



Land at

Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

December 2019

77 High Street, Yeadon, LS19 7SP

Tel: 01943 470363

Email: info@chevin-ltd.co.uk

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Report Title	Land at Reservoir Road, Surfleet, Spalding Phase 1 Desk Study Report December 2019	Site Address	36 Reservoir Road, Surfleet, Spalding, PE11 4DH Grid Ref: (527298,329030)
Author	Chevin Geoenviron Associates Ltd	Contamination / Geotechnical	Contamination
Work Stage	Phase 1 Desk Study	Report Date	December 2019
Brief Description of the Report Contents	Review of desktop information to develop a preliminary conceptual site model in order to identify any potential Contaminant Receptor Pathway pollutant linkages and associated environmental issues.		

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Document Control

Client: Mr. T. Forman
Job Number: C0362

Document Checking:

Prepared by:	David Wright BSc FGS & C. Wilkinson
Prepared by:	Tom Roebuck-Rouse BSc MGeol FGS
Checked by:	David Wilkinson
Issued by:	Christiaan Wilkinson MRes CSci FGS SiLC

Issue	Date	Status	Year
01	19 th December	Final	2019

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Contents Page

1.0	INTRODUCTION	1
1.1	Terms and Conditions	1
1.2	Sources of information	1
2.0	SITE DETAILS	3
2.1	Proposed End Use	3
2.2	Site Location and Description	3
3.0	GEOLOGY HYDROLOGY AND HYDROGEOLOGY	3
3.1	Data Sources	3
3.2	Geology.....	4
3.2.1	Historical Borehole Records	4
3.2.2	Artificial/Made Ground	4
3.2.3	Superficial Geology.....	4
3.2.4	Solid Geology	5
3.2.5	Natural Hazards	5
3.2.6	Faulting.....	5
3.3	Mining and Extraction	5
3.4	Radon	5
3.5	Hydrogeology.....	5
3.5.1	Groundwater and Surface Water Abstractions.....	6
3.6	Hydrology.....	6
3.6.1	Water Quality.....	6
3.6.2	Site Drainage.....	6
3.6.3	Discharge Consent.....	6
3.6.4	Pollution Incidents to Controlled Waters, Land & Air.....	7
3.6.5	Flood Risk	7
4.0	ENVIRONMENTAL SETTING	8
4.1	Source References:.....	8
4.2	Waste Treatment and Disposal	8

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

4.3	Regulatory Permits & Registers.....	8
4.3.1	Control of Major Hazard Sites / Notification of Installations Handling Dangerous Substances	8
4.3.2	List 1 & 2 Dangerous Substance Inventory	8
4.3.3	Pollution Control Licences / Permits	9
4.3.4	Planning Hazardous Substances Consents.....	9
4.4	Current Industrial Uses.....	9
4.5	Fuel Stations and Tanks	9
4.6	Sensitive Land Uses	9
4.7	Archaeology and National Monuments	9
4.8	Contaminated Land Under Part 2A EPA 1990.....	9
5.0	SITE HISTORY.....	9
5.1	Source References.....	9
5.2	History of Site and Surrounding Areas	10
5.3	Previous Investigations	11
6.0	CONCEPTUAL SITE MODEL	12
6.1	Introduction.....	12
6.2	Hazard Identification	13
6.3	Discussion of Risks.....	19
7.0	CONCLUSIONS & RECOMMENDATIONS	20
8.0	REFERENCES	21

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

APPENDIX CONTENTS

Appendix A	Figures and Drawings
Drawing No. C0362-01	Site Location Plan
Drawing No. C0362-02	Proposed Site Layout
Appendix B	Site Walkover Photographs
Appendix C	Groundsure Enviro Insight
Appendix D	Historical Plans

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

1.0 INTRODUCTION

Chevin Geoenviro Associates Ltd (CGA) were commissioned by Mr. T. Forman to carry out a Phase 1 Desk Study on land at Reservoir Road, Surfleet, Spalding, PE11 4DH.

The purpose of this report is to interpret information pertaining to the site obtained during a desk-based review of available data and a walkover survey of the site. The scope of the study is as follows:

- To provide general information on the site such as location and description;
- To discuss the geology, hydrogeology and hydrology at, and in the vicinity of the site;
- To summarise the environmental setting of the site; e.g. landfills, permits and sensitive land uses;
- To discuss and summarise any historical development that have occurred at the site and in the surrounding area.
- To assess potential contamination issues pertaining to the site with consideration of the site's historic use.
- To develop an initial conceptual model linking sources of potential contamination with pathways and receptors;
- To provide a preliminary risk assessment for the current and proposed end use of the site;
- To provide recommendations for further works where necessary.

1.1 Terms and Conditions

This report has been prepared for Mr. T. Forman in support of planning application H17-0346-19. Much of the environmental information relates to the site in its present state and should not be used in a different context without reference to CGA.

1.2 Sources of information

A site walkover survey was carried out on the 10th December 2019. Information on the site layout, potentially contaminative land uses, and current land use of the site is based primarily on information collected during this walkover. Due to the short time scale for production of this study a request for information pertaining to the site from the Environment Agency and Local Authority was unable to be made.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

However, an environmental database search was undertaken by others (Groundsure) and provided by CGA. The information provides supplementary environmental information for the site and surrounding area, as below. This was collated into an Insight Report by Groundsure and as such the potential for further data to exist cannot be ruled out.

The existing database on which this study is based comprises:

- Groundsure Enviro Insight. Dated 9th December 2019
- Groundsure 1:10,000 Historical Maps. Dated 9th December 2019
- Groundsure 1:2,500 Historical Maps. Dated 9th December 2019
- CGA. Site walkover survey carried out on Dated 10th December 2019

Although every effort has been made to ensure the accuracy of the information contained herein, no checks have been carried out to ensure the accuracy of information obtained from third parties and no liability can be accepted for any errors or misinterpretation of the third-party information where it has been incorporated into this report.

Phase 1 Desk Study Report

2.0 SITE DETAILS

2.1 Proposed End Use

The proposed development consists of the construction of two detached dwellings with private gardens and off-road parking.

2.2 Site Location and Description

The site is located approximately 6.25km north east of Spalding town centre and is approximately 0.18ha in size. The site is centred on National Grid Reference: 527298,329030 and is accessed off Reservoir Road.

The site is rectangular in shape orientated slightly north west to south east. The site is directly bounded by neighbouring residential properties to the east and west, Reservoir Road to the south and agricultural field to the north. The northern and western site boundaries are not delineated, the eastern boundary is defined by a wood fence and the southern boundary is defined by the pavement. The surrounding areas are predominantly agricultural in usage, though there are residences along Reservoir Road in both directions.

The site interior was seen to comprise a thinly vegetated agricultural field with evidence of previous tilling. No evidence of crops were noted on the site walkover. Ground conditions appeared to be sandy and gravelly with brick fragments.

There is a corrugated metal stable building near the south western corner of the site on Reservoir Road.

Topographically the site is level. No potential sources of contamination were noted on the site walkover.

A Site Location Plan is presented as Drawing No. C0362-01 in Appendix A.

3.0 GEOLOGY HYDROLOGY AND HYDROGEOLOGY

3.1 Data Sources

The following sources have been referenced for the identification of the geology, hydrogeology and hydrology of the site:

Phase 1 Desk Study Report

- Groundsure Report (presented in Appendix C);
- Environment Agency website (www.gov.uk/government/organisations/environment-agency);
- British Geological Survey (BGS) Geoindex Website (www.bgs.ac.uk/geoindex)
- National Coal Authority Interactive Website (www.mapapps2.bgs.ac.uk/coalauthority)

3.2 Geology

Information regarding the geology of the site has primarily been sourced from the Groundsure Report and the BGS Geoindex website.

3.2.1 Historical Borehole Records

BGS historical borehole (Ref: TF22NE64) located approximately 580m north west of site and within the same geological formation recorded ground conditions to a depth of 1.45m. From surface level to a depth of 0.50m a fine, silty and sandy topsoil was noted. Below this a light brown and orange, very silty, fine sandy laminated clay was noted to 1.00m depth. Finally, below this a light brown and orange, slightly clayey, fine silty sand was encountered to a confirmed depth of 1.45m.

3.2.2 Artificial/Made Ground

According to the Groundsure report and BGS Geoindex mapping artificial deposits of Made Ground (Undivided) are located 270m south of site.

There are additional records of potentially infilled land 282m to the north, at an historical sewage works, and approximately 400m to the east, at a historical reservoir.

3.2.3 Superficial Geology

Geological mapping and the Groundsure report shows the site to be underlain by Tidal Flat Deposits consisting of clays and silts.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

3.2.4 Solid Geology

Geological mapping and the Groundsure report indicates the site is underlain by solid geology of the Oxford Clay Formation, consisting of Mudstone.

3.2.5 Natural Hazards

The Groundsure report records a moderate risk from natural ground subsidence, compressible ground and running sands; a low risk from shrink-swell clays; a very low risk from landslides and a negligible risk from soluble and collapsible rocks.

The identified risks should be considered during the foundation design for any developments.

3.2.6 Faulting

According to BGS Geoindex mapping and the Groundsure report there is no major faulting within 250m of site.

3.3 Mining and Extraction

The Groundsure report indicates the site is not within a Coal Mining Reporting Area.

Groundsure report the site as having no non-coal mining activities on within 500m of the site.

3.4 Radon

The Groundsure report indicates the site is not within a Radon Affected Area, with less than 1% of properties being above the action level. No radon measures are necessary.

3.5 Hydrogeology

Superficial deposits of both the Oxford Clay Formation and the Tidal Flat Deposits underlying the site are classified as Unproductive.

These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

There are no Source Protection Zones within 500m or within the confined aquifer.

Phase 1 Desk Study Report

3.5.1 Groundwater and Surface Water Abstractions

The Groundsure report records no groundwater, surface water or potable water abstraction licences held within 500m of site.

3.6 Hydrology

The Groundsure report records the River Glen as being at surface level and located 27m south of site. Unnamed hydrological features are located 135m and 171m north west, 152m, 156m and 220m north, 190m north east and 204m east of site. These features are associated with agricultural field drainage. All records are located within the Welland catchment area.

A further 9 No. miscellaneous records of surface water features are located 16m south; 134m and 170m north west; 151m, 155m and 219m north; 189m north east and 203 and 232m east of site.

3.6.1 Water Quality

The Groundsure report records water quality data for the River Glen at a location 291m east of site. The report holds 2 No. data sets for both biological and chemical quality data at this location. From 2005 to 2009 the river scored 'B' for biological water quality at both locations. For chemical quality the river scored 'D' in 2005, 'C' from 2006 to 2007 and 'B' from 2008 to 2009 in both data sets.

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

3.6.2 Site Drainage

No dedicated drainage systems were noted on the site walkover.

3.6.3 Discharge Consent

The Groundsure report records no Red List Discharge Consents (potentially harmful discharges to controlled waters) or Water Industry Referrals within 500m of site.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

The Groundsure report records active licenced discharge consents held 291m east of site (2 No.) and 312m west of site. The licences held 291m east of site concerned sewage discharges of final/treated effluent which discharge into a tributary of the River Glen. These records are effective from 12/07/2006. The licence held 312m south west of site concerned sewer storm overflow on behalf of the water company and discharges into Fen Drain. This record is effective from 06/03/2019.

The remaining 2 No. licences are historical, concerned sewer storm overflow and final/treated effluent and were located 312m south west and 479m east of site respectively.

3.6.4 Pollution Incidents to Controlled Waters, Land & Air

The Groundsure report records no pollution incidents (List 1 & 2) to controlled waters, land or air within 500m of site.

3.6.5 Flood Risk

The Groundsure report indicates Zone 2 River or Coastal Flooding Areas located 3m, 83m, 113m, 128m and 182m west; 35m, 54m, 89m, 130m and 145m north; 117m and 119m north west and 182m, 248m north east and 224m south west of site.

The Groundsure report records Zone 3 River and Coastal Flooding Areas located 4m south; 13m, 117m north west; 35m, 37m, 54m, 89m, 121m, 145m north; 42m, 73m, 113m, 128m and 182m west; 99m, 182m and 248m north east and 224m north east of site.

The Risk of Flooding from Rivers and Sea (RoFRaS) flood rating for the site is recorded as Very Low (less than 1 in 1000 chance of flooding in any given year). The Groundsure report indicates a High-risk area located 4m south; medium risk areas 14m north, 28m west and 28m east; a low risk 3m west and a very low risk 6m and 42m south of site.

The site is not within 250m of any flood defences, areas benefitting from flood defences or areas of flood storage.

Phase 1 Desk Study Report

4.0 ENVIRONMENTAL SETTING

4.1 Source References:

The following sources have been referenced for the identification of the environmental setting of the site:

- Groundsure Enviro Insight Report (presented in Appendix C);
- Environment Agency website (www.gov.uk/government/organisations/environment-agency);

4.2 Waste Treatment and Disposal

4.2.1 Landfill Sites

The Groundsure report indicates no landfill, Environment Agency Landfill, Environment Agency Historic landfill, BGS/DoE non-operational landfill or local authority landfill records within 1000m of site.

4.2.2 Waste Management, Transfer, Treatment or Disposal Sites

The Groundsure report indicates no waste management, transfer, treatment or disposal sites within 1000m of site.

4.2.3 Environment Agency Licenced Waste Sites & Landfills

The Groundsure report records no Environment Agency Licenced Waste Sites or Landfill within 1000m of site.

4.3 Regulatory Permits & Registers

The following section provides information on regulatory permits held on or within 500m of site.

4.3.1 Control of Major Hazard Sites / Notification of Installations Handling Dangerous Substances

The Groundsure report indicates no Control of Major Hazard sites (COMAH & NIHHS) within 500m of site.

4.3.2 List 1 & 2 Dangerous Substance Inventory

The Groundsure report records no List 1 or 2 Dangerous Substance Inventory sites within 500m of site.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

4.3.3 Pollution Control Licences / Permits

The Groundsure report records no Pollution Control Licences Part A(2) or B Enforcements within 500m of site.

4.3.4 Planning Hazardous Substances Consents

The Groundsure report indicates no records of Planning Hazardous Substance Consents within 500m of site.

4.4 Current Industrial Uses

The Groundsure report records an electricity substation located 206m east of site.

4.5 Fuel Stations and Tanks

The Groundsure report indicates no fuel stations, sites or tanks located within 500m of site.

4.6 Sensitive Land Uses

The Groundsure report records a Nitrate Vulnerable Zone (NVZ) located 535m south of site.

4.7 Archaeology and National Monuments

There are no known national monuments or areas of archaeological interest within 500m of the site.

4.8 Contaminated Land Under Part 2A EPA 1990

No Part 2A EPA sites are recorded within 500m of the site.

5.0 SITE HISTORY

5.1 Source References

Information relating to the historical development of the site and the surrounding area has been obtained from Historical Ordnance Survey Maps (1:10,000 and 1:10,560 and 1:2,500). It should be noted that changes to the site boundary are likely to be attributed to map scale error when overlaying historical maps on current OS maps. For further information see Appendix D.

Phase 1 Desk Study Report

5.2 History of Site and Surrounding Areas

The earliest historical OS map is dated 1886-1887 and shows most of the site area as occupied by a large, disused flax mill. By 1903 the mill has been completely removed and the site appears empty of structures. No change takes place on site until circa. 1947-1950 when 2 No. small adjacent buildings are located in the southern extent of site. These structures are then removed by 1975-1977 with the no further change shown on mapping.

