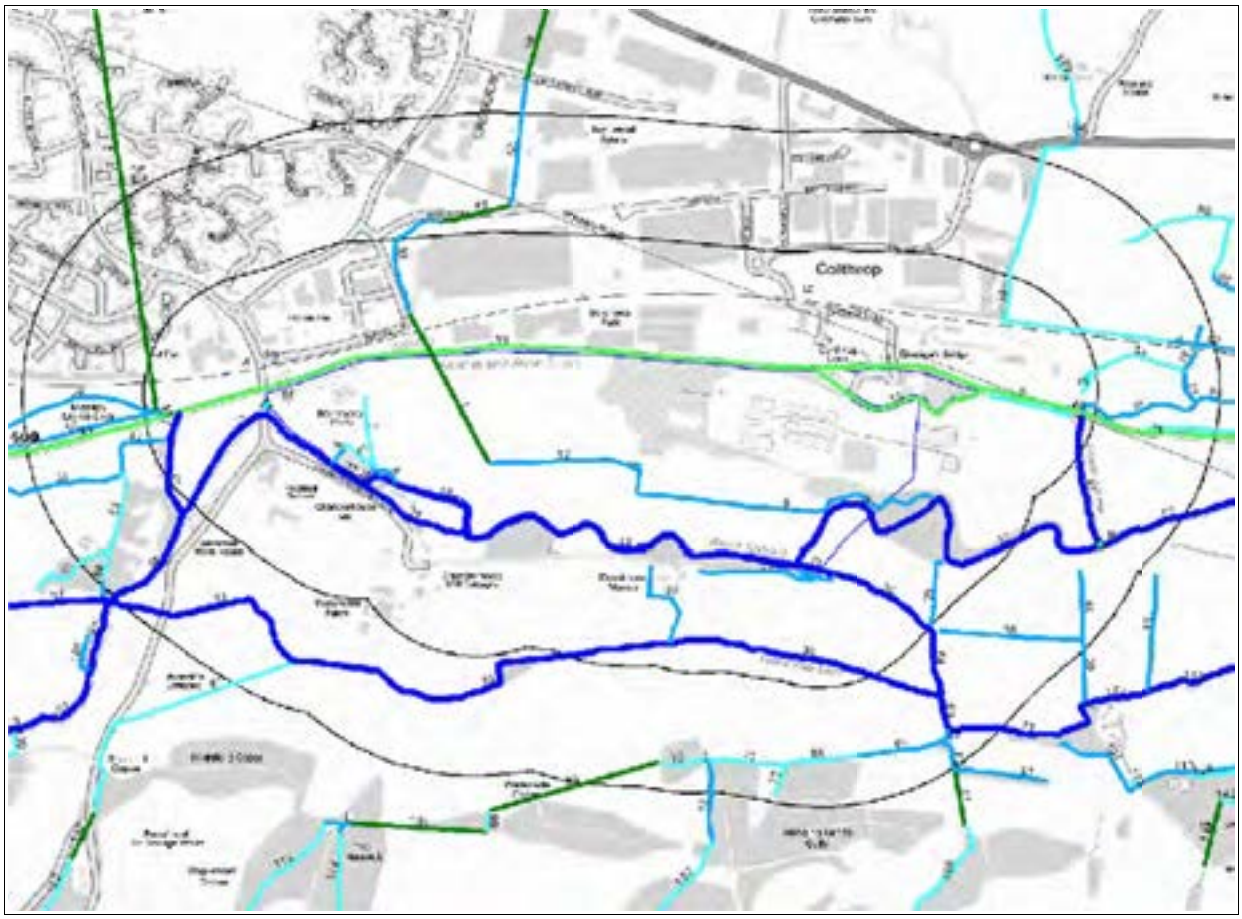
Mapping sourced from Ordnance Survey



5 e. Hydrology – Detailed River Network and River Quality

NW N NE

W E



SW S SE

Hydrology – Detailed River Network and River Quality

Mapping sourced from Ordnance Survey

5. Hydrogeology and Hydrology

5.1 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'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 Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
1	0.0	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
9	182.0	W	Unknown	Unknown
10	321.0	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 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'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 Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	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
4	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.3 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 (5b):

ID	Distance (m)	Direction	NGR	Details	
6	0.0	On Site	453630 166240	Licence No: 28/39/22/0632 Details: Mineral Washing Direct Source: Thames Groundwater Point: Gravel Pit At Colthrop, Thatcham Data Type: Point	Annual Volume (m³): 1600000 Max Daily Volume (m³): 5962 Original Application No: WRW/A/1177 Original Start Date: 6/4/2006 Expiry Date: 31/3/2011 Issue No: 1 Version Start Date: 6/4/2006 Version End Date:
7	17.0	N	453300 166400	Licence No: 28/39/22/0541 Details: Process water Direct Source: Thames Groundwater Point: Field Group Colthrop Borehole Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WRA/6132 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 17/11/1993 Version End Date:
8	69.0	N	453360 166450	Licence No: 28/39/22/0541 Details: Process Water Direct Source: Thames Groundwater Point: Colthrop, Thatcham - Borehole (claude Fenton Holdings Ltd) Data Type: Point	Annual Volume (m³): 2500 Max Daily Volume (m³): 71 Original Application No: WRA/6132 Original Start Date: 17/11/1993 Expiry Date: - Issue No: 101 Version Start Date: 1/4/2008 Version End Date:
9A	97.0	N	454120 166430	Licence No: 28/39/22/0599 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Colthrop Lane, Colthrop, Thatcham Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WRW/A/1058 Original Start Date: 27/6/2000 Expiry Date: - Issue No: 1 Version Start Date: 27/6/2000 Version End Date:
10A	97.0	N	454120 166430	Licence No: 28/39/22/0599 Details: General Washing/Process Washing Direct Source: Thames Groundwater Point: Colthrop Lane, Colthrop, Thatcham Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WRW/A/1058 Original Start Date: 27/6/2000 Expiry Date: - Issue No: 1 Version Start Date: 27/6/2000 Version End Date:
11	148.0	NE	454320 166380	Licence No: 28/39/22/0575 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Colthrop Lane Borehole Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 9/2/1998 Expiry Date: - Issue No: 102 Version Start Date: 3/9/2002 Version End Date:
12	225.0	NE	454300 166500	Licence No: 28/39/22/0572 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Thames Groundwater Point: Mobac Colthrop Industrial Estate Borehole Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 5/9/1997 Expiry Date: - Issue No: 102 Version Start Date: 27/2/2003 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
13	286.0	SW	452600 166000	Licence No: 28/39/22/0230 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Waterside Farm, Thatcham Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 14/11/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/1/2003 Version End Date:
14	290.0	N	453910 166640	Licence No: 28/39/22/0574 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Matsushita Daytona Drive Borehole Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 14/1/1998 Expiry Date: - Issue No: 101 Version Start Date: 30/6/2002 Version End Date:
15B	294.0	SE	454448 166154	Licence No: TH/039/0022/015 Details: General Washing/Process Washing Direct Source: Thames Groundwater Point: Gravel Pit At Colthrop, Thatcham Data Type: Point	Annual Volume (m³): 920000 Max Daily Volume (m³): 3390 Original Application No: NPS/WR/005764 Original Start Date: 1/4/2011 Expiry Date: 31/3/2018 Issue No: 1 Version Start Date: 1/4/2012 Version End Date:
16B	294.0	SE	454448 166154	Licence No: TH/039/0022/015 Details: Mineral Washing Direct Source: Thames Groundwater Point: Gravel Pit At Colthrop, Thatcham Data Type: Point	Annual Volume (m³): 920000 Max Daily Volume (m³): 3390 Original Application No: NPS/WR/005764 Original Start Date: 1/4/2011 Expiry Date: 31/3/2018 Issue No: 1 Version Start Date: 1/4/2012 Version End Date:
17B	294.0	SE	454448 166154	Licence No: TH/039/0022/015 Details: Process Water Direct Source: Thames Groundwater Point: Gravel Pit At Colthrop, Thatcham Data Type: Point	Annual Volume (m³): 920000 Max Daily Volume (m³): 3390 Original Application No: NPS/WR/005764 Original Start Date: 1/4/2011 Expiry Date: 31/3/2018 Issue No: 1 Version Start Date: 1/4/2012 Version End Date:
18	345.0	N	453700 166700	Licence No: 28/39/22/0538 Details: General Use Relating To Secondary Category (High Loss) Direct Source: Thames Groundwater Point: S C A Packaging Colthrop Lane Thatcham Data Type: Point	Annual Volume (m³): 13638 Max Daily Volume (m³): 37.36 Original Application No: WRA/6130 Original Start Date: 26/4/1993 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2008 Version End Date:
19C	406.0	N	453270 166790	Licence No: 28/39/22/0559 Details: Process water Direct Source: Thames Groundwater Point: Enterprise Way Thatcham Borehole Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: WRA/6404 Original Start Date: - Expiry Date: 31/12/2001 Issue No: 100 Version Start Date: 25/3/1996 Version End Date:
20C	416.0	N	453270 166800	Licence No: 28/39/22/0611 Details: Process Water Direct Source: Thames Groundwater Point: Enterprise Way, Thatcham, Berkshire Data Type: Point	Annual Volume (m³): 148000 Max Daily Volume (m³): 438 Original Application No: - Original Start Date: 1/1/2002 Expiry Date: 31/3/2017 Issue No: 2 Version Start Date: 7/3/2005 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	911.0	E	455100 166400	Licence No: 28/39/22/0101 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Kennetholme, Midgham Point B Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRA/2074 Original Start Date: 9/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/5/1966 Version End Date:
Not shown	925.0	NE	454900 166900	Licence No: 28/39/22/0101 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Kennetholme, Midgham Point A Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRA/2074 Original Start Date: 9/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/5/1966 Version End Date:
Not shown	1219.0	NE	454680 167420	Licence No: 28/39/22/0621 Details: General Farming & Domestic Direct Source: Thames Groundwater Point: Kents Down Midgeham - Well Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRW/A/117 Original Start Date: 23/1/2003 Expiry Date: 31/3/2017 Issue No: 1 Version Start Date: 23/1/2003 Version End Date:
Not shown	1654.0	NW	451600 167500	Licence No: 28/39/22/0609 Details: Pollution Remediation Direct Source: Thames Groundwater Point: 3 Boreholes At The Telephone Exchange, Thatcham Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRW/A/1076 Original Start Date: 31/1/2001 Expiry Date: 31/12/2002 Issue No: 1 Version Start Date: 31/1/2001 Version End Date:

5.4 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 (5b):

ID	Distance (m)	Direction	NGR	Details	
25D	0.0	On Site	453500 166300	Licence No: 28/39/22/0537 Details: Non-Evaporative Cooling Direct Source: Thames Surface Water - Non Tidal Point: Kennet & Avon Canal At Colthrop Mills Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: WRA/6131 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/1/1993 Version End Date:
26D	0.0	On Site	453500 166300	Licence No: 28/39/22/0537 Details: Process water Direct Source: Thames Surface Water - Non Tidal Point: Kennet & Avon Canal At Colthrop Mills Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: WRA/6131 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 8/1/1993 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
27	222.0	S	452540 165830	Licence No: 28/39/22/0059 Details: Spray Irrigation - Direct Direct Source: Thames Surface Water - Non Tidal Point: Priors Moor Ditch At Waterside Farm Data Type: Line	Annual Volume (m^3): 11000 Max Daily Volume (m^3): 330 Application No: - Original Start Date: 14/3/1966 Expiry Date: - Issue No: 103 Version Start Date: 1/4/2007 Version End Date:
28E	278.0	S	452500 165800	Licence No: 28/39/22/0059 Details: Spray Irrigation - Direct Direct Source: Thames Surface Water - Non Tidal Point: Priors Moor Ditch, Waterside Farm Data Type: Line	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: WRA/459 Original Start Date: 14/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 2/5/1997 Version End Date:
29E	278.0	S	452500 165800	Licence No: 28/39/22/0059 Details: Spray Irrigation - Direct Direct Source: Thames Surface Water - Non Tidal Point: Priors Moor Ditch At Waterside Farm Data Type: Line	Annual Volume (m^3): 11000 Max Daily Volume (m^3): 330 Application No: - Original Start Date: 14/3/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/2/2006 Version End Date:
30F	946.0	SE	451700 163700	Licence No: 28/39/22/0330 Details: Spray Irrigation - Direct Direct Source: Thames Surface Water - Non Tidal Point: Little Park Estate, Crookham Common Data Type: Line	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: WRA/2371 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1992 Version End Date:
31F	946.0	SE	451700 163700	Licence No: 28/39/22/0330 Details: Spray Irrigation - Direct Direct Source: Thames Surface Water - Non Tidal Point: River Enbourne At Little Park Estate, Crookham Common Data Type: Line	Annual Volume (m^3): 9547 Max Daily Volume (m^3): 318.23 Application No: WRA/2371 Original Start Date: 10/4/1967 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1992 Version End Date:
Not shown	1277.0	SE	455322 165703	Licence No: TH/039/0022/017 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: Thames Surface Water - Non Tidal Point: River Kennet-brimpton Mill Data Type: Point	Annual Volume (m^3): 0 Max Daily Volume (m^3): 0 Application No: NPS/WR/008417 Original Start Date: 2/12/2011 Expiry Date: 31/3/2023 Issue No: 1 Version Start Date: 2/12/2011 Version End Date:

5.5 Potable Water Abstraction Licences

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

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (5c):

ID	Distance (m)	Direction	NGR	Details	
2	97.0	N	454120 166430	Licence No: 28/39/22/0599 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Colthrop Lane, Colthrop, Thatcham Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: WRW/A/1058 Original Start Date: 27/6/2000 Expiry Date: - Issue No: 1 Version Start Date: Version End Date:
3	148.0	NE	454320 166380	Licence No: 28/39/22/0575 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Colthrop Lane Borehole Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 9/2/1998 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
4	290.0	N	453910 166640	Licence No: 28/39/22/0574 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Thames Groundwater Point: Matsushita Daytona Drive Borehole Data Type: Point	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 14/1/1998 Expiry Date: - Issue No: 101 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (5c):

ID	Distance (m)	Direction	Type	Description
1	0.0	On Site	3	Total Catchment

5.7 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.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency 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/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.
0	On Site	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
156	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.

5.9 River Quality

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

5.9.1 Biological Quality:

Database searched and no data found.

5.9.2 Chemical Quality:

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

The following Chemical Quality records are shown on the Hydrology Map (5d):

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
156	1.0	W	452736 166274	River Name: Kennet Reach: Newbury Stw - Aldershot Stream End/Start of Stretch: Sample Point NGR	A	A	A	A	A
157M	407.0	E	454450 165980	River Name: Kennet Reach: Aldershot Stream - Enborne End/Start of Stretch: Start of Stretch NGR	A	A	A	A	A
158M	407.0	E	454450 165980	River Name: Kennet Reach: Newbury Stw - Aldershot Stream End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	845.0	E	455038 166268	River Name: Kennet And Avon Canal Reach: Widmead Lock - Woolhampton End/Start of Stretch: Sample Point NGR	A	A	A	A	A

5.10 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 (5e):

ID	Distance (m)	Direction	Details	
1	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
2	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
3	0.0	On Site	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
4	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
5A	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
6C	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
7A	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
8B	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
9	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
10	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
11 B	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
12	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
13 A	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
14 C	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
15	2.0	N	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
16	4.0	S	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
17 D	4.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
18	4.0	SW	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
19	6.0	N	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
20 A	6.0	SW	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
21	7.0	SW	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
22	7.0	SW	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
23	8.0	SE	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
24	10.0	W	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
25 D	15.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
26 E	16.0	E	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
27 D	19.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
28	20.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
29 E	24.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
30	28.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
31	42.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
32	66.0	SE	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
33	93.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
34	157.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
35	165.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
36 F	177.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
37 F	177.0	W	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
38	180.0	S	River Name: Prior's Moor Ditch Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
39	195.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
40	198.0	E	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
41	206.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
42	206.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

ID	Distance (m)	Direction		Details
43	213.0	W	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
44	213.0	W	River Name: Moor Ditch Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
45 G	219.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
46	223.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
47 H	223.0	E	River Name: Kennet and Avon Canal Welsh River Name: - Alternative Name: -	River Type: Canal Main River Status: Currently Undefined
48	223.0	E	River Name: Aldershot Water Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
49 G	224.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
50	227.0	W	River Name: Moor Ditch Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
51	227.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
52	227.0	W	River Name: Moor Ditch Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
53	238.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
54	254.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
55	272.0	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
56	279.0	SW	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
57	280.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
58	307.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
59	324.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
60	326.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
61	334.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
62 H	359.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
63	364.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

ID	Distance (m)	Direction		Details
64	391.0	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
65	398.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
66	400.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
67	401.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
68J	410.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
69	410.0	E	River Name: River Kennet Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
70	414.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
71	414.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
72	427.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
73	428.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
74	429.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
75I	430.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
76	431.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
77I	431.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
78	431.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
79	434.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
80	435.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
81	439.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
82	439.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
83	443.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
84	445.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

ID	Distance (m)	Direction		Details
85	454.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
86J	463.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
87	463.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
88	484.0	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
89 K	490.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

5.11 Surface Water Features

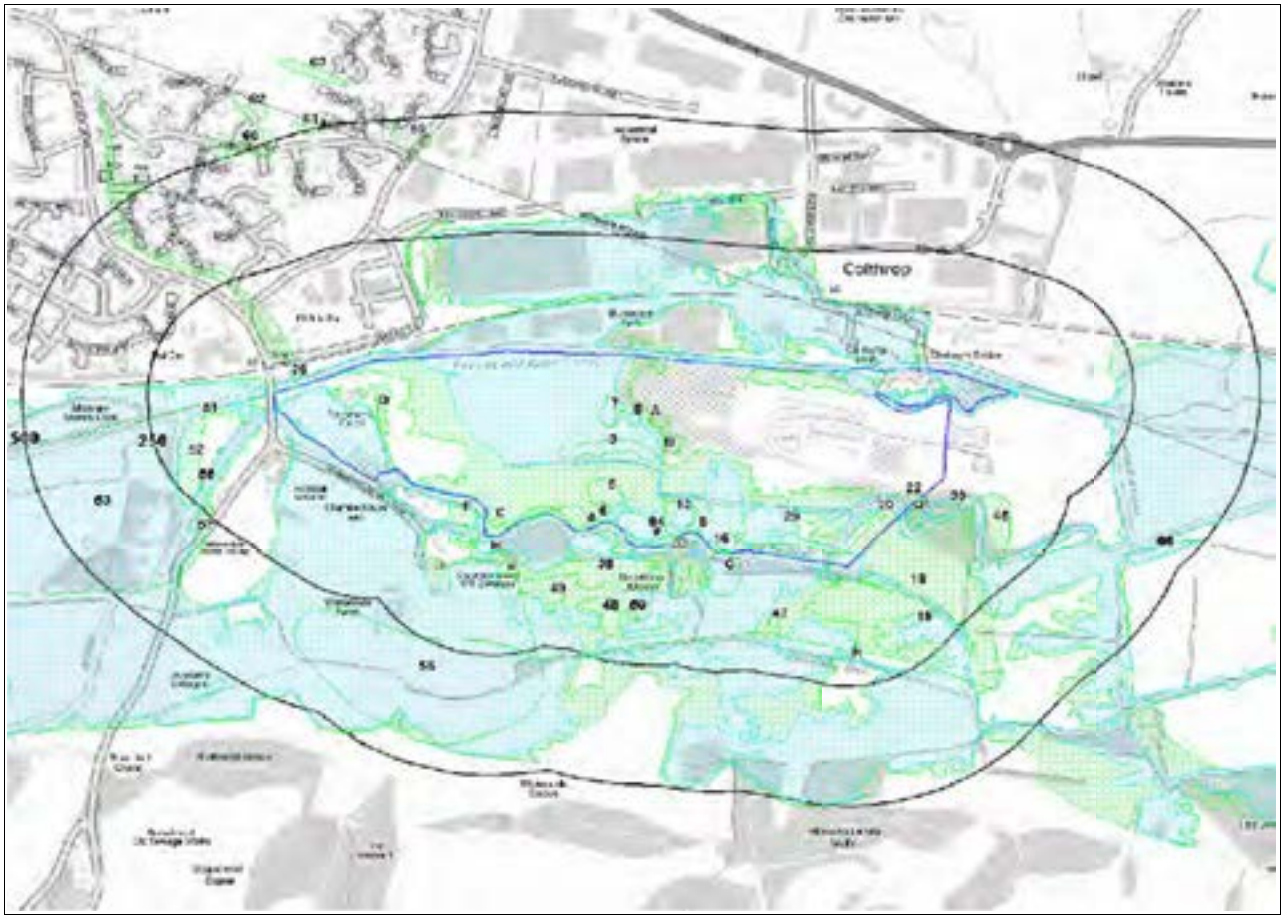
Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	On Site
0.0	S
13.0	W
22.0	SW
24.0	E
25.0	S
42.0	S
53.0	E
85.0	E
92.0	N
146.0	S
158.0	N
160.0	NE
163.0	N
165.0	N
168.0	N
178.0	S
217.0	N
219.0	E
225.0	E
231.0	E
237.0	SE
238.0	E

6. Environment Agency Flood Map for planning (from rivers and the sea)

NW N NE



W E

SW S SE

Environment Agency Flood Map for planning (from rivers and the sea)

Mapping sourced from Ordnance Survey

Site Outline

Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Environment Agency 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 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? Yes

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
1	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
2	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
3	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
4	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
5	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
6	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
7	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
8	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
9	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
10A	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
11A	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
12B	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
13	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
14B	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
15E	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
16	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
17G	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models)
18	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
19	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
20	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)

ID	Distance (m)	Direction	Update	Type
21	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
22	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
23C	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
24C	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
25I	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
26D	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
27D	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Events)
28E	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models)
29	0.0	On Site	03-Nov-2014	Zone 2 - (Fluvial Models)
30	4.0	SE	03-Nov-2014	Zone 2 - (Fluvial Models)
31	5.0	SE	03-Nov-2014	Zone 2 - (Fluvial Events)
32	11.0	SW	03-Nov-2014	Zone 2 - (Fluvial Events)
33	12.0	SE	03-Nov-2014	Zone 2 - (Fluvial Events)
34F	15.0	W	03-Nov-2014	Zone 2 - (Fluvial Events)
35F	18.0	W	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
36	18.0	N	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
37	18.0	N	03-Nov-2014	Zone 2 - (Fluvial Events)
38	29.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
39H	33.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
40G	39.0	SW	03-Nov-2014	Zone 2 - (Fluvial Events)
41H	42.0	S	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
42I	56.0	SW	03-Nov-2014	Zone 2 - (Fluvial Events)
43F	60.0	S	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
44J	79.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
45	79.0	SE	03-Nov-2014	Zone 2 - (Fluvial Events)
46J	85.0	SE	03-Nov-2014	Zone 2 - (Fluvial Models)
47	116.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
48	118.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
49	125.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
50	135.0	S	03-Nov-2014	Zone 2 - (Fluvial Events)
51	139.0	W	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)

ID	Distance (m)	Direction	Update	Type
52	139.0	W	03-Nov-2014	Zone 2 - (Fluvial Events)
53	139.0	W	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
54K	196.0	S	03-Nov-2014	Zone 2 - (Fluvial Models)
55	212.0	SW	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
56	219.0	S	03-Nov-2014	Zone 2 - (Fluvial Models and Fluvial Events)
57	228.0	SW	03-Nov-2014	Zone 2 - (Fluvial Events)

6.2 Zone 3 Flooding

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 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? Yes

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
64	0.0	On Site	03-Nov-2014	Zone 3 - (Fluvial Models)
65K	196.0	S	03-Nov-2014	Zone 3 - (Fluvial Models)

6.3 Flood Defences

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

Database searched and no data found.

6.4 Areas benefiting from Flood Defences

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

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 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).

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

Potential at Surface

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

6.7 Groundwater Flooding Confidence Areas

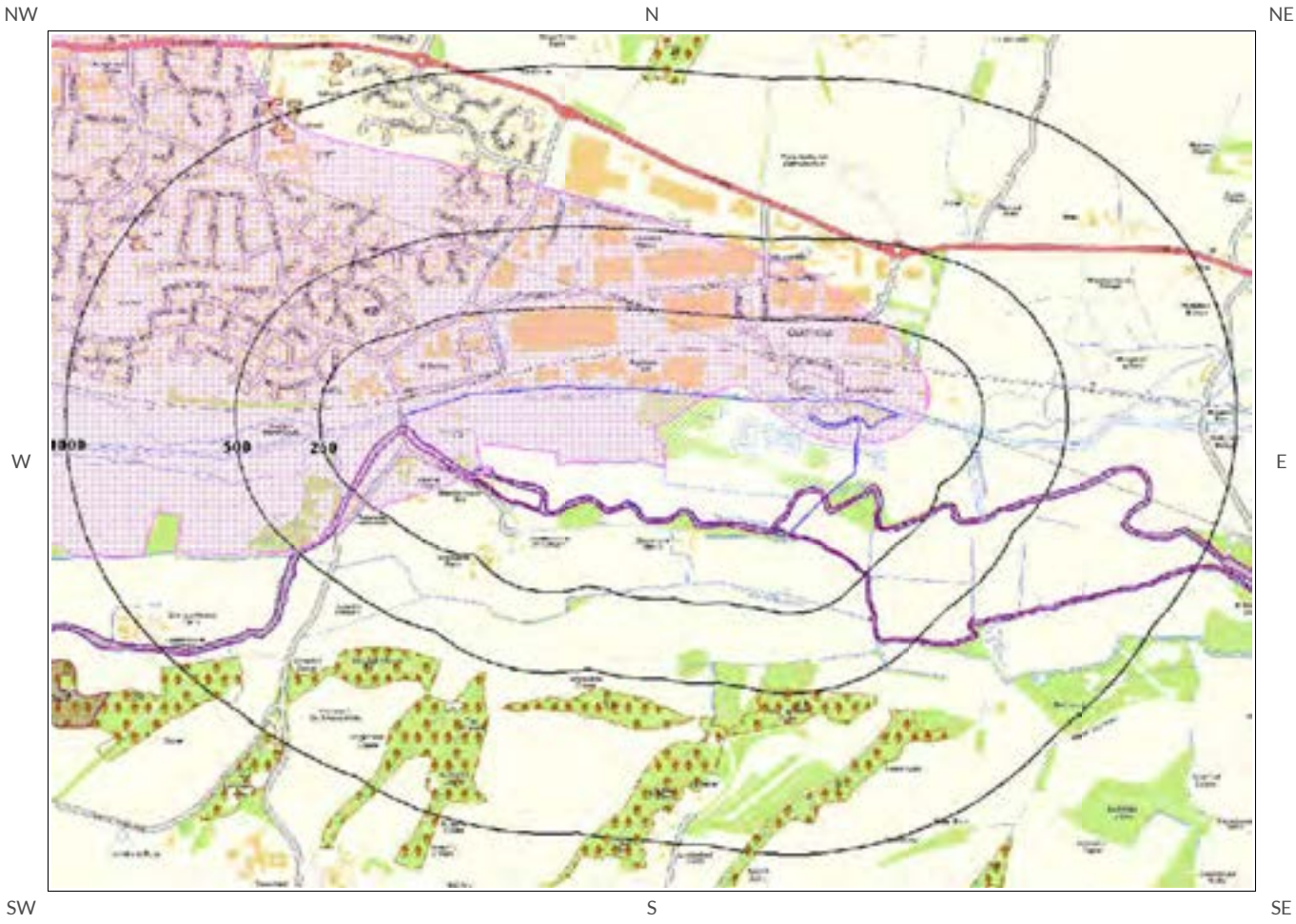
What is the British Geological Survey confidence rating in this result? High

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.

