GROUND ENGINEERING LIMITED
Newark Road, Peterborough PE1 5UA
Tel: 01733 566566
Email: admin@groundengineering.co.uk

DESK STUDY REPORT

LAND AT LOW ROAD AND PLANK DROVE

CROWLAND

LINCOLNSHIRE

Report Reference C15007

On behalf of:

CKH Developments
Shrewsbury Avenue
Peterborough
PE2 7BZ

March 2020

CONTENTS

Introduction	Page 1
Location, Topography and Geology of the Site	Page 2
History of the Site	Page 4
Summary of Environmental Data	Page 7
Preliminary Risk Assessment	Page 10
Summary of Ground Engineering Report C14355	Page 13
Updated Conceptual Model	Page 16
Comments on Ground Conditions in Relation to Proposed Development	Page 17

FIGURES

Site Location Plan	Figure 1
Site Plan	Figure 2

APPENDICES

Historical Map Extracts	Appendix 1
Environmental Database Information	Appendix 2
C14335: Exploratory Hole Records	Appendix 3
C14335: Chemical Test Results	Appendix 4
C14335: Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values	Appendix 5

CKH DEVELOPMENTS

DESK STUDY REPORT

LAND AT LOW ROAD AND PLANK DROVE

CROWLAND

LINCOLNSHIRE

Report Reference No. C15007 **March 2020**

INTRODUCTION

Ground Engineering Limited was instructed by the client, CKH Developments, to carry out a desk study to establish the site history and likely ground conditions beneath land on the corner of Low Road and Plank Drove, Crowland. These works were scheduled, by the client, in advance of a proposed housing development.

The desk study has been compiled from historical map research, geological and environmental database information and makes reference to the findings of a previous intrusive ground investigation presented in Ground Engineering report C14335: December 2017.

This report summarises the findings of the desk study, makes comment on the ground conditions beneath the site and develops a conceptual model with an evaluation relating to the likelihood of ground contamination being present.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The site is located within land to the immediate south of Low Road and east of Plank Drove, on the south-west outskirts of Crowland, Lincolnshire as shown in Figure 1. The site is centred at approximate National Grid Reference TF 2337 0989.

The trapezoid-shaped site has an approximately 60m wide frontage onto the southern side of Low Road from which it extends south for up to 165m.

At the time of the investigation in 2017 the majority of the site comprised a fallow field. A detached bungalow with front and rear gardens, No. 18, was located near centrally along the north-western margin of the site, facing north onto Low Road. Several outbuildings were in the south-west corner of the site and were in a poor state of repair. With the exception of garden hedgerows around No. 18, the north-western and western boundaries were open onto Low Road and Plank Drove, respectively. The eastern and southern boundaries were defined by hedgerows, separating the site from properties, respectively facing Beechcroft Gardens and an arable field. A field boundary drain was also along the southern edge of the site.

Various trees were within the garden of No. 18 Low Road, and along the southern and eastern site boundaries. These trees included mature Cypress, Hawthorn, Horse Chestnut, Poplar, Pine and Willow.

The site is generally level at approximately 3mOD. The surroundings generally slope gently down to the south-west to Fenland beyond, whereas the town of Crowland is on an óislandô to the east. The straightened north-east flowing River Wellend is approximately 700m north of the site. Several associated straightened tributaries are also to the north, including New River about 100m north of the site, beyond Corporation Bank. The latter is an approximately 3m high flood alleviation bund opposite the site to the north.

The 1984 geological map óPeterboroughô at 1:50,000 scale, Sheet 158, shows the site and areas of higher ground to the east to be covered by a superficial deposit of Abbey Gravels (Marine/Estuarine Sand and Gravel) and underlain by the solid geology of the Oxford Clay

Formation. The low-lying Fenland, beyond the site to the west and south is indicated to be covered by superficial Nordelph Peat. Areas to the north of the site, beyond Corporation Bank are indicated to be covered by a superficial deposit of Alluvium, associated with the River Welland floodplain.

The Crowland Bed is a widespread layer of sandy silty clay or clay that is present above the Abbey Gravels in this locality, and typically contains pebbles from underlying deposits by repeated cryoturbation. The Crowland Bed is typically less than 1m thick and therefore not indicated on the geological map for this locality, but is detailed in the accompanying 1989 BGS geological memoir for the Peterborough district.

HISTORY OF THE SITE

Research into the site history involved reference to historical maps and plans, and information obtained from the internet. The map extracts studied are presented in the desk study map section, Appendix 1, and are described below:

Map Extract Studied	*Description*
1888 Ordnance Survey County Series Scale: 1:2500 **Figure A**	The site is shown to be undeveloped as a field divided into two land parcels. Long Drove is located along the north-western site boundary beyond which is an embankment known and Corporation Bank. Apart from Drove Cottage, which is depicted outside the south-western corner of the site, the immediate surroundings comprised fields. The field to the east contains a triangle shaped water feature.
1904 Ordnance Survey County Series Scale: 1:2500 **Figure B**	Whilst the majority of the site appears as open land there is a dwelling called ôMarvaleö, located midway along the north-western site margin. There are barns depicted within the south-western corner of the site and there are four new dwellings to the south of Drove Cottage. There is a second large water feature depicted within the field to the to the east of the site. Embankments are shown along the course of New River, which is shown about 110m to the north-west of the site.
1950 Ordnance Survey County Series Scale: 1:10,560 **Figure C**	The site and immediate surroundings appear as fields as shown in the previous map.
1958 Ordnance Survey TF20NW Scale: 1:10,560 **Figure D**	The site and immediate surroundings appear as fields as shown in the previous map.
1973 Ordnance Survey TF2309 Scale: 1:2500 **Figure E**	The site and immediate surroundings appear as shown in the 1904 map.
1986 Ordnance Survey TF2309 Scale: 1:2500 **Figure F**	The site and immediate surroundings appear as shown in the 1973 map although there is a fenced-off area, with an outbuilding, to the west of the ôMarvaleö dwelling which is no denoted as No.18. To the east of the site there is a new warehouse building between the two water features shown in the 1904 and 1973 map editions.

Map Extract Studied	*Description*
1995 Ordnance Survey TF2309 Scale: 1:2500 **Figure G**	The site appears as shown in the previous map.
1999 **Groundsure Aerial Photograph** Dated 18/06/1999 **Appendix 2**	The main part of the site appears as an agricultural field. A green rectangular area is shown directly to the west of the dwelling which is midway along the north-western site boundary. The barn buildings within the south-western corner of the site are still present.
2003 Ordnance Survey TF2309NW Scale: 1:1250 **Figure H**	The site appears as shown in the previous map.
2010 Ordnance Survey TF20NW Scale: 1:10,000 **Figure I**	The site appears as shown in the previous map. The water body directly to east of the site is no longer shown and has been replaced with a new road and dwellings.
2012 **Groundsure Aerial Photograph** Dated 23/07/2012 **Appendix 2**	The site appears as shown in the 2010 map and clearly shows the houses and gardens to the east, in the position of the former water body.
2014 **Groundsure Aerial Photograph** Dated 06/06/2014 **Appendix 2**	The site appears as shown in the 2012 aerial photograph.
2017 **Groundsure Aerial Photograph** Dated 25/04/2017 **Appendix 2**	The site appears as shown in the 2014 aerial photograph.
2018 **Groundsure Aerial Photograph** Dated 20/04/2018 **Appendix 2**	The site appears as shown in the 2017 aerial photograph, although the barn buildings in the south-wester corner appear to have been removed.
2020 Ordnance Survey TF20NW Scale: 1:10,000 **Figure J**	The site appears as shown in the 2018 aerial photograph.
2020 **Groundsure OS Master Map** Dated 17/03/2020 **Appendix 2**	The site appears as shown in the 1995 map although the buildings shown in the south-western corner are absent. The dwelling No.18 is still shown midway along the north-western boundary.

In 1888 the rural site was undeveloped as a field divided into two land parcels. By 1904 a dwelling called ôMarvaleô had been constructed midway along the north-western site margin and barn buildings located within the south-western corner. Apart from these buildings the site has remained undeveloped as a field through to the time of writing of this report. The barn buildings within the south-west corner appear to have been removed in 2017/2018.

SUMMARY OF ENVIRONMENTAL DATA

Appendix 2 contains information derived from Environmental Databases for a radius of up to 2000m from the site. The information covers datasets held by the Groundsure with contributors including the local authority, the Environment Agency, British Geological Survey, Ordnance Survey and the Coal Authority and the results, within a radius of 250m, are summarised below:

Historical Industrial Sites	**On Site**	**0-50m**	**51 - 250m**
Historical Industrial Land Uses	0	0	2
Historical Tanks	0	0	2
Historical Energy Features Database	0	0	3
Historical Petrol and Fuel Site Database	0	0	0
Historic Garages	0	0	0
Historical Military Land	0	0	0
Landfill and Other Waste Sites	**On Site**	**0-50m**	**51 - 250m**
Landfill Sites	0	1	0
Waste Sites	0	0	7
Current Industrial Land Uses	**On Site**	**0-50m**	**51 - 250m**
Recent Industrial Sites Data	0	0	1
Current or Recent Petrol Stations	0	0	0
Electricity Cables	0	0	0
Gas Pipelines	0	0	0
Sites Determined as Contaminated Land	0	0	0
Permits/Authorisations	0	0	0
Pollution Discharge	0	0	1
Dangerous Substances	0	0	0
Pollution Incidents	0	0	0
Pollutions Inventories	0	0	0
Hydrogeology	**On Site**	**0-50m**	**51 - 250m**
Superficial Aquifer	Identified		
Bedrock Aquifer	Identified		
Groundwater Vulnerability	Identified		
Groundwater Abstractions	0	0	0
Surface Water Abstractions	0	0	2
Potable Abstractions	0	0	0
Source Protection Zones	0	0	0
Hydrology	**On Site**	**0-50m**	**51 - 250m**
Water Network (OS MasterMap)	1	3	28
Surface Water Features	0	4	7
Surface Water Body Catchments	1	0	0

River and Coastal Flooding	On Site	0-50m	51 - 250m
Risk of Flooding from Rivers and Sea	High (within 50m)		
Historical Flood Events	0	1	0
Flood Defences	0	1	0
Areas Benefiting from Flood Defences	0	0	0
Flood storage areas	0	1	0
Flood Zone 2	Identified (within 50m)		
Flood Zone 3	Identified (within 50m)		
Surface Water Flooding			
Surface Water Flooding	1 in 30 year, 0.1m-0.3m (within 50m)		
Groundwater Flooding			
Groundwater Flooding	Moderate (within 50m)		
Designated Environmentally Sensitive Sites	**On Site**	**0-50m**	**51 - 250m**
Environmentally sensitive sites	0	0	0
Natural Hazards			
Hazard			
Shrinking or Swelling Clay	Moderate (within 50m)		
Landslide Ground Stability	Low (within 50m)		
Running Sand	High (within 50m)		
Compressible Ground	Very Low (within 50m)		
Landslides	Very Low (within 50m)		
Ground Dissolution of Soluble Rocks	Negligible (within 50m)		
Mining, Ground Workings & Natural Cavities	**On Site**	**0-50m**	**51 - 250m**
Surface Ground Workings	0	4	0
Underground Mining	0	0	0
Natural Cavities	0	0	0
Radon			
The property is not in a Radon Affected Area, as between less than 1% of properties are above the action level. The site lies within an area where No radon protection measures are necessary.			

Database Summary

There is no historical data relating specifically to the site. There are two historical records, dated 1887 & 1906, within 250m of the site which both relate to a gas works situated 242m to the east.

There are 2 unspecified tank records (135m west, 1973 & 161m north-east, 1995) and 3 records (1973 to 1986) of an electricity substation within 250m of the site. There is an electricity substation recorded 234m to the east of the site, which is recorded as a more recent industrial land use.

There is a 1973 map record of a closed household waste site located within the field directly to the west of the site. Unfortunately, no other details are listed for this landfill which must be over 47 years old. It is noted that there is no topographic record of this landfill on any of the historical maps studied in the previous section and a dwelling is located in the north-eastern corner of the suspected landfill area in the 1983 map. Reference to Google Earth aerial images shows the suspected landfill area to be covered by a grass covered field between 1999 and 2016.

There are 7 records of waste exemption and this relates to Ashleys Farm, which lies about 73m to the south of the site. The activities relate to the use of waste in construction, burning of waste in the open, storage in secure containers and spreading of ash and waste into the soil to confer benefit.

There is a licensed discharge, from a bungalow 184m to the south-west, into controlled waters.

The site is indicated to be underlain by superficial deposits comprising Abbey Sand and Gravel (Secondary (A) Aquifer), which rest on the solid geology of the Oxford Clay Formation (Unproductive).

Whist there are no groundwater abstraction points within 250m distance from the site, there is one surface water extraction. This relates to water taken from New River, for irrigation purposes, some 109m north-west of the site. There are 32 surface watercourses/drainage ditches within 250m of the site. One of these drainage ditches runs along the side of the site. The River Welland is located some 750m to the north-west of the site.

The site lies within an area that benefits from flood defences (Corporation Bank), which provide a low risk of flooding. The land 50m to the north, which is outside the flood defences, has a high risk of flooding area. There is a moderate risk of groundwater flooding due to the naturally high groundwater levels beneath the site.

The property is not in a Radon Affected Area, as between less than 1% of properties are above the action level. The site lies within an area where no radon protection measures are necessary.

PRELIMINARY RISK ASSESSMENT

Potential sources of contamination present on or beneath the site would relate primarily to; the historical use of the site; possible damaged drainage; the presence of contaminated soil; and the potential presence of soil gas beneath the site.

In order to assess the risks associated with the presence of ground contamination the linkages between the sources and potential receptors to contamination need to be established and evaluated. This is in accordance with the Environmental Protection Act 1990, which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that

- *Significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *Pollution of controlled waters is being, or is likely to be, caused*

There are three principal factors that are assessed whilst undertaking a qualitative risk assessment for any site. These are the presence of a contamination source, the existence of migration pathways and the presence of a sensitive target(s). It should be noted that it is necessary for each element of source, pathway and target to be present in order for exposure of a human or environmental receptor to occur.

UK Government guidance on the assessment of contaminated land, requires risk to human health and the environment to be reviewed using source ï pathway ï target relationships. If each of these elements is present, the linkage provides a potential risk to the identified targets.

Contaminants or ***potential pollutants*** identified as ***sources*** in relation to the identified previous uses are listed overleaf in Table 1.

Table 1: Identified Potential Contaminant Sources

Contaminant Source	***Comments***
Soil Beneath Site	Contamination may be present within any made ground materials imported on the site.
Soil Gas	Potential soil gas generated from any made ground present or nearby landfill to the west of site.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining sites.

A ***Pathway*** is defined as one or more routes through which a receptor is being, or could be, exposed to, or affected by, a given contaminant.

Potential ***Target or Receptors*** fall within the categories of Human Health, Water Environment, Flora and Fauna, and Building Materials.

There are a number of possible pathways for the contaminants identified on the site to impact human and/or environmental receptors and these are summarised in Tables 2 and 3.

Table 2: Human Receptors and Pathways

Human Receptor-Mechanism	***Typical Exposure Pathway***
Human Inhalation	Breathing Dust and Fumes Breathing Gas emissions
Human Ingestion	Eating -contaminated soil, for example by small children -produce grown on contaminated soil Ingesting dust or soil on vegetables Drinking contaminated water
Human Contact	Direct skin contact with contamination Direct skin contact with contaminated liquids

Table 3: Water Receptors and Pathways

Receptor-Water Environment	***Typical Exposure Pathway***
The site is indicated to be underlain by superficial deposits comprising Abbey Sand and Gravel (Secondary (A) Aquifer), which rest on the solid geology of the Oxford Clay Formation (Unproductive).	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and migrate to underlying groundwater. Contamination leads to restriction/prevention of use as a resource, for example, drinking water, and can have secondary impacts on other resources, which depend on it.
There are 32 surface watercourses/drainage ditches within 250m of the site. One of these drainage ditches runs along the side of the site. The River Welland is located some 750m to the north-west of the site.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and laterally migrate. Contamination leads to a restriction/prevention of use: -as drinking water resource -for amenity use Effects on aquatic life

Preliminary Conceptual Model

Assessment of the potential linkage between ground contamination sources, human and environmental receptors have been assessed based on the desk study research documented in the preceding sections of this report.

A generalised preliminary conceptual model is presented below in Table 4.

Table 4: Preliminary Conceptual Model Relative to Residential Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources		
		Soil Beneath Site	**Soil Gas**	**Ground Contamination from Outside Site Boundary**
Human Health ï ground/site workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood
Human Health ï users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood
Water Environment	Migration through ground into surface water or surrounding groundwater	Low likelihood	Low likelihood	Low likelihood
Flora	Vegetation on site growing on contaminated soil	Low likelihood	Unlikely	Unlikely
Building Materials	Contact with contaminated soil	Low likelihood	Unlikely	Unlikely

Key to Table 4 **Estimated Potential for Linkage with Contaminant Source**	**Definition**
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.
NA	Not Applicable

SUMMARY OF GROUND ENGINEERING REPORT C14355: DECEMBER 2017

The client, CKH Developments, has obtained permission from Mr. C. Sharp to reference Ground Engineering report C14335: December 2017.

In November 2017, Ground Engineering Limited were instructed by the clients (Mr. C. Sharpe, Mrs. L. Fox and Mrs. E. Skinner) to undertake an intrusive ground investigation, which was undertaken on 14, 15 and 17 November 2017. The scope of the investigation comprised three cable percussion boreholes and seven machine excavated trial pits with geotechnical and chemical testing on recovered samples to determine the nature of the underlying soil. For specific details regarding the finding of this investigation reference should be given to Ground Engineering report C14335: December 2017.

The findings of that investigation are summarised below:

Site Work: In summary the boreholes, BH1, BH2 and BH3, were undertaken using a standard cable percussion rig to depths of 15.00m, 10.00m and 10.00m respectively. On completion gas/water monitoring standpipes were installed to 5.00m into each hole. The trial pits, TP1 to TP7, were undertaken using a JCB 3CX-type excavator to depths between 2.00m and 3.00m. Soakaway tests were carried out in general accordance with BRE Digest 365 in order to allow the assessment of the soil infiltration rate. The exploratory hole records were produced in accordance with British Standard BS5930:2015 ócode of Practice for Site Investigationsô, and are given in Appendix 3.

Geotechnical Laboratory Testing: Samples recovered from the exploratory holes were tested in accordance with the recommendations of British Standard BS1377:1990 óMethods of Tests for Soils for Civil Engineering Purposesôand other industry standards.

Chemical Laboratory Testing: Selected soil and water samples were submitted to a UKAS Accredited Laboratory who carried out a suite of tests which encompassed a wide range of potential

contaminants outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66; 2008 "Guidance for the Safe Development of Housing on Land Affected by Contamination". Copies of the chemical test results are provided in Appendix 4.

Ground Conditions: The ground conditions comprised a 0.30m to 1.15m thick surface layer of made ground/topsoil, mantling the anticipated Crowland Bed over the Abbey Gravels. The initially reworked solid geology of the Oxford Clay was met below the superficial deposits at depths between 2.30m and 3.00m, with the shallowest proved in the eastern part of the site (BH3). The deepest borehole was completed within the Oxford Clay at 15.00m depth.

Groundwater and Stability: Groundwater strikes were noted within the Abbey Gravels in all of the exploratory holes at depths between 1.90m and 2.60m. The groundwater levels in the BH1, BH2 and BH3 standpipes during the subsequent return monitoring visits, undertaken during November and December 2017, were recorded at depths between 1.49m and 1.64m. This groundwater is considered to be "perched" within the Abbey Gravels, above the practically impervious Oxford Clay.

Soakaway Drainage: The results of the soakaway tests in TP1, TP2 and TP3 yielded infiltration rates of 5.42×10^{-6}m/s, 3.28×10^{-6}m/s and 4.65×10^{-6}m/s, respectively, in the Abbey Gravels and indicate a good/poor drainage potential in accordance with BS8004: 1986, Section Six, Figure 6. The presence of groundwater at shallow depths (1.49m to 1.64m) beneath the site would also limit the size of soakaways.

Foundations: The made ground and topsoil should be avoided as bearing stratum. Foundations will also locally require deepening within clay soils due to the presence of trees within the site and along the site boundaries. The Abbey Gravels and Oxford Clay are suitable bearing strata for the

adoption of deepened traditional pad or strip foundations. A piled foundation scheme may also be considered, with piles extending into the very stiff Oxford Clay at depth.

Soil Contamination: A 0.20m to 1.10m thick surface layer of made ground/topsoil was encountered in the exploratory holes. Chemical test results for the samples of near surface soils recovered from across the site found the elements and compounds tested statistically fell below the respective SSVs for a residential with home grown produce end use, considered representative of the proposed end use. A Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values is provided in Appendix 5.

Groundwater Contamination: With regard to the groundwater quality, chemical testing on a recovered water sample provided no evidence of groundwater contamination.

Soil Gas Monitoring Results: Three return visits were made during November and December 2017 to record the concentrations of landfill type gases (methane, carbon dioxide, oxygen) in the BH1, BH2 and BH3 standpipes. The recorded concentrations of methane were all less than 0.1% whereas concentrations of carbon dioxide were between 2.1% and 4.7%. The recorded oxygen concentrations were depleted, between 13.3% and 18.1%. The in-situ measurements confirmed gas emissions with recorded flow rates of less than 0.1l/hr. The results indicate a Gas Screening Value (GSV) of 0.0001l/hr for methane and 0.0047l/hr for carbon dioxide. The results fall into Characteristic Situation 1 as defined by BS8485:2015+A1:2019 ǵCode of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildingsô.

UPDATED CONCEPTUAL MODEL

Assessment of the potential linkage between ground contamination sources and human or environmental receptors have been assessed based on the desk study research and the intrusive ground investigation documented in the preceding sections of this report. A generalised conceptual model, updated following the intrusive works, monitoring and testing, relative to the construction phase and completed development with no remediation undertaken, is presented below in Table 5.

Table 5: Updated Conceptual Model Relative to Future Redevelopment

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources		
		Soil Beneath Site	Soil Gas	Ground Contamination Outside Site Boundary
Human Health ï ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low risk	Very Low risk	Low risk
Human Health ï users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low risk	Very Low risk	Low risk
Water Environment	Migration through ground into surface water or surrounding groundwater	Low risk	Very Low risk	Low risk
Flora	Vegetation on site growing on contaminated soil	Low risk	Very Low risk	Low risk
Building Materials	Contact with contaminated soil	Low risk	Very Low risk	Low risk
Key to Table 5 Risk	**Definition**			
Very High risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. The risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.			
High risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) and remedial works may be necessary in the short term and likely over the long term.			
Moderate risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.			
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.			
Very Low risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.			