The surrounding areas in 1886-1887 are predominantly agricultural field with scattered dwellings, and farmsteads located to the south west and north east. Notable features from this time include a small outbuilding directly north west of site, an unspecified 'tank' located 20m north of site and the River Glen located within 10m south of site. The surrounding areas see little site relevant change through time other than minor residential and farmstead expansion. Major site relevant changes take place in 1971-1972 when the unspecified 'tank' located 20m north is shown as removed; a new sewage works is located approximately 280m north and a poultry house complex approximately 270m south west of site. The farmstead directly east has seen some extension by this point in time and the small outbuilding directly north west of site is now in usage as part of this farm. By 2001 the sewage works to the north has been fully removed. By 2019 the site and surrounding areas are as seen today with residential dwellings located along road-links. A summary of site history can be found in Table 1.1 below;

Table 1.1 Summary of Site History

Date	On-Site Features	Surrounding Area
1886-1887	Site is occupied by Flax Mills (Disused) in the north western corner extending east with secondary building encroaching onto south eastern corner of site.	Surrounding areas are predominantly agricultural field with scattered farmsteads to the south west and north east and River Glen located within 10m south of site. A circular structure -referred to elsewhere in the Groundsure report as a 'tank'- associated with the mill is located 20m north of site. There is a sea bank approximately 130m to the north.
1903	Flax mill has been demolished and fully removed leaving site clear at this time.	One small building of the flax mill remains, near the northwestern corner of the site.
1929-1932	No change on site.	Surrounding areas see little site relevant change.
1947-1950	Two small buildings (potentially farm outbuildings) are located in the southern extent of site at this time.	Surrounding areas see little site relevant change.
1971-1972	No change on site.	Flaxmill House to the west, and the stable building near the southwestern corner of the site is now present.
1975-1977	Small buildings in southern extent of site have been removed, leaving site	A sewage works is now located 280m north of site and there is a large poultry house complex approximately 270m south west. The 'tank' located

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Date	On-Site Features	Surrounding Area
	clear at this time.	20m north of site is now no longer shown on mapping. Farm directly west of site has seen some extension.
1989	No change on site.	Surrounding areas see little site relevant change.
2001	No change on site.	Sewage works to the north is no longer marked on mapping.
2003	No change on site.	Residence adjacent to site 'Old Lammas' to east now present. Residence has a swimming pool.
2018-2019	Site is as seen in present day.	'Old Lammas' no longer has a swimming pool, and has been extended. Surrounding areas now resemble the present-day layout.

5.3 Previous Investigations

No previous site investigations for the site were identified during this assessment.

Phase 1 Desk Study Report

6.0 CONCEPTUAL SITE MODEL

6.1 Introduction

The information obtained from the desktop study of the site has been collated and evaluated to develop a Conceptual Model for the site.

The site has been assessed in line with current UK guidelines, namely the Contaminated Land (England) Regulations 2000 and Part IIA of the Environmental Protection Act 1990 and follows the procedures set out in the Environmental Agency 'Model Procedures for the Management of Land Contamination – Contamination Land Report (CLR).11'.

CLR.11 provides the technical framework for structured decision making about land contamination and builds on previous work carried out under the Contaminated Land Research Programme of the former Department of the Environment. CLR 11 has adopted and refined the methodology and terminology that has been used in contaminated land risk assessment for a number of years.

CLR.11 defines the three essential elements to any risk:

- A contaminant **source** - a substance that is in, on or under land and has the potential to cause harm or to cause pollution of controlled waters.
- A **receptor** – in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body.
- A **pathway** - a route or means by which a receptor can be exposed to, or affected by a contaminant.

Each of these elements can exist independently, but they create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway. This kind of linked combination of source-pathway-receptor is described as a **pollutant linkage**.

This report presents a Phase 1 Conceptual Model and Quantitative Risk Assessments for the site, based on the proposed conservative end use of residential with home grown produce.

Phase 1 Desk Study Report

6.2 Hazard Identification

6.2.1 Sources of Contamination

There may be made ground on the site from the historical use of the site pre-1903 as a Flax Mill, and fragments of brick were observed in the surface soils during the site walkover.

Historical agricultural practices are unlikely to have introduced contamination of the ground. Traces of pesticide and herbicides may be recorded at very low levels although these are unlikely to be at sufficient concentrations to impact receptors.

The historical 'tank' 20m north of the site is considered more likely to have been a pond or a flax silo, due to its size, appearance and location on the historical maps. The residence adjacent to the site to the east was known to have a swimming pool. Backfill of the pond and pool may be producing ground gas.

Historical boreholes in the area did not identify peat, however it is occasionally present in tidal flat deposits. If it is identified, it may be a source of ground gas.

A summary of significant sources of contamination identified during this study are presented in Table 1.2.

Table 1.2 Summary of Contaminant Sources & Contaminants

Structure / Process	Contaminants Present
On-site	
Made Ground (S1)	Metals, PAH, TPH, Asbestos.
Ground Gas (Made Ground & Peat) (S2)	Carbon Dioxide, Methane
Off-site	
Ground Gas (Backfilled Pond, Pool) (S3)	Carbon Dioxide, Methane

6.2.2 Potential Receptors

The following are considered as potential receptors in relation to the current and proposed use of the site.

- **Future Residential users** – Female child aged 0-6 years;

Phase 1 Desk Study Report

- **Utility / Construction / Demolition / Site Investigation workers** – Workers undertaking routine / non-routine work involving ground disturbance works and maintenance of below ground services (assuming workers are only wearing standard construction / utility worker PPE);
- Underlying **Unproductive Aquifers** – Oxford Clay Formation, Tidal Flat Deposits;
- **Surface Water feature** – River Glen 27m south;
- **Structures** – Ingress of ground gas

6.2.3 Potential Contamination Pathways

The following are considered plausible contamination pathways given the nature of the site and the potential contaminative sources identified, and assuming a continued current use.

- Dermal contact and ingestions of soils;
- Inhalation of dust/fibres and vapours;
- Ingestion of home grown produce;
- Migration of leachable contaminants;
- Migration gases via granular soils;
- Ingress of PAH into drinking water supply.

6.2.4 Quantitative Risk Assessment

By considering the sources, pathways and receptors, an assessment of the environmental risks is made with reference to the significance and degree of the risk. This assessment is based on consideration of whether the source contamination can reach a receptor and hence whether it is of major or minor significance.

An initial conceptual model of the source-pathway-receptor linkages has been developed based on the information derived from the CGA desk study and this study. The Conceptual Site Model has been used to identify Relevant Pollutant Linkages for the current and proposed end uses which have been assessed quantitatively and qualitatively using risk terminology within CIRIA 552 guidance, as described below in Table 1.3 and Table 1.4.

Phase 1 Desk Study Report

Table 1.3 Methodology for Assessing Consequence of Harm

Consequence	Criteria
Severe	Short term (acute) risk to Human Health likely to result in “significant harm” as defined by the Environmental Protection Act 1990, Part IIa. Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings / property
Moderate	Chronic damage to Human Health likely, over a long term, to result in “significant harm” as defined by the Environmental Protection Act 1990, Part IIa. Pollution of sensitive water resources
Mild	Health effects to Human Health that are unlikely to result in “significant harm” as defined by the Environmental Protection Act 1990, Part IIa. Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings / structures / services or the environment
Negligible	Non-permanent health effects to Human Health that are unlikely to result in “significant harm” as defined by the Environmental Protection Act 1990, Part IIa. Those that are easily prevented by means such as personal protective clothing. Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve

Table 1.4 Methodology for Assessing Likelihood of Consequence Occurring

Probability	Criteria
Almost Certain	Circumstances are such that an event either appears very likely in the short term and almost inevitable over the long term or there is evidence of currently harm occurring
Likely	Circumstances are such that an event, whilst not inevitable, is possible in the short term and is likely to occur over the long term
Unlikely	Circumstances are such that it is possible an event could occur but it is by no means certain to occur even over a longer period, and it is less likely in the shorter term
Very Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable even in the medium to long term
Extremely Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are highly improbable even in the long term

The risk assessment table and apportioned scores presented in Table 1.5 are in general accordance with CIRIA 552. The main exception is that irreversible risks to human health are considered to have a severe consequence irrespective of whether the effects are chronic or acute in nature. The risks are scored from 0 to 48 with increasing significance with increasing scores.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Table 1.5 Summary of Risk Scoring

Consequence Probability	Severe (4)	Moderate (3)	Mild (2)	Negligible (1)
Almost Certain (12)	Very High Risk (48)	High Risk (36)	Moderate Risk (24)	Low Risk (12)
Likely (9)	High Risk (36)	Moderate Risk (27)	Moderate/ Low Risk (18)	Low Risk (9)
Unlikely (6)	Moderate Risk (24)	Moderate/ Low Risk (18)	Low Risk (12)	Very Low Risk (6)
Very Unlikely (3)	Low Risk (12)	Low Risk (9)	Very Low Risk (6)	Very Low Risk (3)
Extremely Unlikely (0)	Very Low Risk (0)	Very Low Risk (0)	Very Low Risk (0)	Very Low Risk (0)

The categories of risk are defined as follows:

Very High Risk: There is a probability that severe harm is almost certain to arise to a designated receptor from an identified source, or there is evidence that severe harm to a designated receptor is currently occurring.

High Risk: There is a probability that severe harm is likely to arise to a designated receptor from an identified source, or there is a probability that moderate harm is almost certain to arise.

Low Risk: There is a possibility that harm could arise to a designated receptor from an identified source, but it is likely that this harm, if realised, would be mild at worst.

Very Low Risk: There is a very low possibility that harm could arise to the receptor, but it is likely that this harm, if realised, would be mild at worst.

In accordance with CLR11, professional judgement has been employed to evaluate the risk on a qualitative basis using available information.

A summary of the pollution linkages are provided in Table 1.6.

Land at Reservoir Road, Surfleet, Spalding

Phase 1 Desk Study Report

Table 1.6 Phase 1 Conceptual Site Model

Area / Structure	Pollutants (Chemicals of Concern)	Critical Receptor	Pathway	Potential Consequence of Complete S-P-R Linkage	Potential Likelihood of Complete S-P-R Linkage	Risk Score and Equivalent CIRIA Risk Classification	Remedial Option(s) / Next steps	Comments
Made Ground (S1)	Metals, PAH, TPH, Asbestos	Future child site user	Direct contact / Dust inhalation	Moderate	Unlikely	Moderate/ Low Risk (18)	Further Assessment Required	Contamination from previous site uses are considered unlikely, though there is a high probability that there is a legacy of made ground associated with the historical development. No obvious olfactory or visual signs of contamination were noted during the walkover survey.
		Current site users		Mild	Unlikely	Low Risk (12)	No Further Assessment Required	The site is an unused agricultural field with sparse vegetation. Current agricultural use of land not known, but assumed not to be sensitive.
		Ground disturbance workers		Mild	Unlikely	Low Risk (12)	No Further Assessment required	Made ground is considered likely to be on site, and ground disturbance workers are considered more likely to be exposed. Standard clean site practices and basic PPE will reduce exposure.
		New Potable water supply pipes	Penetration of pipes	Negligible	Very Unlikely	Very Low Risk (3)	No Further Assessment required	Made ground on the site is considered to be unlikely to contain sufficient PAH/TPH contamination capable of adversely affecting potable water supplies.
		Unproductive Aquifer	Leaching / dissolution from contaminated soil followed by migration	Negligible	Very Unlikely	Very Low Risk (3)	No Further Assessment Required	The previous development of the site is considered very unlikely to have caused contamination capable of adversely affecting the underlying aquifer.
		Surface water (River Glen, 27m south)	Leaching / dissolution from contaminated soil followed by migration	Negligible	Unlikely	Very Low Risk (6)	No Further Assessment Required	Surface water runoff from the site is considered likely to enter the River Glen to the south. Contaminants are unlikely to be present at levels which could migrate beyond the site boundary.
Ground gas (made ground & peat, S2) (backfilled pond, S3)	Methane & Carbon Dioxide	Dwelling	Ingress of ground gases and vapours into structures	Mild	Unlikely	Low Risk (12)	Further Assessment Required	Two sources of potential ground gas within 250m of the site. Volume of fill material and likely gas generation are unlikely to be significant. Cohesive low permeability soils are unlikely to allow migration of ground gasses onto site. Made ground & Peat deposits, if identified on site, may produce ground gas.

6.3 Discussion of Risks

The risk assessment presented in Table 1.6 above has identified theoretical Contaminant Linkages and human health receptors under the proposed residential with gardens land use. The potential contaminant Linkages are summarised below. The assessment of the linkages is somewhat conservative/ precautionary in nature in order to reflect the absence of recent site specific data.

6.3.1 Human Health

Proposed residential property users

The site's historical development as a mill, and with potential farm buildings are unlikely to have contaminated the soil directly. A legacy of potentially contaminated made ground associated with these developments is likely to be present, although no obvious olfactory or visual signs of contamination were noted during the walkover survey. The level of risk to the future site uses has been estimated to be **MODERATE to LOW**.

Current site users

The site is currently used for agricultural purposes, namely growing crops. Farm workers are assumed to follow safe working practices which limit direct exposure to soils, and therefore the level of risk to current site users has been estimated to be **LOW**.

Utility / Construction / Demolition / Site Investigation (i.e. Ground Disturbance) Workers

The probability of contact with contaminated soils increases for workers involved with ground excavations (e.g. during development, site investigation or maintenance works). Contamination which would require more than standard PPE and standard clean working practices are considered to be unlikely. The level of risk to ground workers from potential contaminated soils is estimated to be **LOW**.

6.3.2 Controlled Waters

Site soils are 'unproductive strata' which would greatly limit percolation. It is considered very unlikely that there is contamination of the site which is sufficient to adversely affecting the underlying aquifer.

Water is more likely to run off from the site and enter the River Glen 27m to the south. However, it is considered unlikely that significant concentrations of contaminants are present on site, which would therefore be unlikely to migrate beyond the site boundary.

The risks to both surface water and the underlying aquifer has been estimated to be **VERY LOW**.

6.3.3 Structures Ground Gases/Vapours

Tidal flat deposits have been identified on the site, which can contain horizons of gas-producing peat. The nearest historical BGS borehole did not identify peat, however there is a possibility that it may be still be present on site.

Two minor sources of ground gas have been identified, relatively close to the site boundary. However, the small size of the potential sources, and cohesive nature of the site strata are considered to greatly reduce the applicable hazard.

Risks from potential ground gases have been estimated to be **LOW**.

6.3.4 Potable Water Supply Pipes

The site made ground is considered to be highly unlikely to be significantly contaminated so as to compromise new potable water pipes, and so the risk to these is considered to be **VERY LOW**.

7.0 CONCLUSIONS & RECOMMENDATIONS

The study has shown the site has been part of a flax mill, and developed with agricultural buildings prior to being used for growing crops. There is likely to be a legacy of made ground on the site, and fragments of brick were observed in the site soils. It is possible that pesticides and herbicides may be recorded within the soils on site, however if present these contaminants would likely be recorded below harmful levels.

A review of the surrounding land recorded a predominantly residential and agricultural use, and two minor off site source ground gas production. However, ground gasses are considered unlikely to be able to migrate through cohesive strata to compromise site structures. Tidal flat deposits are expected to be found on site, which may contain peat. Although a local BGS borehole did not identify any peat, there is still a possibility that it may be present on site.

The overall risk from potential contamination has been estimated to be **MODERATE to LOW** with the risks from potential ground gasses estimated to be **LOW**. However, should peat deposits be encountered during construction excavations the risks from potential ground gases is recommended to be reassessed.

Further investigation to assess the extent, depth and content of any made ground from previous developments on the site is recommended. Such investigation could be conducted using trial pitting methods. However, should made ground or peat deposits be encountered other site investigation methods will be needed to install gas monitoring wells. Samples should be taken and tested for a standard suite of determinands to assess the suitability of site soils for private garden use.

8.0 REFERENCES

- BS 5930: (2015) Code of Practice for Site Investigations. British Standards Institution.
- BS 10175: (2011)+A2:2107 Code of Practice for the Investigation of Potentially Contaminated Sites. British Standard Institution.
- DEFRA and Environment Agency (2004) Model Procedures for the Management of Land Contamination, R&D Publication CLR11.
- DEFRA and The Institute for Environment and Health (2000) Guidelines for Environmental Risk Assessment and Management.
- Environment Agency (2000) Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, R&D Technical Report P5-066/TR.

Land at Reservoir Road, Surfleet, Spalding
Phase 1 Desk Study Report

Appendices

Land at Reservoir Road, Surfleet, Spalding
Phase 1 Desk Study Report

Appendix A – Figures and Drawings



Chevin Geoenviro Associates LTD

Tel: 01943 470363

E-mail info@chevin-ltd.co.uk

Geo-environmental Consultancy
Ground Technologies & Investigation & Remediation

Project : Reservoir Road, Surfleet, Spalding

Client. Mr. T. Forman

Project No. C0362

Date 13/12/2019



Chevin Geoenviro Associates LTD

Tel: 01943 470363

E-mail info@chevin-ltd.co.uk

Geo-environmental Consultancy
Ground Technologies & Investigation & Remediation

Project : Reservoir Road, Surfleet, Spalding

Client. Mr. T. Forman

Project No. C0362

Date 13/12/2019

Land at Reservoir Road, Surfleet, Spalding
Phase 1 Desk Study Report

Appendix B – Site Walkover Photographs



Photograph No.1: Reservoir Road located south of site (site on right), facing slightly north west.