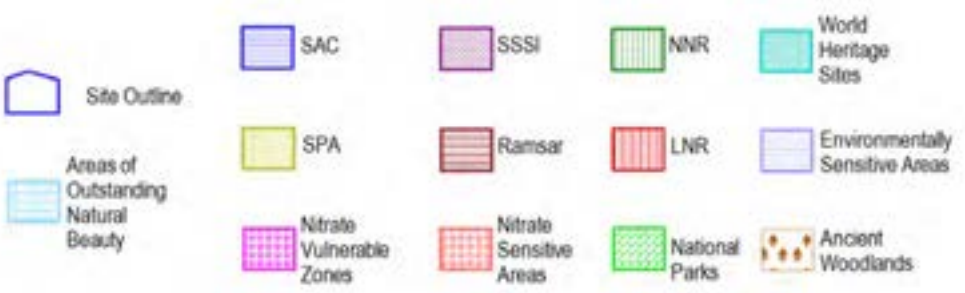
---

7. Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Map

Mapping sourced from Ordnance Survey



7. Designated Environmentally Sensitive Sites

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

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

10

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
2	0.0	On Site	River Kennet	Natural England
Not shown	1168.0	W	Thatcham Reed Beds	Natural England
4	1199.0	SW	Bowdown and Chamberhouse Woods	Natural England
Not shown	1384.0	SW	Greenham and Crookham Commons	Natural England
Not shown	1431.0	SW	Greenham and Crookham Commons	Natural England
Not shown	1554.0	S	Greenham and Crookham Commons	Natural England
Not shown	1564.0	W	Thatcham Reed Beds	Natural England
Not shown	1769.0	SW	Greenham and Crookham Commons	Natural England
Not shown	1848.0	SW	Greenham and Crookham Commons	Natural England
Not shown	1885.0	SW	Greenham and Crookham Commons	Natural England

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

0

Database searched and no data found.

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

1

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
Not shown	1279.0	W	Kennet & Lambourn Floodplain	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

23

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
14	489.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
15	536.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
16	551.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
17	560.0	SW	UNKNOWN	Ancient and Semi-Natural Woodland
18	604.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
19	621.0	SE	UNKNOWN	Ancient and Semi-Natural Woodland
20	861.0	SW	UNKNOWN	Ancient and Semi-Natural Woodland
21	959.0	N	UNKNOWN	Ancient and Semi-Natural Woodland
22	969.0	SW	UNKNOWN	Ancient and Semi-Natural Woodland
23	1143.0	SE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1370.0	N	UNKNOWN	Ancient Replanted Woodland
Not shown	1551.0	N	UNKNOWN	Ancient Replanted Woodland
Not shown	1552.0	N	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1700.0	NE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1770.0	N	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1785.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1847.0	N	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1877.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1910.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1917.0	NE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1930.0	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1943.0	S	UNKNOWN	Ancient Replanted Woodland
Not shown	1976.0	N	UNKNOWN	Ancient and Semi-Natural Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

The following Area of Outstanding Natural Beauty (AONB) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	AONB/NSA Name	Data Source
Not shown	1851.0	N	North Wessex Downs	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

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
12	0.0	On Site	Existing	DEFRA

8. Natural Hazards Findings

8.1 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 GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Moderate

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

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

8.1.2 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.

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

8.1.3 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.

8.1.4 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.

8.1.5 Collapsible Rocks

What is the maximum Collapsible 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
No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site? Low

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

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

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

9. Mining

9.1 Coal Mining

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

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? Negligible

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

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

Guidance: No Guidance Required.

Contact Details

EmapSite
Telephone: 0118 9736883
sales@emapsite.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web:www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web:**www.environment-agency.gov.uk**
Email:**enquiries@environment-agency.gov.uk**

Public Health England

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

The Coal Authority

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

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: West Berkshire Council
Phone: 01635 42400
Web: www.westberks.gov.uk
Address: Council Offices, Market Street, Newbury, RG14 5LD

Gemapping PLC

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

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

APPENDIX 5

BGS Reference: SU56NW2
British National Grid: 452930, 166350
Depth: 9.2 m

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)
6-inch Map Registered No. SU 56 NW/2

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: THATCHAM N° 1.

For whom made

Town or Village THATCHAM County BERKS.

Exact site

Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made TRIAL.

Nat. Grid Reference 529300 163500

1" N.S. Map No.	1" O.S. Map No.	Confidential or not

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

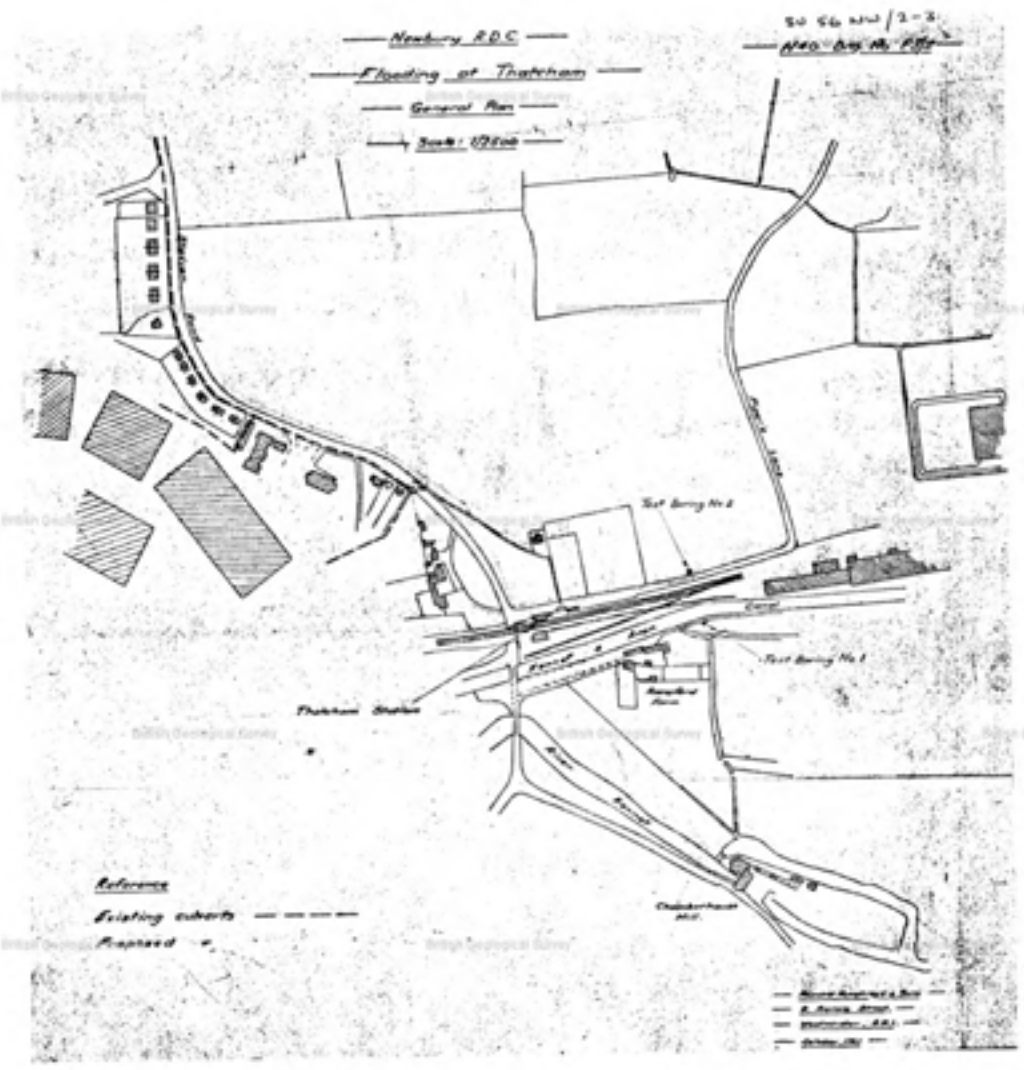
Made by Date of sinking 1962

Information from Date received

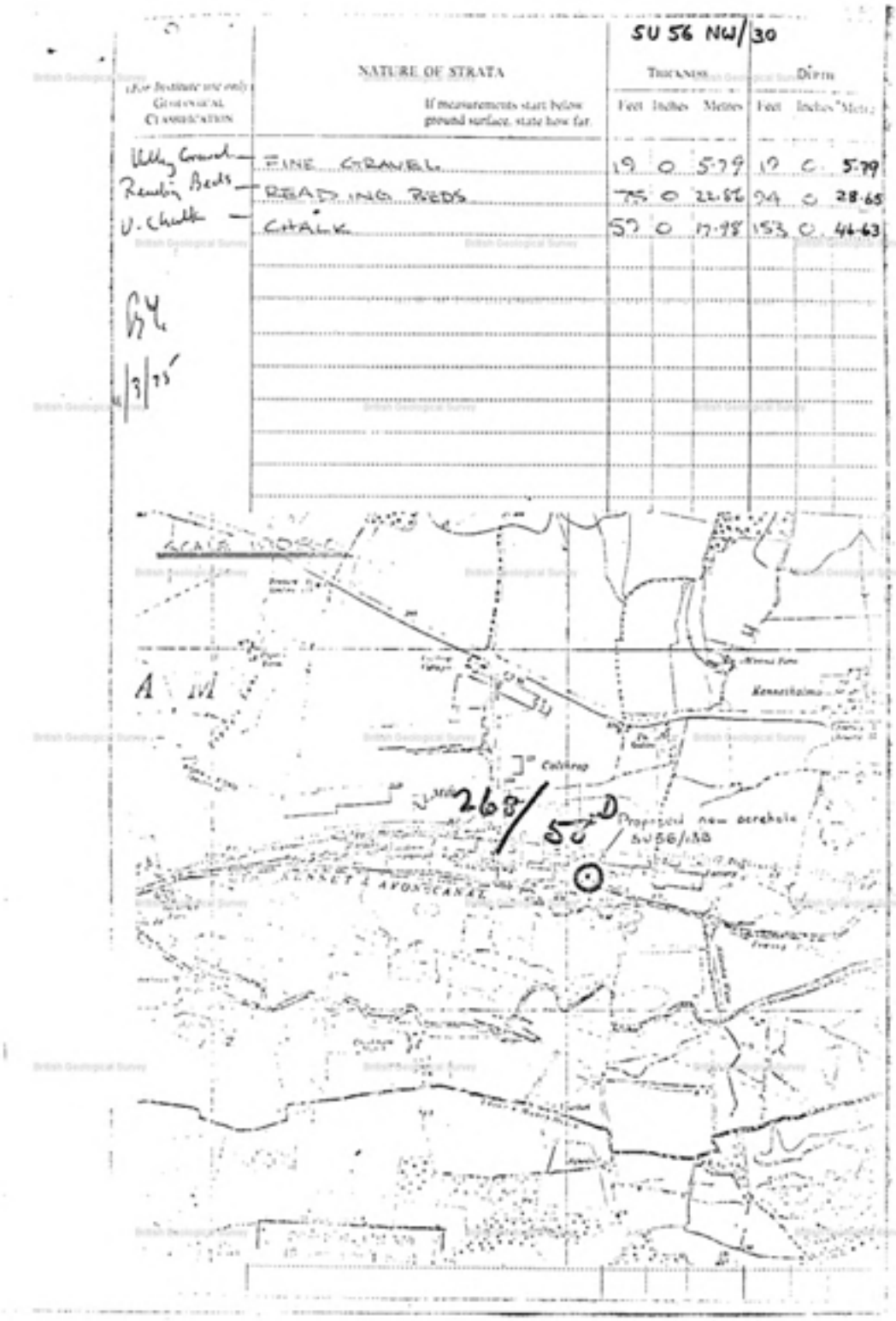
Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	DESCRIPTION OF STRATA	Depth M.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
	Topsoil	(0·61)	2			
	Fine gravel	(1·68)	3	6	5	6
	Large gravel	(2·90)	4		9	6
	Green sandy clay.	(3·66)	2	6	12	
	Mottled clay.	(5·79)	7		19	
	Green / brown sand.	(6·25)	1	6	20	6
	Green sandy clay.	(7·32)	3	6	24	
	Mottled clay.	(9·30)	6	6	30	6


Newbury R.D.C.
Flooding at Thatcham
General Plan
Scale: 6"=1 mile
Test Boring No 2
Test Boring No 1
Thatcham Station
Reference
Existing culverts
Proposed

BGS Reference: 5.79
British National Grid: 454070, 166360
Depth: 46.63 m



BGS Reference: SU56NW31
British National Grid: 453310, 166420
Depth: 47.37 m

SU56NW/31 5331.6642.

268. 57a

...ol. map 1 in. map New Series 267 6 in. map

...ade by . Date Sept...

Sunk feet. Bored feet.

Communicated by Messrs Kopper ... Ltd, ... Southwark Bridge Rd, S.E.1.

Height above Ordnance Datum 228. Rest level of water 20' above ground

Yield 3500 galls an hour 0.45

Quality (with copy of analysis on separate sheet) Analysis attached.

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS. Feet.	Inches.	DEPTH. Feet.	Inches.
~~Made Ground~~	Soil	2	—	2	—
~~Drift~~	Ballast. (Full of water).	13	—	15	—
~~London Clay~~	Blue Clay	21	—	36	—
~~Reading Beds~~	Mottled Clay.	39	—	75	—
	Blue Clay	13	—	88	— 26.8
Upper Chalk	Chalk	74	—	162	—

Nov. 1.9.41

Analysis missing

Tubes. 90' of 4" from surface – see diagram.

In 1950 pumped ... less than 3500 g/hr ... ... by ... 1:50

Suction ... about 50' ...

This is a ... 268 ... 268/57 ...

6w. ... (a.l)

W/268/57 - 31/10/52
Pollution – Nil
Drinking water now from ... Water Co.' R.E.A.

Used. At present disused. Pump to be removed & bore closed off; and then to be kept as emergency supply. Overflows at c. 8' above well top. O.D. ... 15.7.59 M.J.

Now ... Limited. (W/268/... 11.5.68)
Bore ... is ... for cooling water and ...
...

Geological Survey and Museum,
Jermyn Street, London, S.W.1.

BGS Reference: SU56NW33
British National Grid: 453690,166370
Depth: 65 m

SU 56 NW/33   5369 6637

RECORD OF WELL (SHAFT OR BORE) 268/58

N.S. 267

C

Colthrop Board & Paper Mills Ltd.

At ...
Town or Village Thatcham County Berks Six-inch map 43 NE
Exact site ...
in parish of ...

Level of ground surface above sea-level (O.D.) 200 ft. If well starts below ground surface, state how far...
Shaft ... ft., diameter ... ft. Bore ... ft. Diameter of bore: at top ... ins.; at bottom ...
Details of permanent lining tubes (internal diameters preferred). 26'8" x 27". Top 1' a.s. 107'10" x 24". Top 2'3" b.s. including O/F Pipe.
Water struck at depths of (feet) 3', 92'6", 166/175'.
Rest-level of water below/above top of well 1'6" feet. Suction at ... feet. Yield on ... hours'/days' test
30,630 gallons per hour (with pump of capacity ... g.p.h.); depressing water level to ... feet below top. Time of recovery ... hrs. Amount normally pumped daily ... g.p.h. for ... hours.
Quality (attach copy of analysis if available) ...
Sunk by Le Grand S. & Gw. Date of well 18.9.37.
Information from Le Grand

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made	Made up ground	7	-	7	-
Drift	Dirty Gravel	3	6	10	6
	Gravel	7	6	18	-
	Clay Stones (hard)	~~8~~	6	18	6
	Gravel	~~8~~	6	19	-
London Clay	'Sandstone'	~~8~~	6	19	6
	Claystone	~~9~~	9	20	3
	Clay and Stones	2	3	22	6
	Mottled Clay (hard)	5	-	27	6
Reading Beds	Very Sandy Clay	7	6	35	-
	Tough Sandy Clay (mottled)	4	6	39	6
	Hard Sandy Clay (mottled)	34	-	73	6
	Dark Mottled Clay	5	6	79	-
	Mottled Clay - Sandy	9	6	88	6
	Sandy Clay and Shells	4	-	92	6
Upper Chalk	Chalk and Flints	122	6	215	-

ECW 1.7.41

See Berks 43 NE (E.)

[illegible] 268/58

This record is on Sheet 268 & is renumbered 268/58.

Card on 6" Base 4.2.1957

13.7.95

RECORD OF WELL (SHAFT OR BORE) 208

O.S.
G.S.
Ref. SU56/10

52

At Colthrop Paper Mills (J. Henry)
Town or Village THATCHAM County Berks Six-inch quarter 52 SE
Exact site (A rough sketch-map or tracing from a ...)
in parish of
Level of ground surface above sea-level (O.D.) 200 ft. If well starts below ground surface, state how far.
Shaft ft., diameter ft. Bore ft. Diameter of bore: at top ins.; at bottom
Details of permanent lining tubes (internal diameters preferred) 102' x 4" from 6" down
SU 5371 6638
Water struck at depths of (feet)
Rest-level of water above top of well overflowing feet. Suction at feet. Yield on hours'/days' test
7600 gallons per hour (with pump of capacity g.p.h.); depressing water level to feet below top. Time of recovery hrs. Amount normally pumped daily g.p.h. for hours.
Quality (attach copy of analysis if available)
Sunk by Le Grand S. & Co. for Mr Date of well September 1920
Information from Le Grand SB 7580

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made Ground	Made ground	2	6		
Drift	Ballast	9			
Reading Beds	Mottled clay	11	6		
	" " & sand	12			
	" "	41			
	Blue clay	5			
	Sandy clay	4			
Upper Chalk	Chalk & flints, water overflows	65		150	

RY 11/75.

Record attached to 208/58 4.8.42, when locality determined correctly (see above) SGH.

Visited. This record presumably refers to that well which has been sited at b). This is the only other well definitely known at the paper mills apart from a) + c). Disused. Overflowing. Well top 6' below the ground surface. O.D. of well top + c.204. Sited on 6" Berks 43 NE/E. 12.7.59. A.J.

For Survey use only

Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
DEC 1939		

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.

(*11810) Wt.29001/3,869 10,000 9/39 A.& E.W.Ltd. Gp.688

SU56NW/33 5369.6637.

RECORD OF WELL (SHAFT OR BORE) 268

Ref. 58 B

Colthrop Paper Mills (J. Henry)

Town or Village THATCHAM County Berks Six-inch quarter sheet

Exact site

in parish of

Level of ground surface above sea-level (O.D.) 200 ft. If well starts below ground surface, state how far. Shaft ft., diameter ft. Bore ft. Diameter of bore: at top ins.; at bottom

Details of permanent lining tubes (internal diameters preferred) 10? x [illegible] from [illegible]

Water struck at depths of (feet)

Rest level of water below / above top of well overflowing feet. Suction at feet. Yield on hours' / days' test [illegible] gallons per hour (with pump of capacity g.p.h.); depressing water level to feet below top. Time of recovery hrs. Amount normally pumped daily g.p.h. for hours.

Quality (attach copy of analysis if available)

Date of well September 1920

Made by Le Grand [illegible] for Mr. 38 ?522

Information from Le Grand

Geological Classification	Nature of Strata (and any additional remarks)	Thickness Feet	Thickness Inches	Depth Feet	Depth Inches
MADE GROUND	~~Made ground~~	2	6		
		9			
DRIFT	~~Ballast~~	11	6		
	Mottled clay	13			
	" & sand	41			
READING BEDS		5			
	Blue clay	4			
	Sandy clay	65		150	
UPPER CHALK.	Chalk & flints, water overflow				

34

11/75 Record attached to 249/58 4.8.42, also [illegible] determined correctly (see above) [illegible].

Note: This well presumably refers to the well which was [illegible] at 6) ... This is [illegible] [illegible] well definitely [illegible] at the paper mills [illegible] [illegible] a) + c). Disused. Overflowing. Well top 2' [illegible] the ground surface. OD of well top is c.200ft [illegible] 4" [illegible] 12.7.59 [illegible]

BGS Reference: SU56NW163
British National Grid: 452720,166290
Depth: 18 m

NGR 5272 6629

SU56NW163

Sampling Depth	Type	Properties Strength kN/m²	w %	SPT N	Strata Description	Depth	Level
					MADE GROUND: Gravelly TOPSOIL	G.L.	67.23
						0.7	66.53
1.30	SB			40	Dense medium to coarse sub-angular to sub-rounded GRAVEL with many chert cobbles. Some lenses of soft to firm dark brown very silty peaty clay with much fibrous rootlets and some small gastropod shells.		
1.70	D						
2.50	SB			28			
3.30	SB			39			
4.30	SB			31			
						5.1	62.13
5.30	D		29		Firm dark grey silty CLAY of high plasticity with some pockets of brown grey silty fine sand and fine sub-angular to sub-rounded gravel and shell fragments.		
5.60	SD		22	19		5.6	61.63
6.00	D		24		Medium dense brown grey very silty fine SAND with occasional fine to medium well rounded gravel and fine gravel size shell fragments	6.0	61.23
6.20-6.65	U(40)	180	20				
6.65	D		17		Very stiff fissured green grey mottled red brown very silty sandy CLAY becoming sandier with depth.		
7.20-7.60	U(60)		18				
7.60	D		18				
8.20-8.65	U(60)	320	17				
8.65	D		16				
9.20-9.60	U(70)	370	17				
9.60	D		16				

Drilling

Type	From	To	Size	Fluid
Shell and Auger	G.L.	18.00	0.15	-

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
16.50	Slow flow rising to 6.90m in		6.3.85	Nil	Nil	Nil
	20 minutes	-	6.3.85	7.0	6.1	Nil
			7.3.85	-	-	4.2

Remarks

Borehole Record

exploration associates

Project British Waterways Board
Thatcham Bridge
Kennet and Avon Canal

Contract S4751/2

Borehole 2

Sampling		Properties			Strata			
Depth	Type	Strength kN/m²	w %	SPT N	Description SU56NW 163	Depth	Level	Legend
10.3-10.75	U(70)	340	15					
10.75	D		15					
11.3-11.75	U(70)	220	20					
11.75	D		19					
12.3-12.75	U(70)	190	22					
12.75	D		22					
14.0-14.45	U(70)	260	24					
14.45	D		22					
15.7-16.15	U(75)	530	10					
16.15	D		10					
17.3	SD		18	44/220	Very dense grey brown coarse SAND	16.8	50.43	
					End of Borehole	18.0	49.23	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
								7.3.85	18.0	7.0	Nil

Remarks

Borehole Record

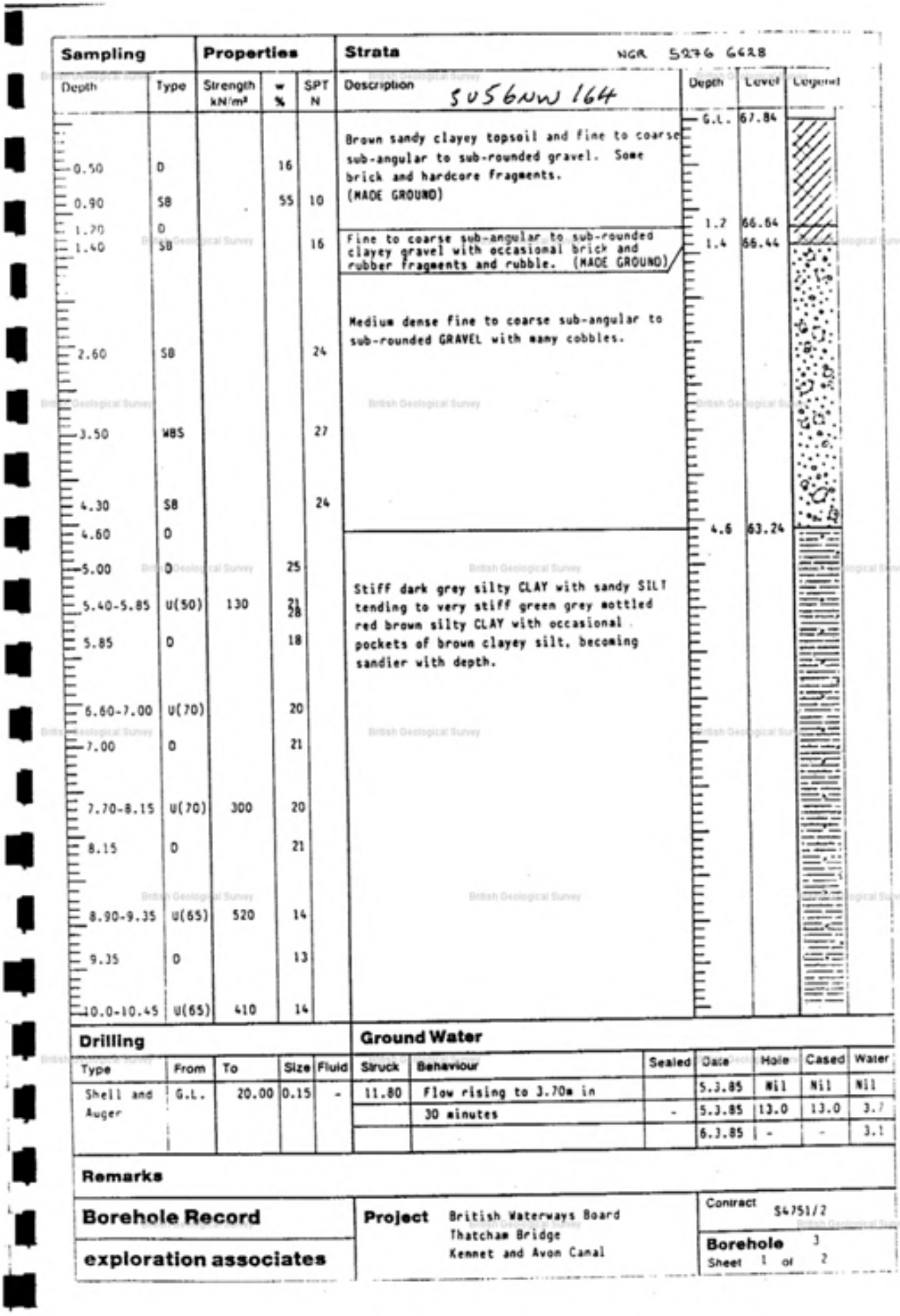
exploration associates

Project British Waterways Board
Thatcham Bridge
Kennet and Avon Canal

Contract S4751/2

Borehole 2

BGS Reference: SU56NW164
British National Grid: 452760,166280
Depth: 20 m



NGR 5276 6628

SU56NW 164

Sampling Depth	Type	Properties Strength kN/m²	w %	SPT N	Strata Description	Depth	Level
					Brown sandy clayey topsoil and fine to coarse sub-angular to sub-rounded gravel. Some brick and hardcore fragments. (MADE GROUND)	G.L.	67.84
0.50	D		16				
0.90	SB		55	10			
1.20	D					1.2	66.64
1.40	SB			16	Fine to coarse sub-angular to sub-rounded clayey gravel with occasional brick and rubber fragments and rubble. (MADE GROUND)	1.4	66.44
2.60	SB			24	Medium dense fine to coarse sub-angular to sub-rounded GRAVEL with many cobbles.		
3.50	WBS			27			
4.30	SB			24			
4.60	D					4.6	63.24
5.00	D			25	Stiff dark grey silty CLAY with sandy SILT tending to very stiff green grey mottled red brown silty CLAY with occasional pockets of brown clayey silt, becoming sandier with depth.		
5.40-5.85	U(50)	130		21 28			
5.85	D			18			
6.60-7.00	U(70)			20			
7.00	D			21			
7.70-8.15	U(70)	300		20			
8.15	D			21			
8.90-9.35	U(65)	520		14			
9.35	D			13			
10.0-10.45	U(65)	410		14			

Drilling

Type	From	To	Size	Fluid
Shell and Auger	G.L.	20.00	0.15	-

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
11.80	Flow rising to 3.70m in		5.3.85	Nil	Nil	Nil
	30 minutes	-	5.3.85	13.0	13.0	3.7
			6.3.85	-	-	3.1

Remarks

Borehole Record

exploration associates

Project British Waterways Board
Thatcham Bridge
Kennet and Avon Canal

Contract S4751/2

Borehole 3

Sheet 1 of 2

NGR 5276 6428

5056NW 164

Sampling		Properties			Strata			
Depth	Type	Strength kN/m²	w %	SPT N	Description	Depth	Level	Legend
						G.L.	67.84	
0.50	D		16		Brown sandy clayey topsoil and fine to coarse sub-angular to sub-rounded gravel. Some brick and hardcore fragments. (MADE GROUND)			
0.90	SB		55	10				
1.20	D					1.2	66.64	
1.40	SB			16	Fine to coarse sub-angular to sub-rounded clayey gravel with occasional brick and rubber fragments and rubble. (MADE GROUND)	1.4	66.44	
2.60	SB			24	Medium dense fine to coarse sub-angular to sub-rounded GRAVEL with many cobbles.			
3.50	WBS			27				
4.30	SB			24				
4.60	D					4.6	63.24	
5.00	D		25		Stiff dark grey silty CLAY with sandy SILT tending to very stiff green grey mottled red brown silty CLAY with occasional pockets of brown clayey silt, becoming sandier with depth.			
5.40-5.85	U(50)	130	21	28				
5.85	D		18					
6.60-7.00	U(70)			20				
7.00	D			21				
7.70-8.15	U(70)	300		20				
8.15	D			21				
8.90-9.35	U(65)	520		14				
9.35	D			13				
10.0-10.45	U(65)	410		14				

Drilling

Type	From	To	Size	Fluid
Shell and Auger	G.L.	20.00	0.15	-

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
11.80	Flow rising to 3.70m in		5.3.85	Nil	Nil	Nil
	30 minutes	-	5.3.85	13.0	13.0	3.7
			6.3.85	-	-	3.1

Remarks

Borehole Record

exploration associates

Project British Waterways Board
Thatcham Bridge
Kennet and Avon Canal

Contract S4751/2

Borehole 3

Sheet 1 of 2

BGS Reference: SU56NW228
British National Grid: 453670,166370
Depth: 65 m

Site plans in SU 56/10

D OF WELL (SHAFT OR BORE) 268/58

& Paper Mills Ltd.