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED DEVELOPMENT

The proposed future development is understood to comprise private housing.

The previous investigation whose findings are presented in Ground Engineering report C14335: December 2017 may not have revealed the full depth or extent of made ground or contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that may appear to be contaminated.

Anticipated exposure scenarios relating to the site and future use, in the context of the conceptual model, are discussed as follows.

Human Health - Construction Workers

No special precautions would be required during the development of the site by workers who may come into contact with the soil during groundworks, providing standard precautions are adopted which should generally include the procedures given by the Health and Safety Executive (The Blue Book).

For the protection of these workers during groundworks the following is recommended:

a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.

b) Washing facilities should be made available to groundworkers, so as to minimise the potential for inadvertent ingestion of soil.

c) If any soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

Human Health – Residential Usage

According to the findings of the desk study the site, apart from the presence of a dwelling and two barn buildings, the site has never been developed and has only been used as agricultural land.

Assuming that the ground conditions have not been have changed since the ground investigation in 2017, no specific scheme of remediation would be considered necessary in relation to the creation of any new soft landscaping/gardens.

It is recommended that all garden/landscaped areas are inspected to ensure that unsuitable materials have not been retained or inadvertently placed during the preceding stages of redevelopment works.

Any topsoil imported to create areas of landscaping should be certified suitable for use on this site with documentation retained for future use.

Imported ócleanônatural soil/topsoil should be supported by verification certificates and re-tested in each garden plot to provide proof of its suitability. Documentation relating to the source of ócleanônatural soil should be available to the Local Planning Authority for approval prior to infilling.

Methane and Carbon Dioxide Soil Gas

A historical landfill is indicated to be situated directly to the west of the site and it is recorded that household waste was permitted. The suspected landfill area is estimated to lie at about 1.5mOD and the groundwater must lie within 1m of the ground surface. From a practical point of view the landfill documentation is probably a record of land raising. A dwelling is located in the north-eastern corner of the suspected landfill area in the 1983 map and the Groundsure database states that the landfill was closed by 1973, over 47 years ago. There is no typical figure for the length of time that landfill gas will be evolved but at many sites significant gas generation can be expected to continue for a period, which is likely to be at least 15 to 25 years after the last deposit of waste. On this basis it would be expected that any gas generating processes within the

landfill would be well past their peak indicating a very low likelihood for gas generation based on an age exceeding 47 years.

Three return visits were made during November and December 2017 to record the concentrations of landfill type gases (methane, carbon dioxide, oxygen) in the BH1, BH2 and BH3 standpipes. The recorded concentrations of methane were all less than 0.1% whereas concentrations of carbon dioxide were between 2.1% and 4.7%. The recorded oxygen concentrations were depleted, between 13.3% and 18.1%. The in-situ measurements confirmed gas emissions with recorded flow rates of less than 0.1l/hr. The results indicate a Gas Screening Value (GSV) of 0.0001l/hr for methane and 0.0047l/hr for carbon dioxide. The results fall into Characteristic Situation 1 as defined by BS8485:2015+A1:2019 ‘Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings’.

No special precautions are therefore considered to be required to protect the proposed development from the ingress of soil gases.

Radon Soil Gas

The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. The site lies within an area where no radon protection measures are necessary.

Off-Site Disposal of Soil Arisings

The results of chemical analysis are provided in Appendix 5 and can be used within the suite of information necessary for basic characterisation of the soil destined for landfill. Excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act, 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. Basic characterisation is the responsibility of the waste producer and compliance checking and on-site verification are generally the responsibility of the landfill operator. The landfill operator will need to liaise with the waste producer as the approach relies on the information from basic characterisation.

The clean arisings from the underlying natural soils, excluding peat and topsoil, across this site should fall under the EWC code 17 05 04 inert category.

GROUND ENGINEERING LIMITED

J. H. GIBB

B.Sc.(Hons.), M.Sc.(Eng.), C.Geol., F.G.S.

Senior Geo-Environmental Engineer

S. J. FLEMING

M.Sc., M.C.S.M., C.Geol., F.G.S.

Director

Figures

Figure 1: Site Location Plan

Figure 2: Site Plan

Site Location Plan

With the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright.
All rights reserved. Licence number AL100005523

Figure 1



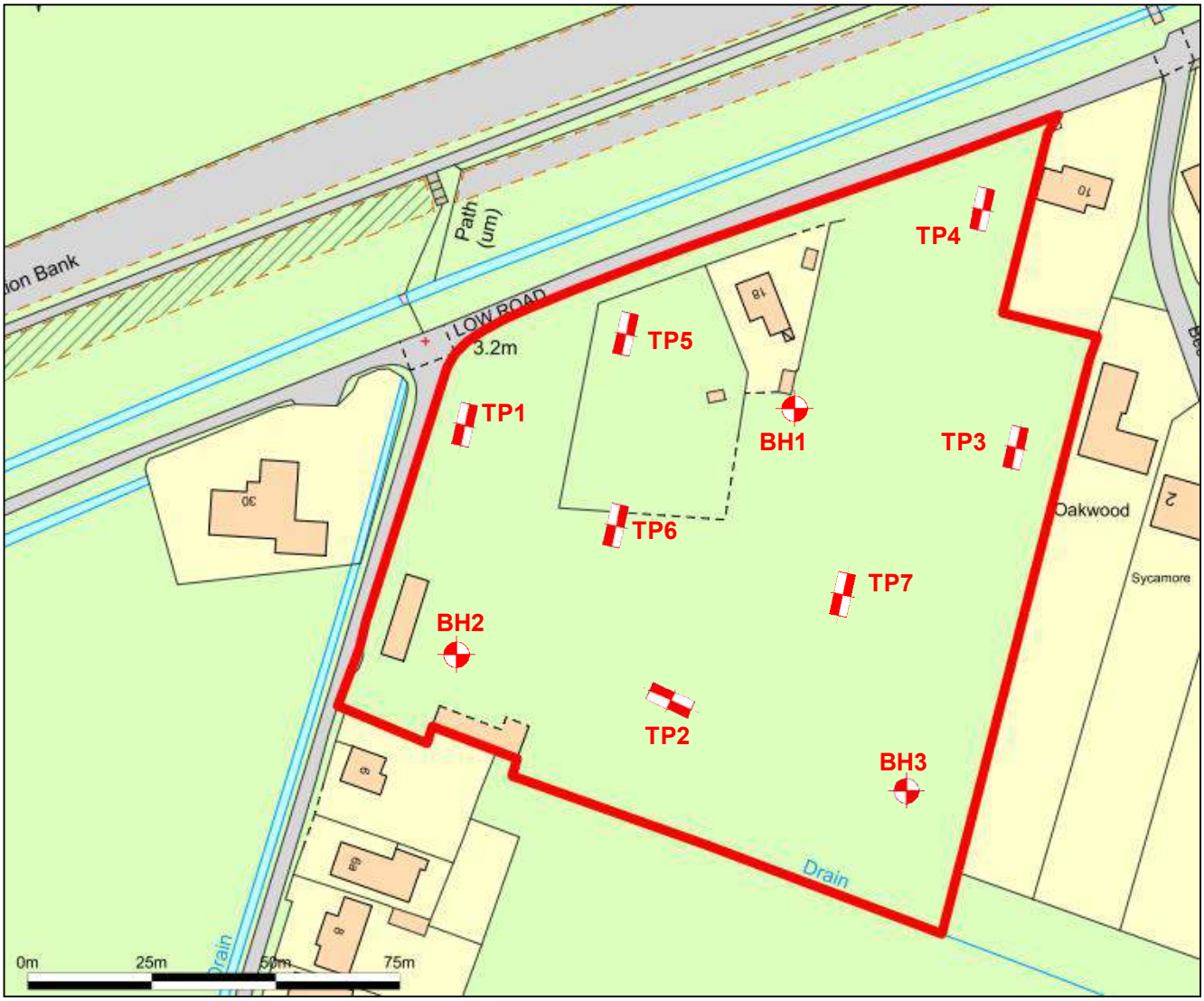
Scale = 1km Grid

Project: Land at Low Road/Plank Drove, Crowland **Client:** CKH Developments	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Exploratory Hole Location Plan

With the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright.
All rights reserved. Licence number AL100005523

Figure 2



Project: Land at Low Road/Plank Drove, Crowland **Client:** CKH Developments	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

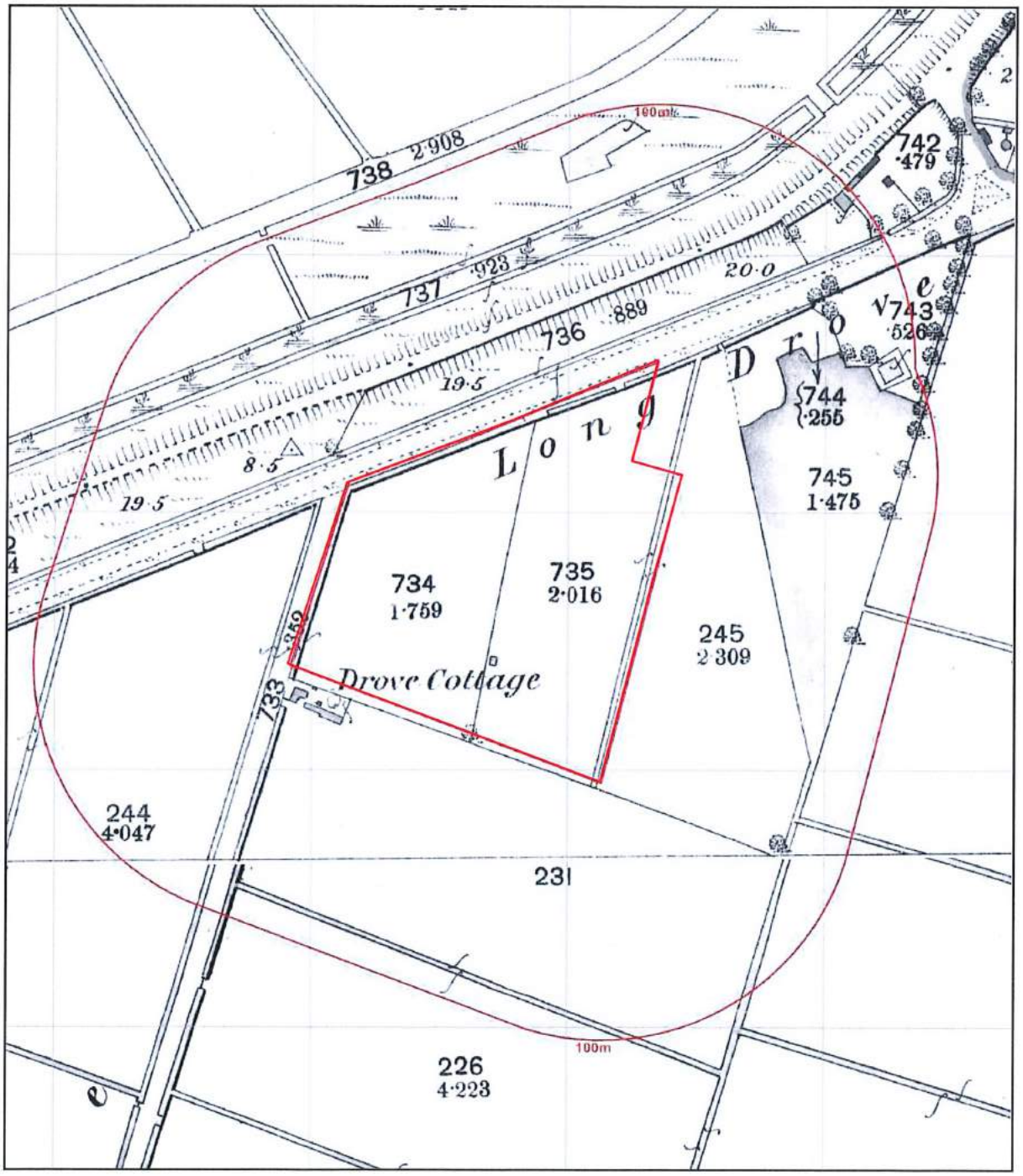
Appendix 1

Historical Map Extracts

Site History

Figure A

Reproduced from the **1888** edition Ordnance Survey sheet **County Series** at **1:2500** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

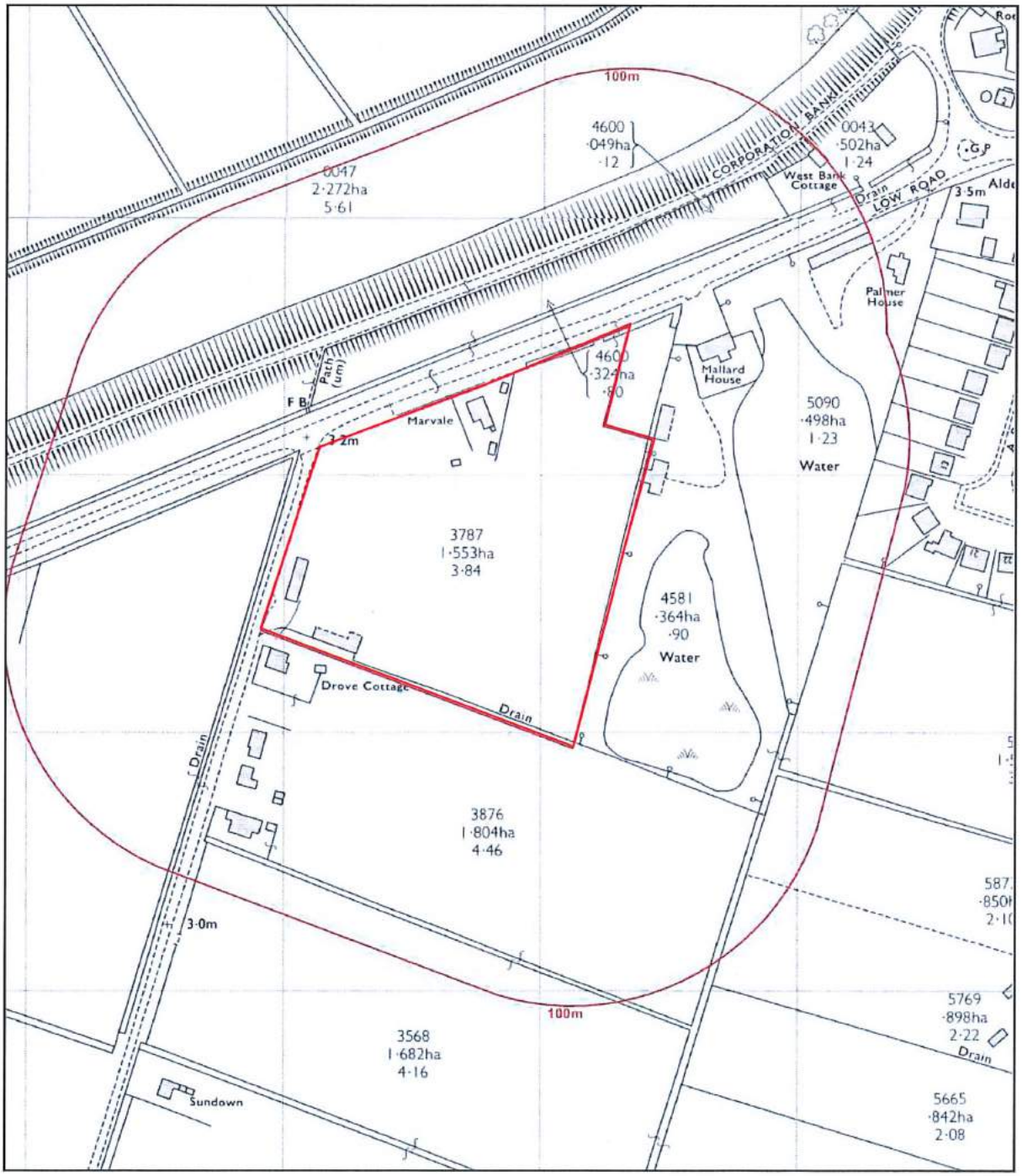


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure B

Reproduced from the **1904** edition Ordnance Survey sheet **County Series** at **1:2500** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

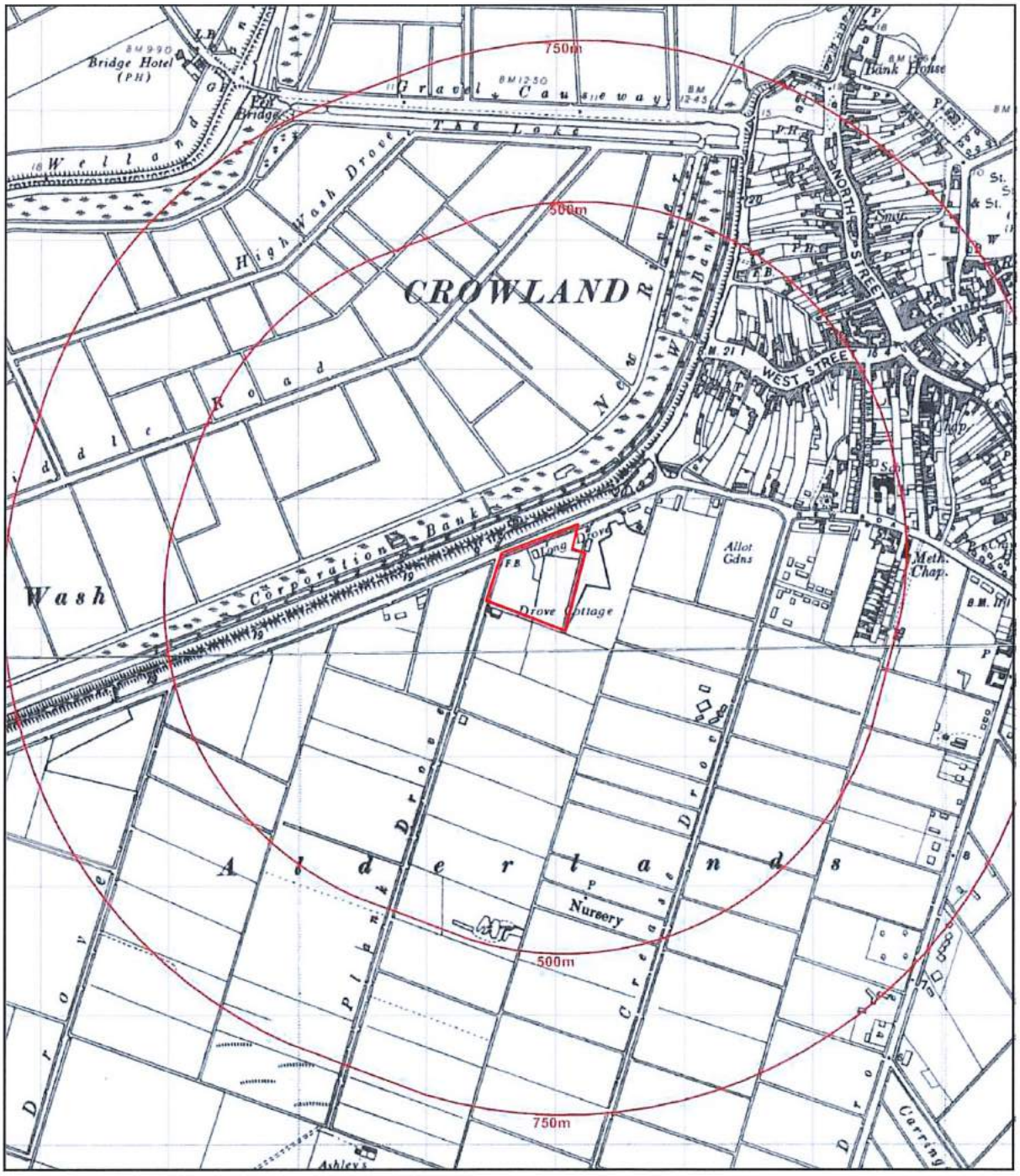


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure C

Reproduced from the **1950** edition Ordnance Survey sheet **County Series** at **1:10,560** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

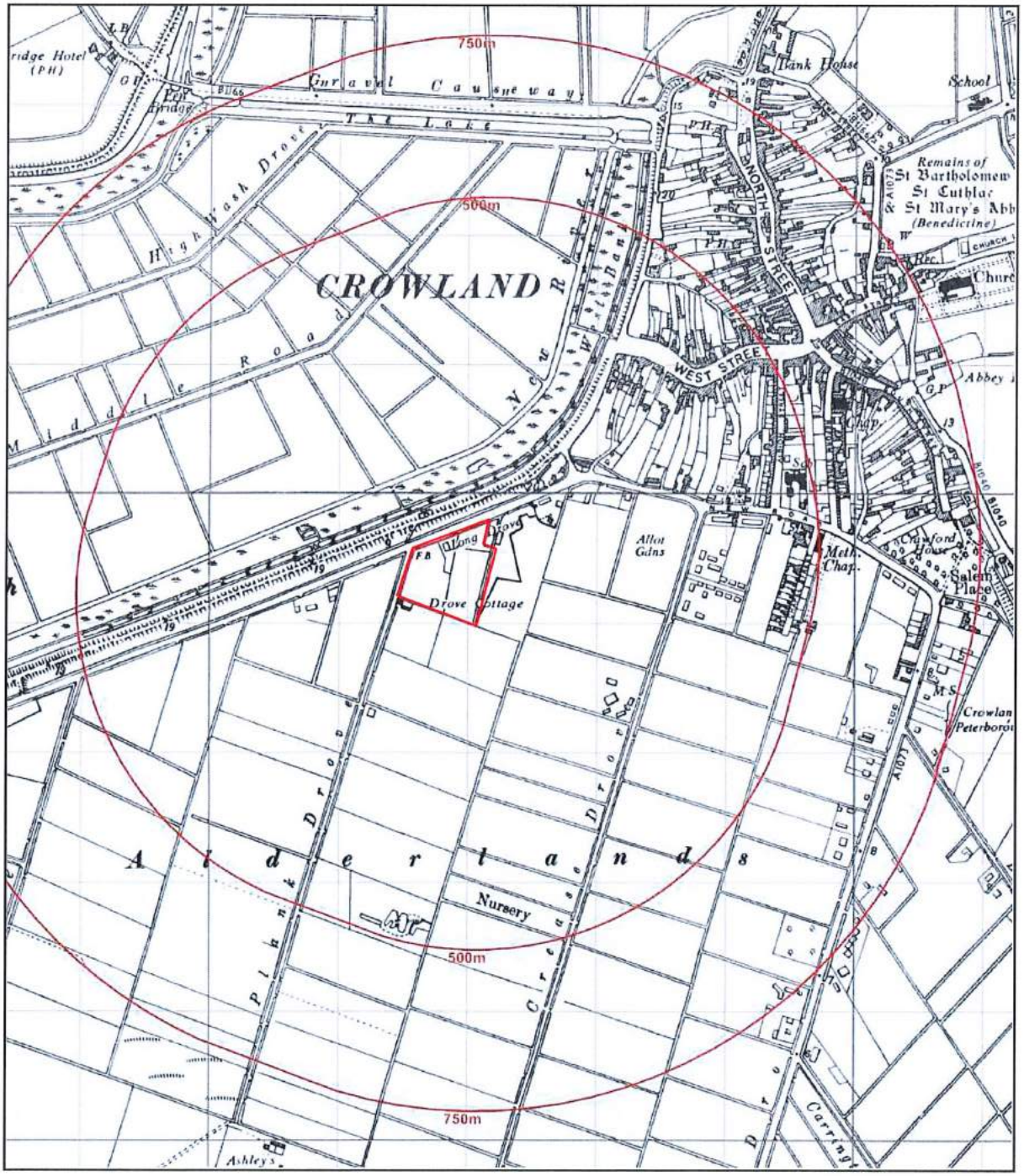


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure D

Reproduced from the **1958** edition Ordnance Survey sheet **TF20NW** at **1:10,560** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