Photograph No.2: South western corner of site from Reservoir Road. Facing north.

Chevin Geoenviro Associates LTD

Tel: 01943 470363

E-mail info@chevin-ltd.co.uk

**Geo-environmental Consultancy
Ground Technologies & Investigation & Remediation**

Project: Reservoir Road, Surfleet, Spalding

Client. Mr. T. Forman

Project No. C0362

Date: 13/12/2019



Photograph No.3: South eastern corner of site from Reservoir Road, facing north west.



Photograph No.4: North eastern corner of site from adjacent field, facing south west.

Chevin Geoenviro Associates LTD

Tel: 01943 470363

E-mail info@chevin-ltd.co.uk

**Geo-environmental Consultancy
Ground Technologies & Investigation & Remediation**

Project: Reservoir Road, Surfleet, Spalding

Client. Mr. T. Forman

Project No. C0362

Date: 13/12/2019



Photograph No.5: North western corner of site from adjacent field, facing south east.



Photograph No.6: Tilled ground conditions on site.

Chevin Geoenviro Associates LTD Tel: 01943 470363 E-mail info@chevin-ltd.co.uk Geo-environmental Consultancy Ground Technologies & Investigation & Remediation	Project: Reservoir Road, Surfleet, Spalding	
	Client. Mr. T. Forman	
	Project No. C0362	Date: 13/12/2019

Appendix C – Groundsure Report



Chevin Geoenviro Associates Ltd
34, Tarn House 77 High Street,
Yeadon, LS19 7SP

Groundsure Reference: GS-6506632

Your Reference: CE362

Report Date 9 Dec 2019

Report Delivery Method: Email - pdf

Enviro Insight

Address: RESERVOIR ROAD, SURFLEET, SPALDING, PE11 4DH

Dear Sir/ Madam,

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

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Address: RESERVOIR ROAD, SURFLEET, SPALDING, PE11 4DH
Date: 9 Dec 2019
Reference: GS-6506632
Client: Chevin Geoviro Associates Ltd



Aerial Photograph Capture date: 20-Apr-2018
Grid Reference: 527298,329030
Site Size: 0.1831ha

Report Reference: GS-6506632
Client Reference: CE362

Contents Page

Contents Page	3
Overview of Findings	6
Using this report	10
1. Historical Land Use	11
1. Historical Industrial Sites	12
1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping	12
1.2 Additional Information – Historical Tank Database	12
1.3 Additional Information – Historical Energy Features Database	12
1.4 Additional Information – Historical Petrol and Fuel Site Database	13
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	13
1.6 Historical military sites	13
1.7 Potentially Infilled Land	13
2. Environmental Permits, Incidents and Registers Map	14
2. Environmental Permits, Incidents and Registers	15
2.1 Industrial Sites Holding Licences and/or Authorisations	15
2.1.1 Records of historic IPC Authorisations within 500m of the study site	15
2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site	15
2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site	15
2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site	15
2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site	15
2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site	16
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	16
2.1.8 Records of Licensed Discharge Consents within 500m of the study site	16
2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site	17
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	17
2.2 Dangerous or Hazardous Sites	17
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents	17
2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site	17
2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site	17
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	18
3. Landfill and Other Waste Sites Map	19
3. Landfill and Other Waste Sites	20
3.1 Landfill Sites	20
3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site	20
3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site	20
3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site	20
3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site	20
3.2 Other Waste Sites	21
3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site	21
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site	21
4. Current Land Use Map	22
4. Current Land Uses	23
4.1 Current Industrial Data	23
4.2 Petrol and Fuel Sites	23
4.3 National Grid High Voltage Underground Electricity Transmission Cables	23
4.4 National Grid High Pressure Gas Transmission Pipelines	24

5. Geology	25
5.1 Artificial Ground and Made Ground.....	25
5.2 Superficial Ground and Drift Geology	25
5.3 Bedrock and Solid Geology	25
6 Hydrogeology and Hydrology	26
6a. Aquifer Within Superficial Geology	26
6b. Aquifer Within Bedrock Geology and Abstraction Licences	27
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences	28
6d. Hydrogeology – Source Protection Zones within confined aquifer	29
6e. Hydrology – Watercourse Network and River Quality	30
6.Hydrogeology and Hydrology	31
6.1 Aquifer within Superficial Deposits.....	31
6.2 Aquifer within Bedrock Deposits.....	31
6.3 Groundwater Abstraction Licences.....	31
6.4 Surface Water Abstraction Licences.....	32
6.5 Potable Water Abstraction Licences.....	33
6.6 Source Protection Zones.....	33
6.7 Source Protection Zones within Confined Aquifer.....	33
6.8 Groundwater Vulnerability and Soil Leaching Potential.....	33
6.9 River Quality.....	34
6.9.1 Biological Quality:.....	34
6.9.2 Chemical Quality:.....	34
6.10 Ordnance Survey MasterMap Water Network.....	35
6.11 Surface Water Features.....	40
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)	41
7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS)	42
Map	42
7 Flooding	43
7.1 River and Coastal Zone 2 Flooding.....	43
7.2 River and Coastal Zone 3 Flooding.....	44
7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating.....	45
7.4 Flood Defences.....	45
7.5 Areas benefiting from Flood Defences.....	45
7.6 Areas benefiting from Flood Storage.....	45
7.7 Groundwater Flooding Susceptibility Areas.....	45
7.8 Groundwater Flooding Confidence Areas.....	46
8. Designated Environmentally Sensitive Sites Map	47
8. Designated Environmentally Sensitive Sites	48
8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:.....	48
8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:.....	48
8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:.....	48
8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:.....	48
8.5 Records of Ramsar sites within 2000m of the study site:.....	48
8.6 Records of Ancient Woodland within 2000m of the study site:	49
8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:.....	49
8.8 Records of World Heritage Sites within 2000m of the study site:.....	49
8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:	49
8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:	49
8.11 Records of National Parks (NP) within 2000m of the study site:	49
8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:.....	49
8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:.....	50

8.14 Records of Green Belt land within 2000m of the study site:.....	50
9. Natural Hazards Findings.....	51
9.1 Detailed BGS GeoSure Data.....	51
9.1.1 Shrink Swell.....	51
9.1.2 Landslides.....	51
9.1.3 Soluble Rocks.....	51
9.1.4 Compressible Ground.....	52
9.1.5 Collapsible Rocks.....	52
9.1.6 Running Sand.....	52
9.2 Radon.....	53
9.2.1 Radon Affected Areas.....	53
9.2.2 Radon Protection.....	53
10. Mining.....	54
10.1 Coal Mining.....	54
10.2 Non-Coal Mining.....	54
10.3 Brine Affected Areas	54
Contact Details.....	55
Standard Terms and Conditions.....	57

Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	1	1	0	2
1.2 Additional Information – Historical Tank Database	0	0	0	5
1.3 Additional Information – Historical Energy Features Database	0	0	0	1
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	1
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	0	6
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	6
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

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

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

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

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified					
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	3	5
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	0	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	Yes	Yes	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	2	14	42	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Environment Agency Zone 2 floodplains within 250m of the study site	Identified					
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Identified					
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low					
7.4 Flood Defences within 250m of the study site	None identified					
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified					
7.6 Areas used for Flood Storage within 250m of the study site	None identified					
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Not Prone					
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Not Applicable					

Section 8: Designated Environmentally Sensitive Sites

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

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	1	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards	
9.1 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Moderate
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Negligible
9.1.6 Maximum Running Sand hazard rating identified on the study site	Moderate
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining	
10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

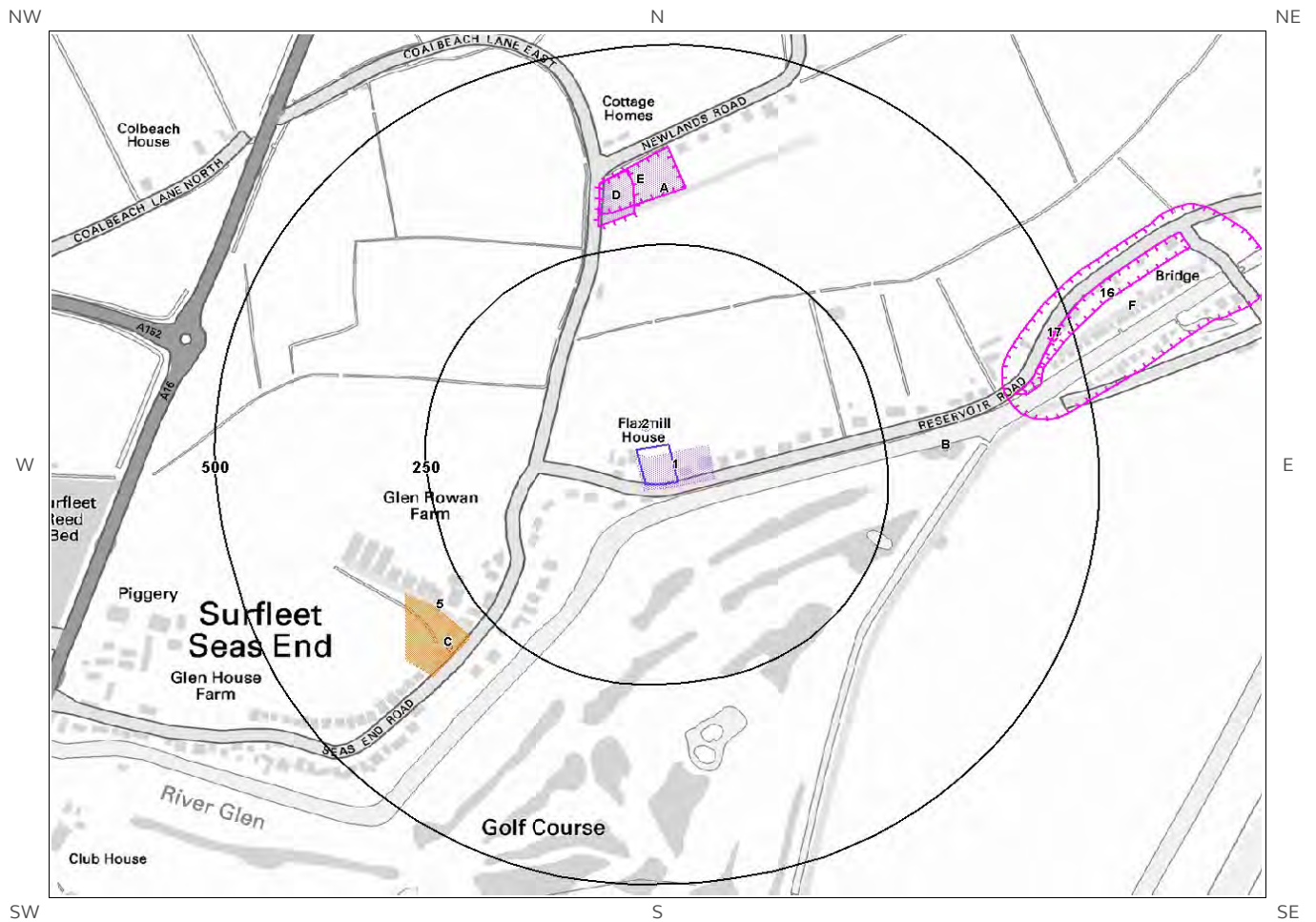
Note: Maps

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

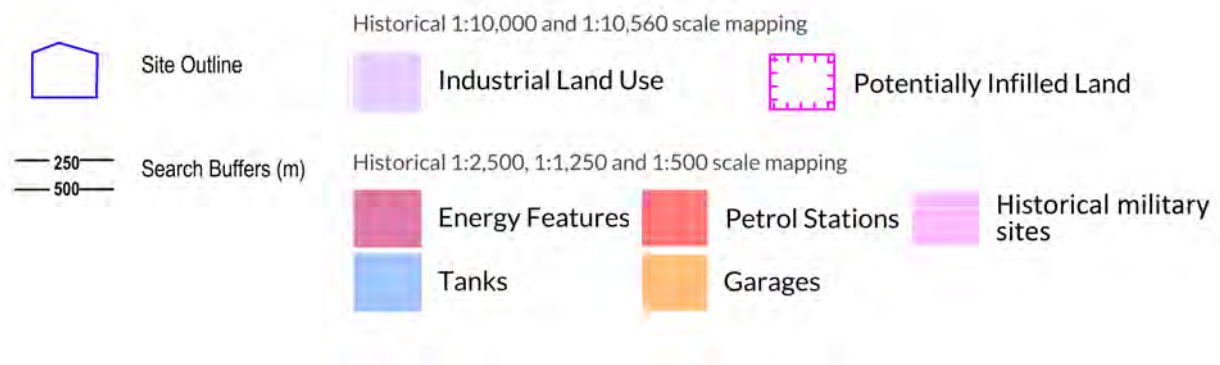
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

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

1. Historical Land Use



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 4

ID	Distance [m]	Direction	Use	Date
1	0	On Site	Disused Flax Mills	1887
2	20	N	Unspecified Tank	1950
3D	282	N	Sewage Works	1973
4E	296	N	Sewage Works	1989

1.2 Additional Information – Historical Tank Database

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

Records of historical tanks within 500m of the search boundary: 5

ID	Distance (m)	Direction	Use	Date
5	287	SW	Unspecified Tank	1972
6A	314	N	Unspecified Tank	1971
7A	314	N	Unspecified Tank	1987
8B	318	E	Unspecified Tank	1987
9B	320	E	Unspecified Tank	1971

1.3 Additional Information – Historical Energy Features Database

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

Records of historical energy features within 500m of the search boundary: 1

ID	Distance (m)	Direction	Use	Date
10C	306	SW	Electricity Substation	1986

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

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

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 1

ID	Distance (m)	Direction	Use	Date
11C	282	SW	Garage	1986

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

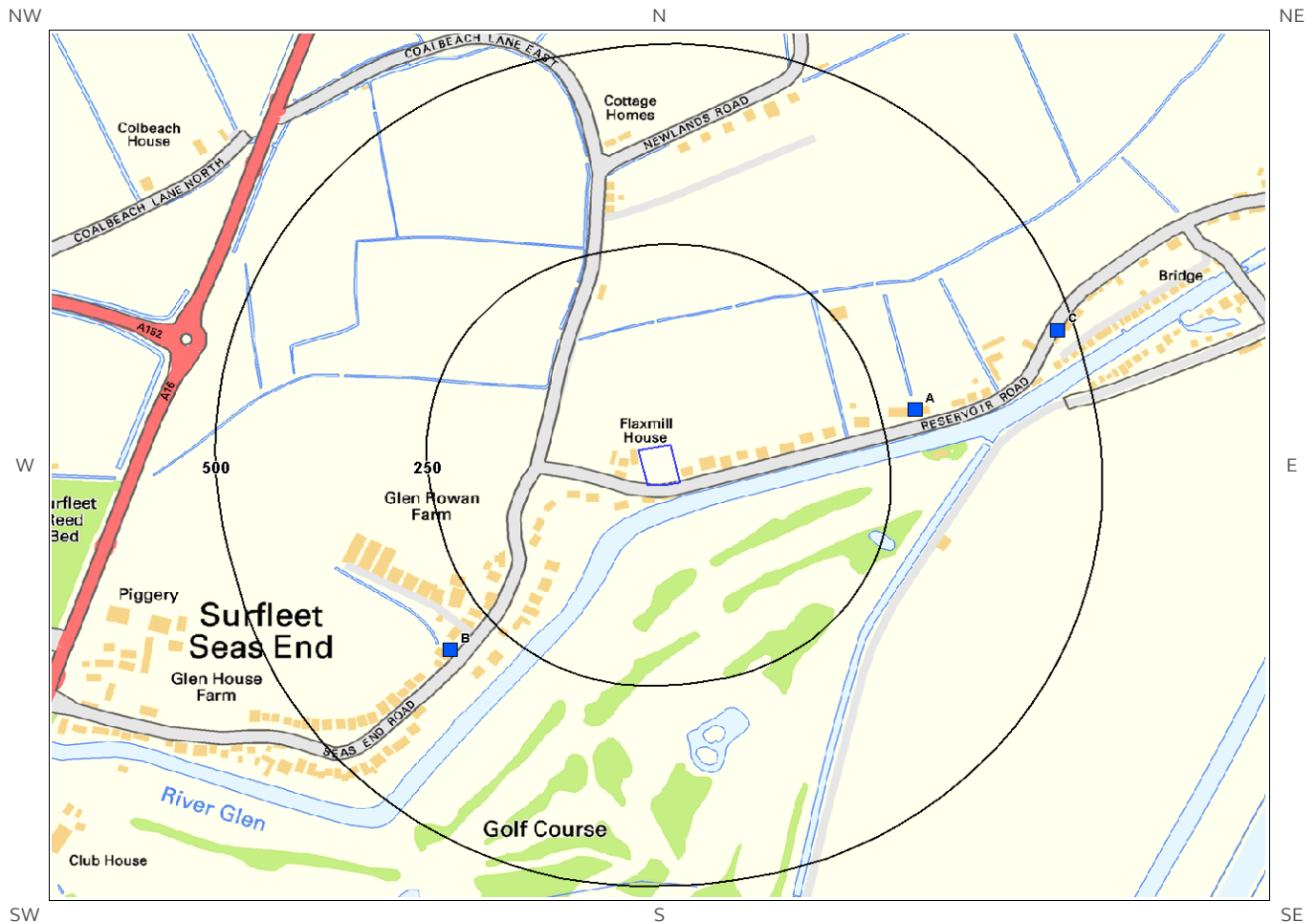
1.7 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 6