N.S. 267
O.S.

tcham County Berks Six-inch map 43NE

sketch-map ng from a y desirable)

in parish of

Level of ground surface above sea-level (O.D.) 200 ft. If well starts below ground surface, state how far

Shaft ft., diameter ft. Bore ft. Diameter of bore: at top ins.; at bottom

Details of permanent lining tubes (internal diameters preferred) 26'8" x 27". Top 1' a.s.
107'10" x 24". Top 2'3" b.s. including O/F Pipe. SU 5367 6637

SU 56/57 C

Water struck at depths of (feet) 3', 92'6", 166/175'.

Rest-level of water above top of well 1'6" feet. Suction at feet. Yield on hours'/days' test

30,630 gallons per hour (with pump of capacity g.p.h.); depressing water level to - feet below top. Time of recovery hrs. Amount normally pumped daily g.p.h. for hours.

Quality (attach copy of analysis if available)

Sunk by Le Grand S. & Co. Date of well 18.9.37.

Information from Le Grand

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	Inches.	DEPTH Feet.	Inches.
Made	Made up ground	7	-	7	-
Drift	Dirty Gravel	3	6	10	6
	Gravel	7	6	18	-
	Clay Stones (hard)	~~6~~	6	18	6
	Gravel	~~6~~	6	19	-
London Clay	'Sandstone'	~~6~~	6	19	6
	Claystone	~~9~~	9	20	3
	Clay and Stones	2	3	22	6
Reading Beds 73'	Mottled Clay (hard)	5	-	27	6
	Very Sandy Clay	7	6	35	-
	Tough Sandy Clay (mottled)	4	6	39	6
	Hard Sandy Clay (mottled)	34	-	73	6
	Dark Mottled Clay	5	6	79	-
	Mottled Clay - Sandy	9	6	88	6
	Sandy Clay and Shells	4	-	92	6
Upper Chalk	Chalk and Flints	122	6	215	-

SCEh. 1.9.47.

on. Berks 43 NE (C).

[former] now 268/58

Another 4" boring is situated about 60 yds to NE of [267/137]. Reported to go to about same depth but is surely used as its water is drawn by the pumping of 267/137 268/58. No record of strata but supposed to have been sunk shortly after 267/137 268/58

This record is on sheet 268 & is renumbered 268/58.

G.A.A. 1954

Sited on 6" Berks. 43NE/C.
Visited. In use 5 x splenner wait when pressure low. Overflows. Overflow at 3 0.9 ... /min. for about 30 mins/day. 80.+6.20 13.7.59 M.S.T.

Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
DEC 1937		

(*11815) Wt.29051/O.269 10,000 9/39 A.& E.W.Ltd. Gp.586

RECORD OF WELL (SHAFT OR BORE) 268/58

N.S. ______
O.S. ______

Colthrop Board & Paper Mills Ltd.

At ______

Town or Village Thatcham County Berks Six-inch quarter 43NE

Exact site ______ (sketch-map showing from a ... desirable)

______ in parish of ______

Level of ground surface above sea-level (O.D.) 200 ft. If well starts below ground surface, state how far ______

Shaft ______ ft.; diameter ______ ft. Bore ______ ft. Diameter of bore: at top ______ ins.; at bottom ______

Details of permanent lining tubes (internal diameters preferred) 26'8" x 27". Top 1' a.s. 107'10" x 24". Top 2'3" b.s. including O/F Pipe. SU 5367 6637

SU 56/57

Water struck at depths of (feet) 3', 92'6", 166/175'.

Rest-level of water above top of well 1'6" feet. Suction at ______ feet. Yield on ______ hours'/days' test 30,630 gallons per hour (with pump of capacity ______ g.p.h.); depressing water level to - feet below top. Time of recovery ______ hrs. Amount normally pumped daily ______ g.p.h. for ______ hours.

Quality (attach copy of analysis if available) ______

Sunk by Le Grand S. & G. Date of well 18.9.37.

Information from Le Grand

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made	Made up ground	7	-	7	-
Drift	Dirty Gravel	3	6	10	6
	Gravel	7	6	18	-
	Clay Stones (hard)	~~6~~	6	18	6
	Gravel	~~6~~	6	19	-
London Clay	'Sandstone'	~~3~~	6	19	6
	Claystone	~~9~~	9	20	3
	Clay and Stones	2	3	22	6
Reading Beds	Mottled Clay (hard)	5	-	27	6
	Very Sandy Clay	7	6	35	-
	Tough Sandy Clay (mottled)	4	6	39	6
	Hard Sandy Clay (mottled)	34	-	73	6
	Dark Mottled Clay	5	6	79	-
	Mottled Clay - Sandy	9	6	88	6
	Sandy Clay and Shells	4	-	92	6
Upper Chalk	Chalk and Flints	122	6	215	-

SCRB 1.9.41.

on. Berks 43NE (E).

[former] now 268/58

Another 4" boring is situated about 40 yds to NE of [267/137
Reported to go to about same depth but is rarely used
as the water is drawn by the pumping of ~~267/137~~ 268/58.
No record of strata but supposed to have been sunk shortly after ~~267/137~~ 268/58c

This record is on sheet 268 & is
renumbered 268/58. G.A.M. 1941.

Sited on 6" Berks. 43NE/E.
Visited. In use to supplement mains when pressure low.
Overflows. Used at 30 gals/min. for about 30 mins/day.
ED. + c.210 13.7.59 AEJ.

For Survey use only

Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
DEC 1939		

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.

(*11815) Wt.29051/O.369 10,000 9/39 A.& E.W.Ltd. Gp.686

BGS Reference: SU56NW230
British National Grid: 453300, 166430
Depth: 49.38 m

Crosfield Heating
BORING at Thatcham — County Berks — 268 57a (92)
Geol. map — 1 in. map New Series 267 — 6 in. map — SU56/8A
Made by — Date Sept–Oct 1942
Sunk feet. Bored feet.
Communicated by Messrs Cropper & Co Ltd, 50 Southwark Bridge Rd, S.E.1.
Height above Ordnance Datum 228. Rest level of water 20' above ground
Yield 3500 galls an hour.
Quality (with copy of analysis on separate sheet) Analysis attached.
SU 5330 6643

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
Made Ground	Soil	2	—	2	—
Drift	Ballast. (Full of water).	13	—	15	—
London Clay	Blue Clay	21	—	36	—
Reading Beds	Mottled Clay	39	—	75	—
	Blue Clay	13	—	88	—
Upper Chalk	Chalk	74	—	162	—
Recd. 1.9.42					

Analysis overleaf.

Tubes. 90' of 4" from surface — see diagram.

In 1950 pumping under [illegible] than 3500 g/h [illegible] [illegible] by 24/58.

Suction level about 20' [illegible]

This is a [illegible] 265 [illegible]
268/57 [illegible]

6 in. Berks 43 NE. (WS)

WS/268/57 – 31/10/52
Abstraction – NIL
Drinking water now from Newbury Corp. Water Co.' REA

Visited. At present disused. Pump to be removed & bore cleaned out, and then to be kept as emergency supply. Overflows at c. 8' above well top. O.D. + c. 213'. 15.7.59. MES.

Now Reed Cartons Limited. (WS/268/Thatcham, 11.5.65)
Bore A in use for cooling water and tank topping.

G.S.M. 8042/21.

Geological Survey and Museum,
Jermyn Street, London, S.W. 1.

(S. 1656.) Wt. 5621/69. 2000. 5/10. Ph. & Ty. Ltd.

BGS ID: 417633 : BGS Reference: SU56NW70
British National Grid: 453820,165900
Depth: 6m

[redacted]

* SU56NW/67-80

Boring at Mr. Ware, Crookham Manor Farm, Thatcham, Berkn. - 8th April, 1965.

SU56NW 67
5335 6591

Hole No. 1.

Top Soil	2'0"
Marl Peat and Clay	9'0"
Ballast	6'0"
Clay	
Water	4'0"

SU56NW 68
5342 6578

Hole No. 2.

Top Soil	2'0"
Peat and Clay	9'0"
Ballast	3'0"
Clay	
Water	4'0"

SU56NW 69
5368 6585

Hole No. 3.

Top Soil	2'0"
Marl Peat and Clay	9'0"
Peat and Stones	6'0" +
Water	4'0"

SU56NW70
5382 6590

305 NW

Hole No. 4.

Top Soil	2'0"
Marl	2'0"
Peat and Clay	10'0"
Ballast Dirty and Poor	6'0"
Water	5'0"

SU56NW71
5402 6582

Hole No. 5.

Top Soil	2'0"
Peat and Clay	8'0"
Ballast	5'0"
Clay	
Water	4'0"

Hole No. 6. SU56NW72

Top Soil	2'0" 5406 6530
Marl Clay and Peat	14'0"
Ballat	2'0"
Clay	
Water	4'0"

Hole No. 7. SU56NW73

Top Soil	2'0" 5386 6572
Marl	8'0"
Peat and Stones	3'0"
Ballast Fair	6'0" +
Water	6'0"

Hole No. 8. SU56NW74

Top Soil	3'0" 5390 6598
Ballast (Very Coarse)	9'0"
Clay	
Water	4'0"

Hole No. 9. SU56NW75

Top Soil	2'0" 5404, 6595
Clay	2'0"
Ballast	8'0"
Water	5'0"
Clay	

Hole No. 10. SU56NW76

Top Soil	2'0" 5359, 6566
Clay and Peat	10'0"
Clay and Stones	3'0"
Clay	
Water	6'0"

Hole No. 11. SU56NW77 5360 6541

Solid Clay - Brown Clay to 7'0"

Hole No. 12. SU56NW78 5231 6551

Top Soil	1'0"
Clay Marl Peat Sandy Clay	15'0"
Clay	
Water	10'0"

Hole No. 13. SU56NW79

Top Soil	1'0" 5312 6536
Marl Peat	10'0"
Grey Clay	

Hole No. 14. SU56NW80

Top Soil	2'0" 5326 6566
Marl and Peat	8'0"
Clay and Stone	3'0"


Thatcham House
T C H A M
Station Road
Oxford Lodge
Piper's Farm
Piper's Lane
ROMAN ROAD
Colthrop Cottages
Colthrop
Mills
Westend Farm
Kennetholme
The Gables
Factory
Station
KENNET & AVON CANAL
Towing Path
Waterside Farm
Crookham Manor
1
2
3
4
5
6
7
8
9
10
11
12
13
14.
PLANTED
Highfield Copse
Waterside Copse
Hanging Lands Gully
The Lamock
SU56NW/67-80

APPENDIX 6

Trial Pit Investigation at Colthrop Board Mill – South Site

Introduction

Colthrop Landfill is located 1 km east of Thatcham between the Kennet and Avon Canal and River Kennet. The site occupies a rectangular parcel of land which contains former water treatment works and areas where paper waste was deposited.

Future development of the site by Grundon, will include works on these former landfill areas and a trial pit investigation was required to assess the quality of the ground, where waste disposal had occurred. Specifically two zones, south of the access bridge, (called Zone A) and east of the effluent plant, (called Zone B) were investigated.

Geology and Hydrogeology

An earlier Ground Investigation Report, (ref: 145064 June 1995) carried out by Exploration Associates, indicates the presence of Alluvium overlying Valley Gravels, Reading Beds and London Clay. In general the Alluvium is irregular and was not detected during this survey. Valley gravels were found at the base of all trial pits, with the majority of this unit removed and replaced by Made Ground. Due to the limited reach of the excavator the Reading Beds and London Clay were not intercepted.

From the Symonds liability report of July 2000, groundwater is present in the Valley Gravels with a flow from the Northwest corner to the Southeast corner throughout the seasons.

Trial Pit Investigation 3rd September 2002

To assess the quality of the ground in the two zones identified above, 9 trial pits were dug using a 15 tonne tracked excavator. Its reach was between 4m and 5m depending on the conditions encountered. Logging of the trial pits involved describing the strata encountered in terms of; texture, particle size, colour and odour; depths where major changes were noted and whether any seepages or major water inflows were noted.

Bulk samples were taken from varying depths and analysed for a standard ICRCL soils suite for contaminated land investigations. (This allows comparison of the results with ICRCL guidelines relating to the development of Contaminated land sites). Analysis was carried out by Alcontrol Geochem at their Rotherham Laboratory. Photographs were also taken. This information is presented in the Appendix attached to this report.

Scope of the Trial Pits

Nine Trial Pits were excavated in locations shown on the attached plan to depths varying between 4 and 4.9m depth. The maximum depth of excavation was limited by whether the hole collapsed due to the inflow of water, (shallow holes), or where no inflow was detected. All the holes encountered a thin layer of soils, made ground or waste and Valley Gravels.

Soils

A thin soil layer was found in most of the pits excavated in Zone A, characterised by 0.3m to 0.4m of light brown material with some angular or sub angular fragments. In Zone B the soil layer was effectively absent as any light brown soily material was mixed with brick fragments, metal wire and pieces of plastic.

Made Ground

All pits encountered made ground to depths of between 2.9m and 4.5m. Zone B has a greater depth of made ground averaging 4.1m, with Zone A averaging 3.5m. All holes found a black, sometimes odorous “inert” type waste, (plate 1) mixed with rubble of various dimensions, (plates 1 and 8). TP1 and TP 2 also displayed black sludge, silty black mud or black clays with a hydrocarbon odour. Some light grey powdery ash material was present in TP1 at 0.7m below the surface.

Within this matrix other waste was found and included, house bricks, wood, paper pulp, Thermolite blocks, rubber hoses, cables, black plastic sheets, asbestos roofing tiles, steel wire, (plate 5) and reinforced concrete.

Paper pulp was confined mainly to Zone A and was present in discrete layers except in TP 4, (plate 3) where larger amounts of paper pulp was found. Thermolite blocks were exclusive to Zone A with TP 6 showing large numbers of blocks, (plate 6). Asbestos roofing tiles were confirmed to TP 2 only, (plate 2). Zone B showed a more uniform made ground made up of general fill with some large blocks, reinforced concrete and metal wire, (plates 7 and 8).

TP 7 encountered a concrete structure at approximately 2.8m below the surface which was traced throughout the length of the excavation, (plate 9).

Valley Gravels

Valley Gravel was detected in all trial pits, underlying the fill materials described above. The top of this unit was found at between 3.6m to 4.6m below the surface. Typically this unit is a grey dense flinty gravel with some larger cobbles present. In most trial pits the matrix was stained dark grey and / or black. The base of the deposit was not proven.

Groundwater

Groundwater in the Valley Gravels was detected in 8 trial pits at 4m to 4.5m below the ground surface. This strike was typified by a rapid flow into the excavation, sometimes causing collapse of the hole. Water has been discoloured by the waste materials.

Seepages were also present in waste above the gravels at depths of 1.5m to 3.6m below the surface. The seepages were sometimes oily as in TP1 and TP3. Bubbling due to gas escape was noted in TP5, (plate 5). Only borehole TP 7 was dry throughout its depth.

Laboratory Testing

Nine bulk samples were taken from 8 of the trial pits with no sample collected from TP6. The sampling schedule is shown below:-

Trial Pit	Depth (m)	Material
1	2.2	waste
2	2.8	waste
3	4.1	gravel
4	2.5	paper pulp
5	3.5	waste
6	no sample	
7	2	waste
8	3.5, 4.8	waste / gravel
9	3.1	waste

Samples were collected using a shovel from the waste pile adjacent to the excavation. A trowel was then used to fill the sample pot with approximatly 0.75 kg of material. Samples were collected by courier and received by the laboratory on the 5th September 2002. Results were issued on the 18th September 2002.

Results of the Trial Pit Investigation

Waste

The trial pits have confirmed that the two areas were filled with a variety of waste to a maximum depth of 4.5m. The waste types correspond to previous reports and show that in addition to paper pulp, thermolite blocks were deposited in large volumes. Other waste such as roofing tiles, cabling and concrete indicate the site was used to receive demolition type wastes.

Land Quality

The results of the sampling have been compared against Guidance Note 59/83 published by the Interdepartmental Committee in the Redevelopment of Contaminated Land, (ICRCL) 1987. This outlines Threshold concentrations for potentially contaminated sites with regard to the sites end use. Therefore the threshold concentration will be lower where development includes domestic gardens, but more relaxed for industrial and open space end use. In the absence of any other guidance, the results have been compared against thresholds for “parks, playing fields and open spaces”. If concentrations are above the threshold value in this category the sample is considered contaminated.

Trial pits encountered gravels which exhibited staining in and around the matrix. Analysis of samples from TP3 and TP8 does not indicate contamination of the valley gravels beneath the made ground.

Three trial pits exhibit samples which are contaminated, when compared to the ICRCL guidance. TP1 at a depth of 2.2m exhibits elevated Copper, Nickel and Zinc. TP 2 at a depth of 2.8m exhibits elevated sulphide, and TP4 at 2.5m shows elevated Copper and Phenol. This is summarised below.

Trial Pit	Depth	Determinand	Value	Threshold
	(m)		mg/kg	mg/kg
TP1	2.2	Copper	206	130
		Nickel	976	70
		Zinc	1430	300
TP2	2.8	Sulphide	2620	2000
TP4	2.5	Copper	157	130
		Phenol	6.68	5

Water Quality

Groundwater was encountered in all pits except TP7. Seepages were common at depths between 1.5m to 3.6m and were oily in TP3 and TP1. Elsewhere water has collected in more permeable layers, (e.g. Thermolite blocks), overlying the black sludge or clay type materials. No water samples were taken but all waters were discoloured by the waste materials.

Conclusion

A trial pit survey has been carried out in two areas at the Colthrop site. Sampling has identified 3 locations at depths of 2.2m to 2.8m, where the ground can be categorised as contaminated. This is based on comparison of the results with ICRCL guidelines for the development of contaminated land sites. Whilst most exceedences are just above the threshold value, the heavy metals Nickel and Zinc are 4 to 14 times the corresponding threshold value in TP1.

The threshold value relates to the end use being, “parks, playing fields and open spaces”. (Dutch guidelines and ICRCL thresholds for a domestic garden end use, have much lower threshold values). As the end use will be for aggregate processing and providing foundations do not extend to depths where contaminated material has been identified, the is no requirement for ground remediation.

Plate 1. TP2 General Rubble Inert Fill 2.8m

Plate 2. TP2 Asbestos Roofing Tiles 1.2m

Plate 3 Paper Pulp mixed with Inert Fill 2.4m

Plate 4. Leachate Seepage at 1.8m with gas emission

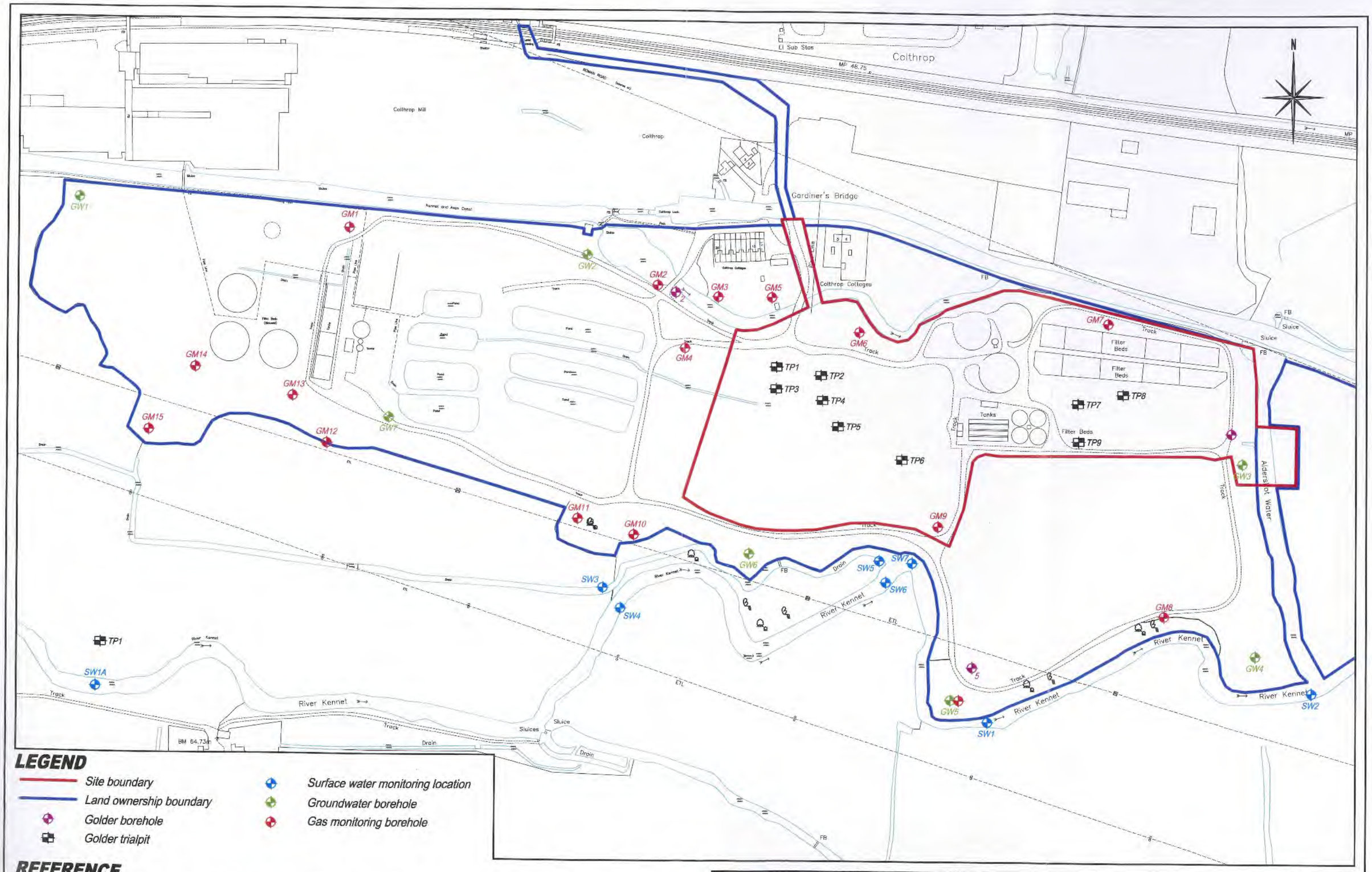
Plate 5. Wire mixed with Paper Pulp

Plate 6. Thermolite Blocks 0.2 to 1.1m

Plate 7. General Inert Fill, bricks and large blocks 0.5m

Plate 8. Odorous Inert Fill 2.2m

Plate 9. Concrete Obstruction 3.8m
(Former Settlement Pond Edging)



LEGEND

- Site boundary
- Land ownership boundary
- Golder borehole
- Golder trialpit
- Surface water monitoring location
- Groundwater borehole
- Gas monitoring borehole

REFERENCE

Figure based on information provided by S.Grundon (Ewelme) Ltd., Drawing Ref's: 060/P/002C, dated 28.07.03 and COL001, dated December 2001; Exploration Associates, Contract 145064, Drawing No.2 (undated).

0 50 100m

Scale

Golder Associates

Date	15th November 2004
Project No.	04529610
Created by	D.M.
File No.	5223156r1

Title

Approximate Environmental Monitoring Locations
Contaminated Land Desk Study Assessment
Colthrop, Newbury

Figure 4

Colthrop Mill Closed Landfill Site

Landfill Gas Risk Assessment

406.0013.00036

Grundon Waste Management Ltd
Goulds Grove, Ewelme, Wallingford, Oxon OX10 6PJ

June 2007

solutions for today's environment

CONTENTS

DRAWINGS

APPENDICES

1.0 INTRODUCTION

SLR Consulting Limited (SLR) has been instructed by Grundon Waste Management Limited (Grundon) to carry out a landfill gas risk assessment on the closed landfill site associated with the former Colthrop Paper Mill, near Thatcham in Berkshire. The location of the site is presented in Drawing 1.

The assessment is required to satisfy a planning condition associated with Grundon's plans to redevelop part of the former landfill site for use in a mineral processing operation. Condition 28 of planning permission 03/01082/MINE states that

No development approved by this permission shall be commenced until a landfill gas risk assessment has been submitted to and approved in writing by the Planning Authority. Where a risk from migrating gas is identified, appropriate works to mitigate the effects of gas shall be incorporated in detailed plans to be approved by the Planning Authority.

The development area comprises approximately 7 hectares in total as presented in Drawing 2. It should be noted that the development area occupies only part of the larger landfill area.

In preparing this assessment, SLR has reviewed a variety of sources of information including previous site investigation reports, borehole and trial pit logs, monitoring data collected by Grundon since taking ownership of the site in 2001 and information held by the Landmark Information Group which is presented in Appendix 1. In addition SLR has carried out a site visit, accompanied by members of Grundon staff who have knowledge of the site history and the proposed development. Photographs from the site visit are presented in Appendix 2.

The historical data relating to the operation of the landfill site is not sufficiently detailed to enable a fully quantitative assessment to be completed. The assessment is therefore qualitative and is based on the source-pathway-receptor approach which is commonly applied in such cases.

2.0 SITE SETTING

2.1. Current site

The application site covers an area of approximately 7 hectares and is located to the south east of the town of Thatcham in Berkshire. The site is currently unoccupied but was formerly part of the Colthrop Paper Mill complex which operated from the early 1800s to the mid-1980s.

The site is located in a semi-rural location, with agricultural land to the south, east and west and a large, modern industrial estate to the north. The industrial estate occupies land which was also formerly part of the Colthrop Paper Mill complex. A small row of residential properties lies between the north western boundary of the development site and the industrial estate.