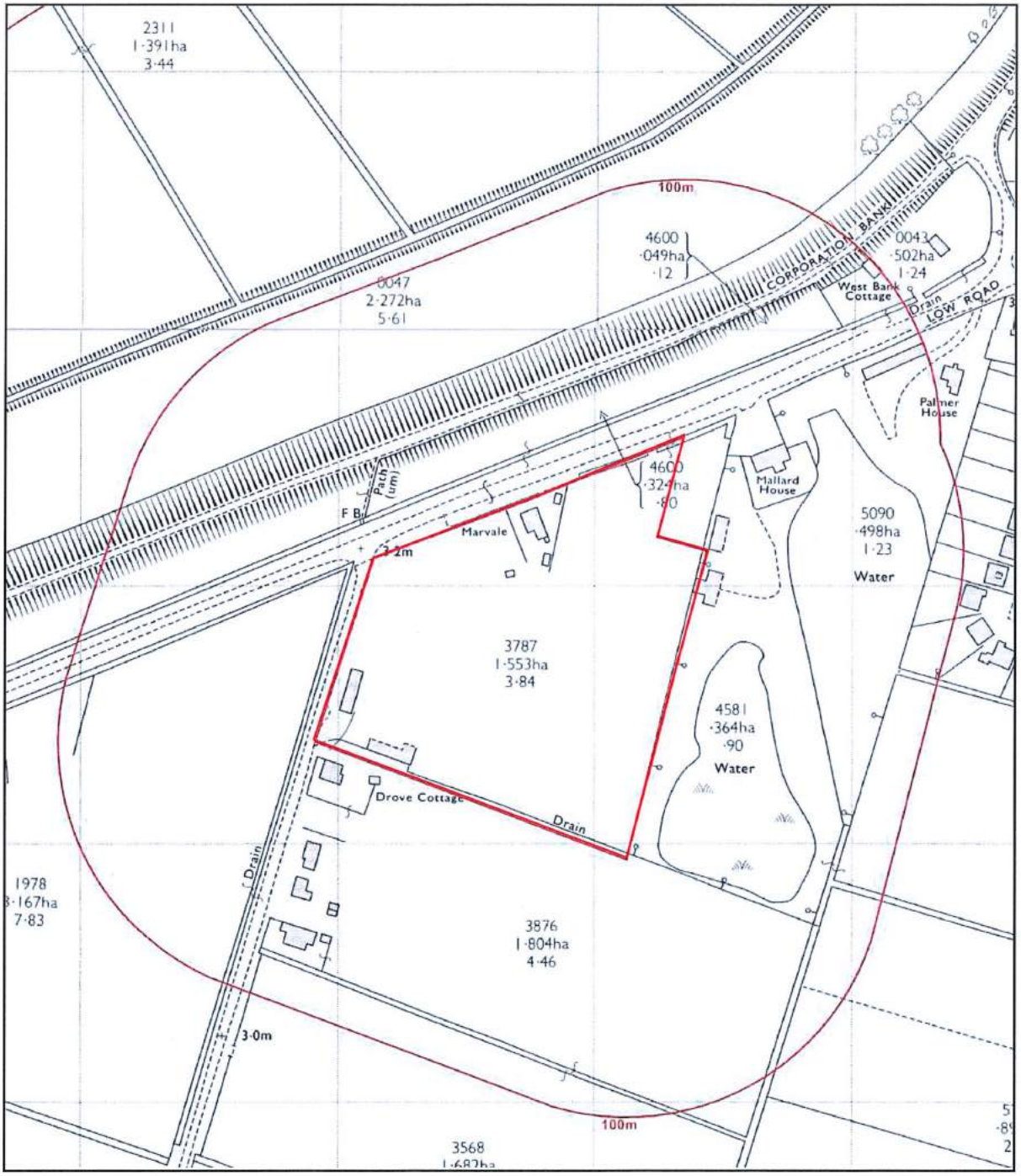


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure E

Reproduced from the **1973** edition Ordnance Survey sheet **TF2309** at **1:2500** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

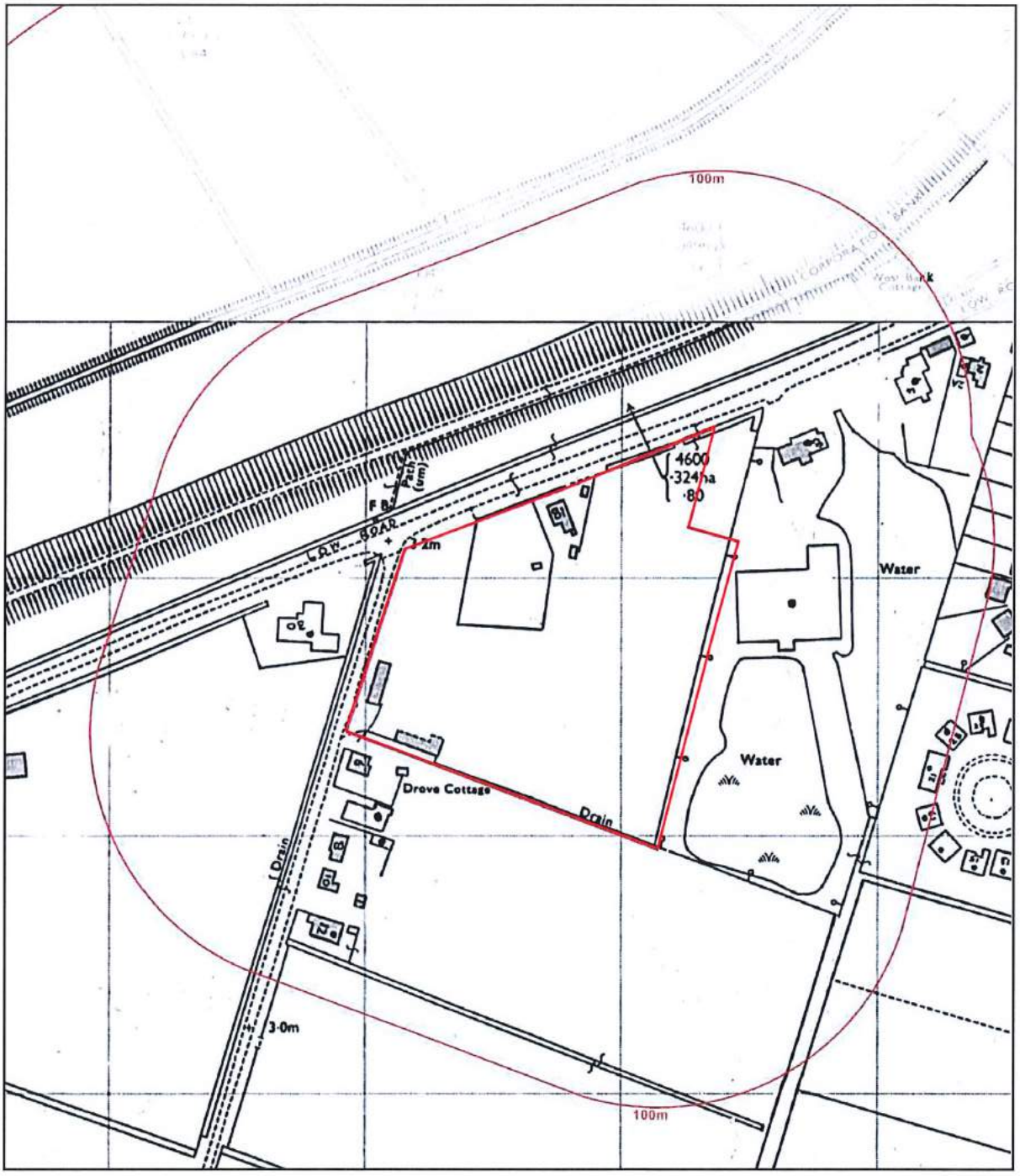


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure F

Reproduced from the **1986** edition Ordnance Survey sheet **TF2309** at **1:2500** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

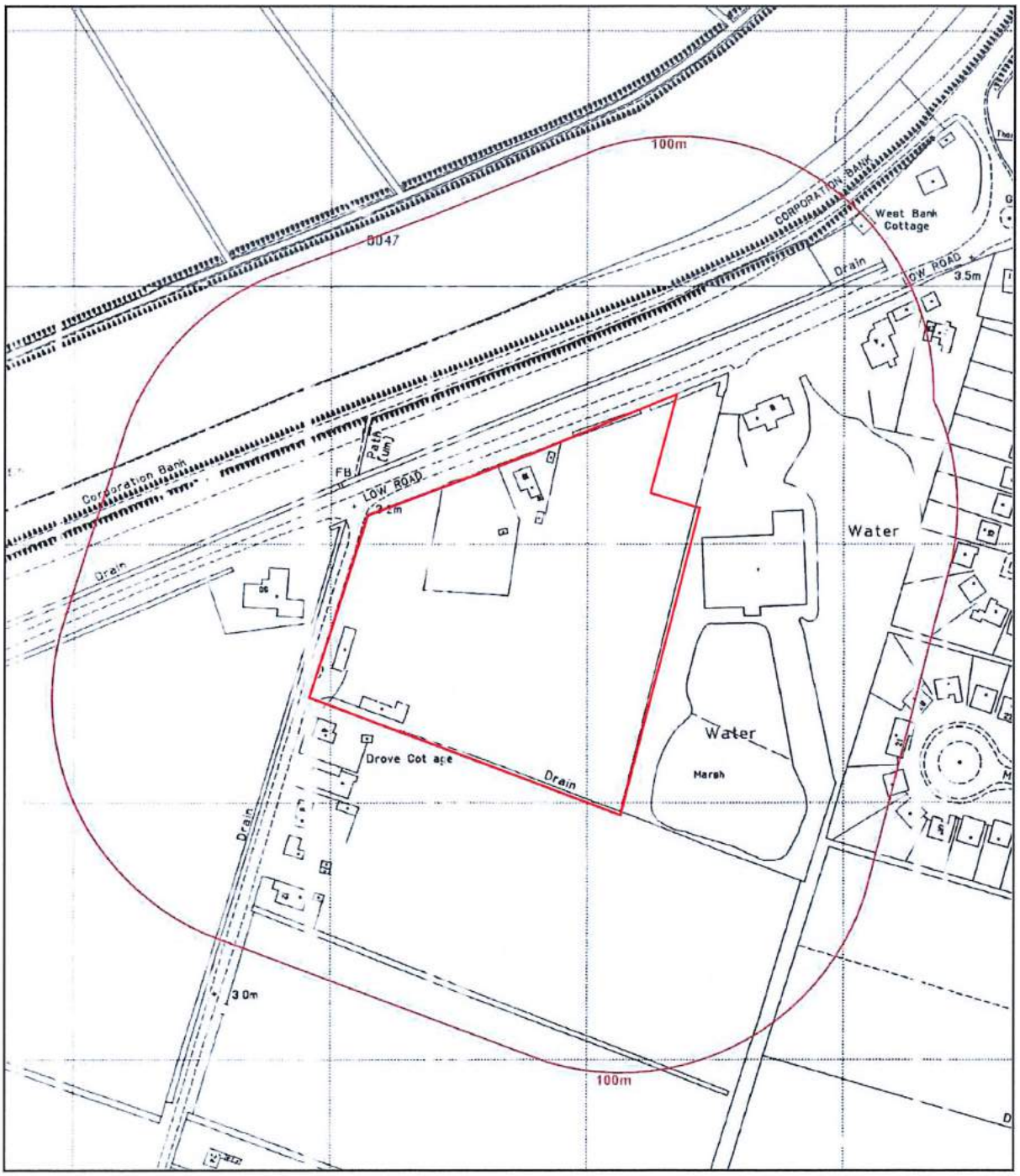


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure G

Reproduced from the **1995** edition Ordnance Survey sheet **TF2309** at **1:2500** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

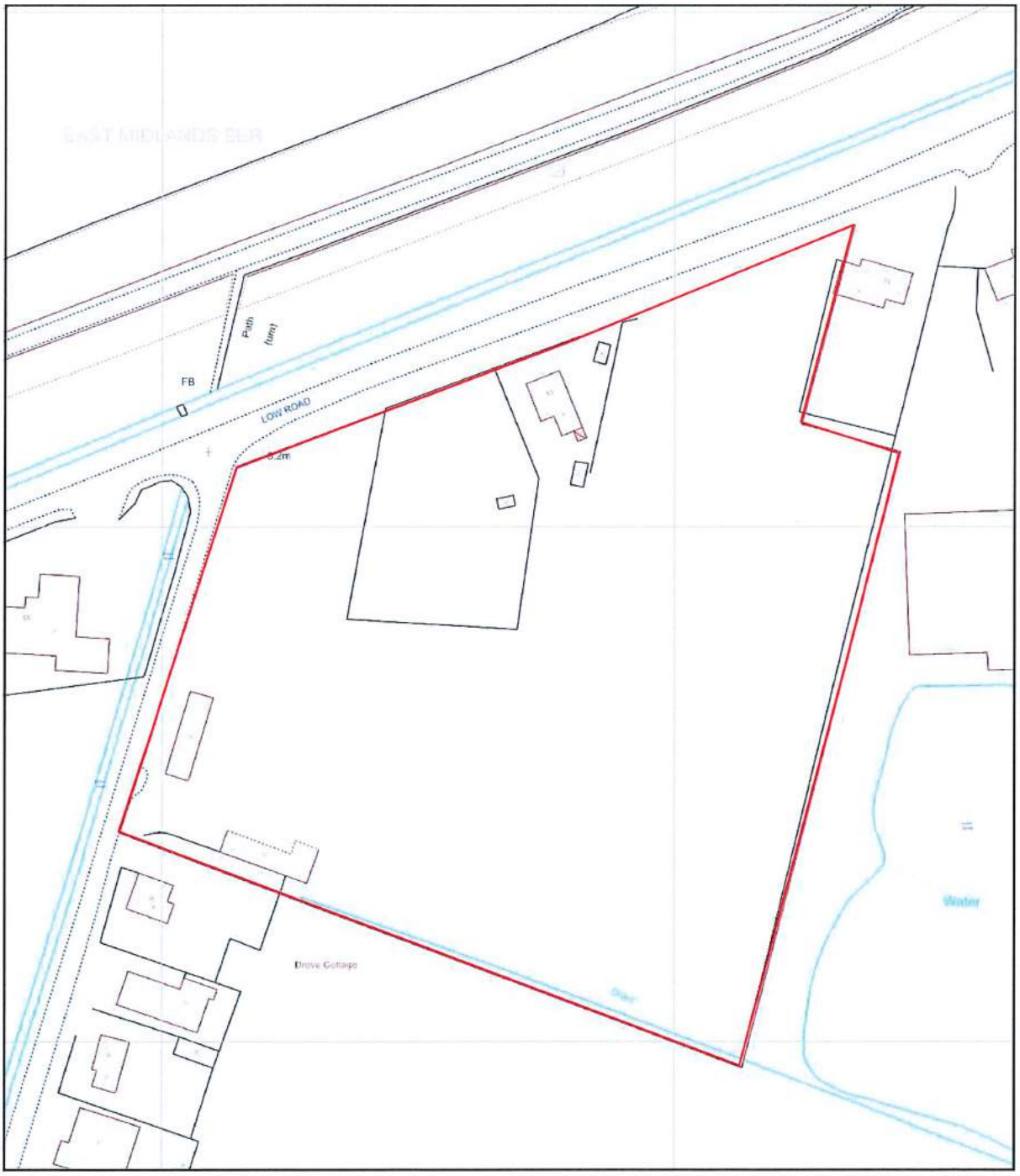


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure H

Reproduced from the **2003** edition Ordnance Survey sheet **TF2309NW** at **1:1250** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

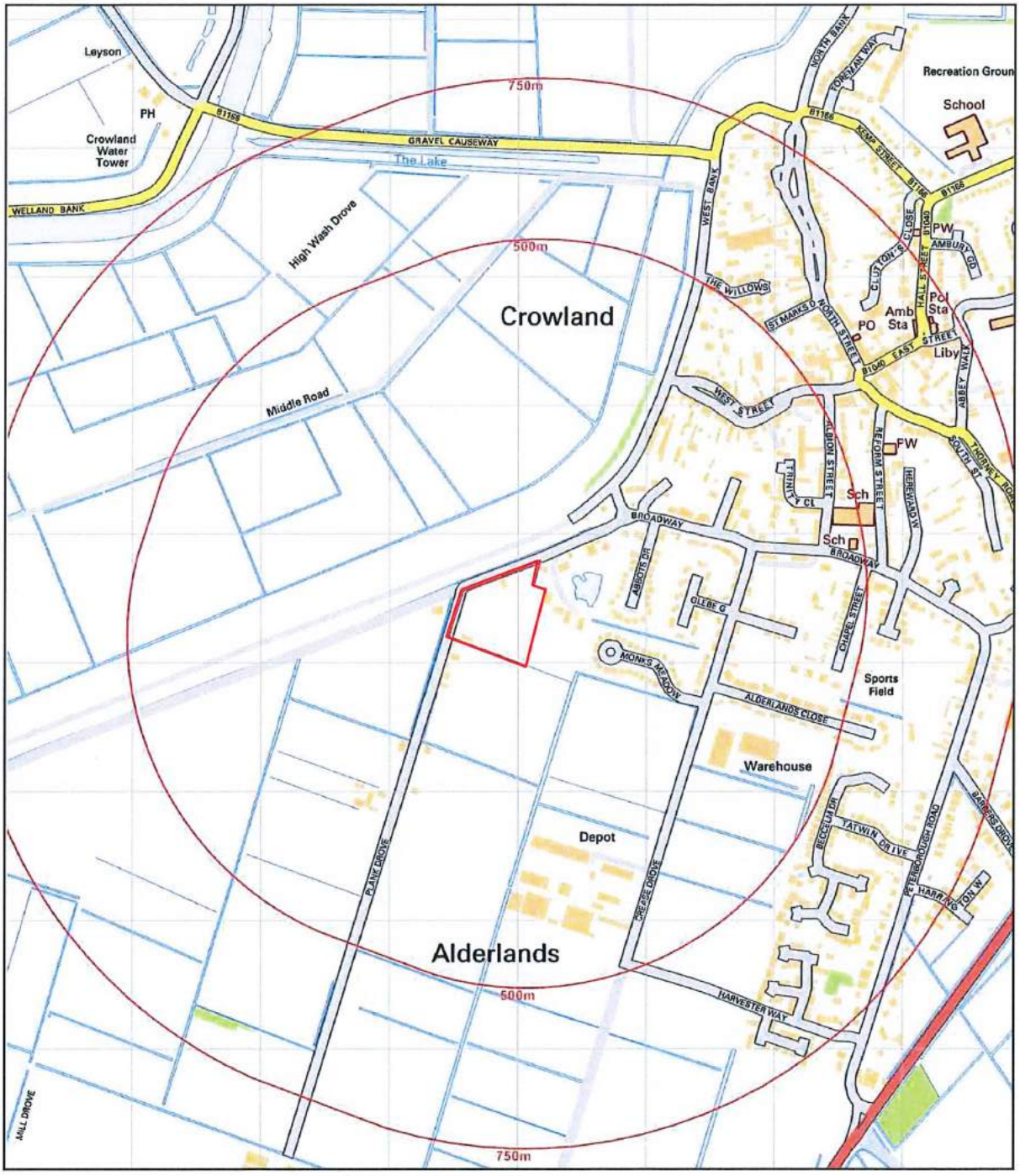


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure I

Reproduced from the **2010** edition Ordnance Survey sheet **TF20NW** at **1:10,000** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523

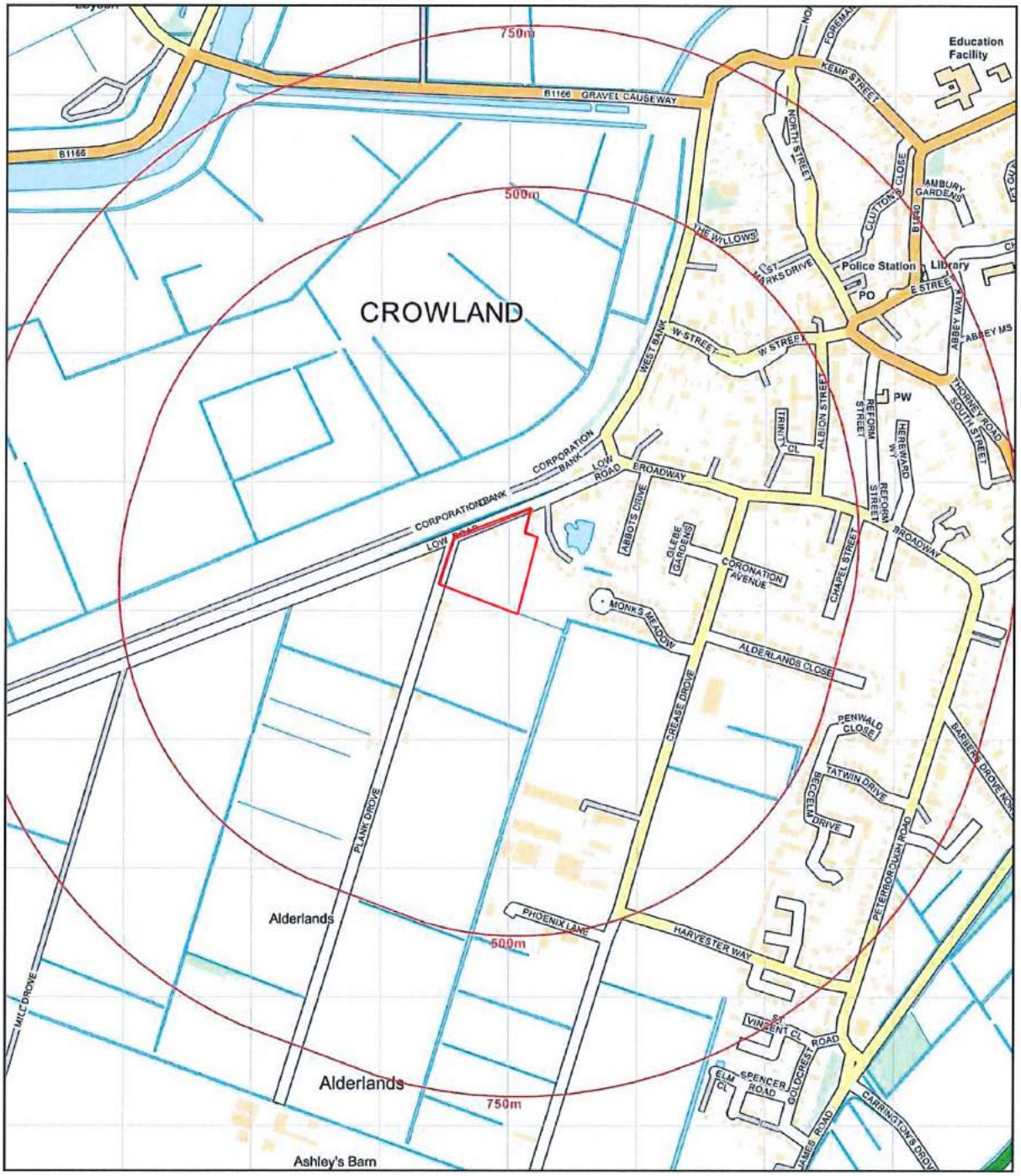


Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Site History

Figure J

Reproduced from the **2020** edition Ordnance Survey sheet **TF20NW** at **1:10,000** scale with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. All rights reserved. Licence number AL100005523