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

ID	Distance(m)	Direction	Use	Date
12D	282	N	Sewage Works	1973
13E	296	N	Sewage Works	1989
14F	403	E	Reservoir	1947
15F	403	E	Reservoir	1903
16	414	E	Reservoir	1932
17	469	E	Reservoir	1955

2. Environmental Permits, Incidents and Registers Map



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

6

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

ID	Distance (m)	Direction	NGR	Details
1A	291	E	527600 329100	Address: BRAMBLE NOOK, RESERVOIR ROAD, SURFLEET, SPALDING, LINCS, PE11 4DH Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRNNF18572 Permit Version: 1 Receiving Water: TRIBUTARY OF RIVER GLEN Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/09/2006 Effective Date: 12-Jul-2006 Revocation Date: -
2A	291	E	527600 329100	Address: BRAMBLE NOOK, RESERVOIR ROAD, SURFLEET, SPALDING, LINCS, PE11 4DH Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRNNF18571 Permit Version: 1 Receiving Water: TRIBUTARY OF RIVER GLEN Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/09/2006 Effective Date: 12-Jul-2006 Revocation Date: -
3B	312	SW	527050 328800	Address: WOODS LANE, SURFLEET, SPALDING Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AW5NF560 Permit Version: 1 Receiving Water: Fen Drain Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 10/08/1971 Effective Date: 10-Aug-1971 Revocation Date: 05/03/2019
4B	312	SW	527050 328800	Address: WOODS LANE, SURFLEET, SPALDING Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AW5NF560 Permit Version: 2 Receiving Water: Fen Drain Status: VARIED UNDER EPR 2010 Issue date: 06/03/2019 Effective Date: 06-Mar-2019 Revocation Date: -
5C	479	E	527769 329199	Address: RESERVOIR ROAD NO.29, SURFLEET RESERVOIR, SPALDING, LINCS Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR5LF5330 Permit Version: 1 Receiving Water: - Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 10/04/1987 Effective Date: 10-Apr-1987 Revocation Date: 13/12/2011

ID	Distance (m)	Direction	NGR	Details
6C	479	E	527769 329199	Address: RESERVOIR ROAD NO.29, SURFLEET RESERVOIR, SPALDING, LINCS Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR5LF5330 Permit Version: 2 Receiving Water: LAND Status: VARIED UNDER EPR 2010 Issue date: 14/12/2011 Effective Date: 14-Dec-2011 Revocation Date: -

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

0

Database searched and no data found.

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

0

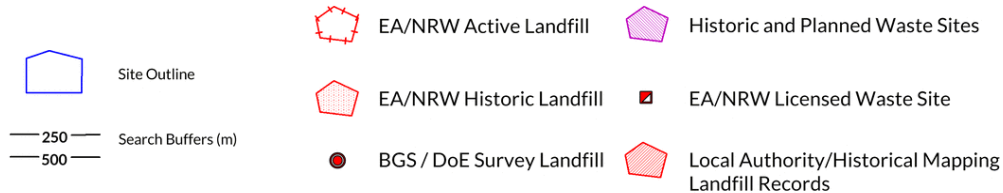
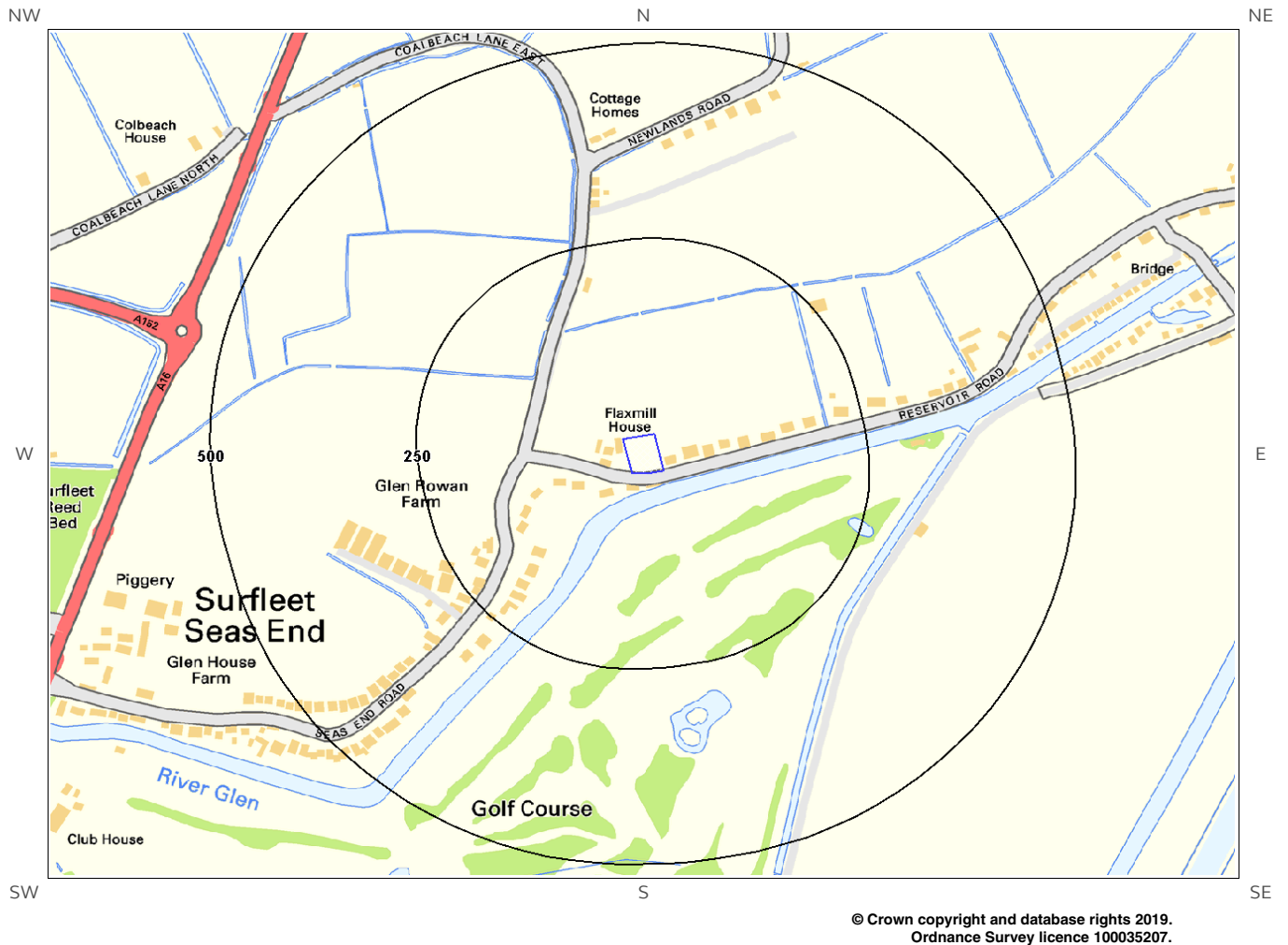
Database searched and no data found.

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

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

Database searched and no data found.

3. Landfill and Other Waste Sites Map



3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	NGR	Details
Not shown	1441	N	Site Address: Surfleet Bank, Gosberton Marsh, Lincolnshire Waste Licence: Yes Site Reference: L228, RD7-0399G, 2500/5308 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: AY1/L/BIR002	Licence Issue: 09-Jun-1993 Licence Surrendered: 07-Apr-2006 Licence Holder Address: Hill House, 1 Little New Street, London Operator: Birse Construction Limited Licence Holder: Birse Construction Limited First Recorded: - Last Recorded: -

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

0

Database searched and no data found.

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

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

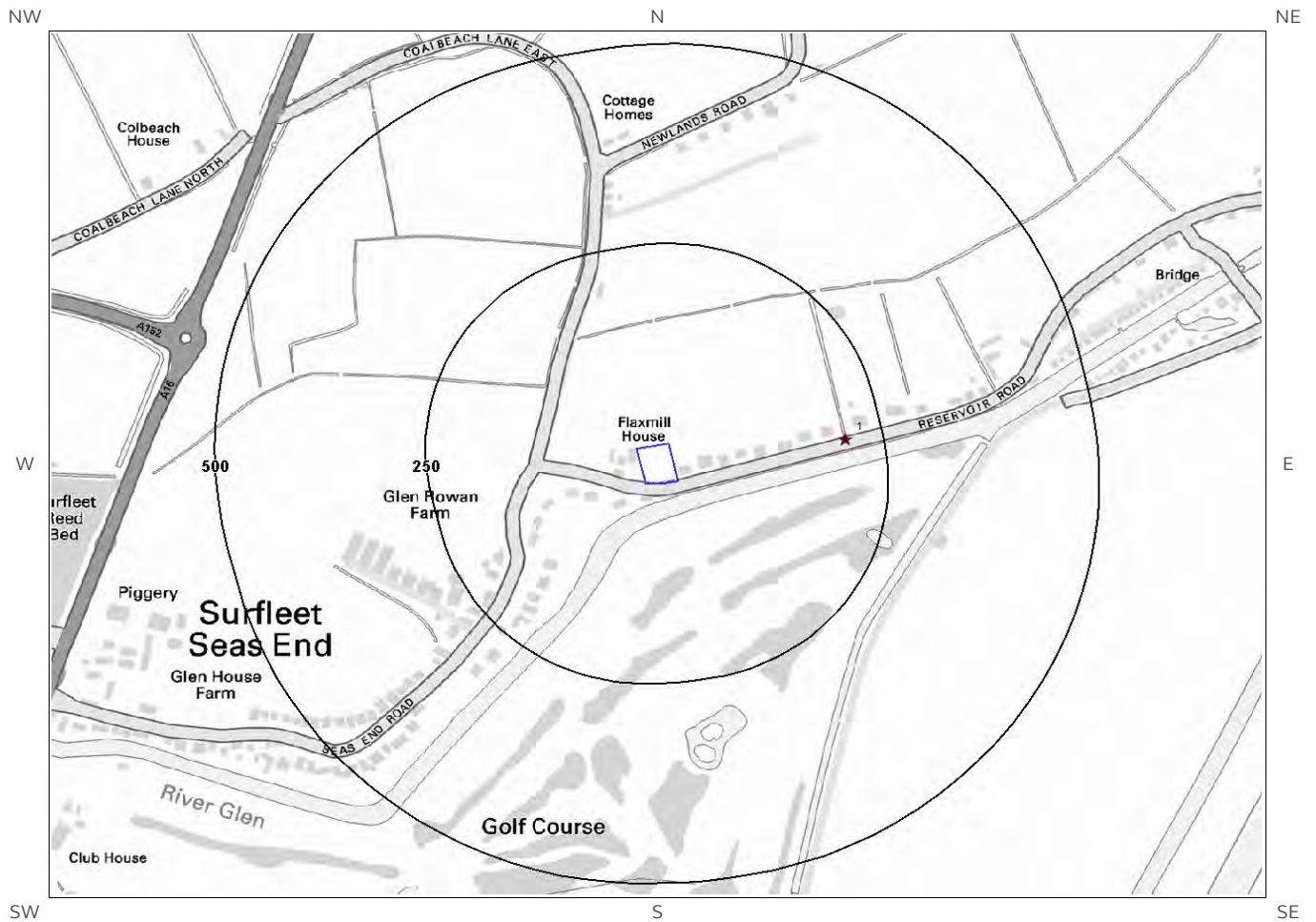
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

2

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

ID	Distance (m)	Direction	NGR	Details
Not shown	1446	N	527400 330500	Site Address: Surfleet Bank, Gosberton Marsh, Lincolnshire, PE11 4PB Type: Landfill taking Non-Biodegradable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BIR002 EPR reference: EA/EPR/BP3992NS/S002 Operator: Burse Construction Ltd Waste Management licence No: 73072 Annual Tonnage: 150000.0 Issue Date: 09/06/1993 Effective Date: - Modified: - Surrendered Date: Apr 7 2006 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Surfleet Bank, Gosberton Marsh Correspondence Address: -
Not shown	1446	N	527400 330500	Site Address: Surfleet Bank, Gosberton Marsh, Lincolnshire, PE11 4PB Type: Landfill taking Non-Biodegradable Wastes Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BIR002 EPR reference: - Operator: Burse Construction Ltd Waste Management licence No: 73072 Annual Tonnage: 0.0 Issue Date: 09/06/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Surfleet Bank, Gosberton Marsh Correspondence Address: Hill House, 1, Little New Street, London, EC4A 3TR

4. Current Land Use Map



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 1

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	206	E	Electricity Sub Station	527521 329062	Lincolnshire, PE11	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
TFD-XCZ	TIDAL FLAT DEPOSITS	CLAY AND SILT

5.3 Bedrock and Solid Geology

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

Lex Code	Description	Rock Type
OXC-MDST	OXFORD CLAY FORMATION	MUDSTONE

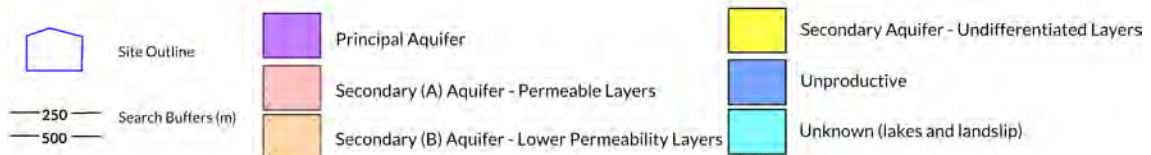
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



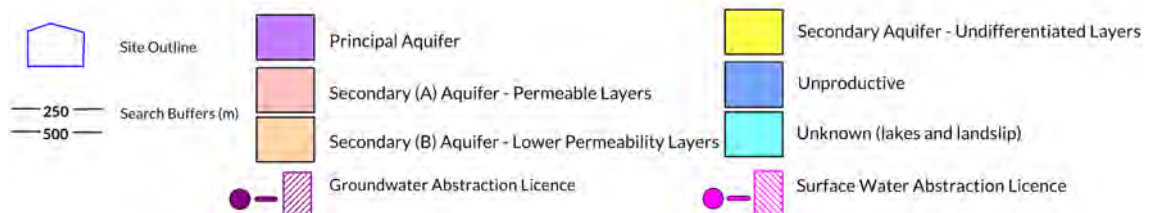
© Crown copyright and database rights 2019
Ordnance Survey licence 100035207.