The site is surrounded by water courses on three sides, the Kennet & Avon Canal to the north, Aldershot Water to the east and the River Kennet to the south. Local topography is predominantly flat at a level of approximately 67mAOD, although a mound of up to 4m height has been formed by the historical deposition of waste materials immediately to the south east of the development site.

2.2. The Proposed Development

The development will comprise creating the infrastructure required to support a mineral processing operation, namely equipment for washing and sorting the feedstock and a significant area for aggregate storage and vehicle loading. Buildings on site will be restricted to a site office and a weighbridge office/mess room. The development proposals suggest that these structures will be brick built, beginning at ground level.

Discussions with Grundon staff have indicated that only a small proportion of the development site will be hard surfaced (see Drawing 2) and that this area has not previously been landfilled. The majority of the site will be covered by a layer of compacted aggregate to facilitate vehicle movement.

The proposals suggest that the focus of assessing any risk to the development from landfill gas should be the two buildings that will be occupied by staff and site users.

3.0 SITE HISTORY

In order to obtain up to date historical records of the activities that have taken place on and around the development site, SLR has purchased an Envirocheck® Report for the site from Landmark Information Group, which is presented in full in Appendix 1.

The series of historical maps for the development site and surrounding area show that a Paper Mill has been present to the immediate north of the Kennet & Avon Canal since at least 1883. At this time, the development site itself appears to be unused, other than for the purposes of water drainage or diversion of water between the various watercourses.

Between 1883 and 1911, the mill complex continued to expand to the north of the Canal and the development site itself remained unchanged. By 1932, the development site is shown to be occupied by filter beds at its westernmost extent.

By 1970, the development site had been fully developed to include a series of filters, tanks and sludge pits in its eastern half and numerous ponds in the western half. A drain running in a west-east direction bisects the site. Anecdotal evidence obtained during SLR's site visit indicates that water was historically moved across the site in an easterly direction, passing through the series of ponds and filter beds before ultimately discharging into Aldershot Water on the eastern site boundary.

The site visit also demonstrated that much of the infrastructure or foundations of infrastructure that covered the eastern half of the site is still in place today, although all but one of the numerous ponds have now been infilled. Previous reports[1] suggest that the site ceased acceptance of paper sludge in early 1992. Although waste disposal continued at the site into the 1990's, it is understood that materials deposited after 1992 comprised predominantly inert demolition waste arising from the decommissioning of the Colthrop Paper Mill, thermolite blocks and restoration materials. The one remaining unfilled pond occupies the proposed location of the weighbridge office/mess room. SLR understands that this feature will be infilled with inert hardcore material prior to construction of any buildings.

Historical map evidence therefore demonstrates that at least part of the development site has been used for the management and disposal of waste materials in the form of paper sludge and construction/demolition type wastes from the adjacent mill since at least the early 1930's.

The Golder Associates report also refers to a letter from the Environment Agency indicating the official closure of the landfill site in July 2000. Grundon took ownership of the site in 2002 and have carried out periodic monitoring of landfill gas, in addition to groundwater and surface water since that time.

[1] Contaminated Land Desk Study Assessment of Land at Colthrop Business Park, Golder Associates (January 2005).

4.0 RISK ASSESSMENT

4.1. Source

The development site is part of a former landfill that is understood to have accepted significant quantities of paper sludge, in addition to predominantly inert construction waste. Paper sludge has significant potential to generate landfill gas and is therefore the most noteworthy potential source for the purposes of this risk assessment.

Location of waste deposits

A review of the historical maps, discussions with Grundon staff on site and a review of previous site investigation reports[2][3] suggest that waste has been deposited in and around the development site in a series of discrete voids which were formerly settling ponds and filter beds for the Colthrop Paper Mill.

It should be noted that the majority of waste deposition appears to have occurred outwith the extent of the proposed development area.

Immediately to the south east of the development site a mound of approximately 4m maximum height has been formed by the landfilling of paper sludge. Historical maps show that this area was previously occupied by two large ponds and therefore the full waste thickness is likely to be in excess of 5m in this area.

The majority of the ponds which have been progressively infilled are located to the west of the development area, although there is some encroachment into its western half. Anecdotal evidence from Grundon staff suggests that ponds infilled within the development area have predominantly been restored using thermolite blocks and other inert materials, with only limited quantities of paper sludge present. This evidence is supported by trial pit logs from an investigation carried out by Grundon in 2002 which identified a variety of waste materials including bricks, rubble, thermolite blocks, wood, paper, paper pulp, wire and plastics. The trial pits typically identified 3.5-4.5m thickness of waste materials underlain by alluvial gravels. Given the variety of waste types encountered, it is considered that the overall volume of biodegradable materials in the ponds in this area is likely to be relatively low and would appear to support the impression that the majority of paper sludge disposal took place in forming the mound feature to the south east of the development area.

4.2. Pathways

The local geology generally comprises made ground overlying alluvial deposits which in turn overlie London Clay. The made ground and alluvial sands and gravels are unlikely to inhibit the movement of gas in the ground and it is therefore considered likely that landfill gas may be seeping through the ground surface and venting to atmosphere as the site has no engineered capping to prevent such movement.

Lateral subsurface movement of landfill gas will be inhibited by the various watercourses which bound the site, effectively containing emissions from the relatively shallow waste. Ongoing monitoring by Grundon has confirmed that groundwater in the vicinity of the site is typically found at a depths of 1.5-2.0m below ground level in the north and 2.0-3.5m below ground level in the south. The waste is typically no more than 4-5m thick and seasonal variations in groundwater depths are insignificant, therefore the potential for lateral migration

[2] Colthrop Mill Effluent Plant, Thatcham. Factual Report on Ground Investigation. Frank Graham Consulting Engineers, June 1995.
[3] Trial Pit Investigation at Colthrop Board Mill – South Site. Grundon, September 2002.

at depth is considered to be negligible. This suggests that any risk to off site receptors is, and will continue to be, minimal. However, given the absence of an engineered cap and the presence of buried waste with the potential to generate landfill gas, there is scope for a source-pathway-receptor linkage to be formed within the development site.

4.3. Receptors

The potential impact of the development on off site receptors is considered to be negligible due to the limited pathways available for lateral migration.

The receptors in the context of this risk assessment are the future occupants and users of the site following its redevelopment as a minerals processing facility. Grundons development proposals include the constructions of two buildings – a site office and a weighbridge office/mess room.

The planning application drawings suggest that these structures will be brick built and in direct contact with the ground surface. Depending upon the detailed design of these buildings, there is therefore a potential mechanism for landfill gas to move through the permeable made ground deposits and accumulate in enclosed spaces within the buildings, either through non-impermeable floor slabs or through conduits associated with the entry of buried services such as water and electricity into the buildings.

4.4. Assessment

Grundon has collected landfill gas monitoring data at a series of locations on and around the proposed development site since February 2002. The monitoring locations are presented in Drawing 3 and the results obtained are summarised in Table 1 below.

Table 1
Summary of Landfill Gas Monitoring Results

BH	Distance From the Development Site	No. of Readings	Methane (% v/v)			Carbon Dioxide (% v/v)			Oxygen (% v/v)		
			Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
GM1	315m WNW	13	0	0	0	0.5	1.1	1.7	14.4	17.6	20
GM2	70m NW	16	0	0	0	0	1.4	3.4	6.4	15.6	20.8
GM3	30m NW	4	0	0.1	0.2	0.1	0.6	1.5	6.8	15.8	21
GM3A		9	0	0	0	0.3	0.7	1.3	19.3	20.2	20.8
GM4	35m W	14	0	0	0.1	0.6	6.8	11.7	7.5	12.5	20
GM5	15m NW	5	0	0	0	0	1.2	2	15.3	18.8	20.3
GM5A		9	0	0	0	0.1	1.2	2.5	17.9	19.4	20.4
GM6	Within Site	15	0	0	0.1	0.1	2	5.3	1.7	11.3	20.3
GM7	Within Site	16	0	0	0.1	0.8	3.1	6	8.7	13.5	18.7
GM8	125m S	16	36.8	49.3	62.9	28.4	32.2	36.1	0.4	2	8.3
GM9	Within Site	14	0	28.2	54	0.1	7.7	13.7	0.7	6.4	21.2
GM10	50m SW	14	0	0	0	0	0.8	2	19.3	20.3	21.1
GM11	85m SW	16	0	30.7	65.3	7	29.1	43.6	0.4	3	14.8
GM12	300m W	14	0	0	0	0.6	4.2	9.3	10.3	16.8	20.5
GM13	320m W	6	0	9.4	21.4	2.2	6.9	18.1	1.6	5.8	16.8
GM14	405m W	15	0	5.6	33.8	3.2	6	11.1	1	8.2	18.3
GM15	435m W	16	0	0	0.1	1.5	9.2	13.2	5.1	8.9	18.7
GW5	125m S	14	0	0.1	0.4	0	1.9	3.2	17.5	19	20.3

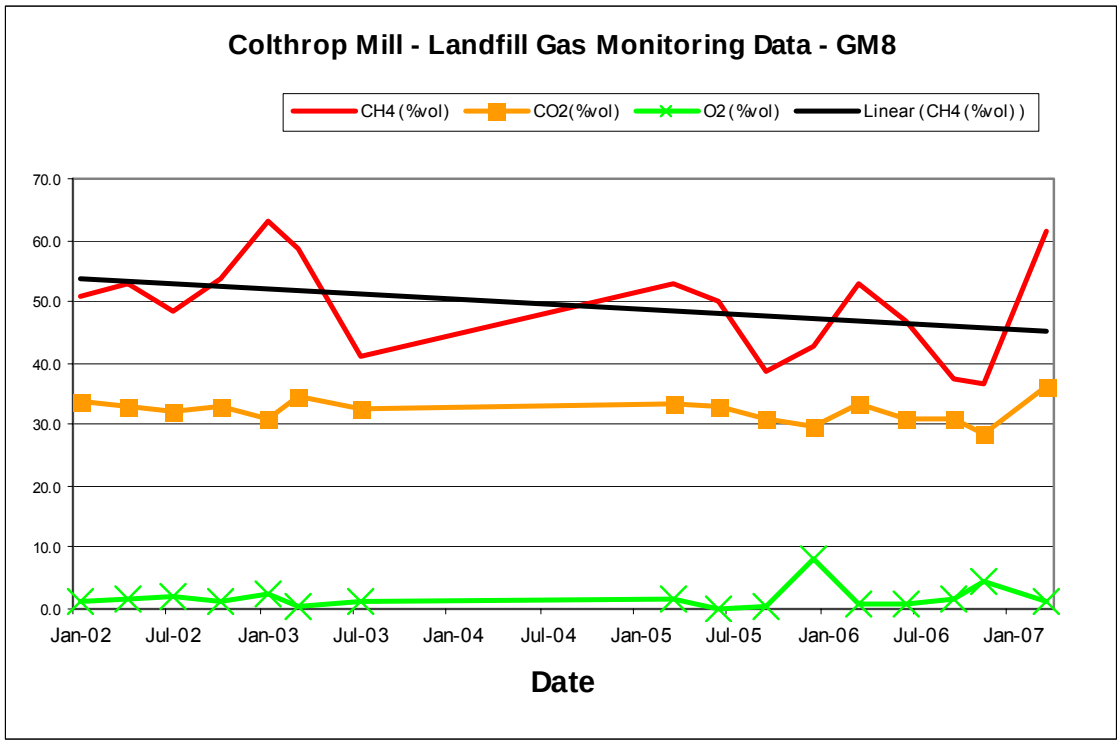
The data show that elevated concentrations of methane (i.e. greater than 1.0% v/v) have been recorded at 5 of the 18 locations (GM8, GM9, GM11, GM13 and GM14), all of which

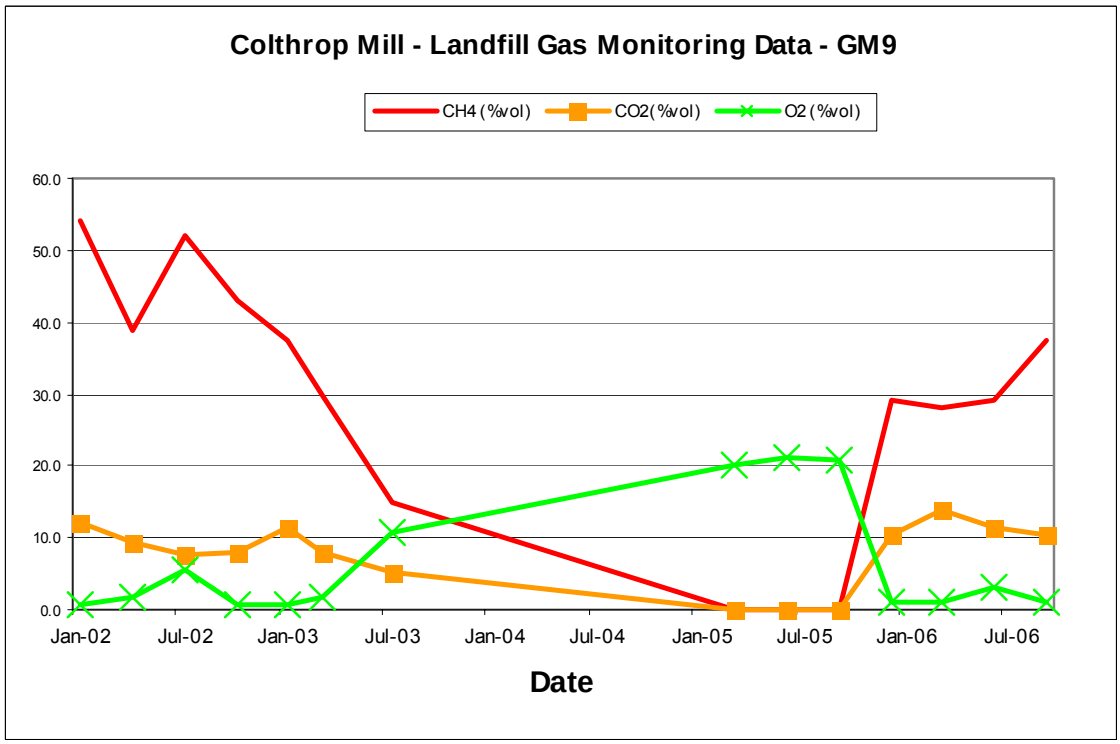
are installed adjacent to the southern boundary of the former landfill site. All 5 have recorded mean methane concentrations in excess of 1.0% v/v during the monitoring review period. The elevated methane concentrations occur in association with elevated concentrations of carbon dioxide and depleted levels of oxygen. None of the monitoring locations within or close to the northern section of the development area have recorded elevated methane concentrations which suggests that no significant source of gas is present in these areas and also that gas which is being produced elsewhere on site does not appear to move in a northerly direction. Grundon has recorded gas flow rates at the monitoring installations on four occasions in 2003 and 2005. The highest flow rates of up to 0.4 litres per minute were recorded at GM4, a location where no methane has been detected, which highlights the difficulties in drawing meaningful conclusions from flow rate monitoring, particularly where the recorded rates are low. Where elevated gas concentrations were detected, gas flows were generally zero.

Locations GM1 and GM12-GM15 are all located sufficiently far from the development site that the gas concentrations recorded are not considered to present any significant risk to the proposed development.

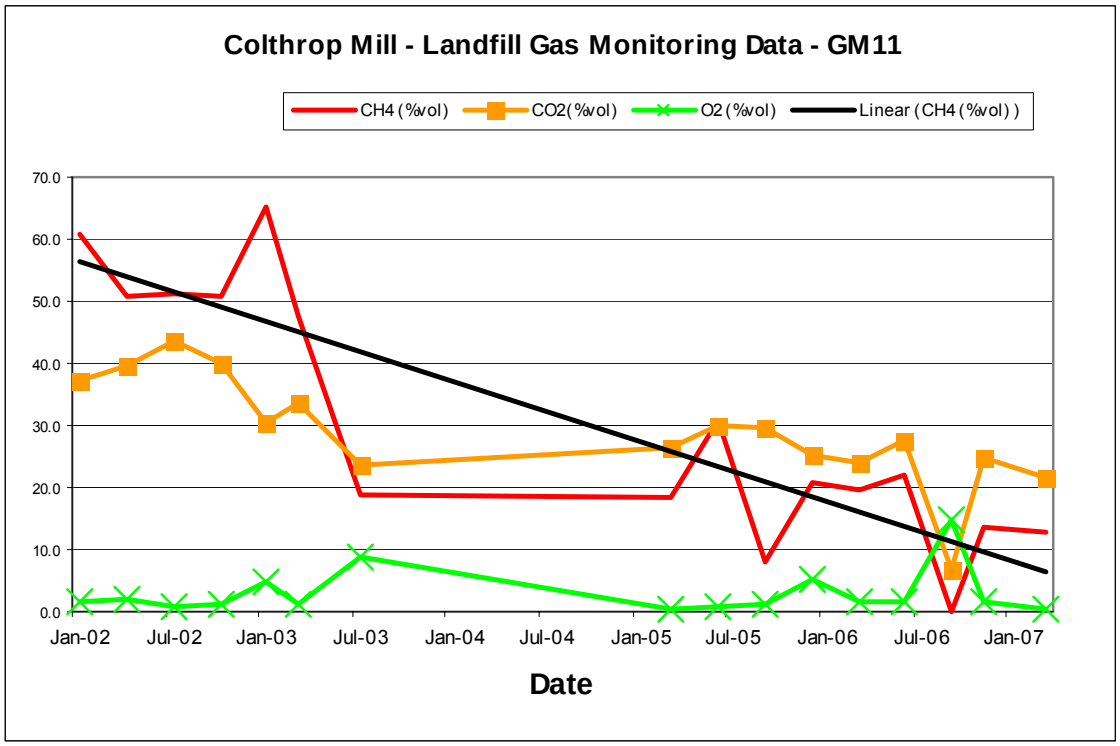
Locations GM8 and GM9 are positioned close to the edge of the most concentrated area of paper sludge disposal and it is therefore not unexpected that landfill gas should be recorded. The specific source of the elevated concentrations in GM11 is less apparent, as the historical maps do not indicate the presence of ponds or waste deposition in this location and installation logs are not available for review.

Data collected from GM8, GM9 and GM11 are presented graphically below. In all three cases, the data suggest that the source term has diminished significantly over the last 5 years, which is to be expected given the length of time that has passed since the deposition of paper sludge ceased. Methane concentrations at GM8 remain high (typically 35-55% v/v) but it should be noted that this location is approximately 225m south east of the position of the proposed site office building. There is no evidence to suggest that gas is migrating in a northerly direction.





The monitoring data for location GM9 have been distorted by a blockage which was recognised in 2005, preventing the collection of truly representative readings. A replacement monitoring probe was installed and concentrations have gradually increased over the subsequent two year period, supporting the suggestion that gas is present in the subsurface. The graph of gas concentrations is therefore distorted and a meaningful trend cannot be determined.



The monitoring data which have been made available suggest that landfill gas is being produced by the former landfill site, and the recording of elevated concentrations of methane is focussed in the southern section of the site. Anecdotal evidence suggests that there is a potentially significant volume of paper sludge waste (estimated to be 150-200,000m^3) deposited in a mound formed immediately to the south east of the development site. Trial pit evidence suggests that waste deposits within the development area itself are more variable and comprise significant quantities of inert waste types with lesser amounts of paper sludge, wood and cardboard.

Given that there is clearly a source of landfill gas within and directly adjacent to the development area, and that the insitu gravels and deposited construction materials provide a potential pathway for lateral migration within the confines of the site, it cannot be concluded that there is no risk to the buildings proposed in the new development. However, the level of risk is considered sufficiently low that mitigation measures can be readily employed in a cost effective manner to ensure that the risk to site occupants and visitors is kept to a minimum.

The recommended mitigation measures are described in Section 5.0.

5.0 CONCLUSIONS

There is clearly a potential source-pathway linkage at the Colthrop Mill site, although the pathways are likely to be shallow across the development area. The two proposed buildings on the site will not be located close to or directly above significant biodegradable waste deposits and both will be constructed within the northern section of the former landfill. Monitoring installations within and along the northern landfill boundary do not indicate the presence of significant concentrations of landfill gas in this area.

The landfill site has been closed for approximately 7 years and has not received significant quantities of biodegradable wastes for approximately 15 years. The rate of landfill gas production is therefore likely to be in significant decline. The majority of the development will not involve the construction of impermeable surfacing and therefore the potential for the development to encourage landfill gas accumulation below ground is limited.

The level of risk presented by the landfilled wastes to the site office and weighbridge office/mess room can be mitigated by ensuring that any potential linkage between pathway and receptor is broken. This could be easily achieved in one of two ways.

If the buildings are to be permanent, brick built constructions at ground level as indicated in the planning application documents, gas protection measures should be incorporated into the building design by combining vent pipes laid beneath the basal slab and impermeable membrane liners. The design should ensure that basal slab construction is continuous and that any service inlets (e.g. water and electricity supplies) to the building are vented and enter the structure above ground level.

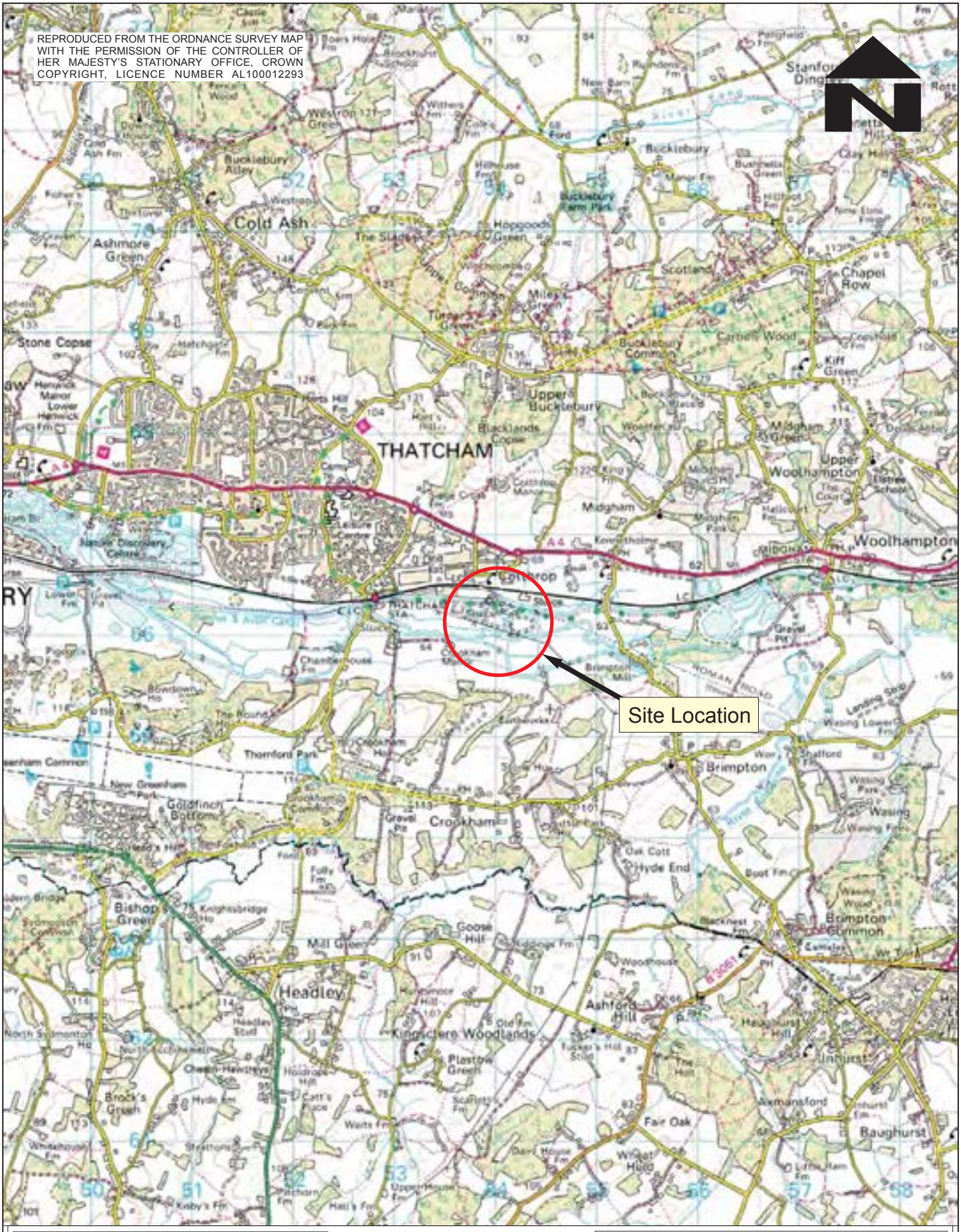
If the weighbridge office/mess room is situated in the position of the one remaining pond on site, any organic materials found in the base of the pond should be removed prior to infilling with clean inert materials in order to remove the potential for naturally formed gas to migrate upwards through the permeable fill material beneath the structure. This will reduce the level of risk to occupants of the new building.

However, if the buildings on site are to be temporary/semi-permanent portacabin type structures installed above ground level, no specific additional gas protection design measures are considered necessary, other than to ensure that service inlet points do not provide a conduit into the buildings.

SLR understands that Grundon will install gas detection sensors in all sensitive locations within site buildings as standard practice which provides an additional level of protection to staff and site users.

DRAWINGS

Drawing No. 1

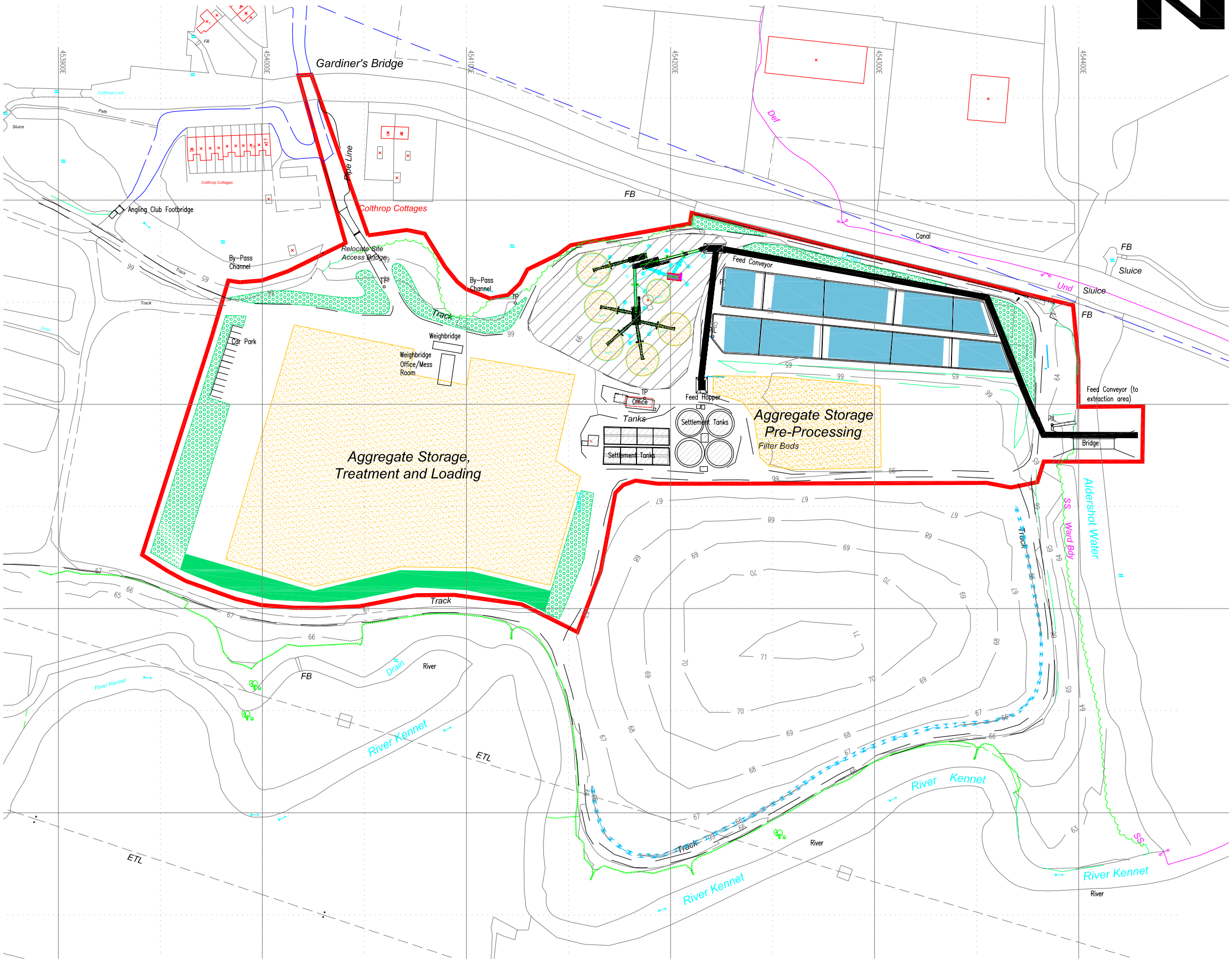


SLR

Revision 0 June 2007
406.0013.00036 JC

Site	Colthrop Mill Closed Landfill
Project	Landfill Gas Risk Assessment
Date	JUNE 2007
Scale	1:50,000
Drawing	**Site Location Plan**
Drawing No.	1

Drawing No. 2



NOTES

LEGEND

APPLICATION BOUNDARY

Revision	Issue Date	Issued By	Comments
0	JUN 07	GP	.