Project : Land at Low Road and Plank Drove, Crowland **Client : CKH Developments**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15007**

Appendix 2

Environmental Database Information

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

LAND AT LOW ROAD & PLANK DROVE, CROWLAND, SPALDING, PE6 0BX

Order Details

Date: 17/03/2020

Your ref: C15007

Our Ref: GS-6700405

Client: Ground Engineering Limited

Site Details

Location: 523371 309874

Area: 1.49 ha



Summary of findings p. 2

OS MasterMap site plan p.13

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	0	0	2	12	-
15	1.2	Historical tanks	0	0	2	0	-
16	1.3	Historical energy features	0	0	3	3	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	2	-
17	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
18	2.1	Historical industrial land uses	0	0	2	15	-
19	2.2	Historical tanks	0	0	5	0	-
20	2.3	Historical energy features	0	0	5	5	-
20	2.4	Historical petrol stations	0	0	0	0	-
20	2.5	Historical garages	0	0	0	4	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
22	3.1	Active or recent landfill	0	0	0	0	-
22	3.2	Historical landfill (BGS records)	0	0	0	0	-
23	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
23	3.4	Historical landfill (EA/NRW records)	0	1	0	0	-
23	3.5	Historical waste sites	0	0	0	0	-
23	3.6	Licensed waste sites	0	0	0	0	-
24	3.7	Waste exemptions	0	0	7	19	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
27	4.1	Recent industrial land uses	0	0	1	-	-
28	4.2	Current or recent petrol stations	0	0	0	1	-
28	4.3	Electricity cables	0	0	0	0	-
28	4.4	Gas pipelines	0	0	0	0	-
28	4.5	Sites determined as Contaminated Land	0	0	0	0	-

28	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
29	4.7	Regulated explosive sites	0	0	0	0	-
29	4.8	Hazardous substance storage/usage	0	0	0	0	-
29	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
29	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
29	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	0	0	2	-
30	4.12	Radioactive Substance Authorisations	0	0	0	0	-
30	**4.13**	**Licensed Discharges to controlled waters**	0	0	1	3	-
31	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
31	4.15	Pollutant release to public sewer	0	0	0	0	-
31	4.16	List 1 Dangerous Substances	0	0	0	0	-
31	4.17	List 2 Dangerous Substances	0	0	0	0	-
32	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
32	4.19	Pollution inventory substances	0	0	0	0	-
32	4.20	Pollution inventory waste transfers	0	0	0	0	-
32	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
33	**5.1**	**Superficial aquifer**	Identified (within 500m)				
35	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
36	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
37	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
37	5.5	Groundwater vulnerability- local information	None (within 0m)				
38	**5.6**	**Groundwater abstractions**	0	0	0	0	2
39	**5.7**	**Surface water abstractions**	0	0	2	0	24
45	5.8	Potable abstractions	0	0	0	0	0
45	5.9	Source Protection Zones	0	0	0	0	-
45	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
46	**6.1**	**Water Network (OS MasterMap)**	1	3	28	-	-

49	6.2	Surface water features	0	4	7	-	-
49	6.3	WFD Surface water body catchments	1	-	-	-	-
50	6.4	WFD Surface water bodies	0	0	0	-	-
50	6.5	WFD Groundwater bodies	0	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
51	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	High (within 50m)				
52	7.2	Historical Flood Events	0	1	0	-	-
52	7.3	Flood Defences	0	1	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
53	7.5	Flood Storage Areas	0	1	0	-	-
54	7.6	Flood Zone 2	Identified (within 50m)				
55	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
56	8.1	Surface water flooding	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
58	9.1	Groundwater flooding	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
59	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
60	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
60	10.7	Designated Ancient Woodland	0	0	0	0	0
60	10.8	Biosphere Reserves	0	0	0	0	0
61	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	Green Belt	0	0	0	0	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0

61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
62	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	**10.16**	**Nitrate Vulnerable Zones**	1	0	0	0	2
63	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
64	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	11.1	World Heritage Sites	0	0	0	-	-
65	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
65	11.3	National Parks	0	0	0	-	-
65	11.4	Listed Buildings	0	0	0	-	-
66	11.5	Conservation Areas	0	0	0	-	-
66	11.6	Scheduled Ancient Monuments	0	0	0	-	-
66	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
67	**12.1**	**Agricultural Land Classification**	Grade 3 (within 250m)				
68	12.2	Open Access Land	0	0	0	-	-
68	12.3	Tree Felling Licences	0	0	0	-	-
68	12.4	Environmental Stewardship Schemes	0	0	0	-	-
69	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
70	**13.1**	**Priority Habitat Inventory**	0	1	0	-	-
71	13.2	Habitat Networks	0	0	0	-	-
71	13.3	Open Mosaic Habitat	0	0	0	-	-
71	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
72	**14.1**	**10k Availability**	Identified (within 500m)				
73	14.2	Artificial and made ground (10k)	0	0	0	0	-
74	**14.3**	**Superficial geology (10k)**	2	2	2	0	-

75	14.4	Landslip (10k)	0	0	0	0	-
76	**14.5**	**Bedrock geology (10k)**	1	1	0	0	-
77	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
78	**15.1**	**50k Availability**	Identified (within 500m)				
79	15.2	Artificial and made ground (50k)	0	0	0	0	-
79	15.3	Artificial ground permeability (50k)	0	0	-	-	-
80	**15.4**	**Superficial geology (50k)**	1	2	1	0	-
81	**15.5**	**Superficial permeability (50k)**	Identified (within 50m)				
81	15.6	Landslip (50k)	0	0	0	0	-
81	15.7	Landslip permeability (50k)	None (within 50m)				
82	**15.8**	**Bedrock geology (50k)**	1	0	0	0	-
83	**15.9**	**Bedrock permeability (50k)**	Identified (within 50m)				
83	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
84	**16.1**	**BGS Boreholes**	0	3	1	-	-
Page	Section	Natural ground subsidence					
86	**17.1**	**Shrink swell clays**	Moderate (within 50m)				
88	**17.2**	**Running sands**	Low (within 50m)				
90	**17.3**	**Compressible deposits**	High (within 50m)				
92	**17.4**	**Collapsible deposits**	Very low (within 50m)				
94	**17.5**	**Landslides**	Very low (within 50m)				
96	**17.6**	**Ground dissolution of soluble rocks**	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
98	18.1	Natural cavities	0	0	0	0	-
99	18.2	BritPits	0	0	0	0	-
99	**18.3**	**Surface ground workings**	0	4	0	-	-
99	18.4	Underground workings	0	0	0	0	0
99	18.5	Historical Mineral Planning Areas	0	0	0	0	-

100	18.6	Non-coal mining	0	0	0	0	0
100	18.7	Mining cavities	0	0	0	0	0
100	18.8	JPB mining areas	None (within 0m)				
100	18.9	Coal mining	None (within 0m)				
100	18.10	Brine areas	None (within 0m)				
101	18.11	Gypsum areas	None (within 0m)				
101	18.12	Tin mining	None (within 0m)				
101	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
102	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
103	**20.1**	**BGS Estimated Background Soil Chemistry**	1	4	-	-	-
103	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
104	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
105	21.1	Underground railways (London)	0	0	0	-	-
105	21.2	Underground railways (Non-London)	0	0	0	-	-
105	21.3	Railway tunnels	0	0	0	-	-
105	21.4	Historical railway and tunnel features	0	0	0	-	-
105	21.5	Royal Mail tunnels	0	0	0	-	-
106	21.6	Historical railways	0	0	0	-	-
106	21.7	Railways	0	0	0	-	-
106	21.8	Crossrail 1	0	0	0	0	-
106	21.9	Crossrail 2	0	0	0	0	-
106	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 20/04/2018

Site Area: 1.49ha

Recent site history - 2017 aerial photograph



Capture Date: 25/04/2017

Site Area: 1.49ha

Recent site history - 2014 aerial photograph



Capture Date: 06/06/2014

Site Area: 1.49ha

Recent site history - 2012 aerial photograph



Capture Date: 23/07/2012

Site Area: 1.49ha

Recent site history - 1999 aerial photograph



Capture Date: 18/06/1999

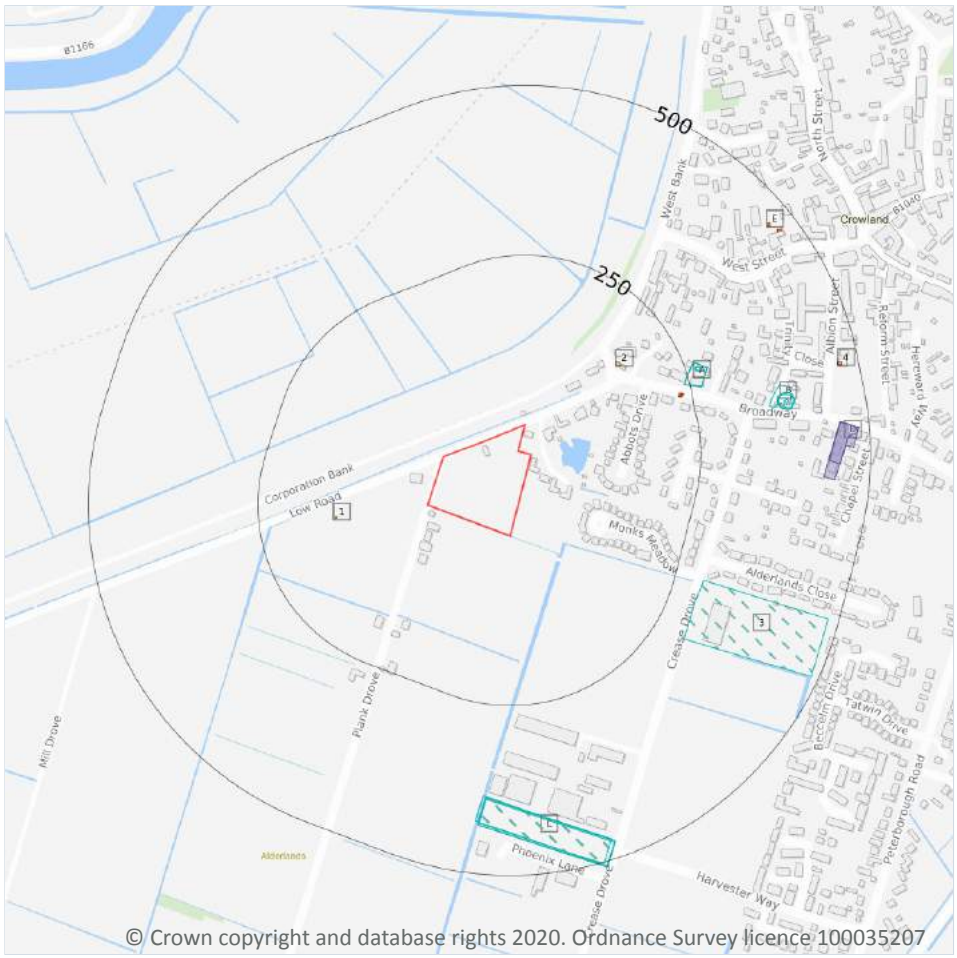
Site Area: 1.49ha

OS MasterMap site plan



Site Area: 1.49ha

1 Past land use



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	14

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	242m E	Gas Works	1887	2006231

ID	Location	Land use	Dates present	Group ID
A	242m E	Unspecified Commercial/Industrial	1906	2010269
A	264m E	Unspecified Tank	1906	2004274
A	264m E	Gasometer	1887	2005422
3	289m E	Unspecified Warehouse	1976	2012036
B	359m E	Corn Windmill	1887	2006849
B	371m E	Unspecified Heap	1950	2028459
B	372m E	Unspecified Heap	1906	2038767
B	372m E	Unspecified Heap	1903	2038731
B	381m E	Unspecified Tank	1903	2004273
C	385m S	Nursery	1958	2038387
C	387m S	Nursery	1900	2019058
C	388m S	Nursery	1901 - 1950	2039106
C	390m S	Nursery	1900	2016367

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**2**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	135m W	Unspecified Tank	1973	337802
2	161m NE	Unspecified Tank	1973 - 1995	342046

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	6

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	229m E	Electricity Substation	1995	222175
A	232m E	Electricity Substation	1973	222788
A	233m E	Electricity Substation	1986	223097
E	462m NE	Electricity Substation	1986	220770
E	468m NE	Electricity Substation	1995	222073
4	469m E	Electricity Substation	1973	220771

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	2

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
D	432m E	Garage	1965	68108
D	440m E	Garage	1996 - 1997	68807

This data is sourced from Ordnance Survey / Groundsure.

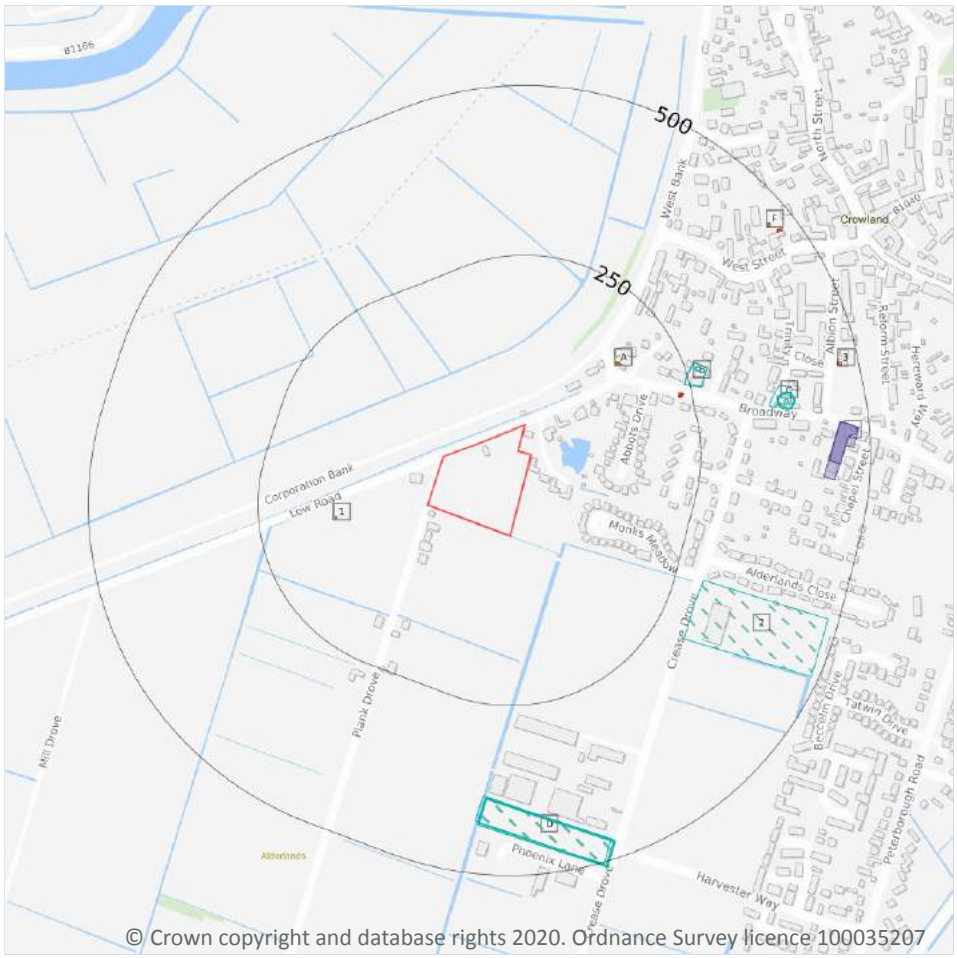
1.6 Historical military land

Records within 500m	**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

2.1 Historical industrial land uses

Records within 500m	17

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
B	242m E	Unspecified Commercial/Industrial	1906	2010269
B	242m E	Gas Works	1887	2006231
B	264m E	Gasometer	1887	2005422

ID	Location	Land Use	Date	Group ID
B	264m E	Unspecified Tank	1906	2004274
2	289m E	Unspecified Warehouse	1976	2012036
C	359m E	Corn Windmill	1887	2006849
C	371m E	Unspecified Heap	1950	2028459
C	371m E	Unspecified Heap	1950	2028459
C	372m E	Unspecified Heap	1906	2038767
C	372m E	Unspecified Heap	1903	2038731
C	381m E	Unspecified Tank	1903	2004273
D	385m S	Nursery	1958	2038387
D	387m S	Nursery	1900	2019058
D	387m S	Nursery	1900	2019058
D	388m S	Nursery	1901	2039106
D	389m S	Nursery	1950	2039106
D	390m S	Nursery	1900	2016367

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m **5**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
1	135m W	Unspecified Tank	1973	337802
A	161m NE	Unspecified Tank	1995	342046
A	161m NE	Unspecified Tank	1995	342046
A	161m NE	Unspecified Tank	1995	342046
A	163m NE	Unspecified Tank	1973	342046

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	10

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
B	229m E	Electricity Substation	1995	222175
B	229m E	Electricity Substation	1995	222175
B	229m E	Electricity Substation	1995	222175
B	232m E	Electricity Substation	1973	222788
B	233m E	Electricity Substation	1986	223097
F	462m NE	Electricity Substation	1986	220770
F	468m NE	Electricity Substation	1995	222073
F	468m NE	Electricity Substation	1995	222073
F	468m NE	Electricity Substation	1995	222073
3	469m E	Electricity Substation	1973	220771

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	4

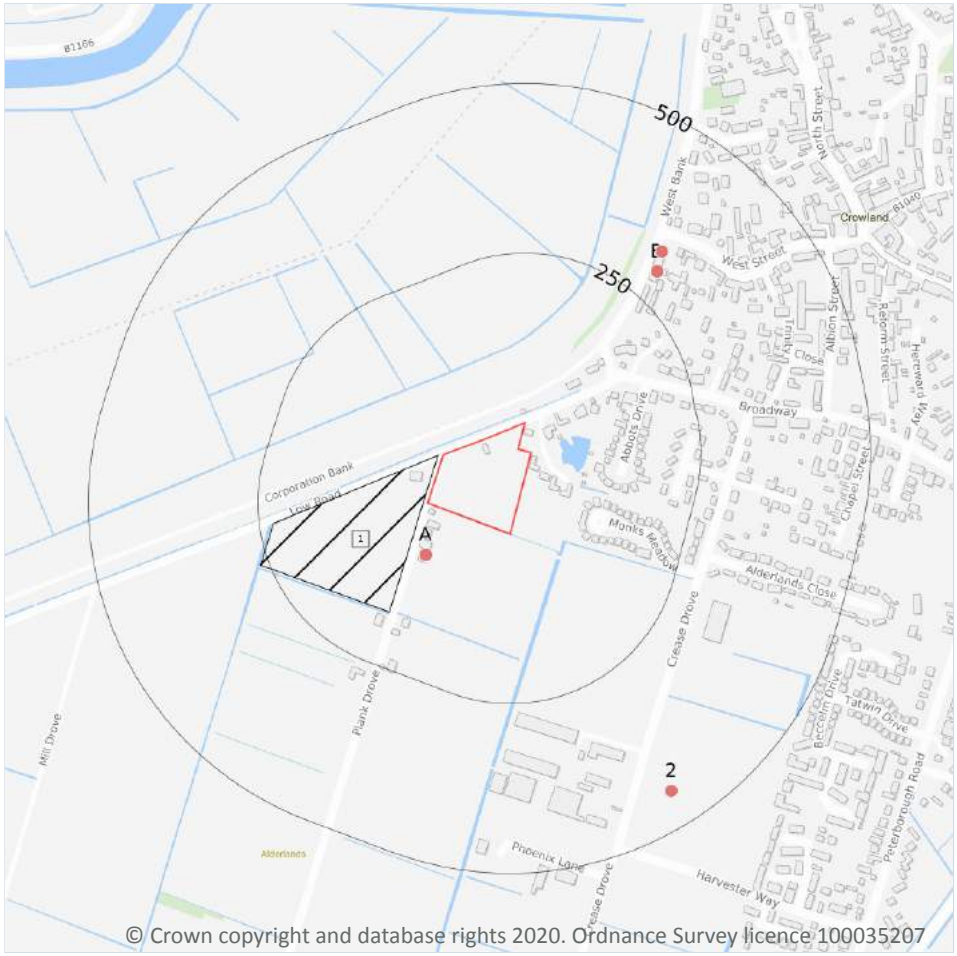
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
E	432m E	Garage	1965	68108
E	440m E	Garage	1997	68807
E	440m E	Garage	1997	68807
E	440m E	Garage	1996	68807

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Historical landfill (EA/NRW)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	1

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 22**

ID	Location	Details		
1	6m W	Site Address: Corporation Bank, Crowland Licence Holder Address: -	Waste Licence: - Site Reference: SH-23-01/89, 2500/5070 Waste Type: Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded - Last Recorded: -

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m **26**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 22**