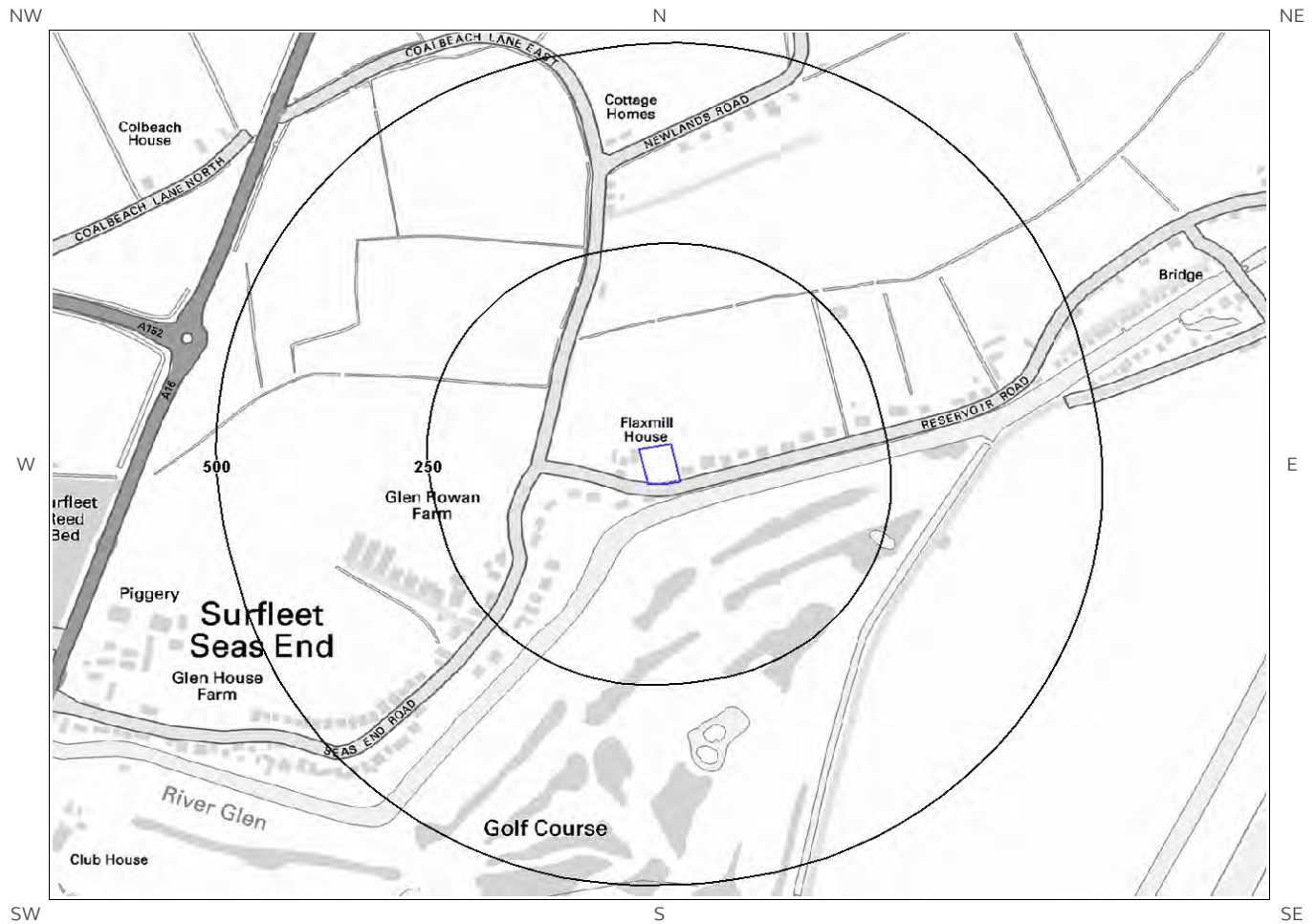
6b. Aquifer Within Bedrock Geology and Abstraction Licences



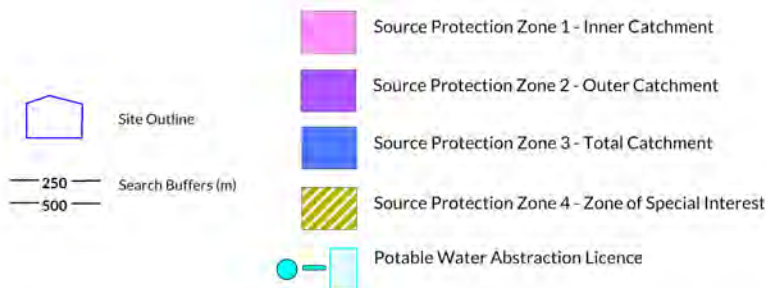
© Crown copyright and database rights 2019
Ordnance Survey licence 100035207.



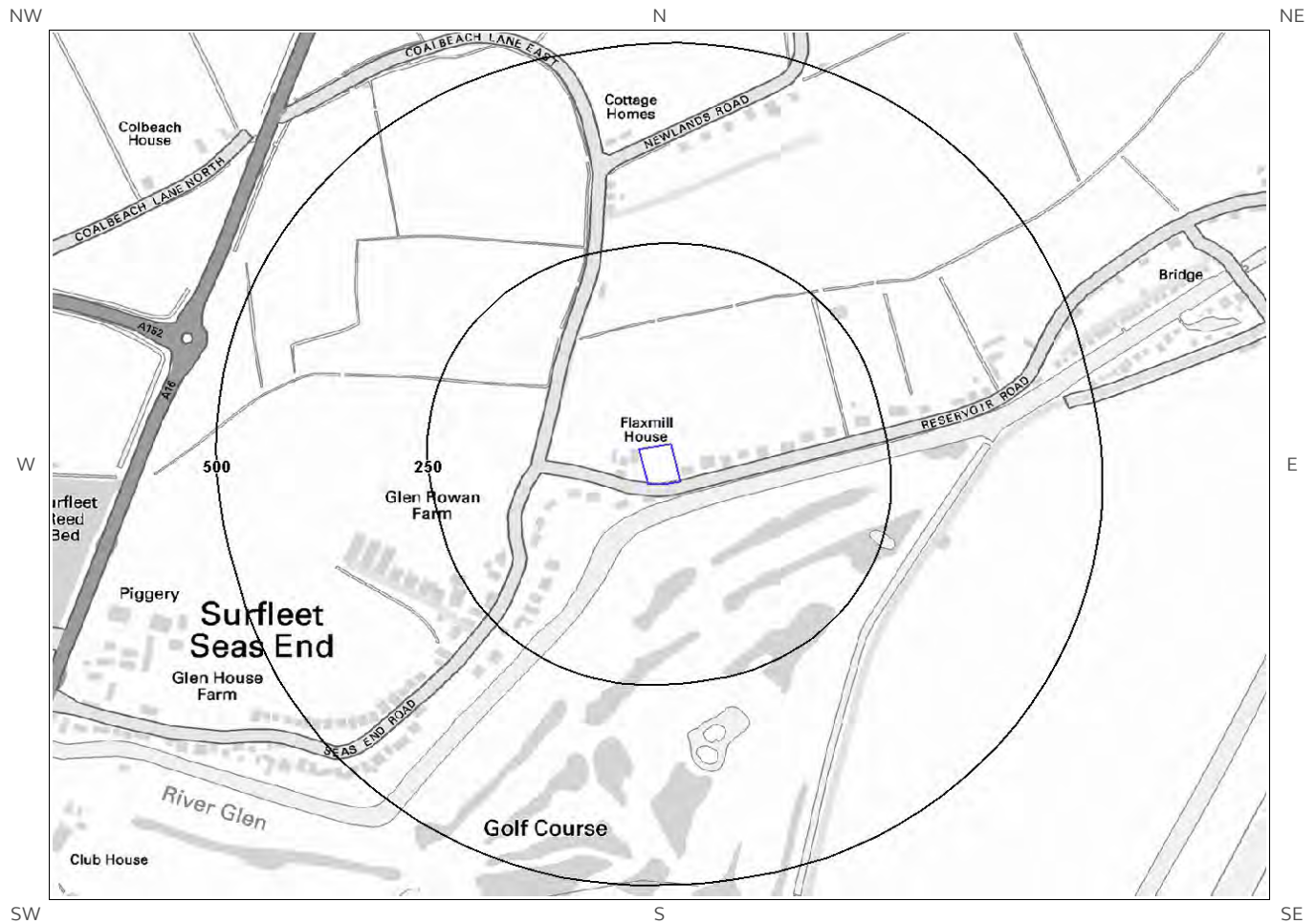
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



© Crown copyright and database rights 2019
Ordnance Survey licence 100035207.



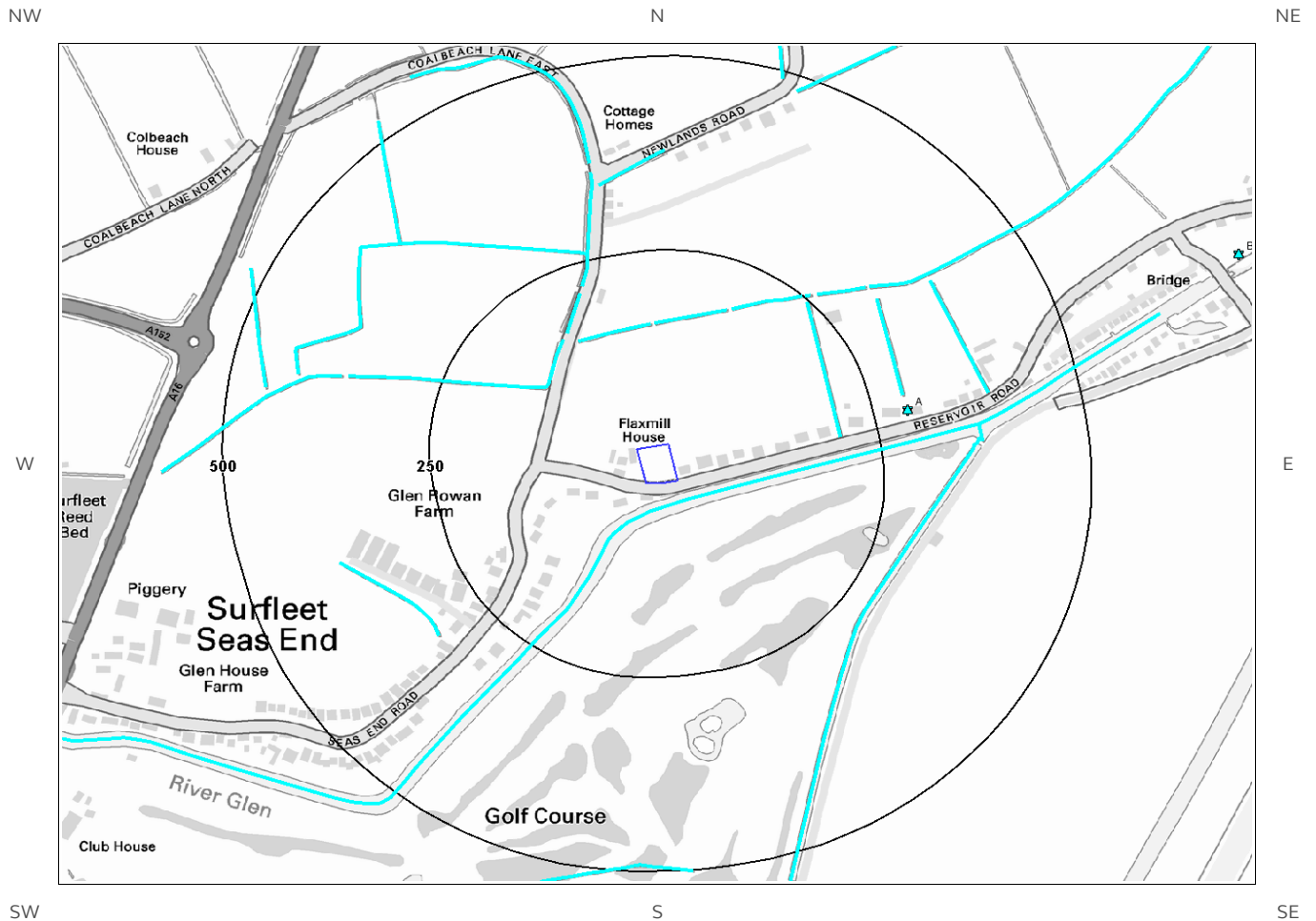
6d. Hydrogeology – Source Protection Zones within confined aquifer



© Crown copyright and database rights 2019
Ordnance Survey licence 100035207.



6e. Hydrology – Watercourse Network and River Quality



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aquifer within Bedrock Deposits

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

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site None identified

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site

Identified

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

ID	Distance (m)	Direction	NGR	Details
3	659	SW	526700 328700	Status: Active Licence No: 5/31/14/*S/0123 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: R GLEN AT SURFLEET Data Type: Point Name: SPALDING GOLF CLUB Annual Volume (m³): 3,410 Max Daily Volume (m³): 250 Application No: - Original Start Date: 01/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2004 Version End Date:
4	726	SW	526640 328670	Status: Active Licence No: 5/31/14/*S/0249 Details: Spray Irrigation - Storage Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: RIVER GLEN - SURFLEET Data Type: Point Name: SPALDING GOLF CLUB Annual Volume (m³): 12,800 Max Daily Volume (m³): 302 Application No: - Original Start Date: 09/01/2002 Expiry Date: 31/03/2022 Issue No: 1 Version Start Date: 01/04/2004 Version End Date:
Not shown	804	S	525810 325600	Status: Active Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: BLUE GOWT "C - D" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:
Not shown	1057	S	526190 325300	Status: Active Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: VERNATTS DRAIN "A - B" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:
Not shown	1057	S	526190 325300	Status: Active Licence No: 5/31/14/*S/0247 Details: General Farming & Domestic Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: VERNATTS DRAIN "A - B" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:
Not shown	1935	S	527010 327090	Status: Active Licence No: 5/31/14/*S/0247 Details: General Farming & Domestic Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: VERNATTS DRAIN "G - H" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:
Not shown	1935	S	527010 327090	Status: Active Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: VERNATTS DRAIN "G - H" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1935	S	527010 327090	Status: Active Licence No: 5/31/14/*S/0247 Details: Spray Irrigation - Storage Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: VERNATTS DRAIN "G - H" Data Type: Line Name: LINCOLNSHIRE FIELD PRODUCTS LTD Annual Volume (m³): 135,000 Max Daily Volume (m³): 8,000 Application No: - Original Start Date: 27/11/1998 Expiry Date: - Issue No: 1 Version Start Date: 27/11/1998 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site None identified

Database searched and no data found.

6.6 Source Protection Zones

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

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

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

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site None identified

Database searched and no data found.

6.9 River Quality

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

6.9.1 Biological Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
30A	291	E	527600 329100	River Name: Glen Reach: Blue Gowt Drain...surfleet Seas End Slui End/Start of Stretch: Start of Stretch NGR	B	B	B	B	B
31A	291	E	527600 329100	River Name: Glen Reach: Surfleet...blue Gowt Drain End/Start of Stretch: End of Stretch NGR	B	B	B	B	B
32B	730	E	528000 329300	River Name: Glen Reach: Blue Gowt Drain...surfleet Seas End Slui End/Start of Stretch: End of Stretch NGR	B	B	B	B	B

6.9.2 Chemical Quality:

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

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
33A	291	E	527600 329100	River Name: Glen Reach: Blue Gowt Drain Surfleet Seas End Slui End/Start of Stretch: Start of Stretch NGR	D	C	C	B	B
34A	291	E	527600 329100	River Name: Glen Reach: Surfleet Blue Gowt Drain End/Start of Stretch: End of Stretch NGR	D	C	C	B	B
35B	730	E	528000 329300	River Name: Glen Reach: Blue Gowt Drain Surfleet Seas End Slui End/Start of Stretch: End of Stretch NGR	D	C	C	B	B

6.10 Ordnance Survey MasterMap Water Network

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

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

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

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	27 S	River Glen Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 19.0
43	27 S	River Glen Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 19.0
2	135 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
44	135 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
3	152 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
45	152 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
4	156 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
46	156 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
5	171 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
47	171 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.0
6	190 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
48	190 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
7	204 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
49	204 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
8	220 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
50	220 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.7
9	252 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
51	252 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.6
10	258 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
11	258 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
52	258 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
53	258	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	N			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
12	263 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
54	263 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
13	281 SE	Blue Gowt Drain Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 7.9
55	281 SE	Blue Gowt Drain Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 7.9
14	290 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
56	290 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
15	314 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
57	314 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
16	316 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
58	316 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
17	342 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
Not shown	342 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): 2.7
18	367 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
Not shown	367 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.1
19	369 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
61	369 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
20	371 E	Blue Gowt Drain Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 20.3
21	371 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.3
Not shown	371 E	Blue Gowt Drain Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 20.3
Not shown	371 E	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.3
22	372 E	River Glen Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 20.3
23	372 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4
Not shown	372 E	River Glen Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 20.3
Not shown	372 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.4

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
24	376 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
66	376 NE	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.3
25	390 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
Not shown	390 NW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
26	454 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
Not shown	454 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.5
27	480 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.6
Not shown	480 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.6
28	490 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.4
Not shown	490 N	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.4
29	492 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	492 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Welland Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