GRUNDON

S.Grundon (Ewelme) Ltd.
Goulds Grove, Ewelme, Wallingford, Oxon OX10 6PJ

Site: COLTHROP MILL CLOSED LANDFILL

Project: LANDFILL GAS RISK ASSESSMENT

Drawing

Proposed Development Layout

Date: JUNE 2007

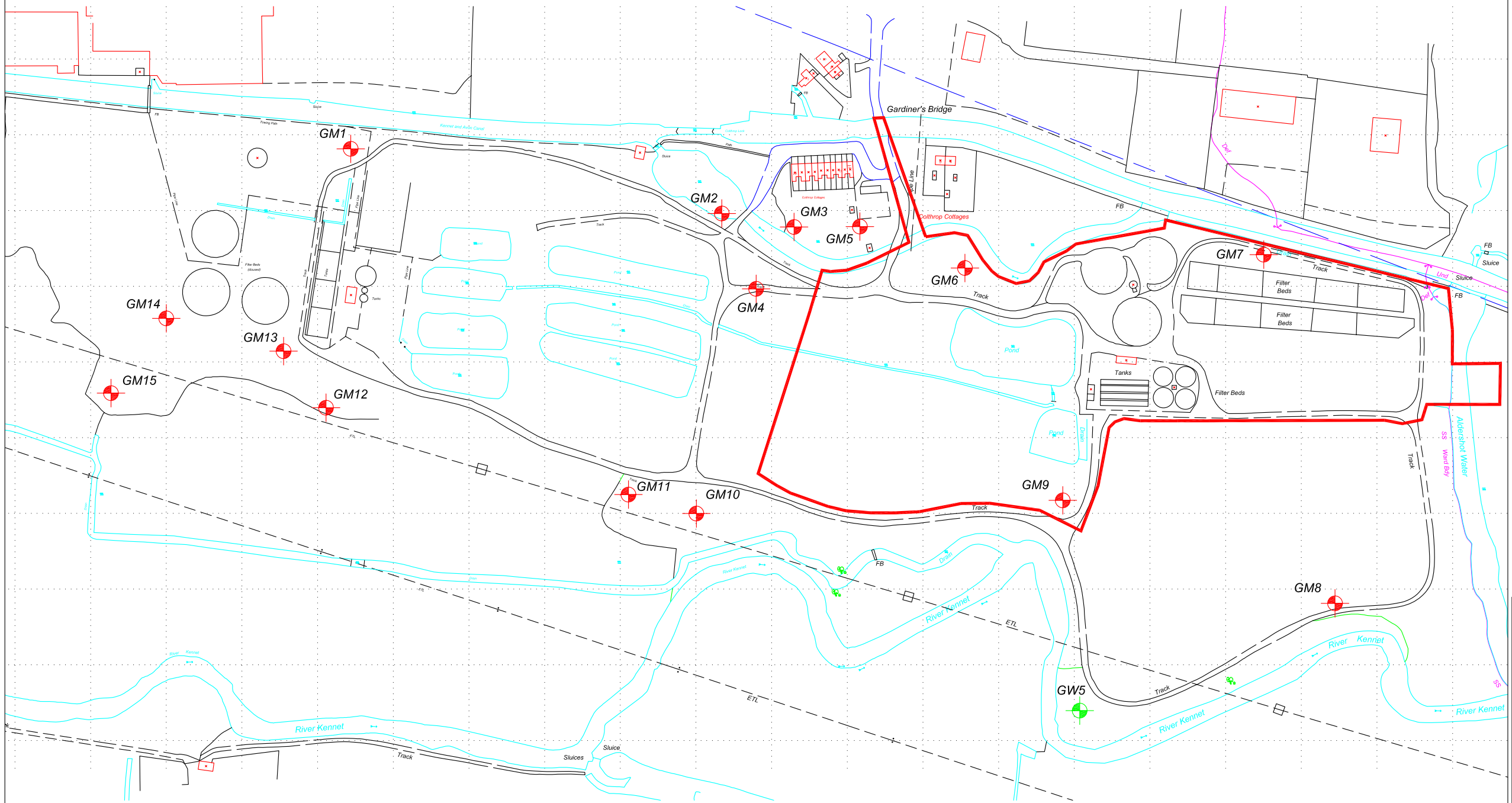
Drawing No. 2

Scale: 1:2,000 @ A3

Paper Size: ISO A3 406.0013.00036 JC

SLR
SUITE 9, BEECH HOUSE
PADGATE BUSINESS PARK
WARRINGTON
CHESHIRE WA1 4JN
T: 01925 827218
F: 01925 827977
www.slrconsulting.co.uk

Drawing No. 3



NOTES

LEGEND

APPLICATION BOUNDARY

Revision	Issue Date	Issued By	Comments
0	JUN 07	GP	.

S.Grundon (Ewelme) Ltd.
Goulds Grove, Ewelme, Wallingford, Oxon OX10 6PJ

Site: COLTHROP MILL CLOSED LANDFILL

Project: LANDFILL GAS RISK ASSESSMENT

Drawing: **Landfill Gas Monitoring Locations**

Date: JUNE 2007

Drawing No.: **3**

Scale: NTS

Paper Size: ISO A3 406.0013.00036 JC

SLR
SUITE 9, BEECH HOUSE
PADGATE BUSINESS PARK
WARRINGTON
CHESHIRE WA1 4JN
T: 01925 827218
F: 01925 827977
www.slrconsulting.co.uk

APPENDICES

APPENDIX 1

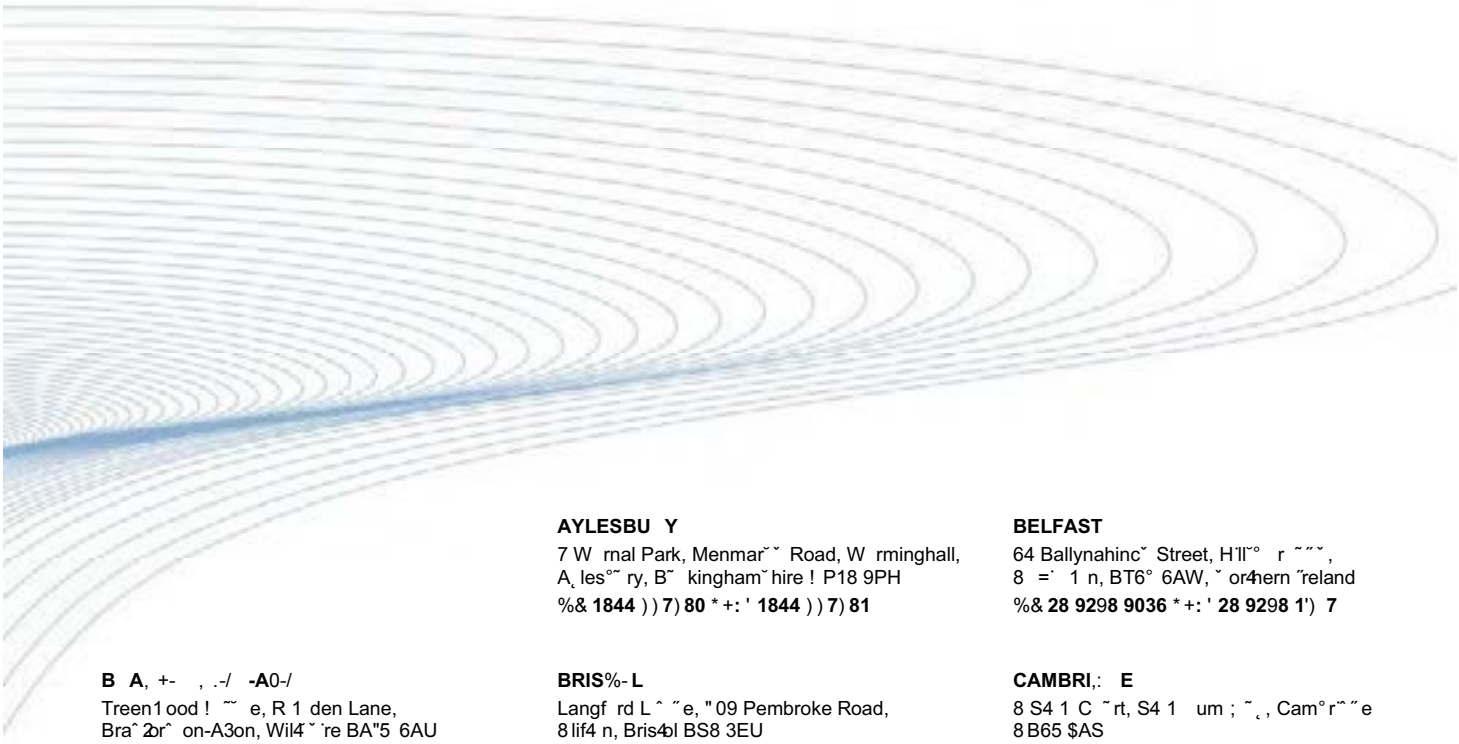
APPENDIX 2

Figure 1 Existing Building – Location of Site Office

Figure 2 Existing Pond – Proposed Weighbridge Office/Mess Room

Figure 3 Foundations of Historical Filter Beds

Figure 4 Disused Filter Beds – Eastern Section of Development Site



AYLESBU Y
7 W rnal Park, Menmar˘ ˘ Road, W rminghall, A˛ les°˜ ry, B˜ kingham˘ hire ! P18 9PH
%& **1844**)) **7**) **80** * +: ' **1844**)) **7**) **81**

BELFAST
64 Ballynahinc˘ Street, H˙ll˜° r ˜˝˘ ,
8 =˙ 1 n, BT6° 6AW, ˘ or4hern ˝reland
%& **28 92**98 **9036** * +: ' **28 92**98 **1**') **7**

B A, +- , .-/ **-A**0-/
Treen1ood ! ˜˜ e, R 1 den Lane,
Bra^ 2or^ on-A3on, Wil4˘ ˙re BA"5 6AU
%& **122 3' 9400** * +: ' **1225 3' 9**(' **1**

BRIS%- **L**
Langf rd L ^ ˝e, " 09 Pembroke Road,
8 lif4 n, Bris4ol BS8 3EU
%& **117 9**'9 (**280** * +: ' **117 3179**)

CAMBRI,: **E**
8 S4 1 C ˜rt, S4 1 um ; ˜˛ , Cam°r^ ˝e
8 B65 $AS
%& **1223 81**) **8' / +&' 1223 81**) **783**

CAR,7 **FF**
Fulmar ! ˜ ˘e, Beignon 8 lo˘ e, O ean Way,
Car^ ˙2 8 F64 5! F
%& **29 2**'(**9 1' 10** * +: ' **29 2**'(**87903**

CHELMSF- ,
Unit 77, Waterhou˘ e B˜ ˘ ine˘ ˘ 8 en4e,
6 8 romar Way, 8 ˘ elm˘ 2ord, E˘ se< CM1 2; E
%& **12**(**392170** * +: ' **12**(**392171**

DUBL7N
7 ˙ undrum B˜ ˘ ˙ness Park, W˙n^ y Arbour,
˙ undrum, ˙ ˜blin " 4, ˝reland
%&**+ 3 3** C'**1 29**9(99 **7 / F&+ 3 3** C**1 29**9(9 **76**

E,7/ **BURG˘**
˘ = 4 The R undal, Roddingla1 B˜˜ ˙nes˘
Park, ^ ˝ ar, E^˙ nb˜ r˜˜ E!" 6 $DB
%& **1**) **1 3**) 9**830** * +: ' **1**) **1 3**) 98) **1**

E>ETER
The ˝nnova4 n 8 en4e, Rennes ˙ rive,
Uni3ers˙4 2 Exeter Camp˜ s, Exeter EX4 4R˘
%& **1**) **92 2**(**7913** * +: ' **1**) **92 4252**(9

FARNBO - UG˘
T˘ e Pa3˙l˙ n, 2 Sherborne Road, S ˜4 h
Farnborough, ! am?˜ hire GU" 4 ° @
%& **1252 515982 / +&01252 512274**

: **LAS**: - ˜
4 W ^ ˘ide Pla e, 8 haring 8 r ˘ ˘, ^ las˝ 1
G3 7; F
%& **1**(**1 3**) ') **7 / +&01**(**1 3**) ') **8**

˘ **UDDE S+7ELD**
We˘ 4e˙˜˜ ! ˜˜ e, Wakefield Roa^ , ˙ en°˛
˙ ale, ! udders2eld ! ˙ 8 #; @
%& **1**(**84 8**9' **521 / F&01**(**84 898286**

LEEDS
S˜ ˙te 1, @˘ n H ˜se, Aerr˛ H˙ll, ! r˜2 r4˘,
Leed˘ LS"# 4@
%& **113 258**'9 **0** * +: ' **113 28188**) **2**

MAIDS%- **NE**
19 ! ollingw rth 8 urt, Turkey Mill, Ma˙^˘ 4one,
Ken4ME" 4 5PP
%& 19**22 6**' **92**(**2 / +&01922 695872**

NEWCAS%LE.U -/ .**%YNE**
Sailor˘ Be4nel, ! oratio Stree4,
˘ ew a˘ 4e ˜? on-T˛ ne NE1 2PE
%& **191 2**9**11**99 * +&' **191 2**)' **2**)(9

/- **%%**: ˘ **AM**
A˘ pe 4! ˜˜ e, A˘ ? e 4 B˜˜ ˙nes˘ Park,
Bennerley Road, ˘ 44ngham ˜^ ° 8WR
%& **115 9**9(**7280** * +: ' **115 9751576**

RE,,7 **%CH**
Br khill 8 our4, Brock˘ ˙ll Lane, Re^ ^ ˙4 ˘ ,
W rce˘ 4ershire B97 6RB
%& **1527 597000** * +: ' **1527 58**((' **8**

S˘ RE˜ SBURY
Myt4 n Mill, For4on ! eat˘ , Mont2 rd Bridge,
Shre1˘ bury SY4 1! A
%& **1743 85**' **170** * +: ' **1743 85**' 898

S%AF+- **RD**
Parker C ˜rt, Sta22r^ ˜˘ ˙re Tec˘ nology Park,
Bea ns˙de, Sta22r^ , S4af2 rdshire ST"# 0WP
%& **178 25**))) **1 /** +&' **1785 2**(99 **60**

˜ **AR** 7 /: **% N**
S˜ ˙te 9 Bee h ! ˜ ˘e, Padgate B˜˜ ˙ne˘ ˘ Park,
^ reen Lane, Warringt n WA1 4@
%& **192 827218 / +&01925 827977**

GRUNDON WASTE MANAGEMENT LTD

COLTHROP LANDFILL

Qualitative Ground Water Risk Assessment

VERSION 1.0

June 2010

CONTENTS

DRAWINGS

APPENDICES

1.0 INTRODUCTION

On 12 August 2004 Grundon commissioned Golder Associates (UK) Ltd (Golder) to carry out a contaminated land desk study assessment[1] of the Colthrop site. Golder also completed a site walkover including all accessible areas of the site. This was done to satisfy planning condition number 30.

The aim of this assessment is to bring that study up to date in order to assess the risks to groundwater from site activities. The historical data relating to the operation of the landfill site is not sufficiently detailed to enable a fully quantitative assessment to be completed. This assessment is therefore qualitative and is based on the source-pathway-receptor approach which is commonly applied in such cases.

[1] Contaminated Land Desk Study Assessment of Land at Colthrop Business Park, Golder Associates (January 2005).

2.0 SITE SETTING AND HISTORY

2.1 Current site

The site covers an area of approximately 7 hectares and is located to the south east of the town of Thatcham in Berkshire. Access to the site is from Colthrop Lane, over Gardiner's Bridge.

The site was formerly part of the Colthrop Paper Mill complex which operated from the early 1800s to the mid-1980s and is now a mineral processing operation, namely equipment for washing and sorting the feedstock and a significant area for aggregate storage and vehicle loading. Only a small proportion of the site is hard surfaced (see Drawing 1) and this area has not previously been landfilled. The majority of the site is covered by a layer of compacted aggregate to facilitate vehicle movement.

The site is located in a semi-rural location, with agricultural land to the south, east and west and a large, modern industrial estate to the north. The industrial estate occupies land which was formerly part of the Colthrop Paper Mill complex. A small row of residential properties lies between the north western boundary of the site and the industrial estate.

The site is surrounded by water courses on three sides, the Kennet & Avon Canal to the north, Aldershot Water to the east and the River Kennet to the south. Local topography is predominantly flat at a level of approximately 67mAOD, although a former mound of up to 4m height was formed by the historical deposition of waste materials immediately to the south east of the re-developed site.

2.2 Historical Site Activities

Information on the historical land use at the site and in the surrounding area was obtained during Golder's desk study from various sources[1].

The series of historical maps for the site and surrounding area show that a Paper Mill was present to the immediate north of the Kennet & Avon Canal since at least 1883. By 1970, the site had been fully developed to include a series of filters, tanks and sludge pits in its eastern

[1] Contaminated Land Desk Study Assessment of Land at Colthrop Business Park, Golder Associates (January 2005), pgs 6 – 16.

half and numerous ponds in the western half. A drain running in a west-east direction bisected the site. Anecdotal evidence indicates that water was historically moved across the site in an easterly direction, passing through the series of ponds and filter beds before ultimately discharging into Aldershot Water on the eastern site boundary.

Historical map evidence also demonstrates that at least part of the site has been used for the management and disposal of waste materials in the form of paper sludge and construction/demolition type wastes from the adjacent mill since at least the early 1930's until the official closure of the landfill site in July 2000. Grundon took ownership of the site in 2002 and have carried out periodic monitoring of landfill gas, in addition to groundwater and surface water since that time.

2.3 Topography

The site is relatively flat, at an elevation of approximately 67mAOD. A small mound of approximately 0.5m is discernable in the eastern area of the site. It is possible that infilling may have occurred within this area of the site, however the extent of possible infilling and hence the thickness of any waste present is not known. Two mounds are located in the western section of the site, and two more are present to the southeast and western boundary. Similarly in this area the extent and depth of possible infilling is not known,

There is a noticeable difference in level between the ownership area including the site and the adjacent land at the site entrance, where the level of the Colthrop cottages is approximately 3m below the levels of the site.

2.4 Geology

The area is covered by the 1:50'000 scale British Geological Survey Geological Map Sheet 268 for Reading. The map indicates that the site is located on made ground. Where made ground is not present beneath the site, there are drift deposits comprising Alluvium made up of variable sandy, silty clay, locally shelly with peat and tufa layers.

The site appears to lie on a geological boundary between the London Clay, in the south of the site and the underlying Lambeth Group in the northern part of the site. The London Clay comprises clay, variably silty, with beds of sand, silt and flint pebbles. The Lambeth Group comprises the following depth order: Harwich Formation (sand and clay which is glauconitic

and shelly), Reading Formation (mottled clay with sand beds) and the Upnor Foundation (sand and clay with flint nodules at the base).

The borehole and trial pit logs encountered during previous ground investigations identified that the site broadly agrees with the geology predicted by the geological map. These boreholes also showed that the composition and depth of the made ground beneath the site varied considerably from 0.7m to 5.25m and comprised: gravelly sand, clinker, ash, peat, brick fragments, plastic, wood, paper sludge, rubble, thermolite blocks, black silty mud, tiles, rubber insulating materials, metal wiring, and plastic sheets.

Below the made ground, a fine to course subrounded flint gravel was observed in all boreholes and trial pits. The gravel was proven to between 1.65 and 4m deep. It is thought that this gravel is the Beenham Grange Gravel shown on the geological map to outcrop some 500m to the north. Below the gravel, stiff, grey, silty, sandy clay was observed with occasional sand lenses. This is interpreted to be the London Clay.

2.5 Hydrology

A number of surface watercourses are present within the vicinity of the site. The Kennet and Avon Canal is located to the northern boundary, the River Kennet is located approximately 200m south, and the Aldershot Water is located directly to the east of the site and connects the River Kennet to the Kennet and Avon Canal. The River Kennet is classed as a Site of Special Scientific Interest (SSSI) due to the river showing a downstream transition from chalk to a lowland clay river with species rich flora and fauna (English Nature, 2004).

The report by Golders in 2005 used the Envirocheck Report to gather information on river flow rates and river quality classification for the above mentioned water courses. Due to the passing of time since that report was written, it would not be beneficial to use the same details within this risk assessment.

However, the Landmark Envirocheck flood map data indicated that the site does not lie within an indicative fluvial floodplain, though land immediately to the northeast and west of the site ownership boundary does. A detailed investigation conducted in 1994, also indicated that the site lies outside of the 1 in 100 year flood plain area.

2.6 Hydrogeology

The Environment Agency has produced a series of maps, covering England and Wales, which identify the vulnerability of groundwater to contamination. It uses geological information to define Major, Minor and Non-Aquifers. Information on soils is used to determine the protection afforded to the groundwater and therefore its overall vulnerability.

The map for this area (Sheet 38, Groundwater Vulnerability of Upper Thames and Bedfordshire Downs) shows that the site is located on a Minor Aquifer. This refers to the drift deposits that directly underlie the site. A Minor Aquifer relates to "fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits ". Although these aquifers will seldom produce large quantities of water for abstraction, they are important both for local supplies and in supplying base flow to rivers.

The London Clay Formation underlying the drift deposits is classified as a non-aquifer. A non-aquifer is "a formation that is regarded as containing insignificant quantities of groundwater". However, groundwater flow through such rocks, although imperceptible, does take place and needs to be considered in assessing the risk associated with persistent pollutants.

The soil vulnerability classification groups the many different soils of England and Wales into vulnerability classes. This is based on a soils physical and chemical properties which affect the downward passage of water and contaminants. The soils beneath the site have been classified as having a high leaching potential.

A search of regulator databases used by Landmark revealed thirteen licensed groundwater and one surface water abstraction points within 1km of the site. All licensed groundwater abstractions are located up groundwater hydraulic gradient from the site.

Groundwater monitoring at the site has indicated that groundwater has been observed to flow from northwest to southeast within the gravels as seen in Figures 1 and 2.

Figure 1: Surfer plot showing the groundwater gradient with site map overlain for reference, in 3D.

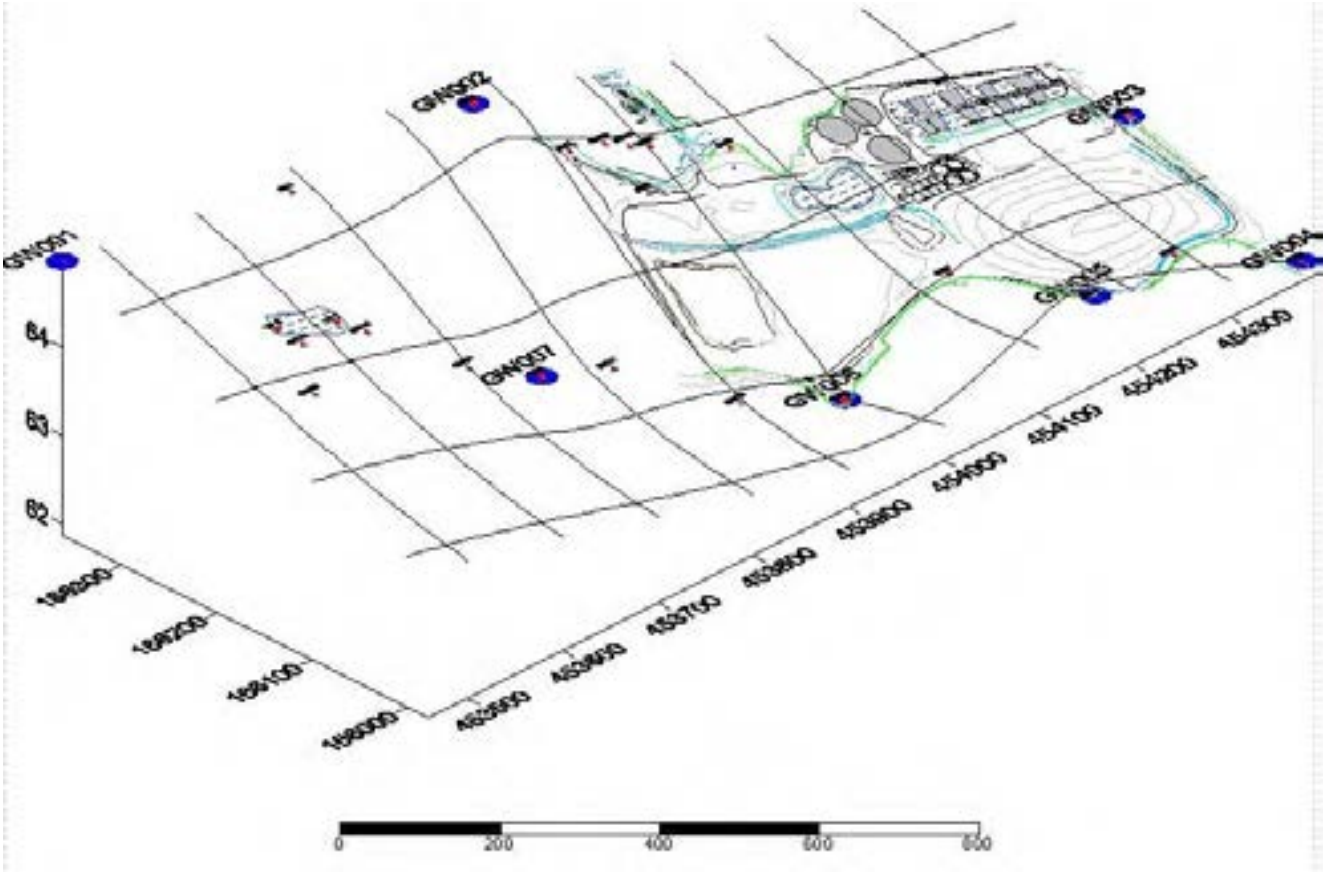
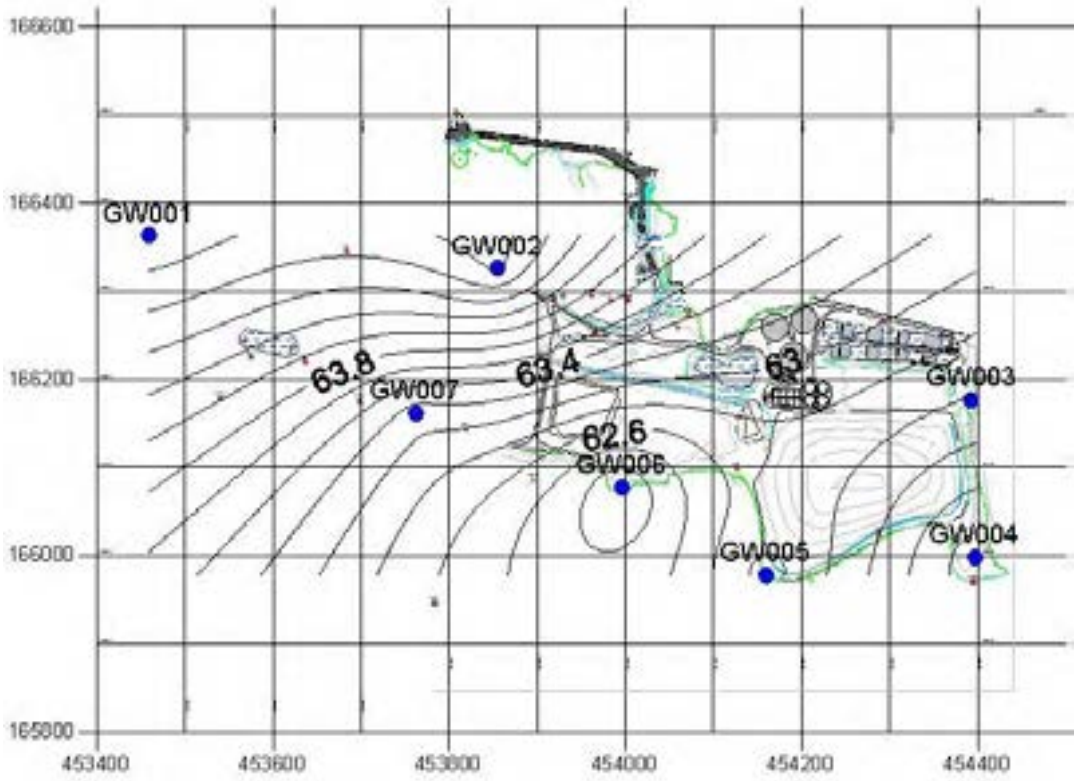


Figure 2: Surfer plot showing the groundwater gradient with site map overlain in 2D.