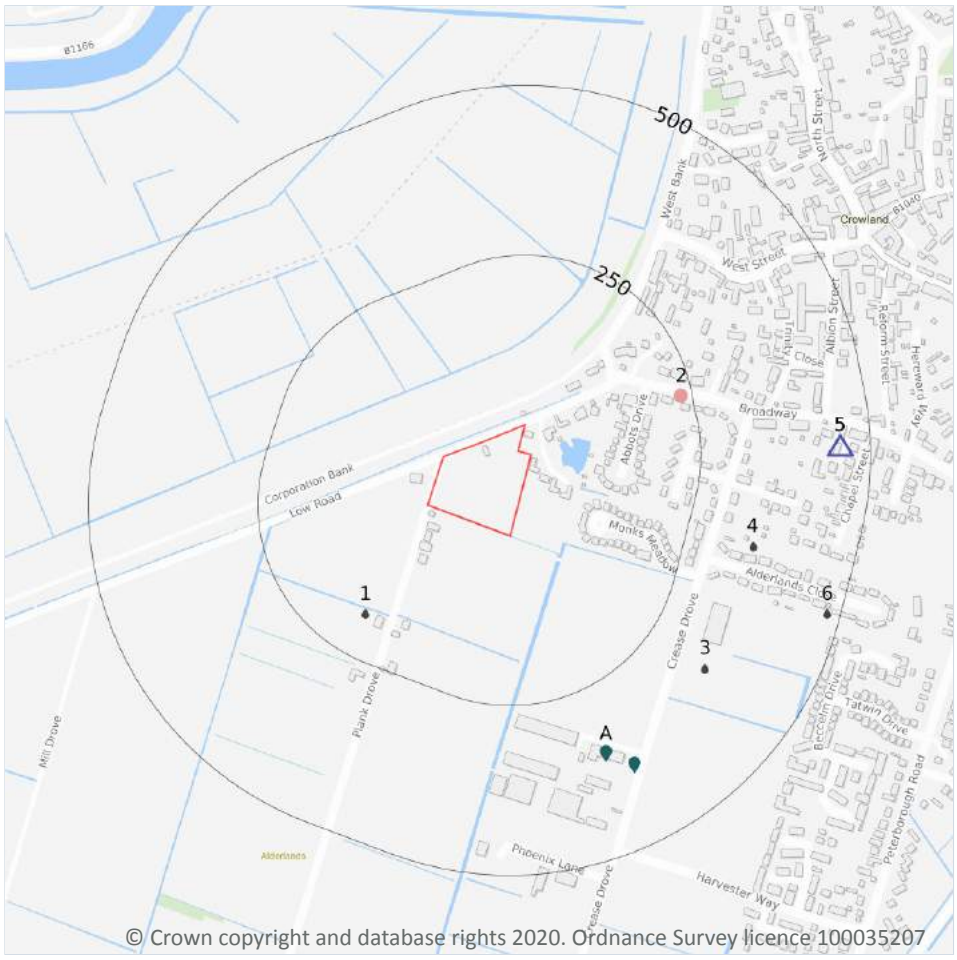
ID	Location	Site	Reference	Category	Sub-Category	Description
A	73m S	Ashleys Farm, Plank Drove, CROWLAND, PETERBOROUGH, PE6 0BY	WEX189875	Using waste exemption	On a Farm	Use of waste in construction
A	73m S	Ashleys Farm, Plank Drove, CROWLAND, PETERBOROUGH, PE6 0BY	WEX189875	Disposing of waste exemption	On a Farm	Burning waste in the open
A	73m S	Ashleys Farm, Plank Drove, CROWLAND, PETERBOROUGH, PE6 0BY	WEX189875	Storing waste exemption	On a Farm	Storage of waste in secure containers
A	73m S	Ashleys Farm, Plank Drove, CROWLAND, PETERBOROUGH, PE6 0BY	WEX189875	Storing waste exemption	On a Farm	Storage of waste in a secure place
A	74m S	Ashley's Barn, Plank Drove, Crowland Peterborough, PE6 0BY	WEX031112	Disposing of waste exemption	On a farm	Burning waste in the open
A	74m S	Ashley's Barn, Plank Drove, Crowland Peterborough, PE6 0BY	WEX031112	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
A	74m S	Ashley's Barn, Plank Drove, Crowland Peterborough, PE6 0BY	WEX031112	Using waste exemption	On a farm	Incorporation of ash into soil
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Disposing of waste exemption	Agricultural Waste Only	Deposit of waste from dredging of inland waters
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Disposing of waste exemption	Agricultural Waste Only	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Disposing of waste exemption	Agricultural Waste Only	Burning waste in the open
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Treating waste exemption	Agricultural Waste Only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising

ID	Location	Site	Reference	Category	Sub-Category	Description
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Using waste exemption	Agricultural Waste Only	Use of waste in construction
B	295m NE	78 West Street PETERBOROUGH PE6 0ED	EPR/HF0130FQ/A001	Using waste exemption	Agricultural Waste Only	Use of waste for a specified purpose
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Using waste exemption	On a Farm	Use of waste in construction
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Using waste exemption	On a Farm	Use of waste for a specified purpose
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Disposing of waste exemption	On a Farm	Deposit of waste from dredging of inland waters
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Disposing of waste exemption	On a Farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Disposing of waste exemption	On a Farm	Burning waste in the open
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX210253	Storing waste exemption	On a Farm	Storage of waste in a secure place
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Disposing of waste exemption	On a farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Disposing of waste exemption	On a farm	Burning waste in the open
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Storing waste exemption	On a farm	Storage of waste in a secure place
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Using waste exemption	On a farm	Use of waste in construction

ID	Location	Site	Reference	Category	Sub-Category	Description
B	323m NE	78, WEST STREET, CROWLAND, PETERBOROUGH, PE6 0ED	WEX060876	Using waste exemption	On a farm	Use of waste for a specified purpose
2	447m SE	-	WEX157611	Using waste exemption	Not on a Farm	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	1

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	Activity	Category
2	234m E	Electricity Sub Station	Lincolnshire, PE6	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	LPG	Status
5	455m E	OBSOLETE	59, Broadway, Crowland, Lincolnshire, PE6 0BH	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	2

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Address	Details	
A	350m SE	Crowland Cranes, Crease Drove, Crowland, Peterborough, Cambridgeshire, PE6 0BN	Process: Respraying of Road Vehicles Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
A	383m SE	Frosts Commercial Refinishes (Crowland), Crease Drove, Crowland, Peterborough, Cambs, PE6 0BN	Process: Respraying of Road Vehicles Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m **0**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m **4**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Address	Details	
1	184m SW	BUNGALOW ON PLANK DROVE, CROWLAND	Effluent Type: UNSPECIFIED Permit Number: PR5LF5081 Permit Version: 1 Receiving Water: land	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 02/10/1985 Effective Date: 02/10/1985 Revocation Date: 01/10/1996
3	346m SE	RES. DEV. TATWIN DRIVE, CROWLAND	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: PR5NF5156 Permit Version: 1 Receiving Water: Fen drain	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 21/05/1986 Effective Date: 21/05/1986 Revocation Date: 11/02/1992
4	349m E	PREMISES AT CREASE DROVE, CROWLAND	Effluent Type: UNSPECIFIED Permit Number: PR5LF3154 Permit Version: 1 Receiving Water: Land	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 03/12/1971 Effective Date: 03/12/1971 Revocation Date: 01/10/1996

ID	Location	Address	Details	
6	480m E	CREASE DROVE, CROWLAND, PETERBOROUGH	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: PR5NF447 Permit Version: 1 Receiving Water: Unknown Trib	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 12/12/1968 Effective Date: 12/12/1968 Revocation Date: 26/02/1992

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

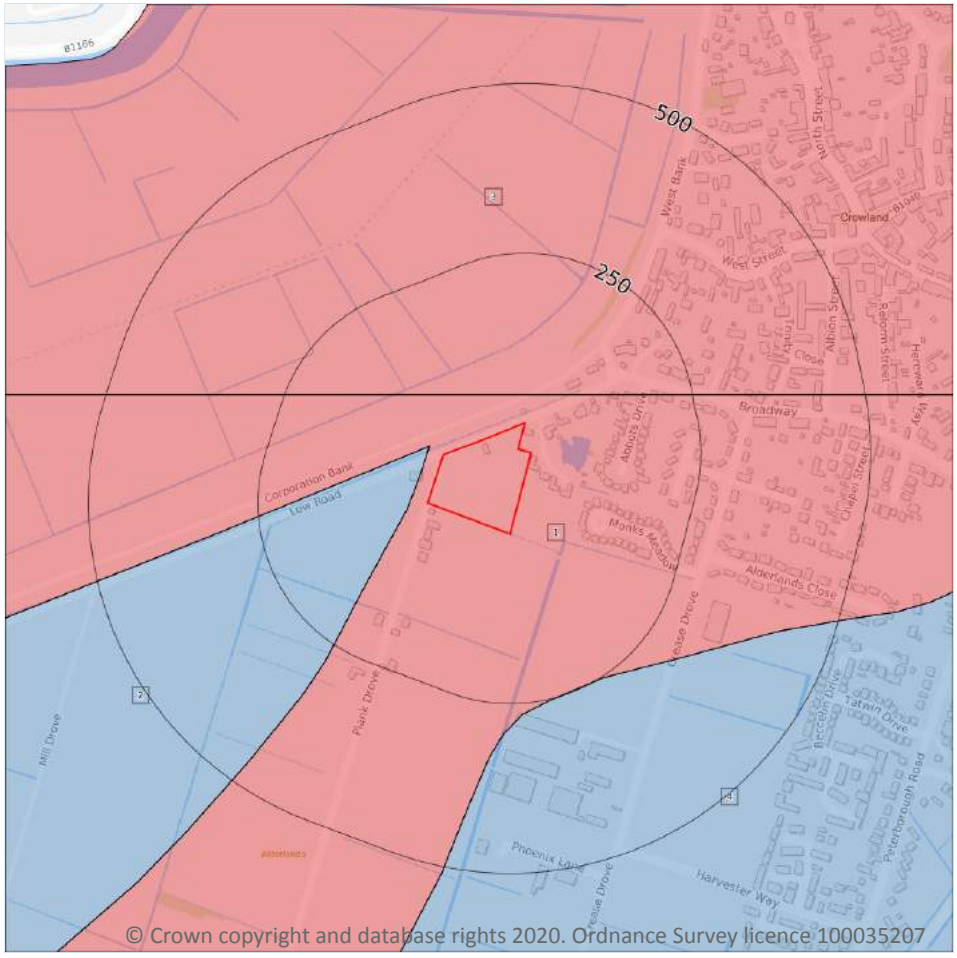
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	4

Aquifer status of groundwater held within superficial geology.

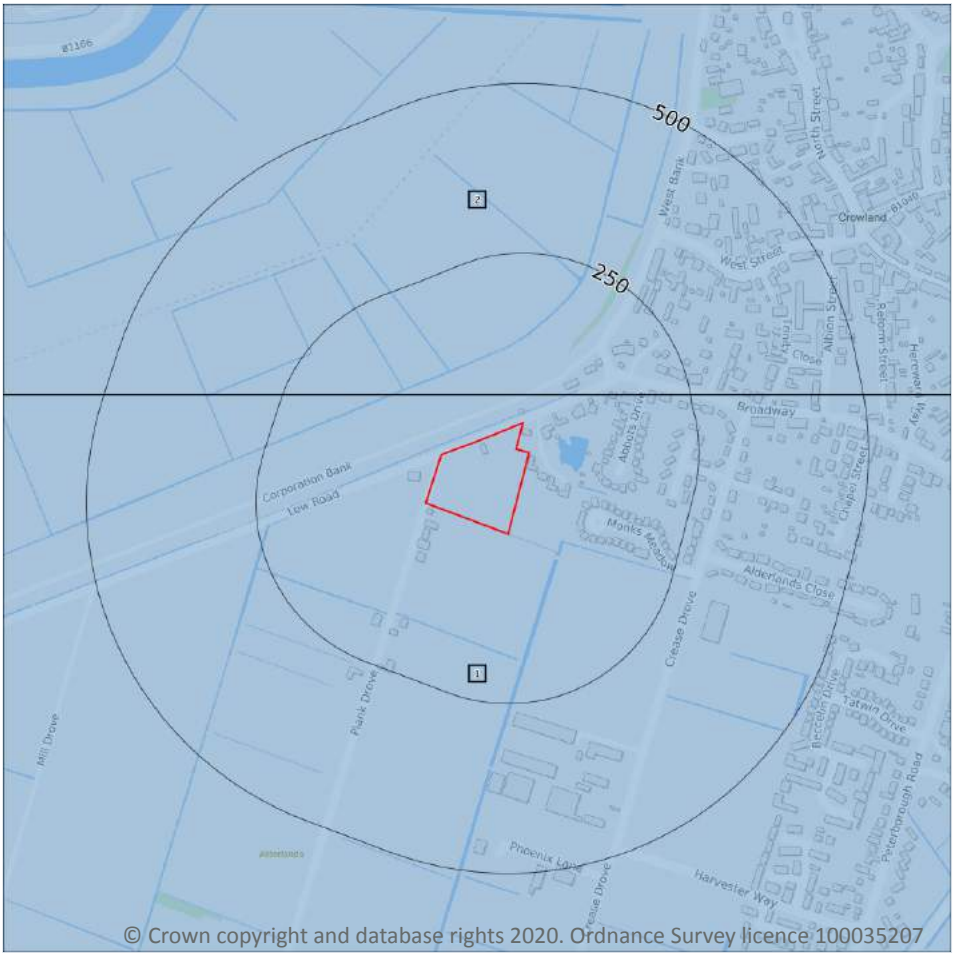
Features are displayed on the Hydrogeology map on **page 33**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	23m W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	41m N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	249m SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	2

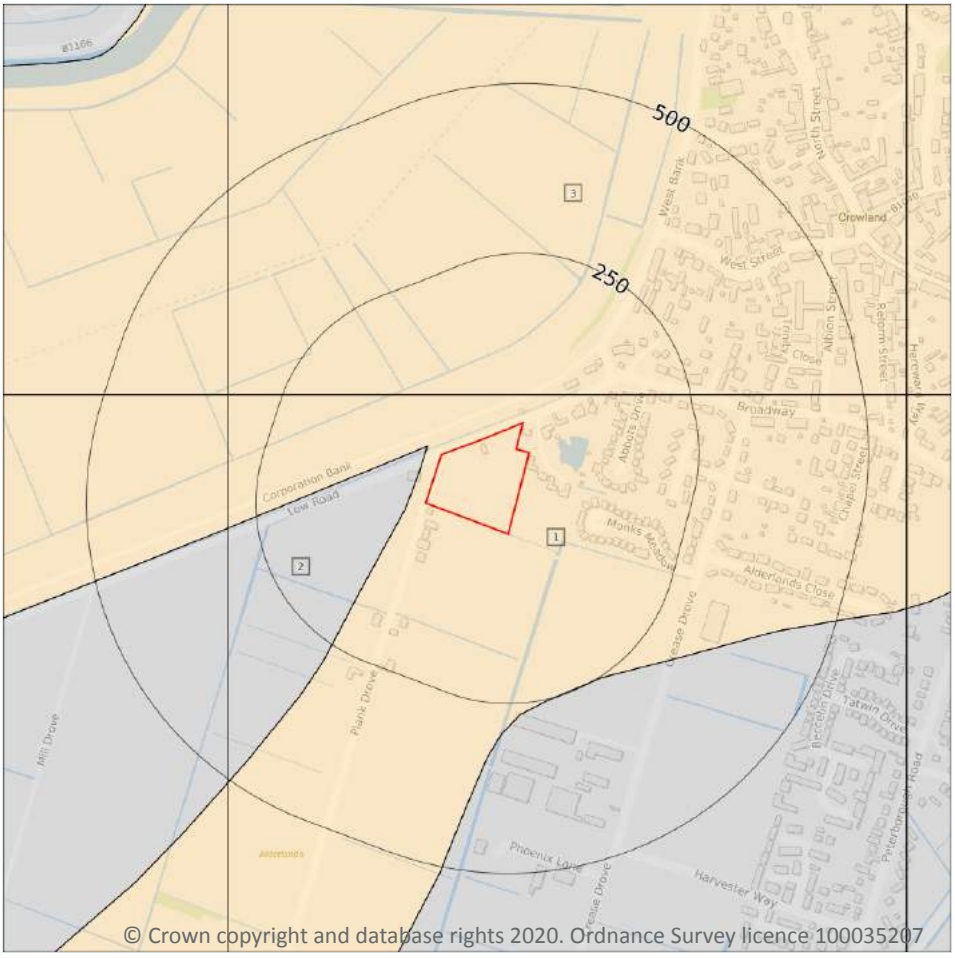
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 35**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	41m N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 36**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures**
2	23m W	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: 3-10m Patchiness value: >90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures
3	41m N	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

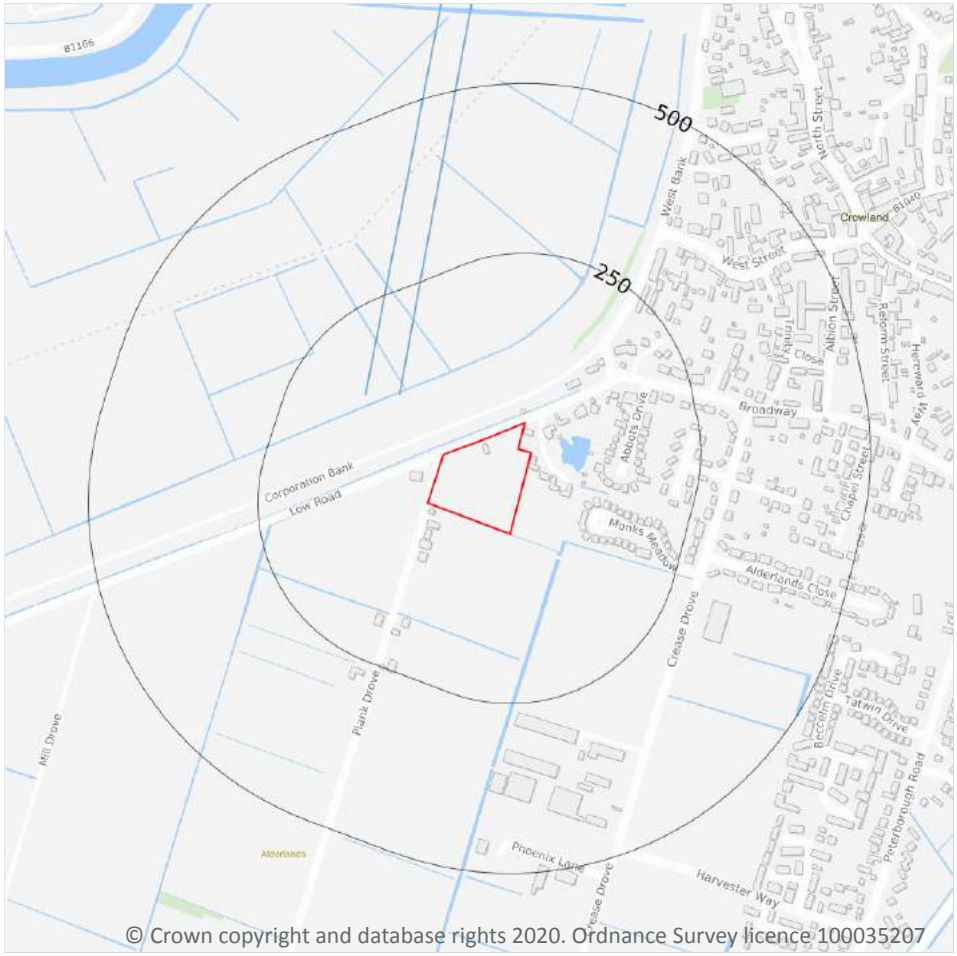
5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	2

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 38**

ID	Location	Details	
-	1139m NE	Status: Historical Licence No: 5/32/11/*G/0024 Details: General Farming & Domestic Direct Source: GROUND WATER SOURCE OF SUPPLY Point: WELL AT 38 POSTLAND ROAD Data Type: Point Name: SMEDLEY Easting: 524300 Northing: 310700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/03/1966 Version End Date: -
-	1586m NW	Status: Historical Licence No: 5/31/14/*G/0156 Details: Spray Irrigation - Direct Direct Source: GROUND WATER SOURCE OF SUPPLY Point: BOREHOLE AT CROWLAND Data Type: Point Name: HOPKINSON Easting: 522000 Northing: 310800	Annual Volume (m^3): 4000 Max Daily Volume (m^3): 130 Original Application No: - Original Start Date: 01/01/1981 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2004 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**26**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 38**

ID	Location	Details	
A	109m NW	Status: Active Licence No: 5/31/14/*S/0254 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER - CROWLAND Data Type: Line Name: F G TANSLEY & SON Easting: 523250 Northing: 310000	Annual Volume (m^3): 22,000 Max Daily Volume (m^3): 4,000 Original Application No: - Original Start Date: 01/07/2001 Expiry Date: - Issue No: 1 Version Start Date: 01/07/2001 Version End Date: -

ID	Location	Details	
A	144m NW	Status: Historical Licence No: 5/31/14/*S/0178B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER AT CROWLAND Data Type: Line Name: F ADAMS & SON Easting: 523200 Northing: 310000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/11/1993 Version End Date: -
-	841m NW	Status: Active Licence No: 5/31/14/*S/0254 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: RIVER WELLAND - CROWLAND Data Type: Line Name: F G TANSLEY & SON Easting: 522930 Northing: 310660	Annual Volume (m^3): 22,000 Max Daily Volume (m^3): 4,000 Original Application No: - Original Start Date: 01/07/2001 Expiry Date: - Issue No: 1 Version Start Date: 01/07/2001 Version End Date: -
-	890m NW	Status: Historical Licence No: 5/31/14/*S/0178B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: RIVER WELLAND AT CROWLAND Data Type: Line Name: F ADAMS & SON Easting: 522900 Northing: 310700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/11/1993 Version End Date: -
-	1016m NW	Status: Active Licence No: 5/31/14/*S/0160 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: COMMON DRAIN, CROWLAND Data Type: Line Name: WHEAT Easting: 521919 Northing: 312031	Annual Volume (m^3): 30,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/09/1983 Expiry Date: - Issue No: 101 Version Start Date: 18/10/2013 Version End Date: -
-	1163m NW	Status: Historical Licence No: 5/31/14/*S/0178A Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: COMMON DRAIN CROWLAND Data Type: Line Name: F ADAMS & SON Easting: 522700 Northing: 310900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1992 Version End Date: -