6.11 Surface Water Features

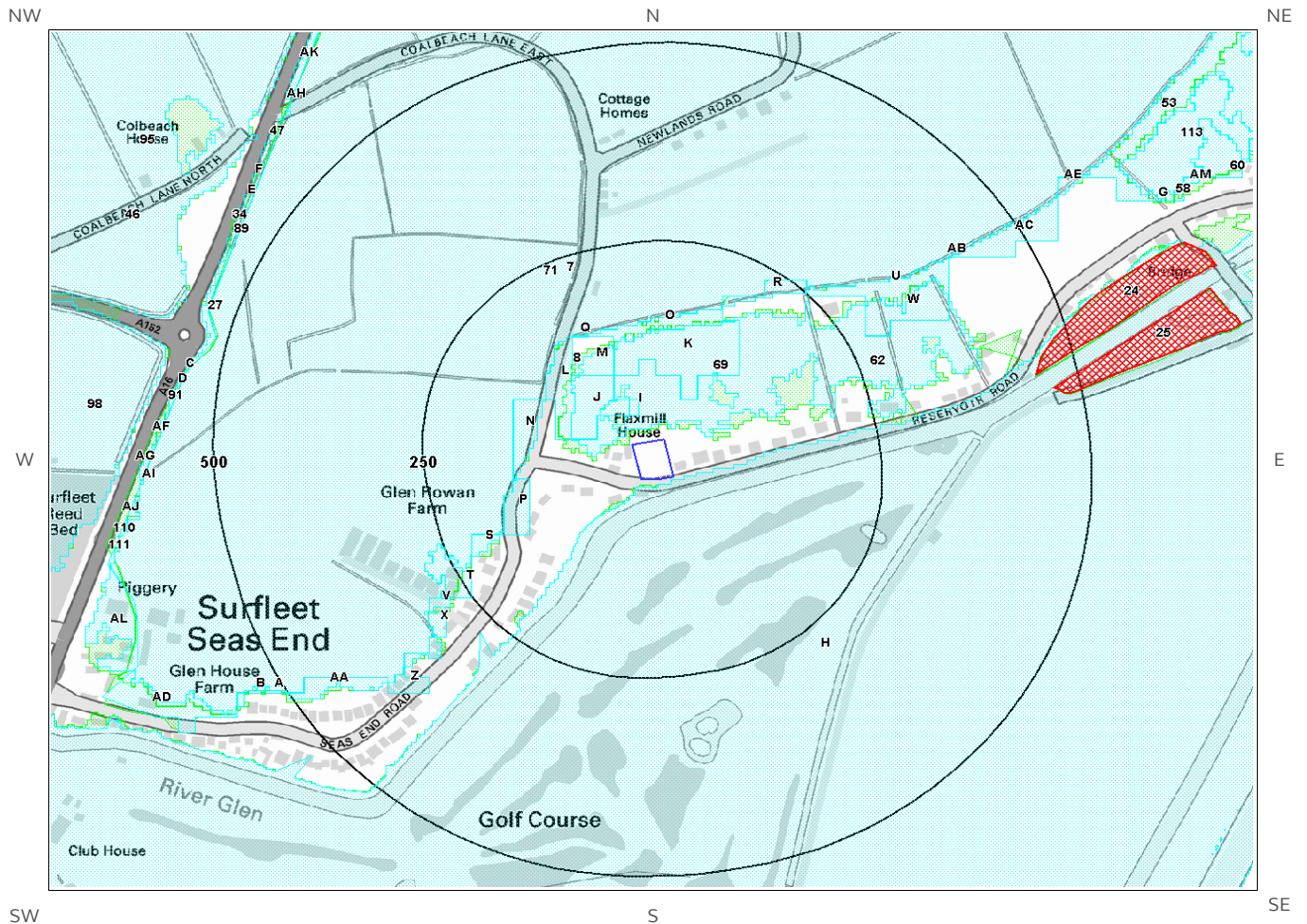
Surface water features within 250m of the study site

Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
16	S
134	NW
151	N
155	N
170	NW
189	NE
203	E
219	N
232	E

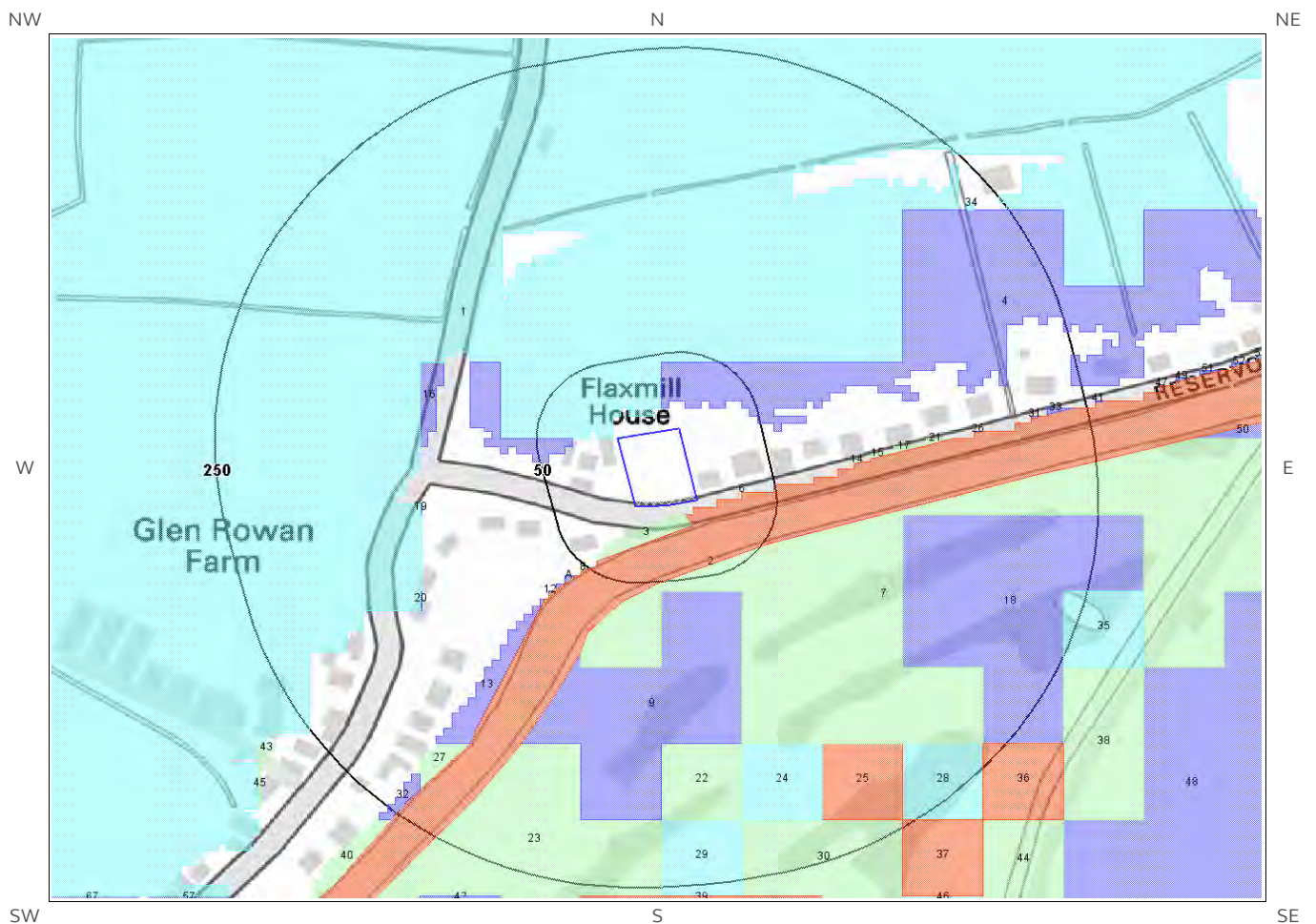
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



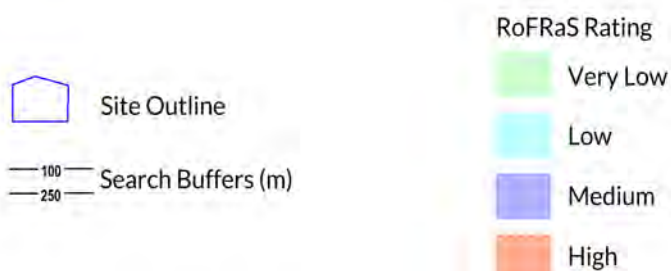
© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



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



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



7 Flooding

7.1 River and Coastal Zone 2 Flooding

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

Identified

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

ID	Distance (m)	Direction	Update	Type
1H	3	W	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
2J	35	N	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
3K	54	N	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
4L	83	W	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
5M	89	N	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
6N	113	W	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
7	117	NW	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
8	119	NW	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
9P	128	W	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
10O	130	N	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
11Q	145	N	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
12R	182	NE	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
13S	182	W	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
14T	224	SW	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)
15U	248	NE	19-Nov-2019	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

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

Identified

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

ID	Distance (m)	Direction	Update	Type
1H	4	S	19-Nov-2019	Zone 3 - (Fluvial Models)
2J	13	NW	19-Nov-2019	Zone 3 - (Fluvial Models)
3K	35	N	19-Nov-2019	Zone 3 - (Fluvial Models)
4L	37	N	19-Nov-2019	Zone 3 - (Fluvial Models)
5M	42	W	19-Nov-2019	Zone 3 - (Fluvial Models)
6N	54	N	19-Nov-2019	Zone 3 - (Fluvial Models)
7	73	W	19-Nov-2019	Zone 3 - (Fluvial Models)
8	89	N	19-Nov-2019	Zone 3 - (Fluvial Models)
9P	99	NE	19-Nov-2019	Zone 3 - (Fluvial Models)
10O	113	W	19-Nov-2019	Zone 3 - (Fluvial Models)
11Q	117	NW	19-Nov-2019	Zone 3 - (Fluvial Models)
12R	121	N	19-Nov-2019	Zone 3 - (Fluvial Models)
13S	128	W	19-Nov-2019	Zone 3 - (Fluvial Models)
14T	145	N	19-Nov-2019	Zone 3 - (Fluvial Models)
15U	182	NE	19-Nov-2019	Zone 3 - (Fluvial Models)
	182	W	19-Nov-2019	Zone 3 - (Fluvial Models)
	224	SW	19-Nov-2019	Zone 3 - (Fluvial Models)
	248	NE	19-Nov-2019	Zone 3 - (Fluvial Models)

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

Highest risk of flooding onsite

Very Low

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

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

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

ID	Distance (m)	Direction	RoFRaS flood Risk
1	3.0	W	Low
2	4.0	S	High
3	6.0	S	Very Low
4	14.0	N	Medium
5	28.0	W	Medium
6	28.0	E	Medium
7	42.0	S	Very Low

7.4 Flood Defences

Flood Defences within 250m of the study site

Database searched and no data found.

None identified

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site

None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site

None identified

7.7 Groundwater Flooding Susceptibility Areas

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

None identified

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

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

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

7.8 Groundwater Flooding Confidence Areas

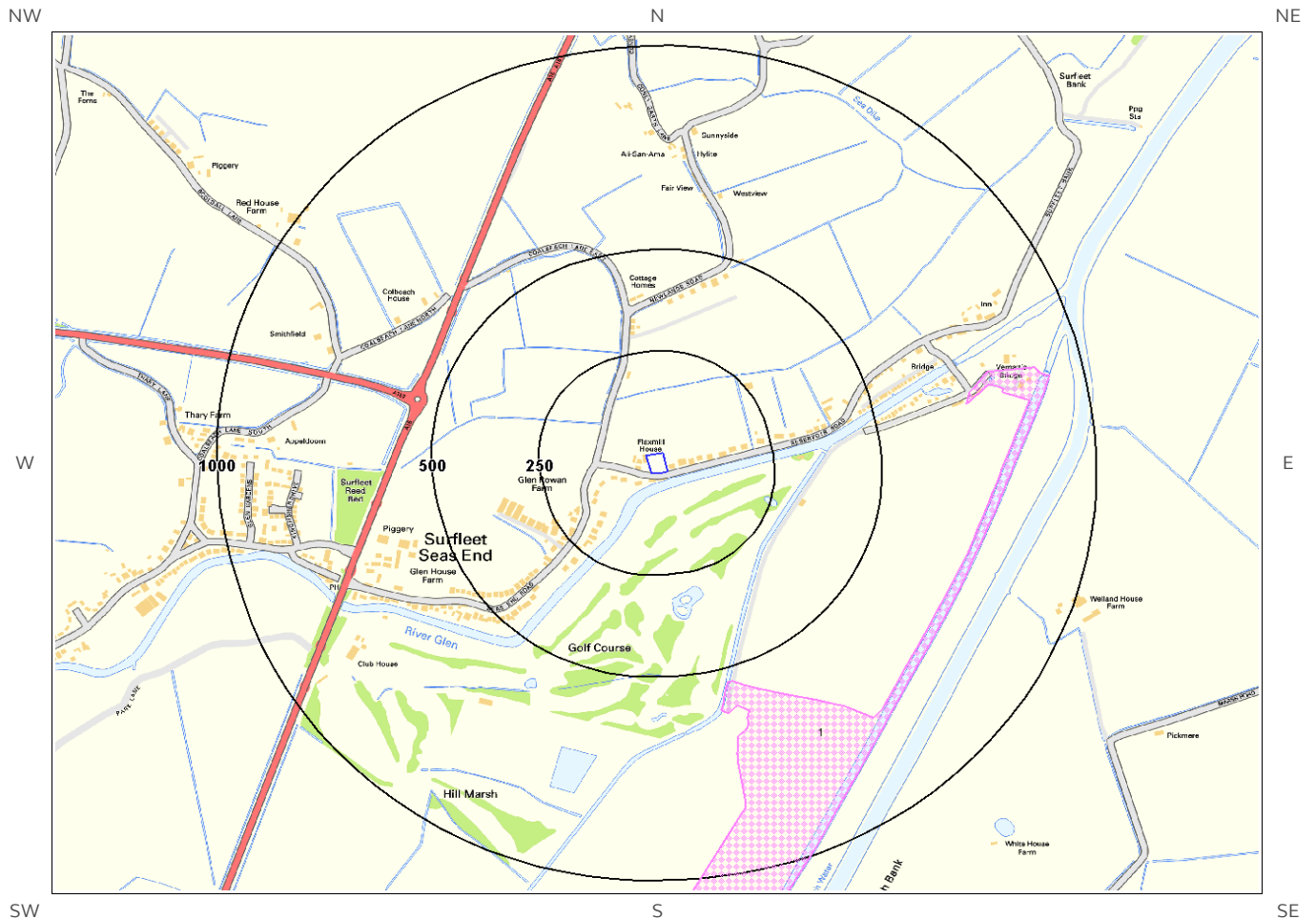
British Geological Survey confidence rating in this result

Not Applicable

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

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

8. Designated Environmentally Sensitive Sites Map



© Crown copyright and database rights 2019.
Ordnance Survey licence 100035207.



8. Designated Environmentally Sensitive Sites

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

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

Database searched and no data found.

0

8.13 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
1	535	S	Existing	DEFRA

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

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

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

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

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

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

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

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

9.1.3 Soluble Rocks

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

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

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

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site

Moderate

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

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

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site

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.

9.1.6 Running Sand

Maximum Running Sand** 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 running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

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

9.2 Radon

9.2.1 Radon Affected Areas

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

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

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site

None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary

None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site

None identified

Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:

Web: www.bgs.ac.uk

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

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 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
www.gov.uk/phe

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: South Holland District Council
Phone: 01775 761 161

Web: <http://www.sholland.gov.uk/>

Address: Council Offices, Priory Road, Spalding, Lincolnshire, PE11

Gemapping PLC

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



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

PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].