3.0 Environmental Monitoring

Environmental monitoring of the area within the land ownership boundary is routinely undertaken by Grundon at Colthrop. Monitoring data which relates to the site have been assessed. Monitoring locations are shown on Drawing 2.

3.1 Groundwater Monitoring

3.1.1 Analysis of Monitoring Results

Boreholes GW1, and GW2 are located towards the northwest of the site and are therefore up hydraulic gradient of the site, as shown in Figures 1 and 2. Boreholes GW4, GW5, and GW6 are all down hydraulic gradient of the site, while GW3 and GW7 are in the middle ground. Groundwater monitoring data from July 2002 to March 2010 has been evaluated, and is presented in Appendix 1.

Concentrations of ammoniacal nitrogen in GW 1 and GW2 (up hydraulic gradient) are generally below the UKDWS of 0.5mg/l in recent years, and exceed the criteria twice in twenty seven, and fourteen times in twenty six measurements respectively. Concentrations in the down hydraulic gradient boreholes GW3 – GW7 are typically higher, with concentrations ranging from <0.3 to 17.6 mg/l in GW6. However, GW4 consistently reports on or close to the <0.3mg/l limit of detection.

Concentrations of iron in all seven boreholes are mostly elevated above the UKDWS of 200ug/l (0.2mg/l). However, concentrations across all seven appear similar in values ranging from 0.17 to 24.4mg/l in GW1 and 0.38 to 24.4mg/l in GW6. There appears to be slightly higher concentrations in the downgradient boreholes.

Calcium concentrations in GW1, GW2, GW3 and GW4 are consistently below the UKDWS of 250mg/l. GW5 has breached quite significantly four out of six sampling regimes with a maximum of 1040mg/l in 2008, GW6 has breached three out of twenty three samples with a maximum of 324mg/l in 2007, and GW7 has breached thirteen times out of twenty three with a maximum of 358mg/l in 2007.

Of the up hydraulic gradient boreholes, GW2 has recorded one breach of the UKDWS of the 25ug/l (0.025mg/l) limit for lead. Down hydraulic gradient, GW3 breached once out of twenty,

GW4 nine times out of twenty, GW5 five out of six times, GW6 once out of twenty one and GW7 has remained below the level on all of the 21 sampling occasions.

Manganese concentrations exceed the UKDWS of 50ug/l (0.05mg/l) in all seven boreholes, while concentrations of Boron breached the UKDWS of 1mg/l in GW1 and GW2 on two occasions with a result of 1.1mg/l for each. The down hydraulic gradient boreholes all remained below the UKDWS throughout the sampling phase.

The UKDWS of 5ug/l (0.005mg/l) for Cadmium and 50ug/l (0.05mg/l) for Chromium were breached once in GW5 and once in GW4 respectively, whereas Copper concentrations in all boreholes remained below the UKDWS of 2mg/l. Nickel concentrations breached the UKDWS of 20ug/l (0.02mg/l) once in GW3, eight times in GW4, and four times in GW5. GW1, GW2, GW6 and GW7 remained consistently below the limit.

Concentrations of Chloride and Sodium remained significantly below the UKDWS of 250mg/l and 200mg/l respectively, while there was one breach in GW7 of the 250mg/l UKDWS limit for Sulphate.

An appropriate standard was not available for the following determinands: alkalinity, BOD, COD, Magnesium, Potassium, TON and Zinc, therefore no assessment has been made.

3.2 Surface water Monitoring

3.2.1 Analysis of Monitoring Results

Eight surface water monitoring locations in the vicinity of the site have been monitored. All surface water monitoring points are located to the south of the site, and sample the River Kennet, and the drain located between the site and the river. Therefore, considering the groundwater flow direction to the southeast, surface water monitoring locations SW1, SW1a, SW2, SW5, SW6 and SW7 are located down groundwater hydraulic gradient from the site, and SW3 and SW4 are located up hydraulic gradient from the site.

Surface water monitoring point SW4 is located on the River Kennet, upstream of the site, and SW3 is located on the drain upstream of the site. SW6 and SW5 sample the drain and River Kennet respectively prior to the confluence of the drain and River Kennet. SW7, SW1 and SW1a are located on the River Kennet adjacent to the site. SW2 is located at the confluence of the River Kennet and Aldershot Water, downstream of the site.

Surface water quality has been assessed against the Environmental Quality Standards (EQS), where they exist for each determinand. Note that where a range exists for an EQS, the upper limit of the range was used for assessment. Surface water monitoring data is contained within Appendix 1. Concentrations of ammoniacal nitrogen and chloride are briefly summarised in Table 1 below. Note that some results have been reported as less than detection limits, these detection limits are significantly higher than reported results; therefore have not been included in the mean concentration calculation.

Table 1: Summary of Surface Water Ammoniacal Nitrogen and Chloride Monitoring Data.

Sampling Point	Date	Ammoniacal Nitrogen (mg/l)		Chloride (mg/l)	
		Range	Mean	Range	Mean
SW1 (Downstream)	30/07/02-01/12/06	<0.05 - 0.3	0.14	4.05 - 46.69	24.48
SW1a (Downstream)	31/07/03-10/03/10	<0.05 - 0.8	0.25	17.0 - 29.6	22.22
SW2 (Downstream)	30/07/02-10/03/10	<0.05 - 2.55	0.68	17.0 - 33.4	23.55
SW3 (Upstream)	31/07/03-31/03/04	<0.60 - 1.69	1.59	22.2 - 34.4	26.17
SW4 (Upstream)	31/07/03-31/03/04	<0.60 - 1.38	1.13	22 - 33.3	25.99
SW5 (Downstream)	31/07/03-31/03/04	<0.60 - 1.2	1.02	22.9 - 34.2	26.50
SW6 (Downstream)	31/07/03-31/03/04	<0.05 - <0.60	-	21.4 - 33.4	26.41
SW7 (Downstream)	31/07/03-31/03/04	<0.05 – <0.05	-	21.5 - 34.4	26.31
Results at limit of detection were removed from the mean calculation, see text.					

Concentrations of ammoniacal nitrogen for all monitoring points ranged from <0.05 to 1.69mg/l, with an average concentration of 0.8mg/l. SW1 and SW6 remained below the EQS limit of 0.5mg/l, while SW2 breached three times, SW3, SW4 and SW5 breached twice each and SW7 and SW1a breached once each. However, all boreholes remained below the EQS limits for chloride (250mg/l), sodium (170mg/l), sulphate (400mg/l), boron (2mg/l), cadmium (0.005mg/l), chromium (0.25mg/l), copper (0.028mg/l), lead (0.25mg/l), and nickel (0.02mg/l).

There were two breaches of the 0.5mg/l EQS limit for zinc across SW1 and SW1a, and eleven breaches of the 1mg/l limit for iron across SW1, SW2, SW3, SW5 and SW1a.

An EQS was not available for the following determinands: alkalinity, BOD, calcium, COD, magnesium, manganese, potassium or TON, therefore no assessment has been made.

4.0 RISK ASSESSMENT

4.1 Source

The source term is difficult to define at the Colthrop site as the landfill has no leachate monitoring infrastructure, therefore the chemistry of the leachate is unknown. In this case key indicator parameters will need to be assessed which are likely to be present in all leachates such as ammoniacal nitrogen, chloride and iron.

As the site has no engineered containment it can assumed that leachate levels are in hydraulic continuity with the groundwater.

4.2 Pathways

Groundwater levels at the site are very shallow at around 2mbgl and this leaves no unsaturated strata to consider as a pathway. As the groundwater is likely to be in hydraulic continuity with the leachate and the flow-paths to surface water courses are short, it is considered appropriate that groundwater beneath the site be classified as a pathway.

4.3 Receptors

The groundwater flow beneath the site has been found to be to the south east. The site is bounded directly to the east and approximately 100m to the south by surface water courses. It is therefore anticipated that a majority of the shallow groundwater beneath the site will discharge into these surface water courses. Therefore surface watercourses have been considered as a potential receptor.

4.4 Assessment

Comparisons of up hydraulic gradient and down hydraulic gradient groundwater monitoring results indicate that groundwater directly beneath the site is being influenced by historical contamination. Although numerous parameters are slightly elevated in upgradient boreholes, the concentrations are generally seen in greater concentrations in downgradient boreholes. Elevated ammoniacal nitrogen and iron concentrations in particular show increased concentrations in the down gradient boreholes.

Surface water data show elevated concentrations of ammoniacal nitrogen upstream of the site. However downstream concentrations are generally lower than upstream concentrations. Generally there is no discernable difference between the upstream and downstream locations. It therefore appears that groundwater quality beneath the site is not having a discernable impact on surface water quality.

5.0 CONCLUSIONS

Groundwater monitoring results indicate that groundwater directly beneath the site is being influenced by historical contamination at the site. The shallow groundwater directly below the site is not abstracted or used, and flow paths to surface watercourses, the anticipated discharge point of the groundwater, are very short. In consideration of this, groundwater has been considered to be a pathway, but not a potential receptor.

The groundwater flow direction at the site has been found to be to the southeast. The site is bounded directly to the east and approximately 100m to the south by surface watercourses. It is anticipated that the majority of the shallow water beneath the site will discharge into these surface watercourses. Therefore, the surface watercourses have been deemed as the main potential receptor.

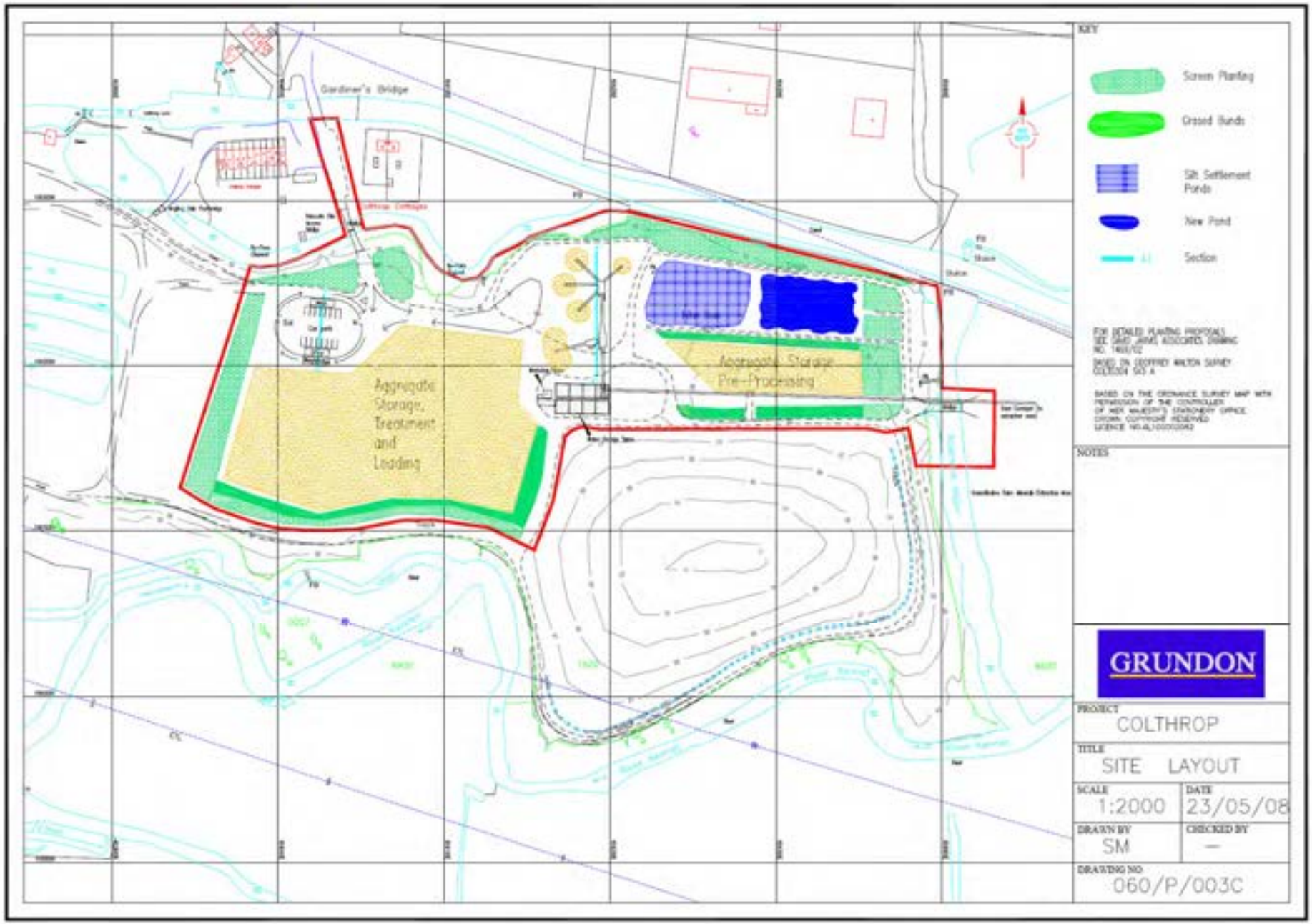
Following review of the surface water monitoring data it is clear that groundwater is not having a discernable impact on surface water courses at the site.

The level of risk presented by the landfilled wastes to the surface watercourses can be mitigated by ensuring that surface water monitoring continues at the site to ensure the site continues to have no impact on downstream quality.

.

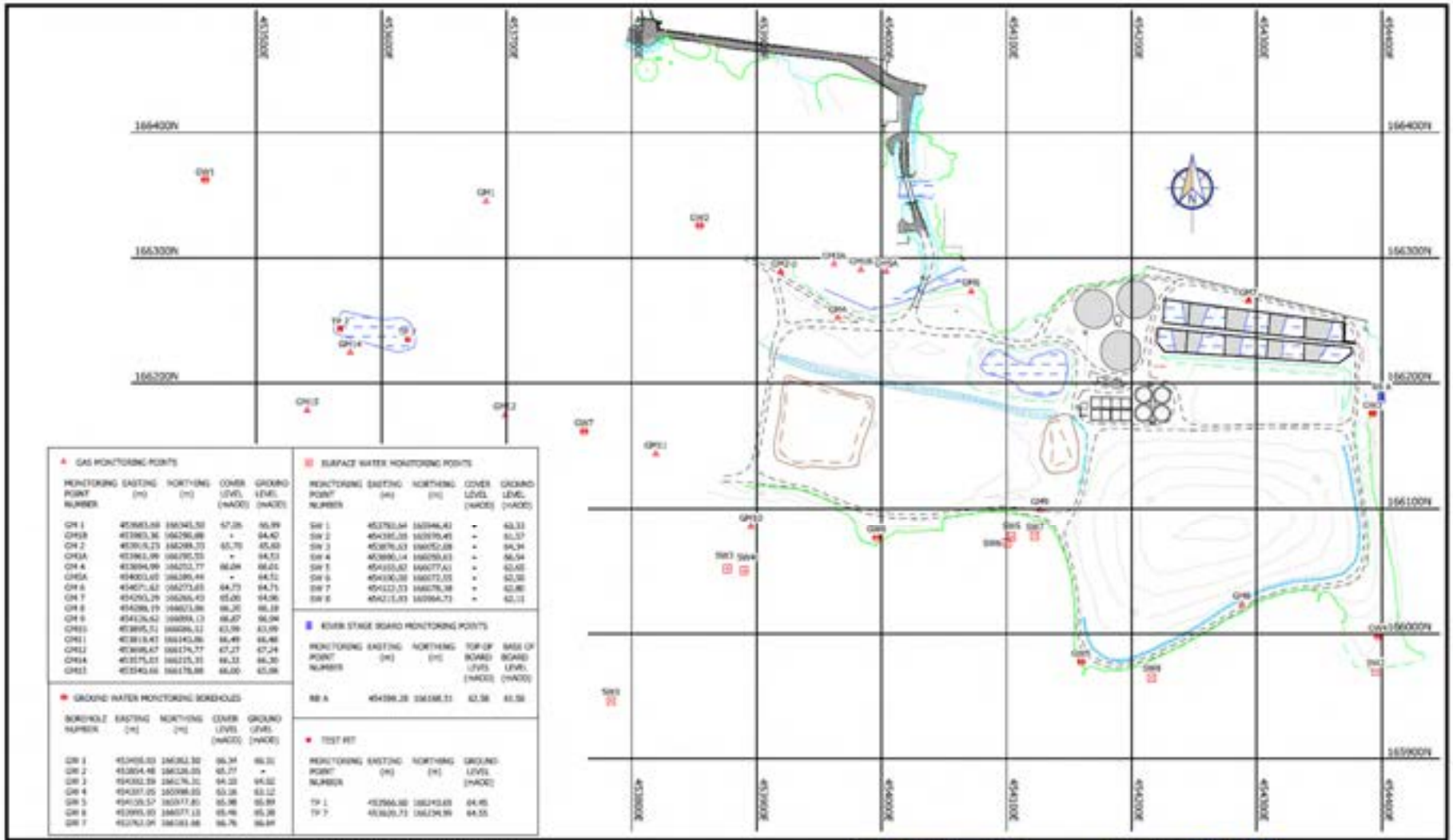
DRAWING 1

Site Plan with Monitoring Locations


Gardiner's Bridge
Aggregate Storage, Treatment and Loading
Aggregate Storage Pre-Processing
KEY
Screen Planting
Grassed Bunds
Silt Settlement Ponds
New Pond
Section
NOTES
GRUNDON
PROJECT
COLTHROP
TITLE
SITE LAYOUT
SCALE
1:2000
DATE
23/05/08
DRAWN BY
SM
CHECKED BY
—
DRAWING NO.
060/P/003C

DRAWING 2

Site Plan with Monitoring Locations



GAS MONITORING POINTS

MONITORING POINT NUMBER	EASTING (m)	NORTHING (m)	COVER LEVEL (mAOD)	GROUND LEVEL (mAOD)
GM 1	453665.50	166345.50	67.05	66.99
GM1B	453663.36	166290.88	-	64.42
GM 2	453614.23	166288.33	65.70	65.60
GM2A	453662.99	166290.55	-	64.53
GM 4	453694.99	166252.77	66.04	66.01
GM5A	454003.65	166289.44	-	64.51
GM 6	454071.62	166273.65	64.75	64.71
GM 7	454250.29	166266.43	65.00	64.96
GM 8	454288.19	166673.86	66.20	66.19
GM 9	454126.62	166899.13	66.97	66.94
GM10	453895.51	166886.12	63.99	63.99
GM11	453819.43	166143.86	66.49	66.48
GM12	453698.67	166174.77	67.27	67.24
GM14	453575.03	166215.35	66.33	66.30
GM15	453540.66	166178.88	66.00	65.98

GROUND WATER MONITORING BOREHOLES

BOREHOLE NUMBER	EASTING (m)	NORTHING (m)	COVER LEVEL (mAOD)	GROUND LEVEL (mAOD)
GW 1	453405.93	166351.30	66.34	66.31
GW 2	453654.48	166126.55	65.77	-
GW 3	454302.59	166176.31	64.33	64.32
GW 4	454107.05	165998.85	63.16	63.12
GW 5	454135.57	165977.85	65.98	65.89
GW 6	453995.85	166077.13	65.46	65.38
GW 7	453763.04	166183.68	66.76	66.69

SURFACE WATER MONITORING POINTS

MONITORING POINT NUMBER	EASTING (m)	NORTHING (m)	COVER LEVEL (mAOD)	GROUND LEVEL (mAOD)
SW 1	453750.64	165946.42	-	62.33
SW 2	454386.05	165970.45	-	61.57
SW 3	453870.63	166052.08	-	64.34
SW 4	453890.14	166059.63	-	66.94
SW 5	454103.62	166077.61	-	62.65
SW 6	454330.30	166072.55	-	62.50
SW 7	454112.33	166076.38	-	62.80
SW 8	454215.93	165996.73	-	62.13

RIVER STAGE BOARD MONITORING POINTS

MONITORING POINT NUMBER	EASTING (m)	NORTHING (m)	TOP OF BOARD LEVEL (mAOD)	BASE OF BOARD LEVEL (mAOD)
RB A	454386.28	166168.31	62.58	61.58

TEST PIT

MONITORING POINT NUMBER	EASTING (m)	NORTHING (m)	GROUND LEVEL (mAOD)
TP 1	453966.30	166243.65	64.45
TP 7	453630.71	166234.99	64.55

MONITORING POINTS LEGEND

- GM — Gas monitoring point
- GW — Groundwater monitoring borehole
- SW — Surface water monitoring point
- RB — River stage board
- TP — Test pit

NOTES

- Based on A1 version of same plan, Drawing No. COLT0511 MP1-A

Version	Revision and completion notes	Date
A	Draft - issued to T.Robinson	05.02.2007

GWP consultants

Upton House
Market Street
Charlbury
Oxford OX7 3PJ

tel 01608 811574
fax 01608 810093
email info@gwpuk.com
www.gwpuk.com

Site plan showing ground water, surface water, gas monitoring points and river board and trial pit locations (surveyed 17.11.2005) including survey detail from April'03

Client: Grundon Waste Management Ltd

Project: Colthrop

Date	Drawn	Checked	Scale
05.02.2007	EB/EMB	DM	1:3000

Drawing Ref	Drawing No	Version
COLT0511	MP1 (GA1)	A

APPENDIX 1

Groundwater and Surface water Data

Groundwater Data

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW001	30/07/2002	272	3.274	29.2			196	189	21			2.75		10.4	0.345		5.2	<1.0	40.7	<1.0	
CoGW001	30/10/2002	280	0.175	1.1			185	50.6	21			0.015		3.1	<3		1.7	<5.0	45.7	<1.0	
CoGW001	25/03/2003	284	< 0.60	< 4.1			151	52	22.7					3.08			2.3	14	58.8	< 0.40	
CoGW001	18/09/2003	246	< 0.60	< 2.9			229	52	< 20.0					3.2			3.21	15	40.2		
CoGW001	22/09/2004	256	<0.05	<4.07		<0.005	170	29.4	25.2	<0.01	<0.01	8.25	<0.03	2.81	0.122	<0.01	3.07	15.7	34.4	<0.4	<0.02
CoGW001	23/12/2004	282	0.131	<5.7	0.418	<0.005	164	37.4	<20	<0.01	0.0172	17.1	<0.03	2.97	0.168	0.0102	2.88	14.9	48	<0.5	0.038
CoGW001	22/03/2005	280	0.142	<9.5	<0.3	<0.005	177	55	29.2	<0.01	0.0188	20.4	<0.03	3.21	0.214	<0.01	2.71	15.4	76.8	<0.5	0.0517
CoGW001	01/06/2005	268	0.118	<5.7	<0.3	<0.005	169	62.2	21.6	0.011	0.0125	24.6	<0.03	3.05	0.211	0.013	2.66	14.2	92.1	<0.5	0.0447
CoGW001	08/09/2005	296	<0.05	<9.5	<0.3	<0.005	176	54.9	27.7	<0.01	<0.01	10	<0.03	2.86	0.137	<0.01	2.57	15.2	47.3	<0.5	0.0323
CoGW001	13/12/2005	340	0.163	6.09	<0.3	<0.005	183	65.4	27.1	<0.01	0.0253	18.3	<0.03	3.22	0.196	0.0155	2.99	16.5		<0.5	0.07
CoGW001	07/03/2006	80	0.057	<5.7	<0.3	<0.005	162	27.4	24.4	<0.01	0.0119	9.89	<0.03	2.98	0.157	<0.01	2.27	14.6		<0.5	0.0571
CoGW001	08/06/2006	276	0.086	<5.7	<0.3	<0.005	127	17.9	26.6	<0.01	<0.01	0.102	<0.03	2.7	0.0506	<0.01	2.24	15.9		<0.5	<0.02
CoGW001	12/09/2006	292	0.092	<2.9	0.315	<0.005	162	43.5		<0.01	<0.01	12	<0.03	2.78	0.203	0.0102	4.41	17	40.6	<0.5	<0.02
CoGW001	01/12/2006	286	0.088	<1.9	0.456	<0.005	151	20.2	24.7	<0.01	<0.01	6.1	<0.03	2.8	0.13	<0.01	2.39	16.1	40.3	<0.5	<0.02
CoGW001	01/03/2007	294	<0.05	<4.8	<0.3	<0.005	160	41.6	24.2	<0.01	0.0115	6.8	<0.03	3.22	0.124	<0.01	2.27	15.2	60.9	<0.5	0.0462
CoGW001	12/06/2007	272	<0.05	<9.5	<0.3	<0.005	191	43.9	22	<0.01	<0.01	12.7	<0.03	3.23	0.154	<0.01	2.63	15.8	59.6	<0.5	0.0329
CoGW001	19/09/2007	271	<0.05	<9.5	<0.3	<0.005	160	24.3	22.5	<0.01	<0.01	6.44	<0.03	2.85	0.125	<0.01	2.51	14.8	42.8	<0.5	0.0281
CoGW001	13/12/2007	340	0.163	6.09	<0.3	<0.005	183	65.4	27.1	<0.01	0.0253	18.3	<0.03	3.22	0.196	0.0155	2.99	16.5	67.4	<0.5	0.07
CoGW001	12/03/2008	262	<0.3	<1		<0.0005	146	23	18	<0.005	0.044	3.07	0.008	3.2	0.14	<0.005	2.3	19	39	<0.3	0.019
CoGW001	18/06/2008	261	<0.3	1		<0.0005	123	20	19	<0.005	<0.005	<0.05	<0.005	2.7	0.12	0.015	2.1	10	35	<0.3	0.02
CoGW001	02/09/2008	259	<0.3	<1		<0.0005	135	<20	18	<0.005	<0.005	4.29	0.011	2.6	0.13	0.006	2	11	27	<0.3	0.018
CoGW001	03/12/2008	251	<0.3	2		<0.0003	135	26	20	0.002	0.007	6.38	0.01	2.44	0.17	0.0062	2	11	24	0.4	0.014
CoGW001	25/03/2009	275	<0.3	8		0.0006	166	<20	23	<0.001	0.002	7.26	0.009	2.98	0.15	<0.0009	1.89	11	38	<0.3	0.015
CoGW001	17/06/2009		<0.3						24												