ID	Location	Details	
-	1199m NW	Status: Active Licence No: 5/31/14/*S/0253 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: COMMON DRAIN - CROWLAND COMMON Data Type: Line Name: F G TANSLEY & SON Easting: 522680 Northing: 310930	Annual Volume (m^3): 28,000 Max Daily Volume (m^3): 4,000 Original Application No: - Original Start Date: 01/07/2001 Expiry Date: - Issue No: 1 Version Start Date: 01/07/2001 Version End Date: -
-	1345m SE	Status: Active Licence No: 5/32/11/*S/0112 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: GREEN BANK DRAIN, CROWLAND Data Type: Line Name: BOOR Easting: 524630 Northing: 309220	Annual Volume (m^3): 15,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 101 Version Start Date: 30/09/2002 Version End Date: -
-	1431m SW	Status: Historical Licence No: 5/32/11/*S/0133 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEWBOROUGH MAIN DRAIN-CROWLAND Data Type: Line Name: WOODROFFE Easting: 522230 Northing: 308880	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/03/1993 Expiry Date: 31/10/2002 Issue No: 100 Version Start Date: 01/06/1998 Version End Date: -
-	1431m SW	Status: Historical Licence No: 5/32/11/*S/0156 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEWBOROUGH MAIN DRAIN AT CROWLAND Data Type: Line Name: WOODROFFE Easting: 522230 Northing: 308880	Annual Volume (m^3): 18000 Max Daily Volume (m^3): 700 Original Application No: - Original Start Date: 21/06/2004 Expiry Date: 31/10/2008 Issue No: 1 Version Start Date: 21/06/2004 Version End Date: -
-	1431m SW	Status: Active Licence No: 5/32/11/*S/0169 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEWBOROUGH MAIN DRAIN AT CROWLAND Data Type: Line Name: WOODROFFE Easting: 522230 Northing: 308880	Annual Volume (m^3): 18,000 Max Daily Volume (m^3): 700 Original Application No: - Original Start Date: 18/08/2008 Expiry Date: 31/03/2020 Issue No: 1 Version Start Date: 01/04/2009 Version End Date: -

ID	Location	Details	
-	1479m N	Status: Active Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: R WELLAND AT CROWLAND Data Type: Line Name: BOOR Easting: 523018 Northing: 311378	Annual Volume (m^3): 10,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 102 Version Start Date: 18/09/2013 Version End Date: -
-	1480m N	Status: Historical Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: R WELLAND AT CROWLAND Data Type: Line Name: BOOR Easting: 523020 Northing: 311380	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 2000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 101 Version Start Date: 23/02/2005 Version End Date: -
-	1500m W	Status: Historical Licence No: 5/31/14/*S/0009 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FARM & S DROVE DRAIN RIVER WELLAND (2) Data Type: Line Name: DENNIS ESTATES Easting: 521300 Northing: 309600	Annual Volume (m^3): 105000 Max Daily Volume (m^3): 6000 Original Application No: - Original Start Date: 01/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/1989 Version End Date: -
-	1505m N	Status: Historical Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: R WELLAND AT CROWLAND Data Type: Line Name: BOOR Easting: 523000 Northing: 311400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 100 Version Start Date: 01/06/1986 Version End Date: -
-	1520m W	Status: Historical Licence No: 5/31/14/*S/0274 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FARM & S DROVE DRAIN RIVER WELLAND (2) Data Type: Line Name: DENNIS ESTATES Easting: 521300 Northing: 309670	Annual Volume (m^3): 105000 Max Daily Volume (m^3): 6000 Original Application No: - Original Start Date: 23/06/2008 Expiry Date: - Issue No: 1 Version Start Date: 23/06/2008 Version End Date: -

ID	Location	Details	
-	1665m SE	Status: Active Licence No: 5/32/11/*S/0112 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FIELD DRAINS, CROWLAND Data Type: Line Name: BOOR Easting: 524530 Northing: 308560	Annual Volume (m^3): 15,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 101 Version Start Date: 30/09/2002 Version End Date: -
-	1852m N	Status: Active Licence No: 5/31/14/*S/0160 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: UN-NAMED DRAIN IN WELLAND & DEEPINGS IDB Data Type: Point Name: WHEAT Easting: 522689 Northing: 311655	Annual Volume (m^3): 30,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/09/1983 Expiry Date: - Issue No: 101 Version Start Date: 18/10/2013 Version End Date: -
-	1899m N	Status: Historical Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER AT CROWLAND Data Type: Line Name: BOOR Easting: 523900 Northing: 311800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 100 Version Start Date: 01/06/1986 Version End Date: -
-	1970m N	Status: Historical Licence No: 5/31/14/*S/0178A Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: R WELLAND, CROWLAND Data Type: Point Name: F ADAMS & SON Easting: 523100 Northing: 311900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1992 Version End Date: -
-	1970m N	Status: Active Licence No: 5/31/14/*S/0160 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: RIVER WELLAND, CROWLAND Data Type: Point Name: WHEAT Easting: 523100 Northing: 311900	Annual Volume (m^3): 30,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/09/1983 Expiry Date: - Issue No: 101 Version Start Date: 18/10/2013 Version End Date: -

ID	Location	Details	
-	1972m N	Status: Active Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER AT CROWLAND Data Type: Line Name: BOOR Easting: 523889 Northing: 311878	Annual Volume (m^3): 10,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 102 Version Start Date: 18/09/2013 Version End Date: -
-	1974m N	Status: Historical Licence No: 5/32/11/*S/0019 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER AT CROWLAND Data Type: Line Name: J W E BANKS LTD Easting: 523890 Northing: 311880	Annual Volume (m^3): 4546 Max Daily Volume (m^3): 545.5 Original Application No: - Original Start Date: 01/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 28/02/2005 Version End Date: -
-	1974m N	Status: Historical Licence No: 5/31/14/*S/0185 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: NEW RIVER AT CROWLAND Data Type: Line Name: BOOR Easting: 523890 Northing: 311880	Annual Volume (m^3): 10000 Max Daily Volume (m^3): 2000 Original Application No: - Original Start Date: 01/06/1986 Expiry Date: - Issue No: 101 Version Start Date: 23/02/2005 Version End Date: -
-	1981m N	Status: Active Licence No: 5/31/14/*S/0253 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: RIVER WELLAND - CROWLAND COMMON Data Type: Point Name: F G TANSLEY & SON Easting: 523040 Northing: 311900	Annual Volume (m^3): 28,000 Max Daily Volume (m^3): 4,000 Original Application No: - Original Start Date: 01/07/2001 Expiry Date: - Issue No: 1 Version Start Date: 01/07/2001 Version End Date: -
-	1996m W	Status: Active Licence No: 5/31/14/*S/0171 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: STOWGATE NORTH DRAIN Data Type: Line Name: JOHNSON Easting: 520900 Northing: 310100	Annual Volume (m^3): 17,000 Max Daily Volume (m^3): 2,000 Original Application No: - Original Start Date: 01/10/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/01/1998 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

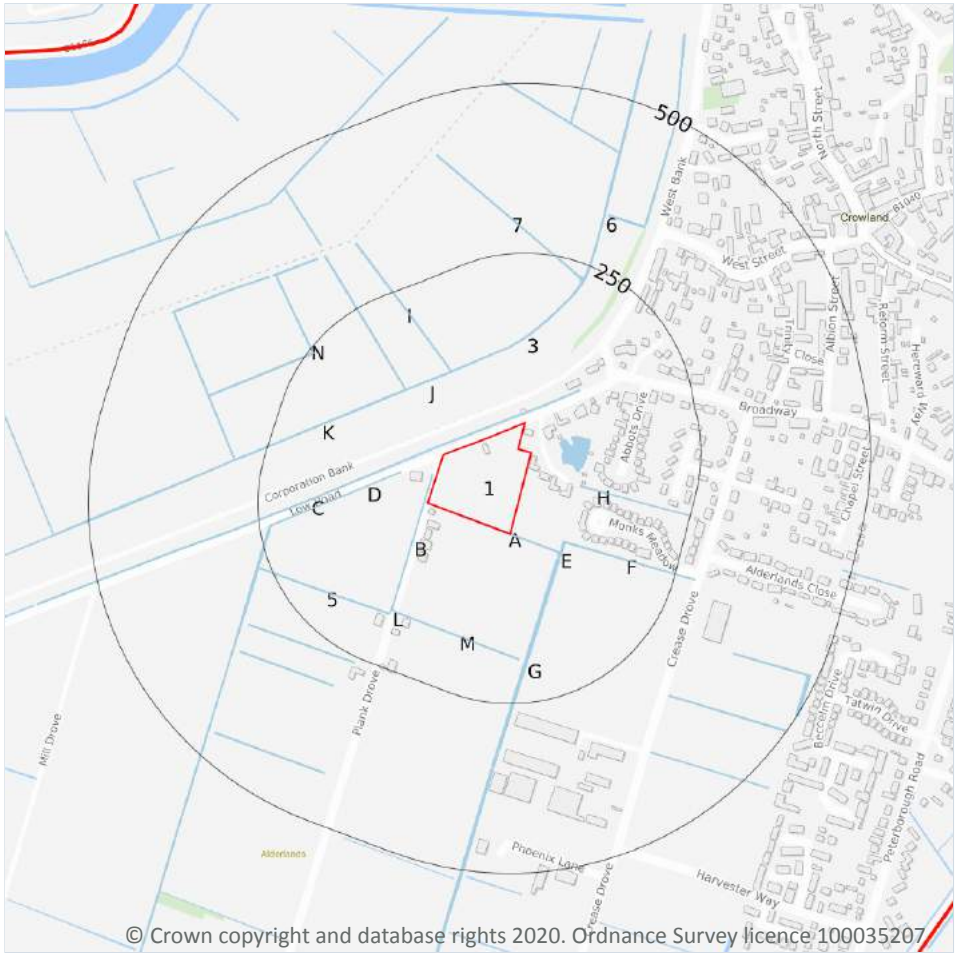
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



6.1 Water Network (OS MasterMap)

Records within 250m	32

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	5m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	13m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	13m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	50m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	75m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	78m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	78m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	79m SE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
G	79m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	82m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	109m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	New River
J	110m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	110m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	New River

ID	Location	Type of water feature	Ground level	Permanence	Name
K	110m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	New River
3	110m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	New River
I	110m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	111m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	125m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	142m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	145m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	153m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	163m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
L	165m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
L	165m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
M	167m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	172m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
H	186m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	227m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	New River
7	227m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	243m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	243m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**11**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 46**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River WB catchment**	**Welland - conf Greatford Cut to tidal**	**GB205031050685**	**Lower Welland**	**Welland**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	**1**

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	750m NW	River	Welland - conf Greatford Cut to tidal	GB205031050685	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

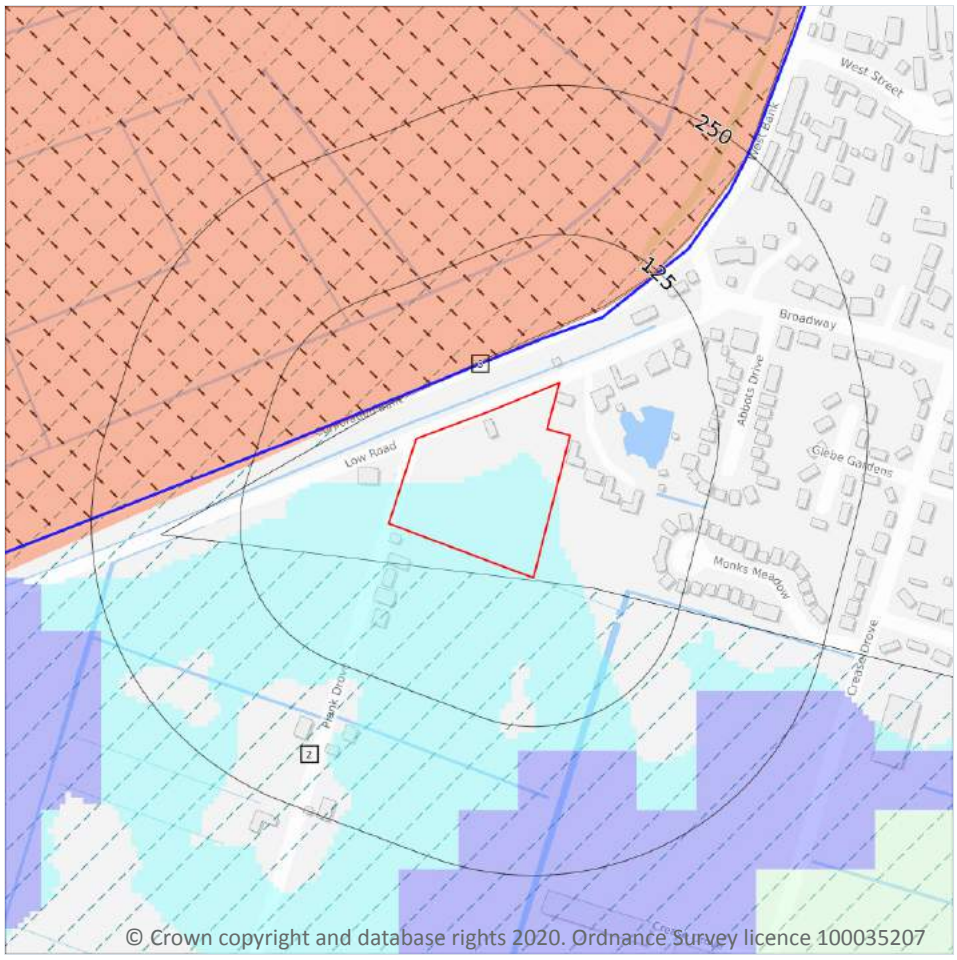
6.5 WFD Groundwater bodies

Records on site	**0**

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

Environment Agency river and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	**2**

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 51**

Distance	RoFRaS flood risk
On site	**Low**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	1

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

Features are displayed on the River and coastal flooding map on **page 51**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
2	2m S	March 1947 On The River Welland Near Cowbit	1947-03-16 1947-03-18	Main river	Other	Fluvial

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	1

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

Features are displayed on the River and coastal flooding map on **page 51**

ID	Location	Update
3	38m N	10/03/2020

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	**1**

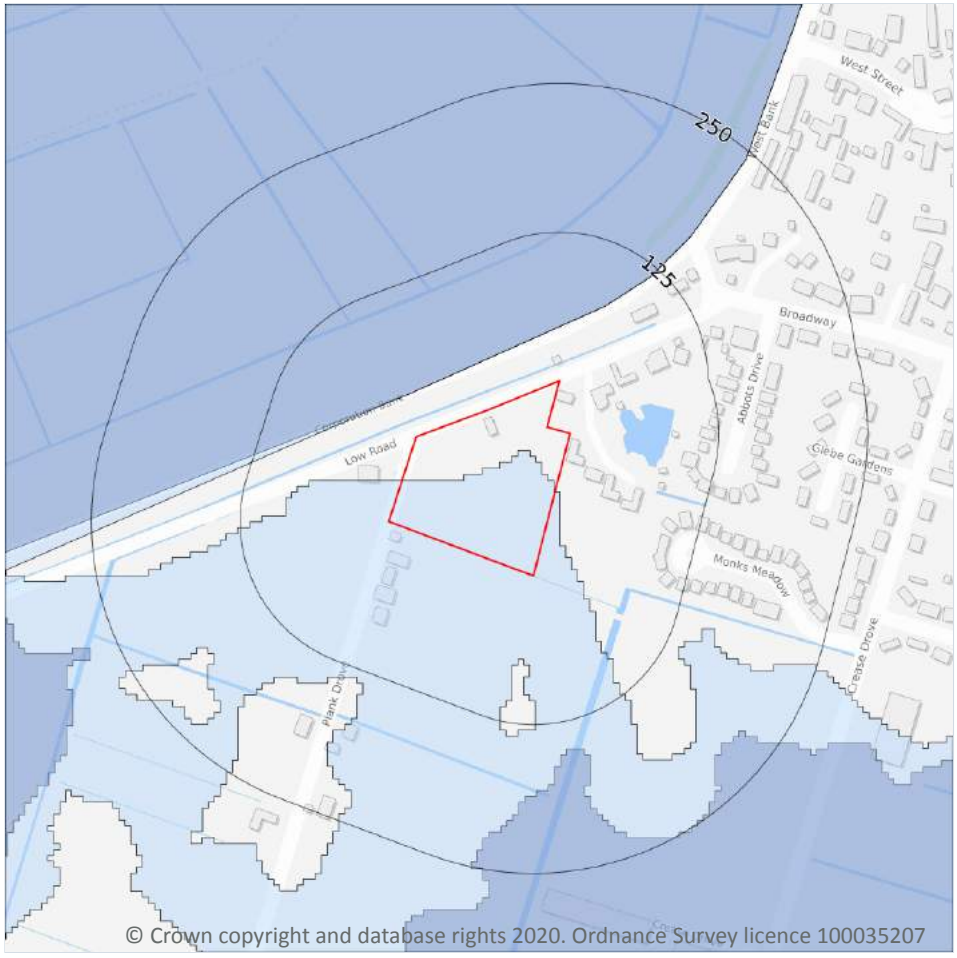
Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

Features are displayed on the River and coastal flooding map on **page 51**

ID	Location	Update
A	36m N	Flood Storage Area

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 51**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 51**

Location	Type
36m N	Zone 3 - (Fluvial Models)

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline

Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 56**

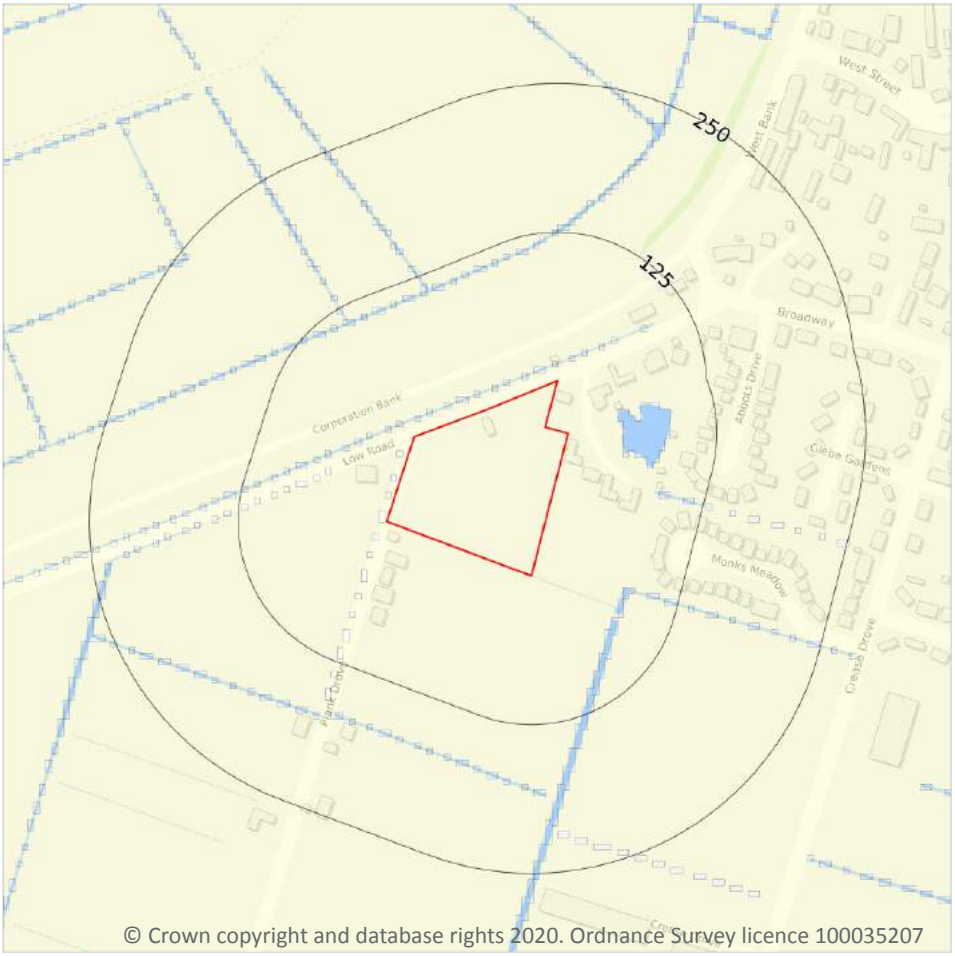
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site	**Moderate**
Highest risk within 50m	**Moderate**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 58**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

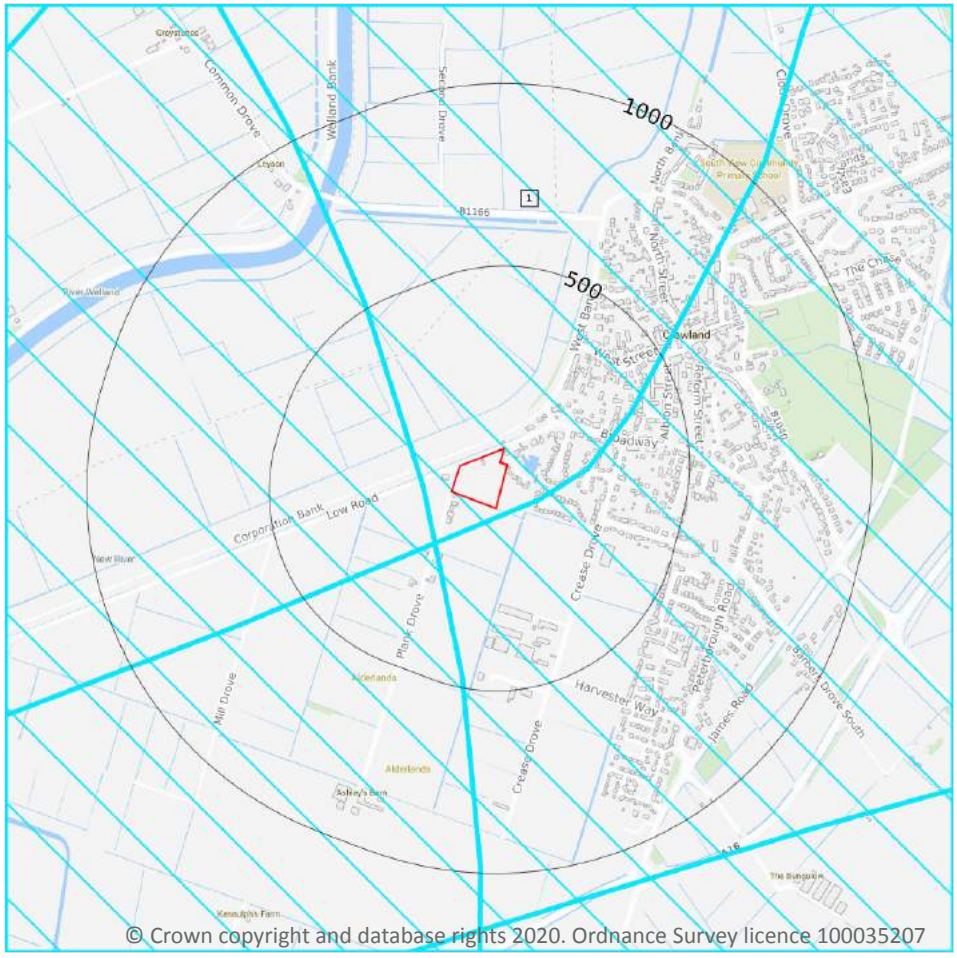
Records within 2000m	3

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**River Welland NVZ**	**Surface Water**	**S832**	**Existing**
648m NE	River Welland NVZ	Surface Water	S832	Existing
782m NW	Vernatt's Drain NVZ	Surface Water	S379	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 63**