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

Standard Terms and Conditions

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

<https://www.groundsure.com/terms-and-conditions-feb11-2019>

Appendix D – Historical Plans

Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1888

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

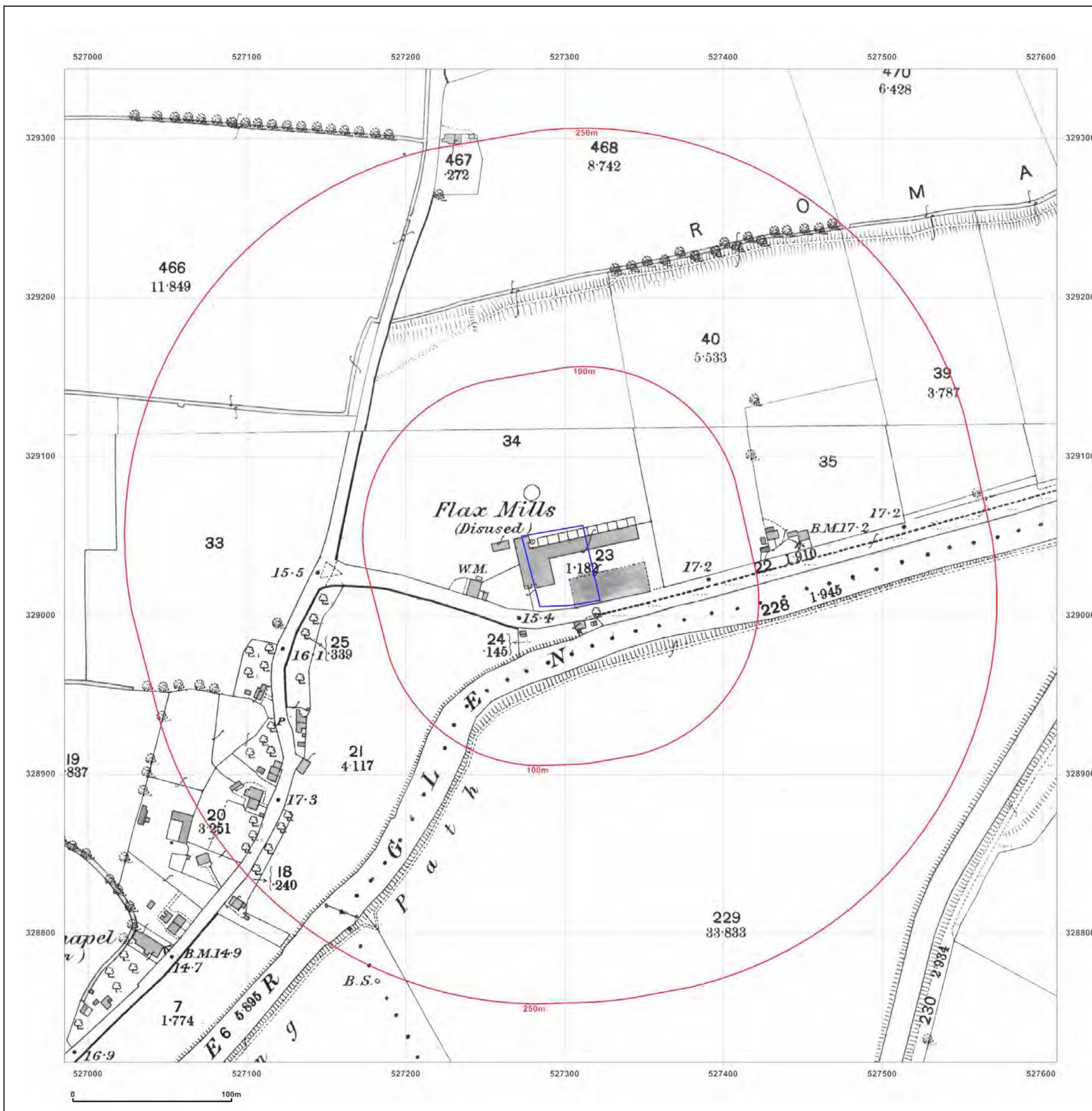


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1904-1905

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1905
Revised 1905
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1904
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

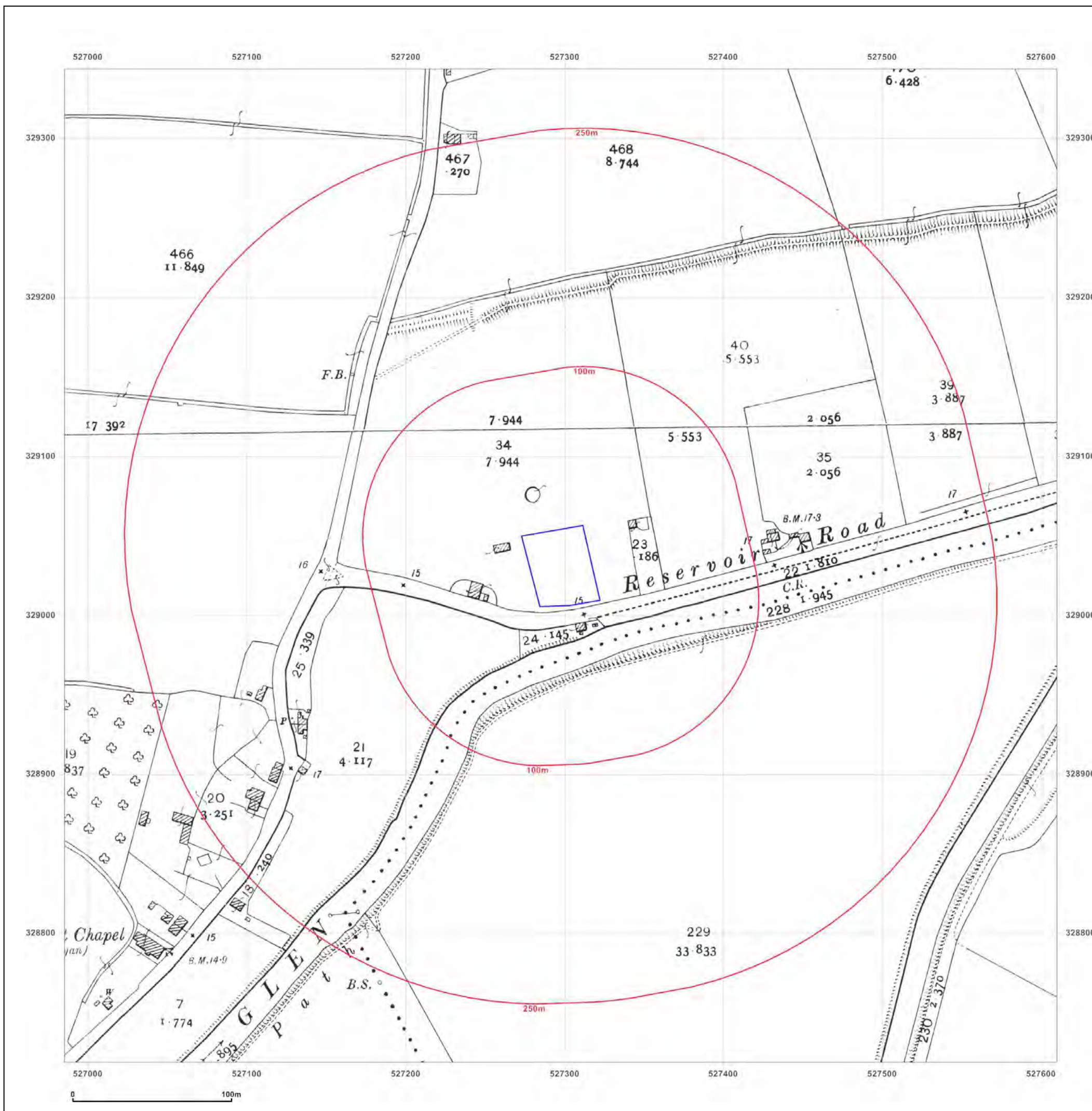


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

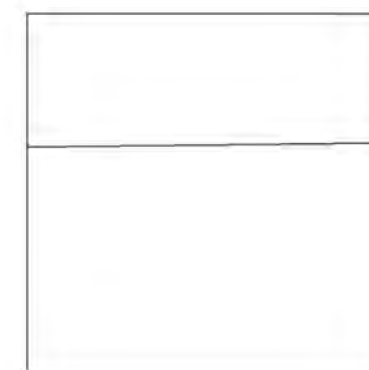
Map date: 1931

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1931
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

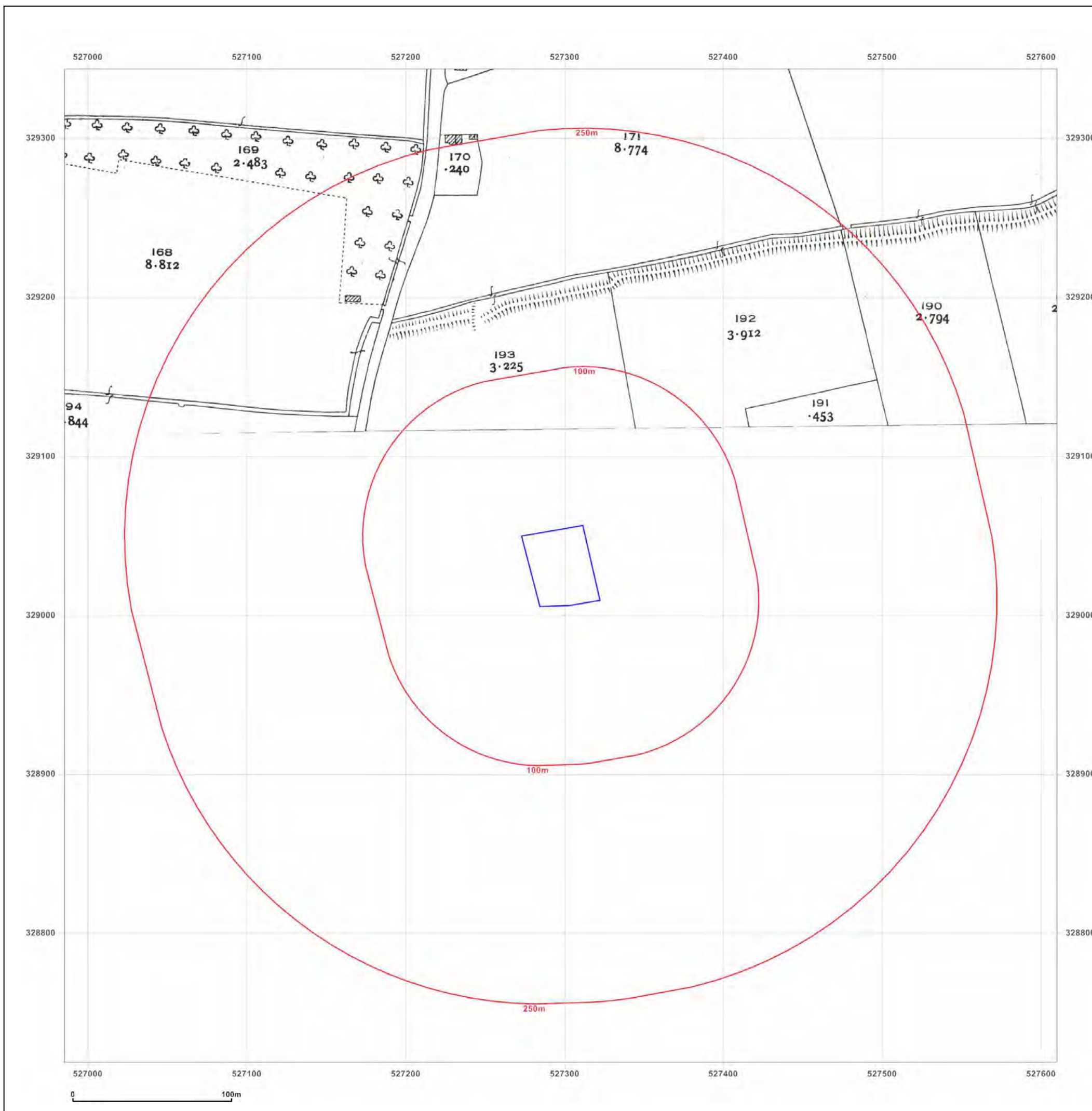


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: National Grid

Map date: 1971-1972

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1971
Revised 1971
Edition N/A
Copyright 1973
Levelled 1965