CoGW001	09/09/2009		<0.3	4	<0.3	0.0004		30	22	<0.001	<0.001	0.17	0.016		0.076	0.0036				<0.3	0.004
CoGW001	02/12/2009		<0.3						25												
CoGW001	10/03/2010		0.6	2	1.1	<0.0003		40	27	0.001	0.006	16.08	<0.002		0.13	<0.0009				1.8	0.025

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW002	30/07/2002	257	0.209	1.4			76	39	21			43.511		5.2	0.335		5.6	11.3	39.3	<1.0	
CoGW002	30/10/2002	295	0.631	<1.0			134	15.3	22			0.038		3.4	<3		4	<5.0	21.9	<1.0	
CoGW002	30/01/2003		0.5						29.3												
CoGW002	25/03/2003	268	< 0.60	< 4.1			145	< 17	< 20.0					3.18			4.74	15.3	47.5	2.12	
CoGW002	18/09/2003	256	< 0.60	< 2.9			130	< 17	< 20.0					3.03			5.04	13.2	42.3		
CoGW002	21/09/2004	376	0.674	<4.07		<0.005	147	<17	23.4	<0.01	<0.01	12.3	<0.03	4.2	0.407	<0.01	8.63	17.9	36.3	<0.4	<0.02
CoGW002	23/12/2004	328	0.519	<9.5	0.524	<0.005	164	<17	<20	<0.01	<0.01	9.99	<0.03	4.47	0.448	<0.01	8.74	18.2	75.1	1.44	0.0223
CoGW002	22/03/2005	306	0.905	<9.5	<0.3	<0.005	155	<17	29.8	<0.01	<0.01	0.617	<0.03	4.4	0.1	<0.01	9.23	16.2	33.1	0.536	<0.02
CoGW002	01/06/2005	292	0.901	<5.7	<0.3	<0.005	138	<17	<20	<0.01	<0.01	7.69	<0.03	3.52	0.364	<0.01	5.96	14.5	58.5	<0.5	<0.02
CoGW002	08/09/2005	328	0.987	<9.5	<0.3	<0.005	155	<17	27.8	<0.01	<0.01	10.5	<0.03	3.6	0.326	<0.01	7.06	14.8	20.3	<0.5	<0.02
CoGW002	13/12/2005	368	0.867	<5.7	<0.3	<0.005	161	<17	26	<0.01	<0.01	10.5	<0.03	4.41	0.349	<0.01	8.1	18.8		<0.5	0.023
CoGW002	07/03/2006	300	0.832	<5.7	<0.3	<0.005	150	<17	22.7	<0.01	<0.01	6.22	<0.03	3.79	0.2	<0.01	5.22	16.1		0.926	0.0216
CoGW002	08/06/2006	276	0.989	<9.5	<0.3	<0.005	124	<17	26	<0.01	<0.01	0.282	<0.03	3.74	0.077	<0.01	5.47	15.4		<0.5	<0.02
CoGW002	12/09/2006	223	0.94	<2.9	<0.3	<0.005	110	<17		<0.01	<0.01	11.6	<0.03	3.15	0.291	<0.01	9.06	15.2	19.7	<0.5	<0.02
CoGW002	01/12/2006	303	0.703	<1.9	0.362	<0.005	150	<17	22.4	<0.01	<0.01	7.42	<0.03	4.38	0.221	<0.01	6.59	17.8	37.4	0.559	<0.02
CoGW002	01/03/2007	302	0.574	7.32	<0.3	<0.005	152	23.7	21.8	<0.01	<0.01	15.7	0.0323	4.76	0.415	<0.01	11	16.7	47	2.21	0.058
CoGW002	12/06/2007	286	0.054	<9.5	<0.3	<0.005	141	<17	20.5	<0.01	<0.01	7.85	<0.03	3.76	0.168	<0.01	5.62	15.1	36.3	1.8	<0.02
CoGW002	19/09/2007	274	0.269	<5.7	<0.3	<0.005	135	<17	23.4	<0.01	<0.01	7.46	<0.03	3.63	0.148	<0.01	6.06	14.4	38.8	1.94	<0.02
CoGW002	13/12/2007	368	0.867	<5.7	<0.3	<0.005	161	<17	26	<0.01	<0.01	10.5	<0.03	4.41	0.349	<0.01	8.1	18.8	23.3	<0.5	0.023
CoGW002	12/03/2008	302	<0.3	<1		<0.0005	136	27	16	<0.005	<0.005	5.02	<0.005	4.1	0.22	<0.005	9.1	12	27	1.1	0.011
CoGW002	18/06/2008	270	<0.3	<1		<0.0005	130	<20	18	<0.005	<0.005	6.82	<0.005	3.9	0.24	<0.005	7.4	11	26	1.7	0.024

CoGW002	02/09/2008	302	0.5	<1		<0.0005	130	<20	17	<0.005	<0.005	7.4	0.007	3.9	0.25	0.007	6.3	12	19	<0.3	0.017
CoGW002	03/12/2008	314	<0.3	1		<0.0003	144	<20	19	0.001	0.001	7.74	0.01	3.94	0.25	0.0067	6.3	12	14	1.3	0.013
CoGW002	25/03/2009	296	<0.3	<1		<0.0003	149	<20	21	<0.001	<0.001	4.2	<0.002	4.07	0.15	<0.0009	5.88	12	29	2.5	0.009
CoGW002	09/09/2009		0.7	3	0.3	<0.0003		22	22	<0.001	<0.001	0.35	0.005		0.21	0.0031				0.3	0.004
CoGW002	10/03/2010		<0.3	<1	1.1	<0.0003		37	26	<0.001	<0.001	6.3	<0.002		0.19	<0.0009				2.5	0.026

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW003	30/07/2002	408	4.567	<1.0			150	47	26			40.034		10.3	0.718		4.5	28.3	<10.0	1.3	
CoGW003	30/10/2002	443	7.71	1.6			165	42.1	25			0.073		9.1	<3		3.8	20.9	25.9	<1.0	
CoGW003	30/01/2003		2.4																		
CoGW003	25/03/2003	460	5.03	< 4.1			190	63	< 20.0					8.93			4.56	28.8	38.2	0.57	
CoGW003	18/09/2003	326	< 0.60	< 2.9			161	41	< 20.0					7.53			4.08	22.7	68.8		
CoGW003	21/09/2004	439	7.09	<5.7		<0.005	192	57.8	25.5	0.01	0.0177	5.91	<0.03	10.8	0.425	0.0117	6.93	31.4	42.1	<0.4	<0.02
CoGW003	23/12/2004	398	6.58	<9.5	<0.3	<0.005	204	31.1	<20	0.0135	0.0347	9.7	<0.03	1.1	0.458	0.0173	7.01	30.7	75.1	<0.5	0.0279
CoGW003	22/03/2005	430	6.85	<9.5	0.352	<0.005	193	27.2	31.2	<0.01	0.0265	3.84	<0.03	11.3	0.387	<0.01	6.69	29	76.3	<0.5	<0.02
CoGW003	01/06/2005	464	6.95	<5.7	<0.3	<0.005	210	28.3	<20	<0.01	<0.01	0.15	<0.03	11	0.247	<0.01	6.46	33.8	44.6	<0.5	<0.02
CoGW003	08/09/2005	425	7.57	<9.5	<0.3	<0.005	190	27.6	27.6	<0.01	<0.01	2.44	<0.03	9.8	0.307	<0.01	5.14	25.6	56.1	<0.5	<0.02
CoGW003	13/12/2005	424	6.82	<5.7	<0.3	<0.005	184	23.5	27.3	<0.01	<0.01	2.68	<0.03	10.4	0.379	<0.01	5.91	28.4		<0.5	0.026
CoGW00	07/03/200	36	5.96	<5.7	0.34	<0.005	18	26.	21.6	<0.01	<0.01	2.86	<0.03	9.8		<0.01	4.8	25.		<0.	0.021

3	6	8			6		4	7						3			8	5		5	6
CoGW003	08/06/2006	360	6.69	<5.7	<0.3	<0.005	172	<17	26.7	<0.01	<0.01	0.143	<0.03	9.54	0.276	<0.01	5.41	27		<0.5	<0.02
CoGW003	12/09/2006	368	6.88	<2.9	0.317	<0.005	171	36.9		<0.01	<0.01	3.21	<0.03	9.05	0.407	<0.01	7.1	26.1	37.9	<0.5	<0.02
CoGW003	01/12/2006	351	5.23	<1.9	0.394	<0.005	165	<17	27.1	<0.01	<0.01	3.57	<0.03	8.83	0.343	<0.01	4.34	26	88.2	<0.5	<0.02
CoGW003	01/03/2007	474	5.24	<5.7	0.321	<0.005	230	69.6	22.9	0.0341	0.0713	36.7	0.0362	10	0.657	0.0574	5.78	25.2	56.1	1.27	0.109
CoGW003	12/06/2007	392	4.97	<9.5	0.54	<0.005	194	27.1	<20	<0.01	0.01	6.63	<0.03	9.13	0.411	0.0118	5.02	23.8	89	<0.5	0.0459
CoGW003	19/09/2007	371	0.792	<5.7	0.322	<0.005	194	21.7	<20	<0.01	0.0107	3.42	<0.03	9.41	0.409	<0.01	5.17	24.3	121	4.51	<0.02
CoGW003	13/12/2007	424	6.82	<5.7	<0.3	<0.005	184	23.5	27.3	<0.01	<0.01	2.68	<0.03	10.4	0.379	<0.01	5.91	28.4	108	<0.5	0.026
CoGW003	12/03/2008	386	2.3	<1		0.0005	216	55	14	<0.005	0.013	7.77	0.006	10	0.54	<0.005	5	20	127	2	0.014
CoGW003	18/06/2008	407	3.3	3		0.0006	195	49	16	0.006	0.016	7.95	0.008	9.2	0.59	0.012	5.3	19	51	1.7	0.019
CoGW003	02/09/2008	341	5	<1		<0.0005	196	39	15	<0.005	0.01	4.57	0.01	9.8	0.51	0.005	4.8	21	130	0.9	0.013
CoGW003	03/12/2008	423	0.9	4		<0.0003	207	44	19	0.004	0.016	3.13	0.011	10	0.63	0.0103	5.62	23	72	5.2	0.012
CoGW003	25/03/2009	229	<0.3	1		<0.0003	148	31	22	0.002	0.005	5.73	0.006	6.47	0.24	0.0024	3.03	14	97	3.2	0.009
CoGW003	09/09/2009		<0.3	<1	<0.3	0.0009		<20	20	<0.001	<0.001	0.03	0.012		0.04	0.0082				0.9	0.035

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW004	30/07/2002	258	<0.050	<1.0			211	48	20			12.657		4	0.587		1.7	11.1	32.2	<1.0	

CoGW004	30/10/2002	264	<0.1	<1.0			199	188	21			<0.012		3.4	<3		2.1	<5.0	18.1	1.1	
CoGW004	25/03/2003	240	< 0.60	< 4.1			133	70	21.3					2.36			2.04	13.1	32.2	4.19	
CoGW004	18/09/2003	244	< 0.60	< 2.9			200	124	< 20.0					3.18			3.24	15.6	26.9		
CoGW004	21/09/2004	281	<0.05	<4.07		<0.005	171		24.8	0.0551	0.0609	7.96	0.0361	3.01	0.19	0.0479	3.63	16.7	41.4	<0.4	0.053
CoGW004	23/12/2004	244	<0.05	<4.07	<0.3	<0.005	202	115	<20	<0.01	<0.01	<0.1	<0.03	3.69	<0.05	<0.01	4.14	17.6	47.4	2.82	<0.02
CoGW004	22/03/2005	290	<0.05	<9.5	<0.3	<0.005	167	128	28.9	<0.01	<0.01	0.8	<0.03	3.01	<0.05	<0.01	2.7	15.5	46.4	4.5	0.0601
CoGW004	01/06/2005	240	<0.05	<4.07	<0.3	<0.005	147	199	<20	<0.01	0.0275	5.76	<0.03	2.32	0.175	0.0142	2.37	18	34.9	1.99	0.0342
CoGW004	08/09/2005	285	0.076	<29	<0.3	<0.005	193	170	24.1	0.0134	0.0786	13.1	0.0533	3.03	0.378	0.0342	2.77	15.8	45.5	<0.5	0.104
CoGW004	13/12/2005	288	1.03	<5.7	<0.3	<0.005	142	144	29.7	<0.01	0.0279	4.23	<0.03	2.8	0.106	0.0155	2.76	16.5		2.38	0.038
CoGW004	07/03/2006	252	<0.05	<5.7	<0.3	<0.005	163	193	24.9	<0.01	0.0717	12.4	0.0478	3.12	0.299	0.0281	2.59	16.3		3.9	0.103
CoGW004	08/06/2006	268	<0.05	<9.5	<0.3	<0.005	121	125	24.9	<0.01	<0.01	0.214	<0.03	2.45	<0.05	<0.01	2.48	16.4		1	<0.02
CoGW004	12/09/2006	295	<0.05	<2.9	<0.3	<0.005	156	144		0.0125	0.0573	11.5	0.0374	2.84	0.281	0.0292	4.42	16.4	38	<0.5	0.0384
CoGW004	01/12/2006	266	<0.05	<1.9	<0.3	<0.005	164	126	25.5	<0.01	0.0179	6.67	<0.03	3.06	0.163	0.0193	2.66	15.9	49.2	1.65	<0.02
CoGW004	01/03/2007	331	<0.05	<9.5	<0.3	<0.005	182	149	23.4	0.018	0.127	15.1	0.0801	3.48	0.356	0.0587	2.75	15.2	47.1	3.09	0.166
CoGW004	12/06/2007	304	<0.05	<9.5	<0.3	<0.005	179	230	<20	<0.01	0.0794	10.3	0.0527	3.35	0.242	0.0387	2.82	16.1	66.5	<0.5	0.103
CoGW004	13/12/2007	288	1.03	<5.7	<0.3	<0.005	142	144	29.7	<0.01	0.0279	4.23	<0.03	2.8	0.106	0.0155	2.76	16.5	38.3	2.38	0.038
CoGW004	12/03/2008	300	<0.3	<1		0.0006	171	389	18	<0.005	0.068	6.3	0.048	3.1	0.26	<0.005	2.4	11	31	2.9	0.057
CoGW004	18/06/2008	294	<0.3	<1		<0.0005	117	213	18	<0.005	<0.005	0.19	<0.005	2.4	0.076	<0.005	2.2	9.6	35	0.8	0.011
CoGW004	02/09/2008	262	<0.3	<1		<0.0005	183	299	17	0.007	0.1	9.1	0.051	3.7	0.25	0.048	2.8	20	29	<0.3	0.083
CoGW004	03/12/2008	257	<0.3	1		<0.0003	125	101	20	0.001	0.014	1.23	0.012	2.35	0.096	0.0088	2.05	11	28	3.1	0.011
CoGW004	25/03/2009	260	<0.3	<1		0.0003	157	167	23	0.003	0.044	4.89	0.032	2.69	0.22	0.0234	1.95	11	27	3.8	0.034
CoGW004	09/09/2009		<0.3	<1	<0.3	0.0005		118	21	<0.001	<0.001	0.06	0.013		0.03	0.0011				3.2	0.009
CoGW004	10/03/2010		<0.3	<1	0.5	<0.0003		94	25	0.002	0.029	4.68	<0.002		0.2	0.0069				4.6	0.047

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW005	01/03/2007	599	<0.05	<9.5	0.372	<0.005	559	288	<20	0.045	0.309	28.3	0.474	13.4	0.552	0.0708	9.4	17.5	144	5.4	0.854
CoGW005	12/03/2008	1560	4	<1		0.0077	1040	1740	10	0.039	0.62	38.49	1.02	12	1.55	0.11	8.5	18	99	0.5	1.79
CoGW005	18/06/2008	692	2.2	3		0.0007	213	970	10	<0.005	<0.005	0.21	<0.005	10	0.68	<0.005	5.5	11	105	1.1	0.041
CoGW005	02/09/2008	3950	8	<1				2940	13										51	<0.3	See A/C
CoGW005	03/12/2008	673	<0.3	5		0.0009	364	469	10	0.015	0.17	13.12	0.32	9.71	0.85	0.0354	6.09	18	78	3.4	0.45
CoGW005	25/03/2009	714	0.9	4		0.0006	266	230	10	0.004	0.046	4.65	0.092	10	0.71	0.0108	5.17	10	80	2.5	0.16
CoGW005	10/03/2010		0.5	2	<0.3	<0.0003		970	7	0.006	0.1	9.73	0.23		0.21	0.0201				4.4	0.31

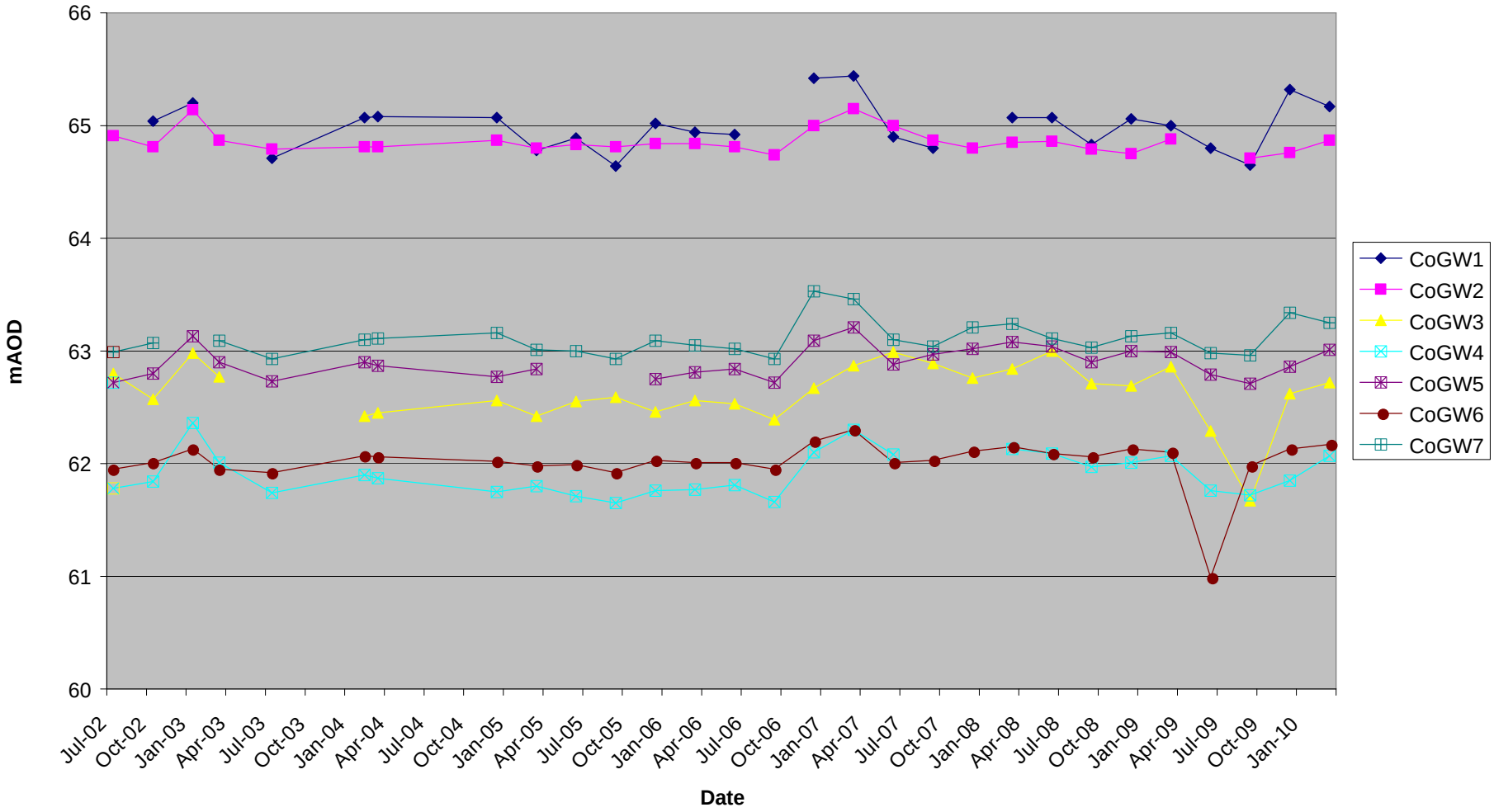
Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW006	30/07/2002	488	13.622	1.6			275	103	29			25.255		13.2	0.878		10.9	33.1	<10.0	<1.0	
CoGW006	30/10/2002	563	13.213	1.1			222	62.4	28			<0.012		9.8	<3		6.6	23.1	<10	<1.0	
CoGW006	25/03/2003	672	14	< 9.5			230	47	38.9					12.9			11.2	37.3	40.9	< 0.40	

CoGW006	18/09/2003	573	< 0.60	< 4.1			234	45	151.41					11.1			10.3	33.5	11.1		
CoGW006	21/09/2004	507	14.8	<9.5		<0.005	219	45.2	27.9	<0.01	<0.01	10.5	<0.03	10.9	0.546	<0.01	11	34.9	15	<0.4	<0.02
CoGW006	23/12/2004	524	14.8	<4.07	0.576	<0.005	200	25.8	24.5	<0.01	<0.01	11.8	<0.03	10.2	0.547	<0.01	10.5	33.8	18.6	<0.5	0.0507
CoGW006	22/03/2005	555	14.9	<9.5	0.516	<0.005	46.5	36.4	34	<0.01	<0.01	7.99	<0.03	2.42	0.52	<0.01	2.04	7.22	21.2	<0.5	0.0246
CoGW006	01/06/2005	584	17.5	<4.07	0.419	<0.005	37	36	23	<0.01	<0.01	6.65	<0.03	10.6	0.53	<0.01	35.8	37.1	19.3	<0.5	<0.02
CoGW006	08/09/2005	545	15.5	<9.5	0.474	<0.005	209	45.7	30.1	<0.01	<0.01	7.86	<0.03	10.3	0.52	<0.01	8.89	30.2	24.2	<0.5	<0.02
CoGW006	13/12/2005	552	15.5	<5.7	0.491	<0.005	174	26	29.9	<0.01	<0.01	8.7	<0.03	10.1	0.526	<0.01	9.72	32.9		<0.5	<0.02
CoGW006	07/03/2006	456	14.7	<9.5	0.5	<0.005	170	26.2	25.8	<0.01	<0.01	10.2	<0.03	9.64	0.494	<0.01	8.74	30.7		<0.5	<0.02
CoGW006	08/06/2006	460	14.3	<9.5	0.412	<0.005	172	31	27.1	<0.01	<0.01	1.25	<0.03	10	0.445	<0.01	9.34	31.7		<0.5	<0.02
CoGW006	12/09/2006	467	14.2	5.56	0.461	<0.005	149	37.9		<0.01	<0.01	9.18	<0.03	9.44	0.539	<0.01	11.2	30.4	12.4	<0.5	<0.02
CoGW006	01/12/2006	478	13.6	15.5	0.59	<0.005	171	22.7	27.3	<0.01	<0.01	7.85	<0.03	9.83	0.466	<0.01	9.05	31.7	13.1	<0.5	<0.02
CoGW006	01/03/2007	843	12.8	<9.5	0.485	<0.005	324	49.2	25.3	0.0125	0.0138	24.4	0.032	12.3	0.666	<0.01	10.4	32.9	33.9	0.718	0.0625
CoGW006	12/06/2007	815	15.5	<9.5	0.777	<0.005	290	41.6	24.2	<0.01	<0.01	13.5	<0.03	16.3	0.713	<0.01	11.7	38.4	23	<0.5	0.0692
CoGW006	19/09/2007	574	13.9	<5.7	0.68	<0.005	218	29.3	25	<0.01	<0.01	7.25	<0.03	12.6	0.55	<0.01	10.5	33	59.7	<0.5	0.032
CoGW006	13/12/2007	552	15.5	<5.7	0.491	<0.005	174	26	29.9	<0.01	<0.01	8.7	<0.03	10.1	0.526	<0.01	9.72	32.9	19.5	<0.5	<0.02
CoGW006	12/03/2008	579	14.8	<1		<0.0005	221	48	18	<0.005	<0.005	5.62	<0.005	13	0.58	<0.005	10	27	39	<0.3	0.045
CoGW006	18/06/2008	648	15	2		<0.0005	248	39	18	<0.005	<0.005	0.59	<0.005	16	0.79	<0.005	12	27	23	1.1	0.1
CoGW006	02/09/2008	707	17.6	1		<0.0005	244	38	19	<0.005	<0.005	7.92	0.01	16	0.7	<0.005	11	29	12	<0.3	0.097
CoGW006	03/12/2008	629	13.4	2		<0.0003	225	31	23	0.002	<0.001	6.62	0.005	13	0.78	0.0024	10	29	29	1.4	0.01
CoGW006	25/03/2009	541	9.8	<1		0.0004	247	41	22	<0.001	<0.001	10.43	0.005	12	0.63	<0.0009	7.93	27	95	1	0.006
CoGW006	09/09/2009		12.9	<1	0.7	0.0008		31	21	<0.001	<0.001	0.38	0.013		0.55	0.0014				2.9	0.009
CoGW006	10/03/2010		9.9	<1	1	<0.0003		45	23	<0.001	<0.001	11.23	<0.002		0.66	<0.0009				<0.3	0.009

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoGW007	30/07/2002	581	10.5	4.1			55	39	26			0.159		2.4	<0.003		1.1	8.9	11.5	<1.0	
CoGW007	30/10/2002	679	12.594	1.9			240	62.1	23			0.045		11.6	<3		8.6	26.2	<10	<1	
CoGW007	25/03/2003	868	15.7	< 9.5			296	45	27					14.5			9.8	48.4	40.4	< 0.40	
CoGW007	18/09/2003	615	7.78	< 2.9			249	38	95.22					9.9			7.16	35.7	61		