ID	Location	Type of developments requiring consultation
1	On site	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 10 units or more. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**0**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

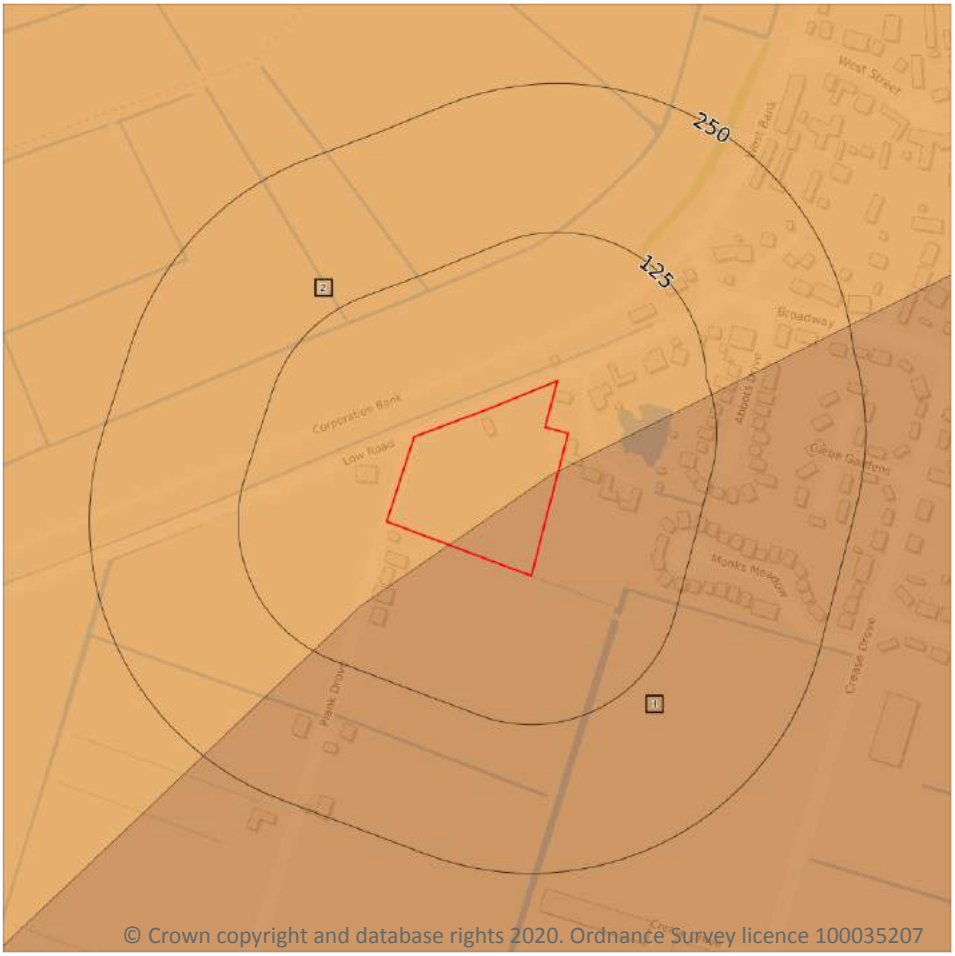
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	2

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 67**

ID	Location	Classification	Description
1	On site	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
2	On site	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

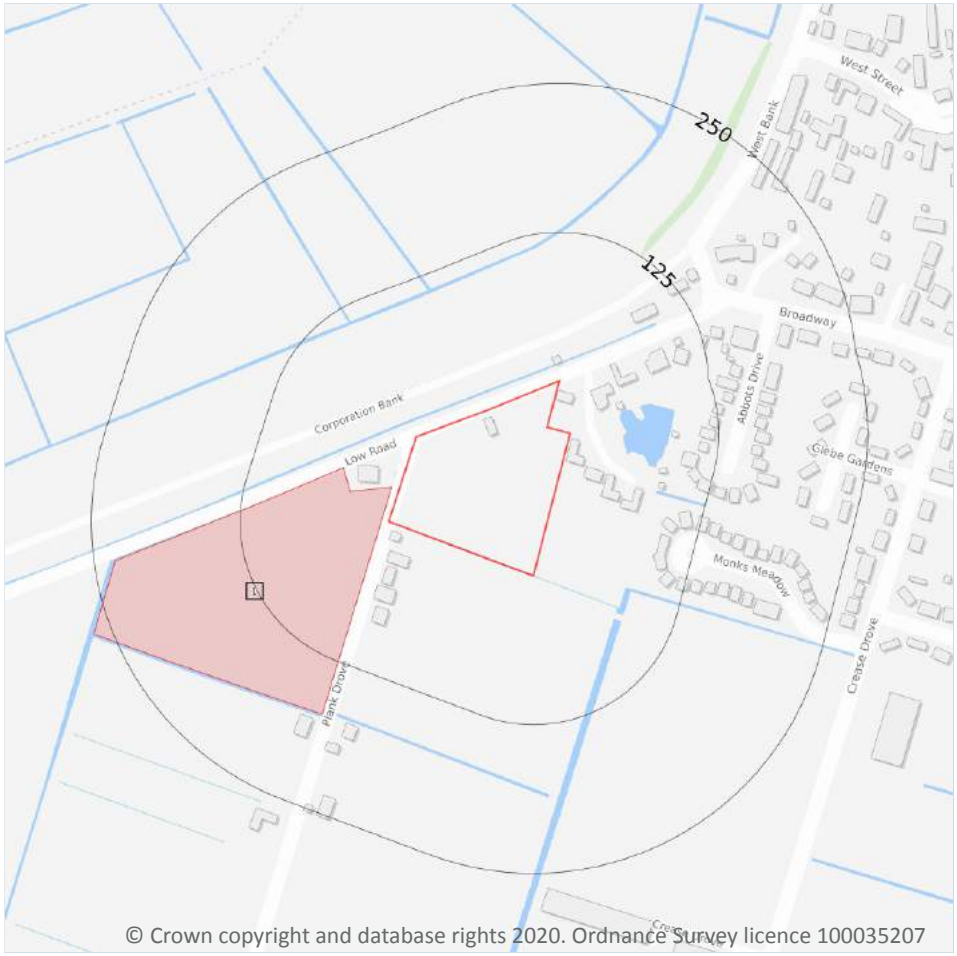
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	1

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 70**

ID	Location	Main Habitat	Other habitats
1	6m W	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

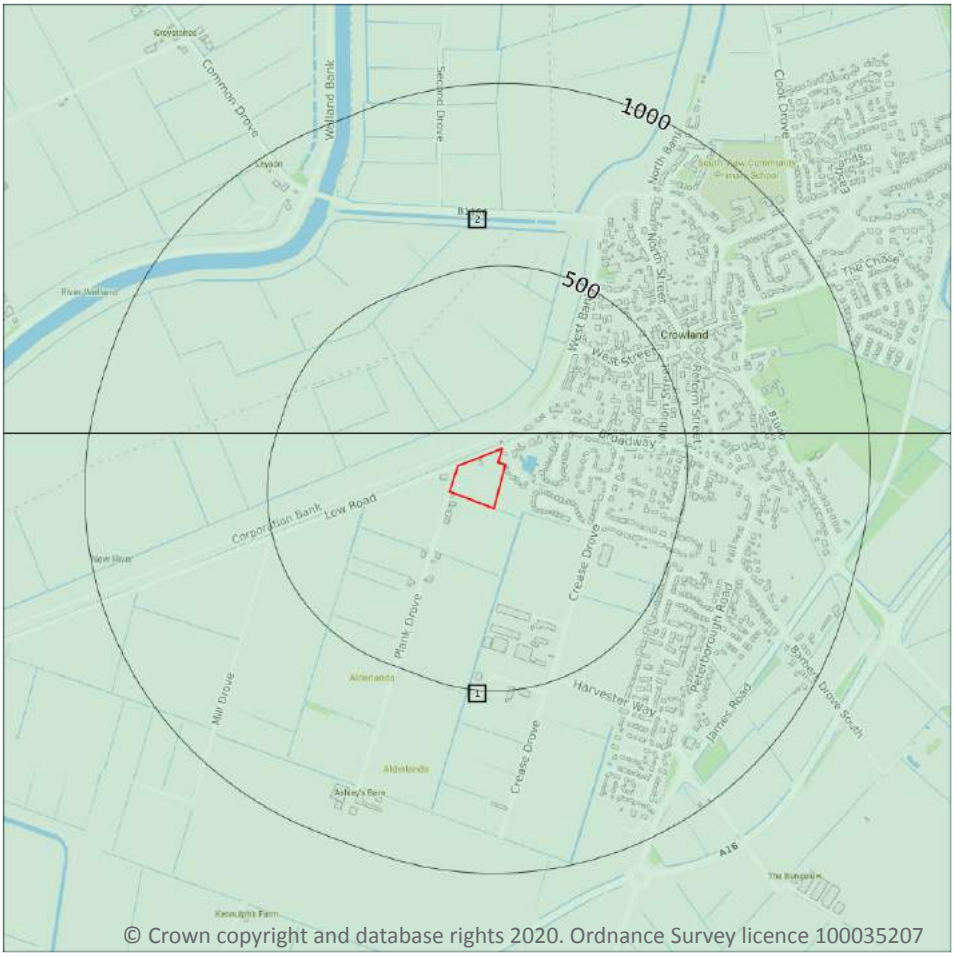
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 72**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**TF20NW**
2	41m N	No coverage	Full	Full	No coverage	TF21SW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

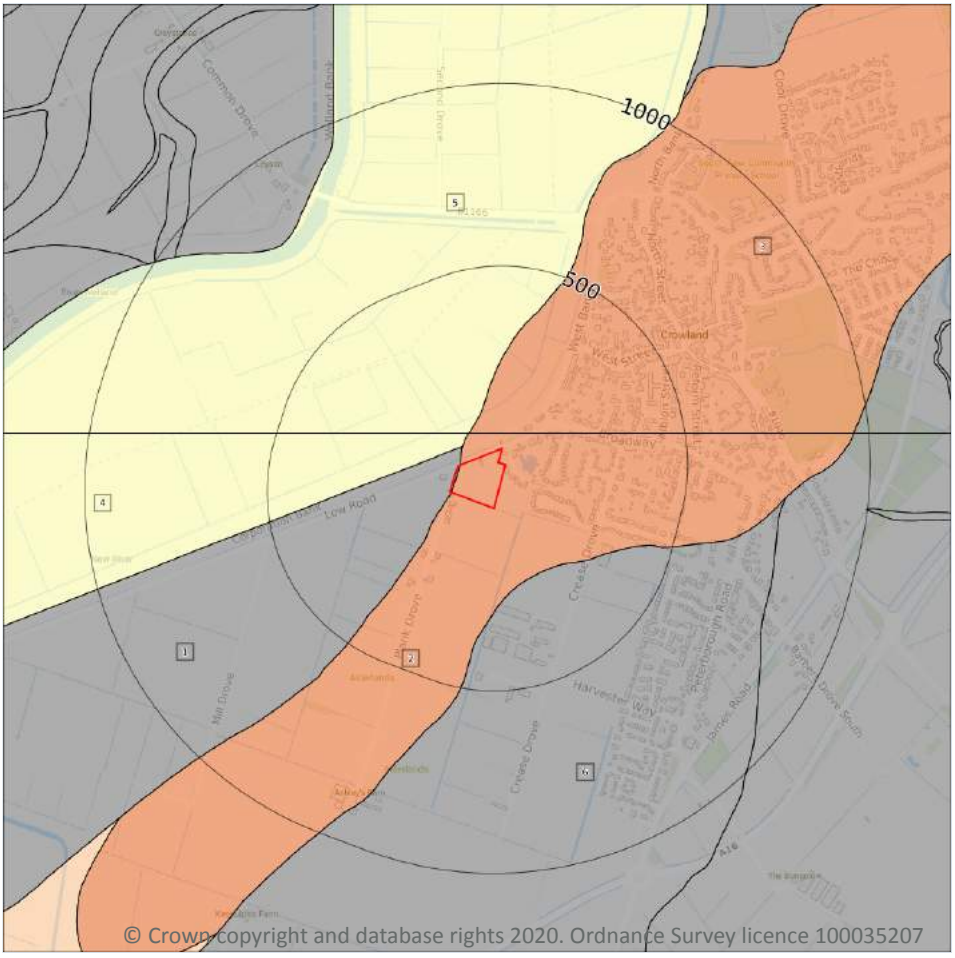
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **6**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 74**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**NP-P**	**Nordelph Peat - Peat (unlithified Deposits Coding Scheme)**	**Peat**
2	**On site**	**ABSG-XSV**	**Abbey Sand And Gravel - Sand And Gravel**	**Sand And Gravel**
3	41m N	ABSG-XSV	Abbey Sand And Gravel - Sand And Gravel	Sand And Gravel
4	45m N	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

ID	Location	LEX Code	Description	Rock description
5	73m N	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
6	215m SE	NP-P	Nordelph Peat - Peat (unlithified Deposits Coding Scheme)	Peat

This data is sourced from the British Geological Survey.

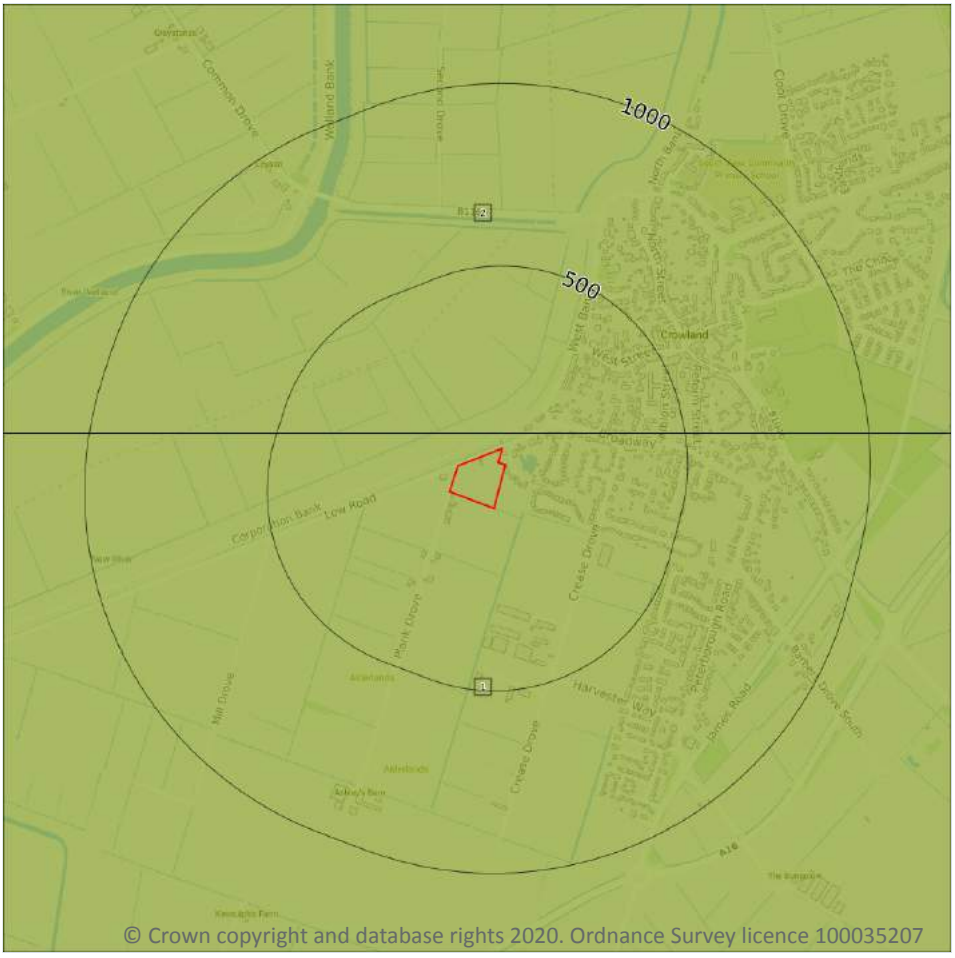
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	2

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 76**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**OXC-MDST**	**Oxford Clay Formation - Mudstone**	**Oxfordian Age - Callovian Age**
2	41m N	OXC-MDST	Oxford Clay Formation - Mudstone	Oxfordian Age - Callovian Age

This data is sourced from the British Geological Survey.

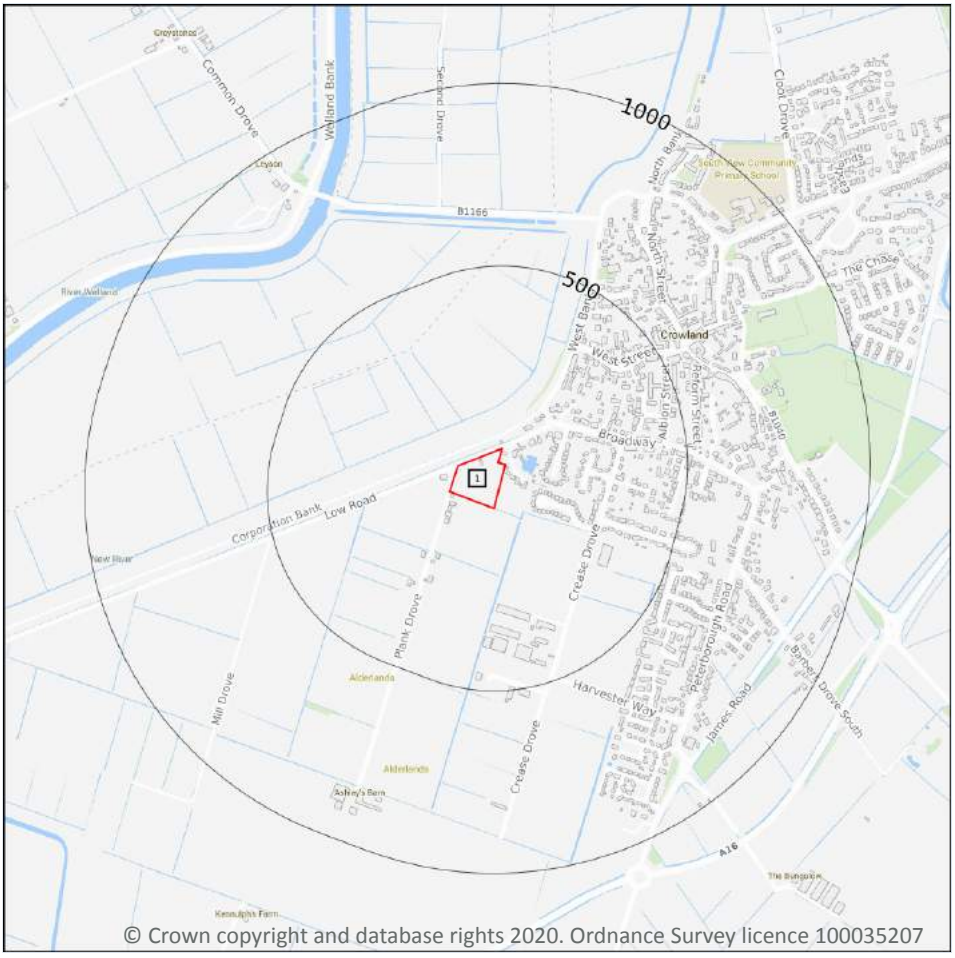
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 78**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**EW158_peterborough_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

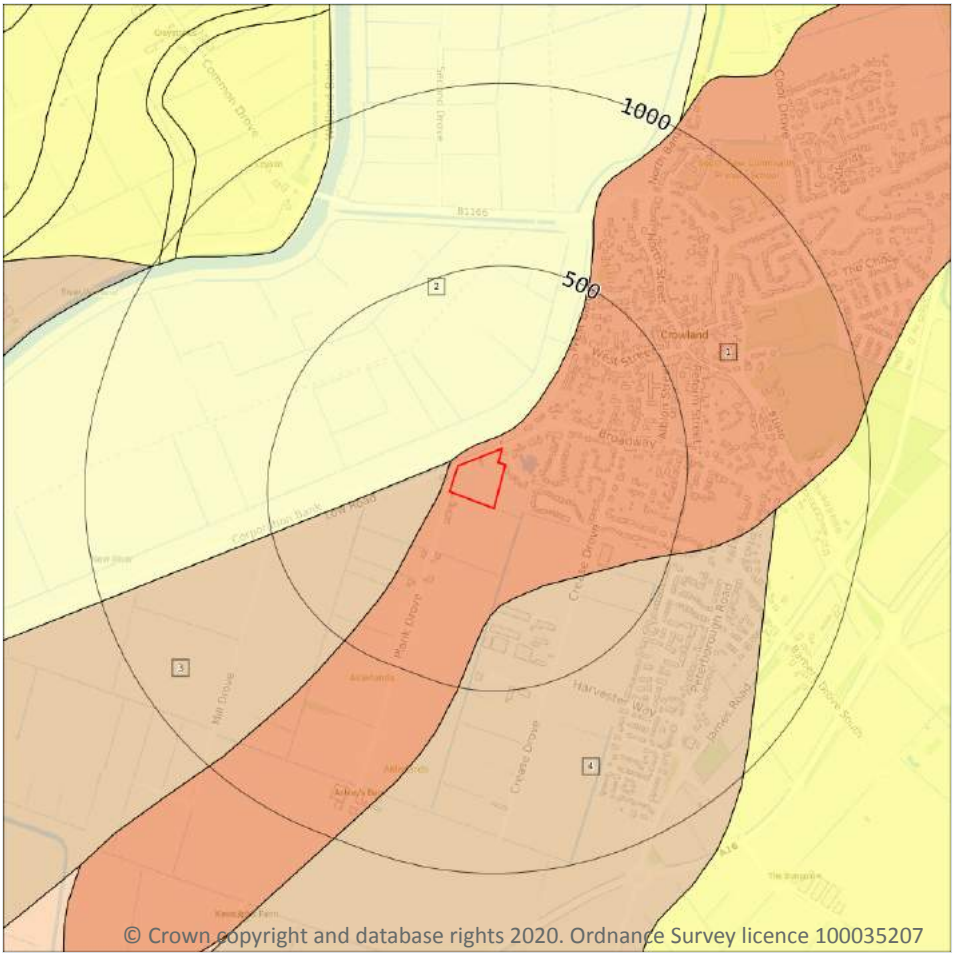
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **4**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 80**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ABSG-XSV**	**ABBEY SAND AND GRAVEL**	**SAND AND GRAVEL**
2	22m NW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
3	23m W	PEAT-P	PEAT	PEAT
4	249m SE	PEAT-P	PEAT	PEAT