Surveyed 1972
Revised 1972
Edition N/A
Copyright 1973
Levelled 1965

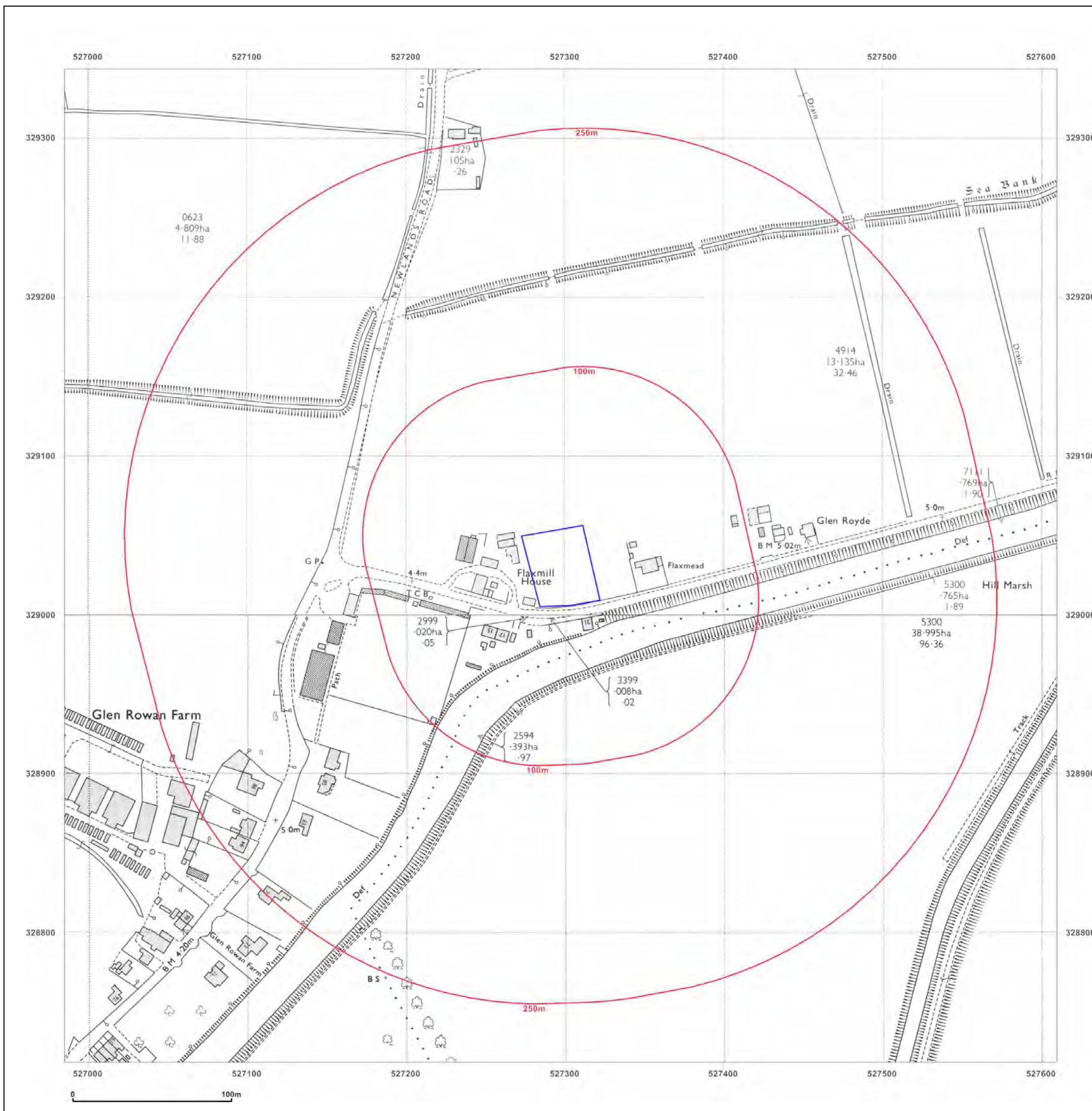


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: National Grid

Map date: 1973

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

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

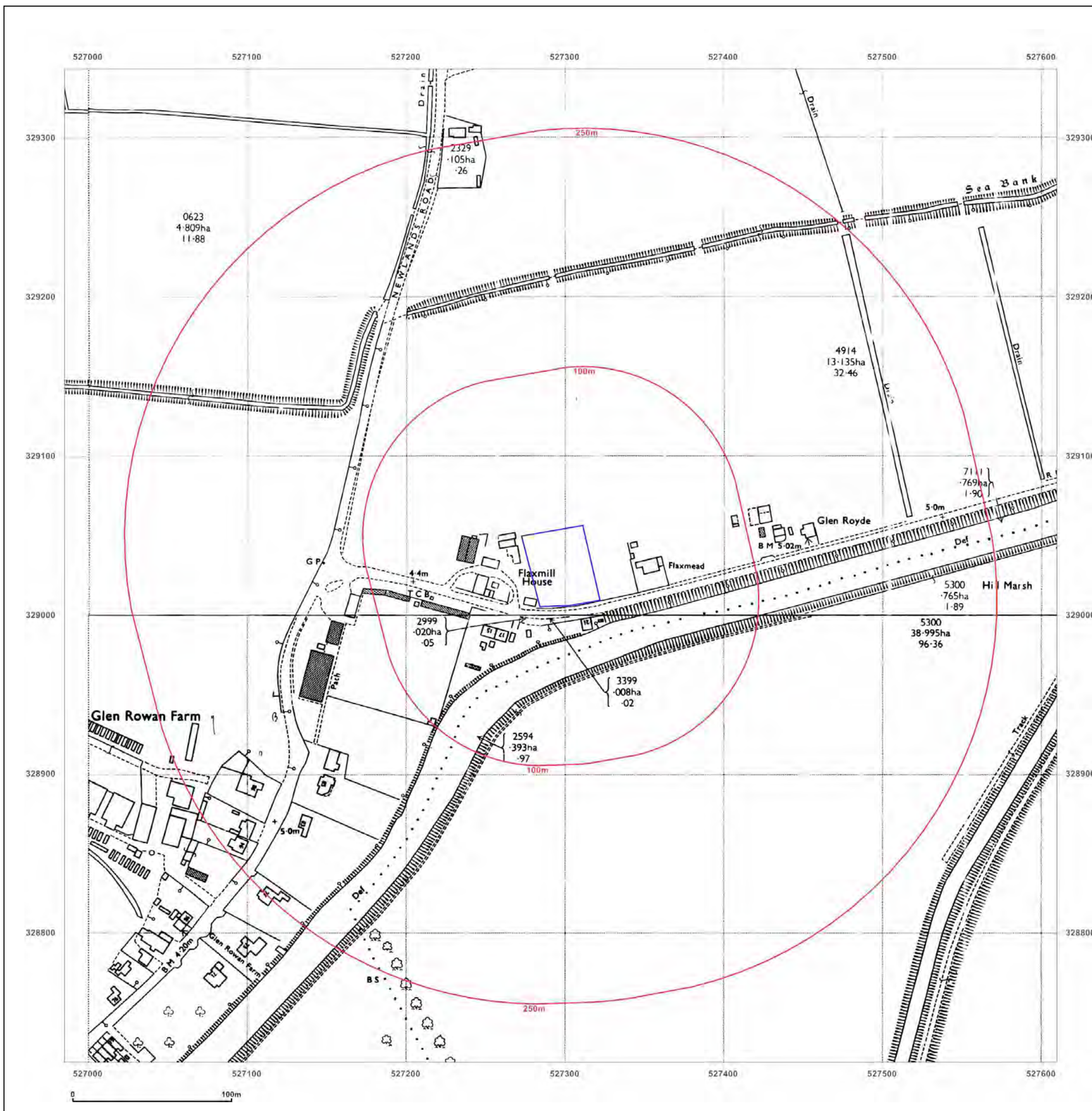


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: National Grid

Map date: 1986-1987

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1965
Revised 1986
Edition N/A
Copyright 1987
Levelled 1965

Surveyed 1965
Revised 1986
Edition N/A
Copyright 1987
Levelled 1965

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

Surveyed N/A
Revised 1986
Edition N/A
Copyright 1987
Levelled 1965

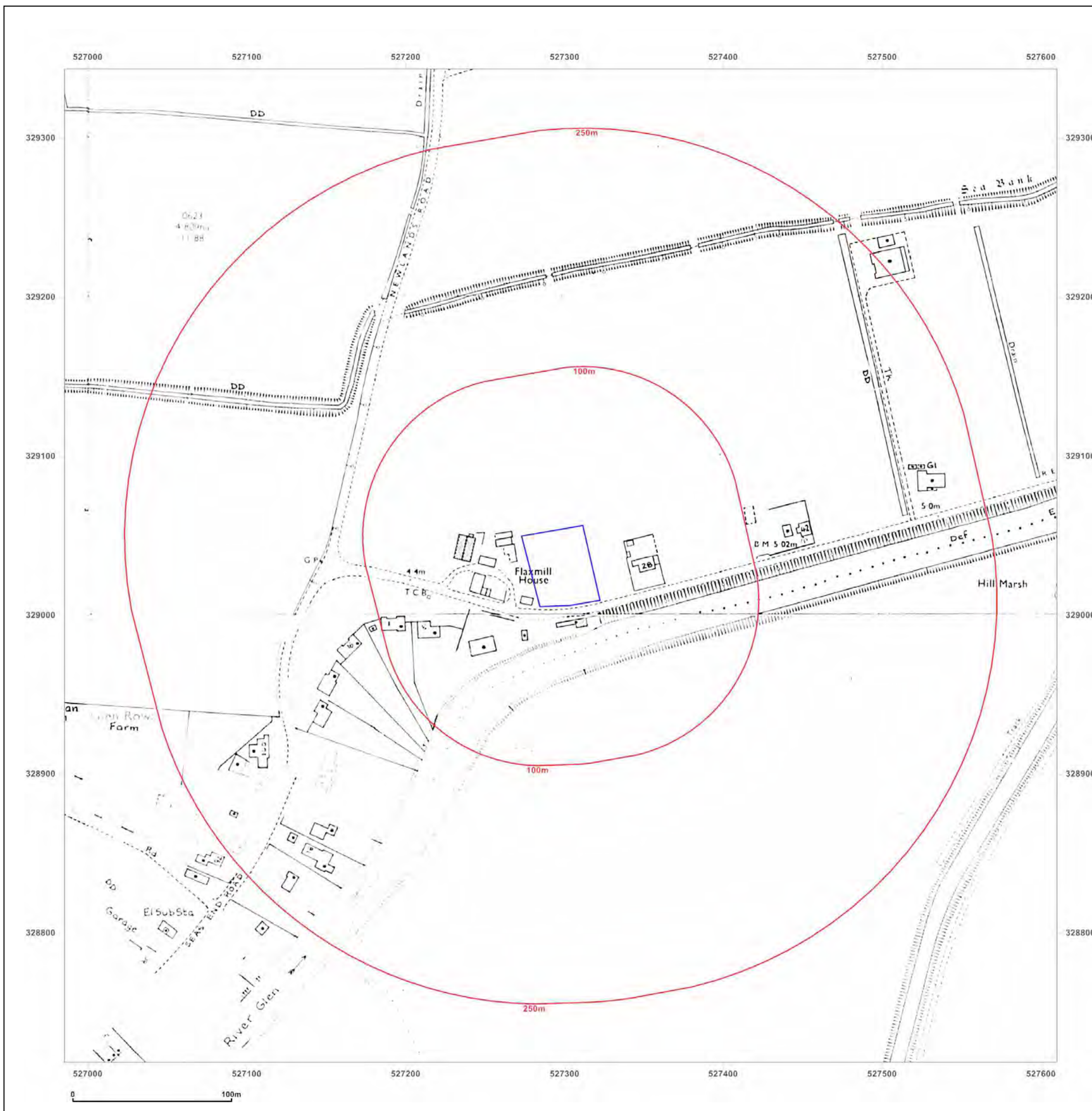


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: National Grid

Map date: 1995

Scale: 1:2,500

Printed at: 1:2,500



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

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

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

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



Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1886-1887

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1887
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1886
Revised 1886
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1887
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1887
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

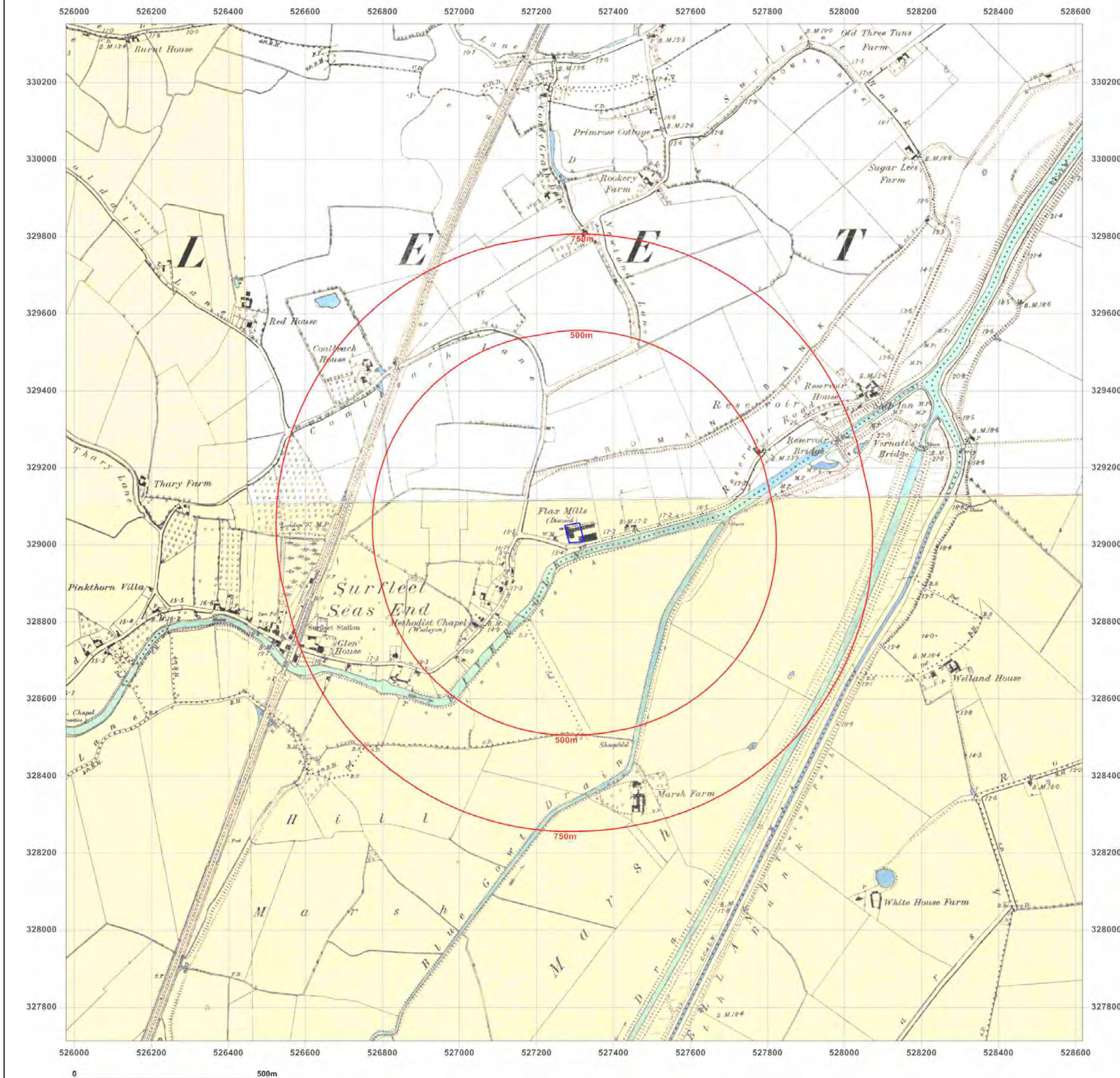


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1903

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1886
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1886
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A



Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

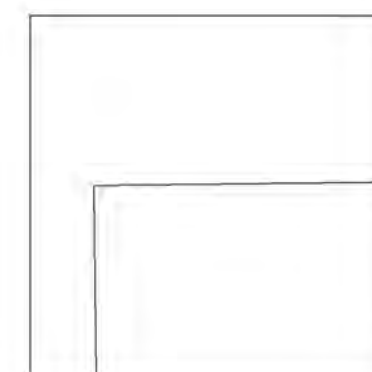
Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1906

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1886
Revised 1906
Edition 1906
Copyright N/A
Levelled N/A

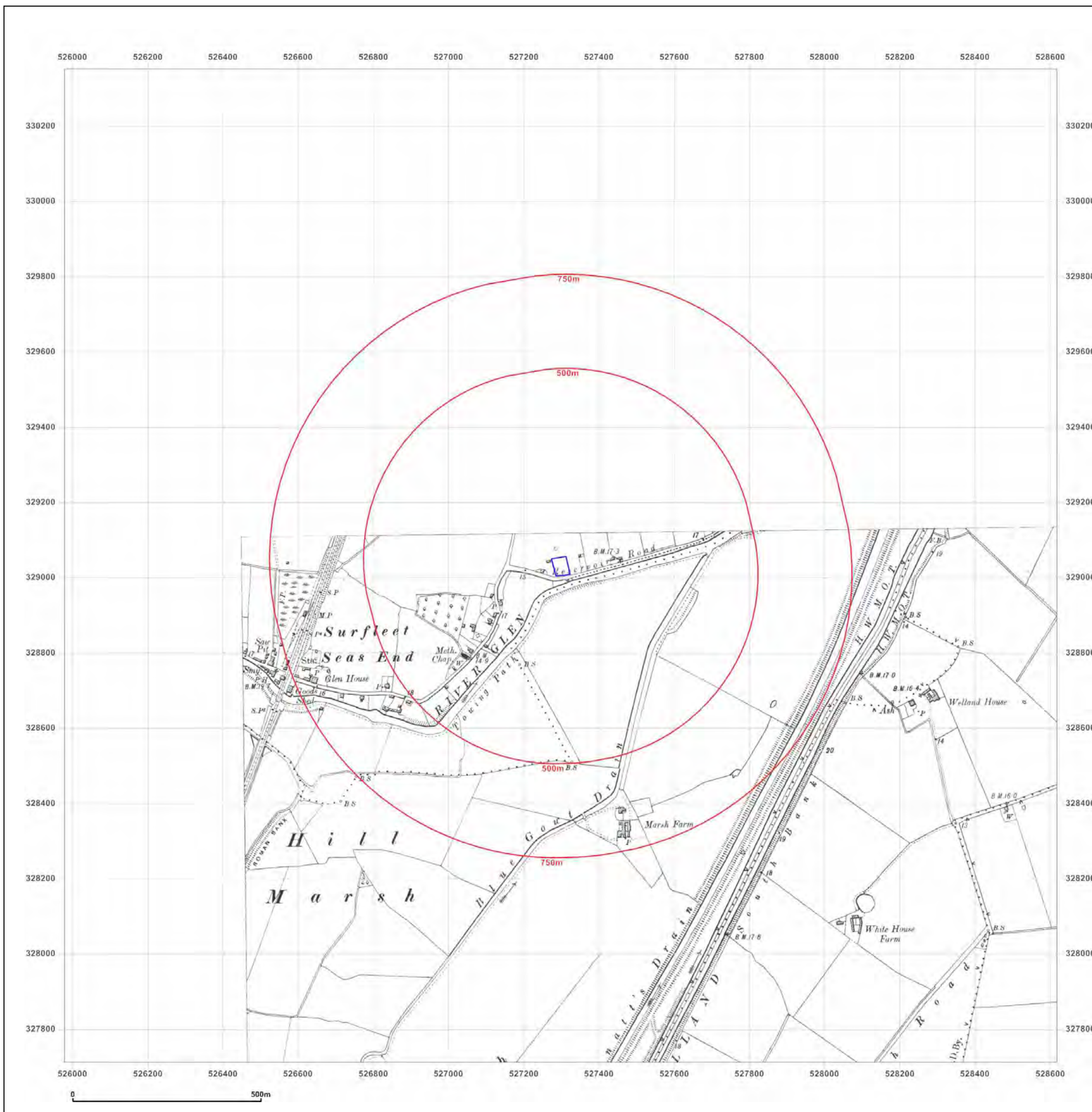


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

RESERVOIR ROAD, SURFLEET,
SPALDING, PE11 4DH

Client Ref: CE362
Report Ref: GS-6506634
Grid Ref: 527297, 329031

Map Name: County Series

Map date: 1929-1932

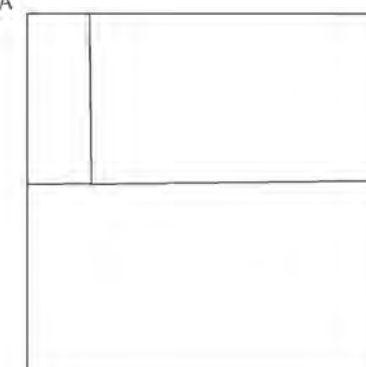
Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1886
Revised 1929
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1887
Revised 1932
Edition 1932
Copyright N/A
Levelled N/A



Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 09 December 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