CoGW007	22/09/2004	329	11.5	<9.5		<0.005	305	77.5	30.4	0.0142	<0.01	10.3	<0.03	13.3	0.678	0.0148	9.54	38.8	120	<0.4	<0.02
CoGW007	23/12/2004	562	11	<7.13	0.335	<0.005	253	32.2	<20	<0.01	0.0116	5.28	<0.03	12.2	0.522	<0.01	7.81	33.6	89.5	<0.5	0.0356
CoGW007	22/03/2005	622	11.8	<9.5	0.373	<0.005	248	33.9	27.6	<0.01	<0.01	3.09	<0.03	12.3	0.53	<0.01	7.63	34.8	106	<0.5	<0.02
CoGW007	01/06/2005	604	10.1	6.6	0.483	<0.005	277	33.7	<20	<0.01	<0.01	2.14	<0.03	11.9	0.564	<0.01	7.57	40.5	<0.114	<0.5	<0.02
CoGW007	08/09/2005	20	7.62	<9.5	0.324	<0.005	276	35.2	26.1	0.0102	<0.01	7.85	<0.03	10.7	0.616	<0.01	6	30.6	146	<0.5	0.0236
CoGW007	13/12/2005	584	10.8	<5.7	0.372	<0.005	236	27.9	24	<0.01	<0.01	2.15	<0.03	12.1	0.528	<0.01	7.32	31.9		<0.5	<0.02
CoGW007	07/03/2006	544	11.1	<5.7	<0.3	<0.005	233	29.4	21	<0.01	<0.01	<0.1	<0.03	11.5	<0.05	<0.01	6.93	31.3		<0.5	<0.02
CoGW007	08/06/2006	568	10.4	<2.9	0.354	<0.005	269	29.1	24.6	<0.01	<0.01	0.228	<0.03	12.7	0.502	<0.01	7.71	34.3		<0.5	<0.02
CoGW007	12/09/2006	465	7.22	5.73	0.322	<0.005	222	26.4		<0.01	<0.01	5.39	<0.03	11	0.631	<0.01	8.57	32.7	137	<0.5	<0.02
CoGW007	01/12/2006	550	8.66	4.68	0.47	<0.005	248	26.1	20.1	<0.01	<0.01	1.11	<0.03	12.8	0.344	<0.01	6.78	31.9	134	<0.5	<0.02
CoGW007	01/03/2007	689	12.1	<5.7	0.47	<0.005	296	48.8	21	<0.01	<0.01	8.67	<0.03	15.4	0.488	<0.01	8.49	34.7	147	<0.5	0.0296
CoGW007	12/06/2007	716	12	<9.5	0.442	<0.005	358	36.2	20.3	<0.01	<0.01	9.93	<0.03	17.3	0.769	<0.01	9.19	40.8	270	<0.5	<0.02
CoGW007	19/09/2007	608	11.5	<5.7	0.486	<0.005	288	30.4	<20	<0.01	<0.01	3.4	<0.03	15.1	0.598	<0.01	8.5	36	212	0.627	<0.02
CoGW007	13/12/2007	584	10.8	<5.7	0.372	<0.005	236	27.9	24	<0.01	<0.01	2.15	<0.03	12.1	0.528	<0.01	7.32	31.9	105	<0.5	<0.02
CoGW007	12/03/2008	635	11.6	<1		<0.0005	266	54	13	<0.005	<0.005	3.37	<0.005	16	0.39	<0.005	8.3	27	106	1.2	0.006
CoGW007	18/06/2008	637	12.5	2		0.0007	285	44	13	<0.005	<0.005	0.22	0.008	17	0.68	<0.005	8.8	25	177	0.9	0.022
CoGW007	02/09/2008	636	12.4	1		<0.0005	313	37	14	<0.005	<0.005	5.75	0.006	18	0.74	<0.005	9.4	31	170	0.4	0.007
CoGW007	03/12/2008	494	7.7	3		<0.0003	235	28	14	0.002	<0.001	1.47	0.003	14	0.48	0.0029	6.99	23	144	3.3	0.006
CoGW007	25/03/2009	618	9.3	2		<0.0003	287	43	16	<0.001	<0.001	3.67	0.007	17	0.58	<0.0009	8.41	26	118	3.3	<0.002
CoGW007	09/09/2009		4.3	<1	0.5	0.0014		32	16	<0.001	<0.001	0.14	0.019		0.55	0.0015				5.2	0.009
CoGW007	10/03/2010		9.9	<1	0.9	<0.0003		54	16	<0.001	<0.001	2.74	<0.002		0.35	<0.0009				0.4	0.01

Colthrop Groundwater Hydrograph



Surface water Data

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW001	30/07/2002	248	0.067	1.1	<0.08	<0.005	275	14	20			0.199		4.4	0.01	<0.01	2.2	10.4	19.5	4.9	<0.02
CoSW001	30/10/2002	283	0.3	1.7	<0.08	<0.005	122	13.6	25			0.288		2.8	41	<0.01	4	11.6	32.5	<1.0	<0.02
CoSW001	25/03/2003	288	< 0.60	< 4.1	<0.1	<0.005	159	< 17	27.72					3.03		<0.01	3.69	13.4	42.8	1.78	<0.02
CoSW001	31/07/2003	230	< 0.60	< 4.1	<0.1	<0.005	116	<17	22.1	<0.01	<0.01	0.146	<0.05	1.99	<0.05	<0.01	1.86	12.9	22.9	4.99	<0.05
CoSW001	12/08/2003	222	<0.60	<9.5	0.135	<0.005	112	<17	28.9	<0.01	<0.01	<0.1	<0.05	2.13	<0.05	<0.01	1.91	13.3	21	4.05	<0.05
CoSW001	18/09/2003	245	< 0.60	< 0.60	<0.1	<0.005	120	< 17	4.05					2.07		<0.01	2.02	13.9	19.4	20.4	<0.02
CoSW001	31/03/2004	234	<0.05	<4	<0.1	<0.005	122	<17	20.6	<0.01	<0.01	0.602	<0.03	2	<0.05	<0.01	1.7	12	23.1	5.31	0.0495
CoSW001	21/09/2004	245	<0.05	<2.85		<0.005	126		46.69	<0.01	<0.01	<0.1	<0.03	2.11	<0.05	<0.01	2.51	15.3	20.1	5.29	<0.02
CoSW001	23/12/2004	237	0.052	<4.07	<0.3	<0.005	122	<17	24.7	<0.01	<0.01	0.242	<0.03	2.28	<0.05	<0.01	2.55	14.7	20.9	5.45	<0.02
CoSW001	22/03/2005	244	0.056	<9.5	<0.3	<0.005	124	<17	<20	<0.01	<0.01	0.17	<0.03	2.04	<0.05	<0.01	1.89	13.7	22.8	4.88	<0.02
CoSW001	01/06/2005	240	<0.05	<4.07	<0.3	<0.005	122	<17	29.6	<0.01	<0.01	<0.1	<0.03	1.91	<0.05	<0.01	1.63	15.4	20.4	5.09	<0.02
CoSW001	08/09/2005	<10	<0.05	<7.1	<0.3	<0.005	134	<17	<20	<0.01	<0.01	<0.1	<0.03	2.1	<0.05	<0.01	1.91	13.6	21.7	4.17	<0.02
CoSW001	13/12/2005	156	<0.05	<5.7	<0.3	<0.005	43.1	<17	26.9	<0.01	<0.01	1.28	<0.03	1.8	0.128	<0.01	2.44	11.4		<0.5	0.0292
CoSW001	07/03/2006	250	<0.05	<5.7	<0.3	<0.005	128	<17	<20	<0.01	<0.01	<0.1	<0.03	2.03	<0.05	<0.01	1.8	12.5		5.54	0.685
CoSW001	08/06/2006	232	0.159	<2.9	<0.3	<0.005	116	<17	21.3	<0.01	<0.01	<0.1	<0.03	2.15	<0.05	<0.01	1.86	13.5		4.54	<0.02
CoSW001	12/09/2006	218	0.177	<2.9	<0.3	<0.005	114	<17	24	<0.01	<0.01	0.243	<0.03	1.99	<0.05	<0.01	3.09	14.7	20	3.82	<0.02
CoSW001	01/12/2006	188	0.165	<1.9	<0.3	<0.005	106	<17	21.1	<0.01	<0.01	1.4	<0.03	2.48	<0.05	<0.01	3.08	12.7	23.6	4.4	<0.02

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW1a	31/07/2003	216	<0.60	<4.1	<0.1	<0.005	119	<17	22.9	<0.01	<0.01	<0.1	<0.05	2.52	<0.05	<0.01	3.14	12.6	39.7	1.69	<0.05
CoSW1a	12/08/2003	222	<0.60	<9.5	0.135	<0.005	112	<17	28.9	<0.01	<0.01	<0.1	<0.05	2.13	<0.05	<0.01	1.91	13.3	21	4.05	<0.05
CoSW1a	18/09/2003	245	<0.60	<1.9	<0.1	<0.005	120	<17	25.8	<0.01	<0.01	<0.1	<0.05	2.07	<0.05	<0.01	2.02	13.9	19.4	4.99	<0.05
CoSW1a	31/03/2004	234	<0.05	<4	<0.1	<0.005	122	<17	20.6	<0.01	<0.01	0.602	<0.03	2	<0.05	<0.01	1.7	12	23.1	5.31	0.0495
CoSW1a	21/09/2004	245	<0.05	<2.85	0.862	<0.005	126		24.7	<0.01	<0.01	<0.1	<0.03	2.11	<0.05	<0.01	2.51	15.3	20.1	5.29	<0.02
CoSW1a	22/03/2005	244	0.056	<9.5	<0.3	<0.005	124	<17	29.6	<0.01	<0.01	0.17	<0.03	2.04	<0.05	<0.01	1.89	13.7	22.8	4.88	<0.02
CoSW1a	01/06/2005	240	<0.05	<4.07	<0.3	<0.005	122	<17	<20	<0.01	<0.01	<0.1	<0.03	1.91	<0.05	<0.01	1.63	15.4	20.4	5.09	<0.02
CoSW1a	08/09/2005	<10	<0.05	<7.1	<0.3	<0.005	134	<17	26.9	<0.01	<0.01	<0.1	<0.03	2.1	<0.05	<0.01	1.91	13.6	21.7	4.17	<0.02
CoSW1a	13/12/2005	156	<0.05	<5.7	<0.3	<0.005	43.1	<17	<20	<0.01	<0.01	1.28	<0.03	1.8	0.128	<0.01	2.44	11.4	19	<0.5	0.0292
CoSW1a	07/03/2006	250	<0.05	<5.7	<0.3	<0.005	128	<17	21.3	<0.01	<0.01	<0.1	<0.03	2.03	<0.05	<0.01	1.8	12.5	21.9	5.54	0.685
CoSW1a	08/06/2006	232	0.159	<2.9	<0.3	<0.005	116	<17	20.2	<0.01	<0.01	<0.1	<0.03	2.15	<0.05	<0.01	1.86	13.5	22.5	4.54	<0.02
CoSW1a	12/09/2006	218	0.177	<2.9	<0.3	<0.005	114	<17	24	<0.01	<0.01	0.243	<0.03	1.99	<0.05	<0.01	3.09	14.7	20	3.82	<0.02
CoSW1a	01/12/2006	188	0.165	<1.9	<0.3	<0.005	106	<17	21.1	<0.01	<0.01	1.4	<0.03	2.48	<0.05	<0.01	3.08	12.7	23.6	4.4	<0.02
CoSW1a	01/03/2007	245	<0.05	<9.5	<0.3	<0.005	127	22.7	21.6	<0.01	<0.01	0.414	<0.03	2.15	<0.05	<0.01	1.93	12.5	21.5	5.58	0.0209
CoSW1a	12/06/2007	260	0.087	<9.5	<0.3	<0.005	130	<17	<20	<0.01	<0.01	0.163	<0.03	2.12	<0.05	<0.01	1.74	13.2	23.9	5.33	<0.02
CoSW1a	19/09/2007	234	0.06	<5.7	<0.3	<0.005	127	<17	<20	<0.01	<0.01	<0.1	<0.03	2.03	<0.05	<0.01	1.72	12.4	24.1	6.14	<0.02
CoSW1a	12/03/2008	237	<0.3	<1		<0.0005	121	<20	17	<0.005	<0.005	0.16	<0.005	2.1	0.028	<0.005	1.9	11	18	6	0.008
CoSW1a	18/06/2008	233	0.8	<1		0.0008	117	<20	17	<0.005	<0.005	<0.05	<0.005	2.1	0.073	<0.005	1.7	8.9	18	5.7	0.013
CoSW1a	02/09/2008	225	<0.3	<1		<0.0005	107	<20	17	<0.005	<0.005	0.13	0.005	2.1	0.036	<0.005	2.1	11	17	5.2	0.009
CoSW1a	03/12/2008	238	0.5	<1		<0.0003	116	<20	19	<0.001	<0.001	0.11	0.004	1.97	0.043	0.0027	1.71	9.71	26	6.3	0.009
CoSW1a	25/03/2009	241	<0.3	<1		0.0008	133	<20	21	<0.001	<0.001	0.1	0.011	2.16	0.025	<0.0009	1.58	9.85	17	6.4	<0.002
CoSW1a	17/06/2009		<0.3					<20	23												
CoSW1a	09/09/2009		<0.3					<20	20												

CoSW1a	02/12/2009		<0.3					<20	23											
CoSW1a	10/03/2010		<0.3					20	22											

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW002	30/07/2002	240	<0.050	1.2	<0.08	<0.0005	<3	18	21			0.114		<1.0	0.009	<0.01	<0.5	<5.0	20.4	4.6	<0.05
CoSW002	30/10/2002	252	0.2	<1.0	<0.08	<0.0005	116	10.7	20			0.076		2.2	4	<0.01	2.2	11.1	<10	4.4	<0.05
CoSW002	25/03/2003	240	< 0.60	< 4.1	<0.1	<0.005	129	< 17	20.9					2.02		<0.01	1.76	13.1	22.2	6.11	<0.05
CoSW002	31/07/2003	236	< 0.60	< 4.1	<0.1	<0.005	116	<17	22.6	<0.01	<0.01	0.148	<0.05	1.99	<0.05	<0.01	1.87	13	21.9	4.82	<0.05
CoSW002	12/08/2003	225	<0.60	<4.1	0.11	<0.005	112	<17	28.7	<0.01	<0.01	<0.1	<0.05	2.12	<0.05	<0.01	1.85	13.1	20.7	3.96	<0.05
CoSW002	04/09/2003	234	2.55	7.7	<0.1	<0.005	120	<17	26.2	<0.01	<0.01	<0.1	<0.05	2.14	<0.05	<0.01	2.2	14.8	23.9	4.89	<0.05
CoSW002	18/09/2003	249	< 0.60	7.7	<0.1	<0.005	118	< 17	26.6	<0.01	<0.01	<0.1	<0.05	2.04	<0.05	<0.01	1.89	13	19.3		<0.05
CoSW002	30/09/2003	240	< 0.60	< 2.9	<0.1	<0.005	188	<17	26.6	<0.01	<0.01	10	<0.05	7.34	0.222	<0.01	2.49	48.6	27.8	5.08	<0.05
CoSW002	15/10/2003	240	<0.60	<2.9	<0.1	<0.005	123	<17	33.4	<0.01	<0.01	<0.1	<0.05	2.05	<0.05	<0.01	2.34	13.4	22.4	5.06	<0.05
CoSW002	31/03/2004	251	<0.05	5.05	<0.1	<0.005	121	30.4	23.8	<0.01	<0.01	<0.1	<0.03	2.01	<0.05	<0.01	1.82	12.6	23	5.51	<0.02
CoSW002	21/09/2004	259	<0.05	<4.07	0.578	<0.005	127		24.6	<0.01	<0.01	<0.1	<0.03	2.1	<0.05	<0.01	2.46	15.1	20.3	5.35	<0.02
CoSW002	23/12/2004	241	<0.05	<4.07	<0.3	<0.005	122	<17	<20	<0.01	<0.01	0.202	<0.03	2.3	<0.05	<0.01	2.63	15.3	20	5.46	0.0202
CoSW002	22/03/2005	240	0.05	12.9	<0.3	<0.005	125	<17	30.5	<0.01	<0.01	0.198	<0.03	2.08	<0.05	<0.01	2.04	15.3	24	4.99	<0.02
CoSW002	01/06/2005	232	<0.05	<4.07	<0.3	<0.005	122	<17	<20	<0.01	<0.01	<0.1	<0.03	1.95	<0.05	<0.01	1.63	15.7	20.7	4.83	<0.02
CoSW002	08/09/2005	260	<0.05	<7.1	<0.3	<0.005	141	21.5	28.4	<0.01	<0.01	0.425	<0.03	2.14	<0.05	<0.01	1.95	13.8	21.3	4.2	<0.02
CoSW002	13/12/2005	296	0.054	<5.7	<0.3	<0.005	124	<17	26.6	<0.01	<0.01	<0.1	<0.03	2.29	<0.05	<0.01	2.34	14.3	23.2	5.45	<0.02
CoSW002	07/03/2006	262	<0.05	<5.7	<0.3	<0.005	129	<17	21.3	<0.01	<0.01	<0.1	<0.03	2.14	<0.05	<0.01	1.86	13	24.8	6.3	<0.02
CoSW002	08/06/2006	240	0.062	<2.9	<0.3	<0.005	116	<17	23.1	<0.01	<0.01	<0.1	<0.03	2.14	<0.05	<0.01	1.87	13.5	22.6	4.66	<0.02

CoSW002	12/09/2006	233	0.152	<2.9	<0.3	<0.005	106	<17	23.6	<0.01	<0.01	<0.1	<0.03	1.89	<0.05	<0.01	3.03	14.1	19.5	3.7	<0.02
CoSW002	01/12/2006	188	0.189	16.3	<0.3	<0.005	102	25.9	23.9	<0.01	<0.01	1.06	<0.03	2.43	<0.05	<0.01	2.96	12.6	23.4	4.42	<0.02
CoSW002	01/03/2007	242	<0.05	<5.7	<0.3	<0.005	124	17.3	21.7	<0.01	<0.01	0.386	<0.03	2.16	<0.05	<0.01	1.99	12.9	21.7	5.49	0.0255
CoSW002	12/06/2007	252	<0.05	<9.5	<0.3	<0.005	127	<17	<20	<0.01	<0.01	0.113	<0.03	2.09	<0.05	<0.01	1.72	13.3	24.7	4.56	<0.02
CoSW002	19/09/2007	236	<0.05	<5.7	<0.3	<0.005	125	<17	21.8	<0.01	<0.01	0.201	<0.03	1.99	<0.05	<0.01	1.71	12.1	23.6	6.16	<0.02
CoSW002	12/03/2008	233	<0.3	<1		<0.0005	120	<20	17	<0.005	<0.005	0.14	<0.005	2.1	0.029	<0.005	1.9	11	18	6	0.006
CoSW002	18/06/2008	239	2.3	<1		0.0009	117	<20	19	<0.005	<0.005	0.09	0.007	2.2	0.07	<0.005	2	9.3	19	9.4	0.039
CoSW002	02/09/2008	224	<0.3	<1		<0.0005	109	<20	17	<0.005	<0.005	0.14	0.006	2.1	0.037	<0.005	2.2	12	17	5.2	0.007
CoSW002	03/12/2008	239	0.6	<1		<0.0003	122	<20	19	<0.001	<0.001	0.25	0.004	2.15	0.046	0.0028	1.9	9.97	18	6.4	0.004
CoSW002	25/03/2009	228	<0.3	<1		0.0003	126	<20	22	<0.001	<0.001	0.06	0.004	2.13	0.021	<0.0009	1.62	9.67	17	6.3	0.012
CoSW002	17/06/2009		<0.3					<20	24												
CoSW002	09/09/2009		<0.3					<20													
CoSW002	02/12/2009		<0.3					<20	23												
CoSW002	10/03/2010		<0.3					25	23												

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW003	31/07/2003	244	<0.60	< 4.1	<0.1	<0.005	124	18	23.1	<0.01	<0.01	0.725	<0.05	2.65	<0.05	<0.01	2.95	12.9	38.9	1.35	<0.05
CoSW003	12/08/2003	228	<0.60	<4.0	<0.1	<0.005	113	<17	28.6	<0.01	<0.01	<0.1	<0.05	2.17	<0.05	<0.01	1.95	13.2	21.6	3.99	<0.05
CoSW003	04/09/2003	241	1.69	< 4.1	<0.1	<0.005	129	25	24.9	<0.01	<0.01	1.98	<0.05	2.65	0.07	<0.01	2.99	13.6	37.3	1.89	<0.05
CoSW003	18/09/2003	242	<0.60	< 2.9	0.11	<0.005	126	17	22.2	<0.01	<0.01	<0.1	<0.05	2.46	<0.05	<0.01	3.24	12.3	34.3	1.6	<0.05
CoSW003	30/09/2003	265	<0.60	< 2.9	<0.1	<0.005	131	83	26.1	<0.01	0.012	1.85	<0.05	2.9	0.06	0.011	3.85	20.9	40.1	1.5	<0.05
CoSW003	15/10/2003	242	<0.60	<2.9	<0.1	<0.005	128	28	34.4	<0.01	<0.01	0.423	<0.05	2.57	0.06	<0.01	3.1	12.2	35	1.23	<0.05
CoSW003	31/03/2004	280	1.48	<2.85	0.177	<0.005	156	29.3	23.9	<0.01	<0.01	<0.1	<0.03	3.17	<0.05	<0.01	3.41	14.3	55	6.69	<0.02

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW004	31/07/2003	241	<0.60	< 4.1	<0.1	<0.005	115	<17	22.1	<0.01	<0.01	0.169	<0.05	1.96	<0.05	<0.01	1.8	12.7	21.5	4.56	<0.05
CoSW004	12/08/2003	223	<0.60	<4.1	<0.1	<0.005	113	<17	28.5	<0.01	<0.01	<0.1	<0.05	2.13	<0.05	<0.01	1.88	13	20.8	4.01	<0.05
CoSW004	04/09/2003	235	0.88	< 4.1	<0.1	<0.005	119	<17	26.1	<0.01	<0.01	<0.1	<0.05	2.14	<0.05	<0.01	2.21	14.9	22.4	5.16	<0.05
CoSW004	18/09/2003	231	<0.60	< 1.9	<0.1	<0.005	119	<17	22.2	<0.01	<0.01	<0.1	<0.05	2.05	<0.05	<0.01	2.07	13.6	20	5	<0.05
CoSW004	30/09/2003	236	<0.60	< 2.9	<0.1	<0.005	121	<17	27.7	<0.01	<0.01	<0.1	<0.05	2.43	<0.05	<0.01	2.85	21.5	25.7	5.35	<0.05
CoSW004	15/10/2003	245	<0.60	<2.9	<0.1	<0.005	121	<17	33.3	<0.01	<0.01	<0.1	<0.05	2.01	<0.05	<0.01	2.17	12.7	22.3	4.95	<0.05
CoSW004	31/03/2004	249	1.38	<2.9	0.129	<0.005	121	26.5	22	<0.01	<0.01	<0.1	<0.03	2.01	<0.05	<0.01	1.77	12.1	22.7	5.85	<0.02

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW005	31/07/2003	289	< 0.60	< 4.1	0.113	<0.005	145	22	24.4	<0.01	<0.01	3	<0.05	3.78	0.143	<0.01	4.1	16.8	37.3	2.2	<0.05
CoSW005	12/08/2003	231	<0.60	<4.1	0.108	<0.005	112	<17	27.9	<0.01	<0.01	<0.1	<0.05	2.13	<0.05	<0.01	1.85	13.1	20.7	4.23	<0.05
CoSW005	04/09/2003	234	0.84	< 4.1	<0.1	<0.005	127	32	25.5	<0.01	<0.01	3.12	<0.05	2.82	0.114	<0.01	3.05	14	36	1.73	<0.05

CoSW005	18/09/2003	246	< 0.60	< 1.9	<0.1	<0.005	126	48	22.9	<0.01	<0.01	3.03	<0.05	2.68	0.064	<0.01	3	13.2	34.1	1.86	<0.05
CoSW005	30/09/2003	243	< 0.60	< 2.9	<0.1	<0.005	123	<17	27.2	<0.01	<0.01	<0.1	<0.05	2.85	<0.05	<0.01	3.19	19.1	38.7	1.46	<0.05
CoSW005	15/10/2003	252	<0.60	<2.9	<0.1	<0.005	122	25	34.2	<0.01	<0.01	3.38	<0.05	2.52	0.077	<0.01	3.12	11.9	34.9	1.2	<0.05
CoSW005	31/03/2004	290	1.2	<2.85	0.198	<0.005	158	23.5	23.4	<0.01	<0.01	0.58	<0.03	3.63	0.096	<0.01	3.69	15.7	51.3	5.31	0.0616

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW006	31/07/2003	234	< 0.60	< 4.1	<0.1	<0.005	116	<17	22.5	<0.01	<0.01	0.166	<0.05	2	<0.05	<0.01	1.86	12.9	22.1	4.76	<0.05
CoSW006	12/08/2003	233	<0.60	<4.1	<0.1	<0.005	113	<17	31	<0.01	<0.01	<0.1	<0.05	2.16	<0.05	<0.01	1.91	13.2	21.2	4.02	<0.05
CoSW006	04/09/2003	248	< 0.60	< 4.1	<0.1	<0.005	120	<17	25.2	<0.01	<0.01	<0.1	<0.05	2.14	<0.05	<0.01	2.19	15.1	22.1	4.86	<0.05
CoSW006	18/09/2003	245	< 0.60	< 1.9	<0.1	<0.005	119	<17	24.7	<0.01	<0.01	<0.1	<0.05	2.06	<0.05	<0.01	2.12	13.4	19.4	5.51	<0.05
CoSW006	30/09/2003	245	< 0.60	< 2.9	<0.1	<0.005	118	<17	26.7	<0.01	<0.01	<0.1	<0.05	2.34	<0.05	<0.01	2.5	20.2	24.4	5.05	<0.05
CoSW006	15/10/2003	244	<0.60	<2.9	<0.1	<0.005	119	<17	33.4	<0.01	<0.01	<0.1	<0.05	2	<0.05	<0.01	2.05	12.4	22.2	4.83	<0.05
CoSW006	31/03/2004	247	<0.05	<2.9	0.115	<0.005	122	20.1	21.4	<0.01	<0.01	0.195	<0.03	2.02	<0.05	<0.01	1.78	12.2	23.2	6.05	<0.02

Sample Point	Date	Alkalinity (mg/l) (-)	Ammoniacal Nitrogen (mg/l) (-)	B.O.D. (mg/l) (-)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l) (-)	Chemical Oxygen Demand (mg/l) (-)	Chloride (mg/l)	Chromium (mg/l)	Copper (mg/l)	Iron (mg/l) (-)	Lead (mg/l)	Magnesium (mg/l) (-)	Manganese (mg/l) (-)	Nickel (mg/l)	Potassium (mg/l) (-)	Sodium (mg/l) (-)	Sulphate (mg/l)	TON (mg/l)	Zinc (mg/l)
CoSW007	31/07/2003	242	< 0.60	< 4.1	<0.1	<0.005	117	18	22.6	<0.01	<0.01	0.149	<0.05	2.05	<0.05	<0.01	1.86	13.1	22.5	4.59	<0.05
CoSW007	12/08/2003	251	<0.60	<4.1	<0.1	<0.005	122	<17	30	<0.01	<0.01	<0.1	<0.05	2.66	<0.05	<0.01	2.58	12.8	35.2	0.72	<0.05
CoSW007	04/09/2003	236	13.2	< 4.1	<0.1	<0.005	121	<17	25.2	<0.01	<0.01	0.106	<0.05	2.13	<0.05	<0.01	2.14	14.5	22.4	4.9	<0.05
CoSW007	18/09/2003	244	< 0.60	< 1.9	<0.1	<0.005	119	<17	22.5	<0.01	<0.01	<0.1	<0.05	2.07	<0.05	<0.01	2.07	13.2	20.2	4.71	<0.05
CoSW007	30/09/2003	244	< 0.60	< 2.9	<0.1	<0.005	119	<17	28	<0.01	<0.01	<0.1	<0.05	2.37	<0.05	<0.01	2.52	20.1	25	5.03	<0.05
CoSW007	15/10/2003	253	<0.60	<2.9	<0.1	<0.005	120	<17	34.4	<0.01	<0.01	<0.1	<0.05	1.98	<0.05	<0.01	2.12	12.3	22.7	5.04	<0.05
CoSW007	31/03/2004	240	<0.05	<2.85	0.107	<0.005	122	20.2	21.5	<0.01	<0.01	<0.1	<0.03	2.03	<0.05	<0.01	1.74	11.8	23.5	5.82	<0.02