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	5

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Very High**	**High**
22m W	Intergranular	High	Very Low
23m SW	Mixed	Low	Very Low
41m N	Intergranular	High	Very Low
42m NE	Intergranular	Very High	High

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

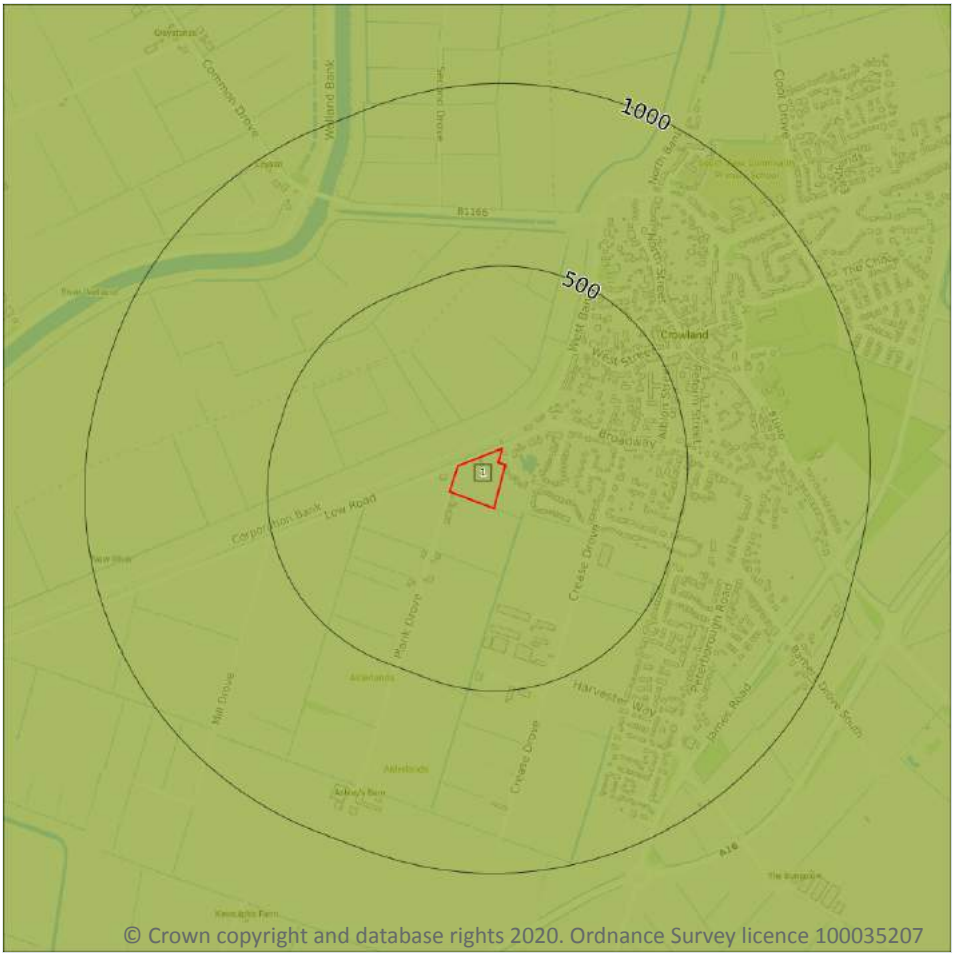
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 82**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**OXC-MDST**	**OXFORD CLAY FORMATION - MUDSTONE**	**CALLOVIAN**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	2

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Low**	**Very Low**
41m NW	Fracture	Low	Very Low

This data is sourced from the British Geological Survey.

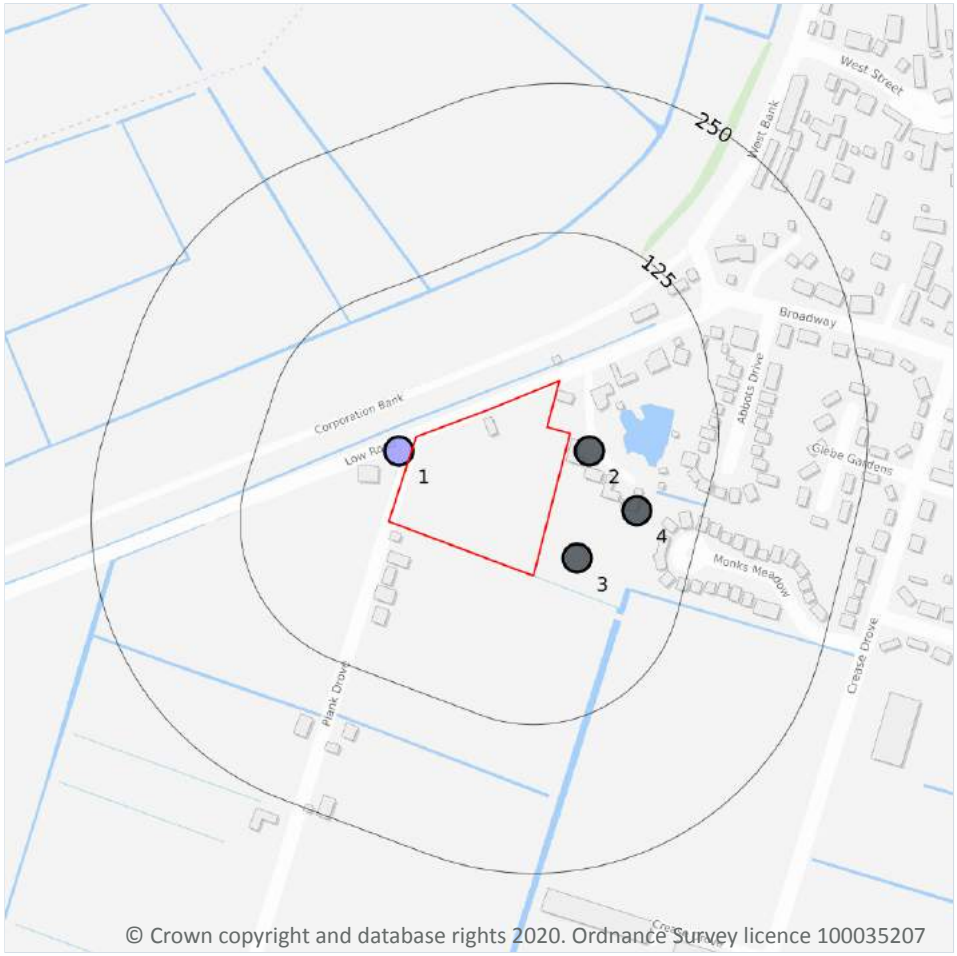
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline

Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m **4**

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

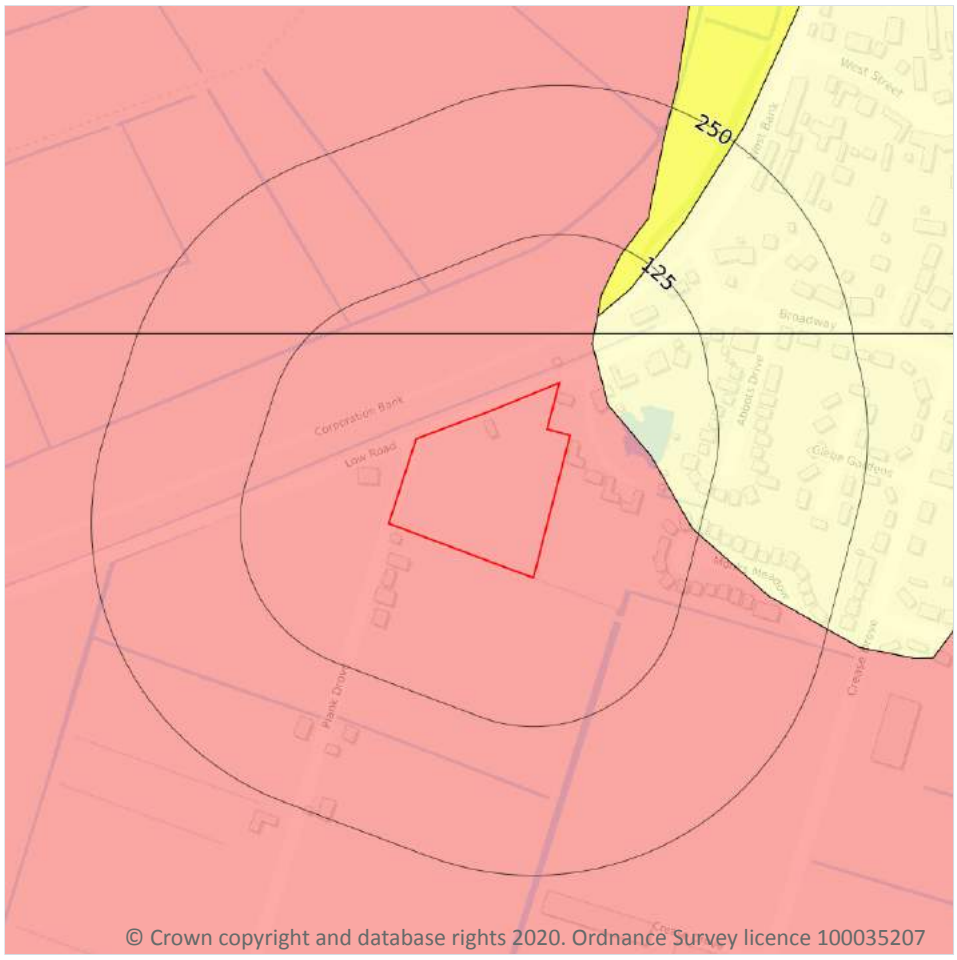
Features are displayed on the Boreholes map on **page 84**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	10m W	523300 309900	DROVE COTTAGE PLANK DROVE	2.5	N	473030
2	19m E	523460 309900	LOW ROAD CROWLAND 103	-	Y	N/A
3	32m E	523450 309810	LOW ROAD CROWLAND 101	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	70m E	523500 309850	LOW ROAD CROWLAND 102	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	3

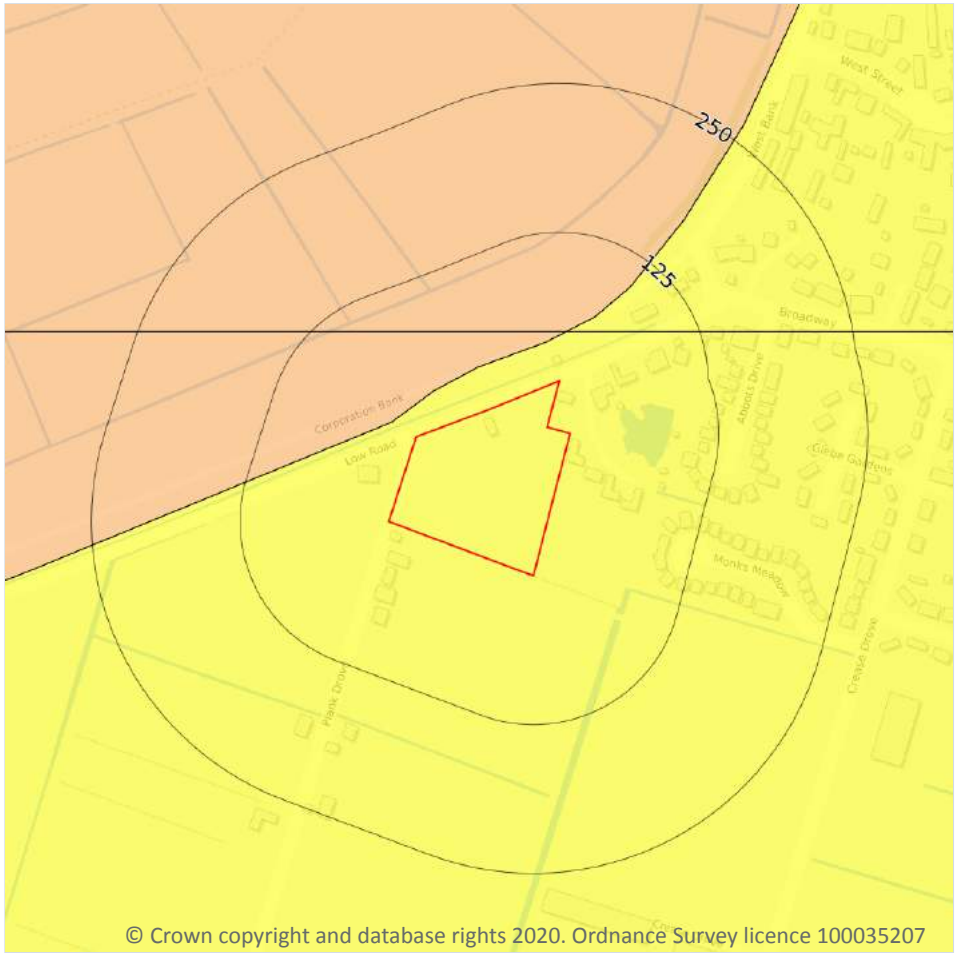
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 86**

Location	Hazard rating	Details
On site	**Moderate**	**Ground conditions predominantly high plasticity.**
35m E	Negligible	Ground conditions predominantly non-plastic.
41m N	Moderate	Ground conditions predominantly high plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	4

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

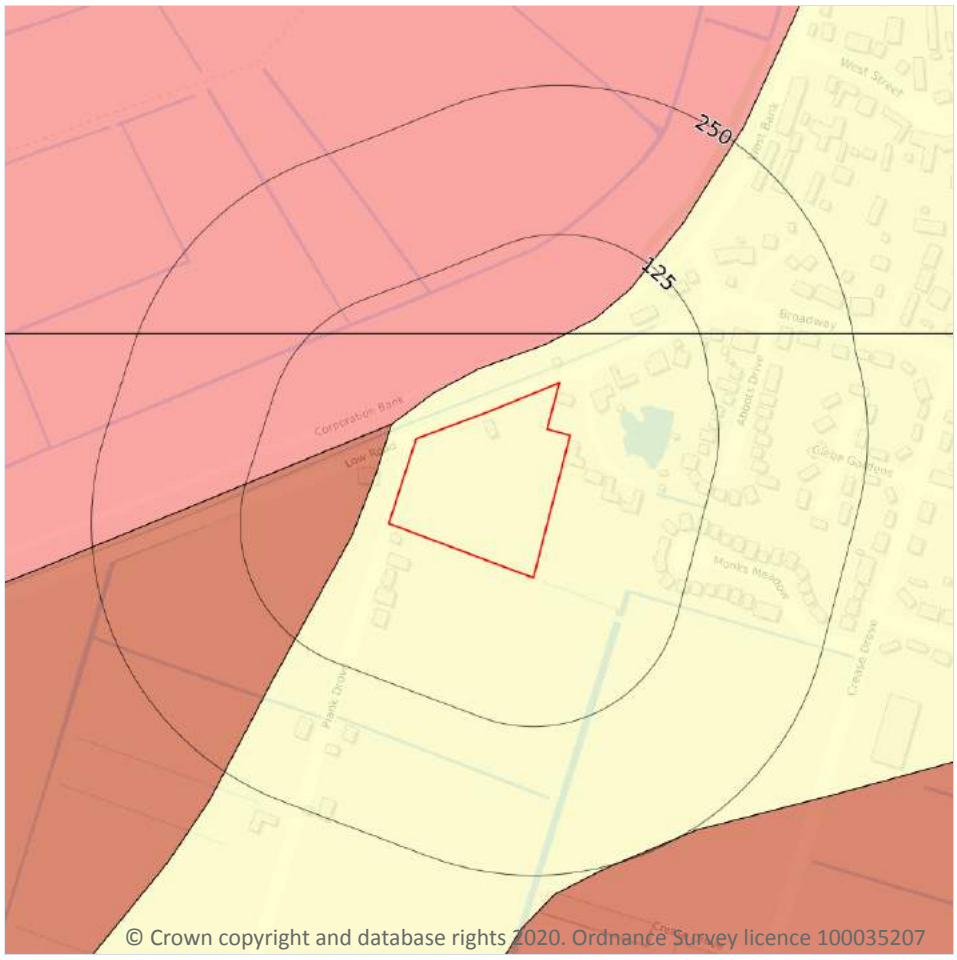
Features are displayed on the Natural ground subsidence - Running sands map on **page 88**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
22m NW	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
41m N	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
42m N	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	5

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

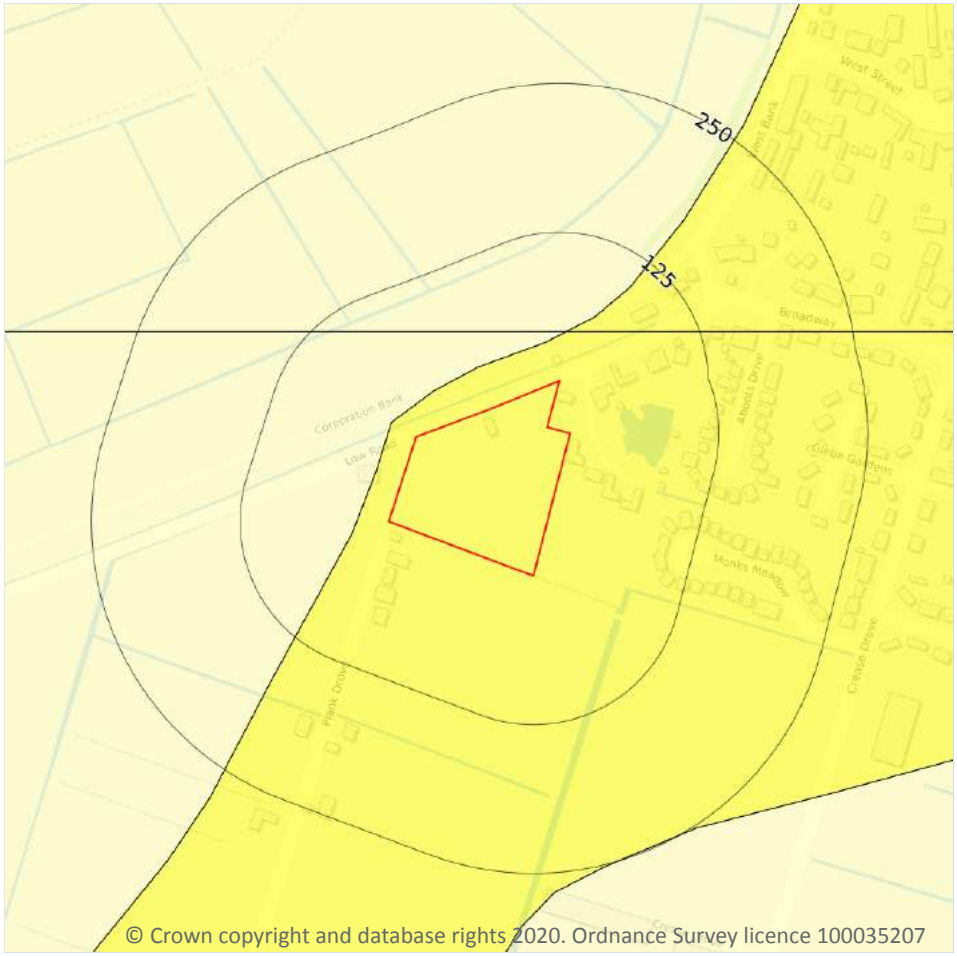
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 90**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
22m NW	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

Location	Hazard rating	Details
23m W	High	Highly compressible strata present. Significant constraint on land use depending on thickness.
41m N	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.
42m N	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	4

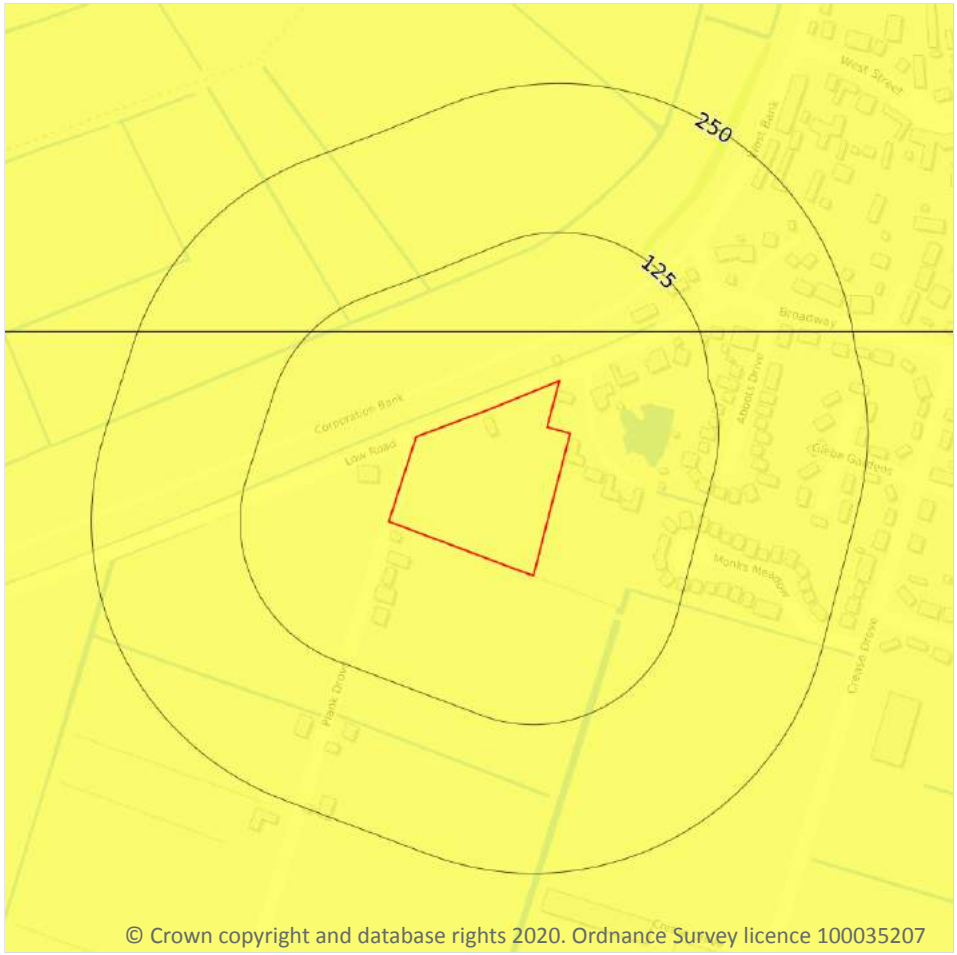
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 92**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**
22m NW	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
41m N	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
42m N	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	2

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

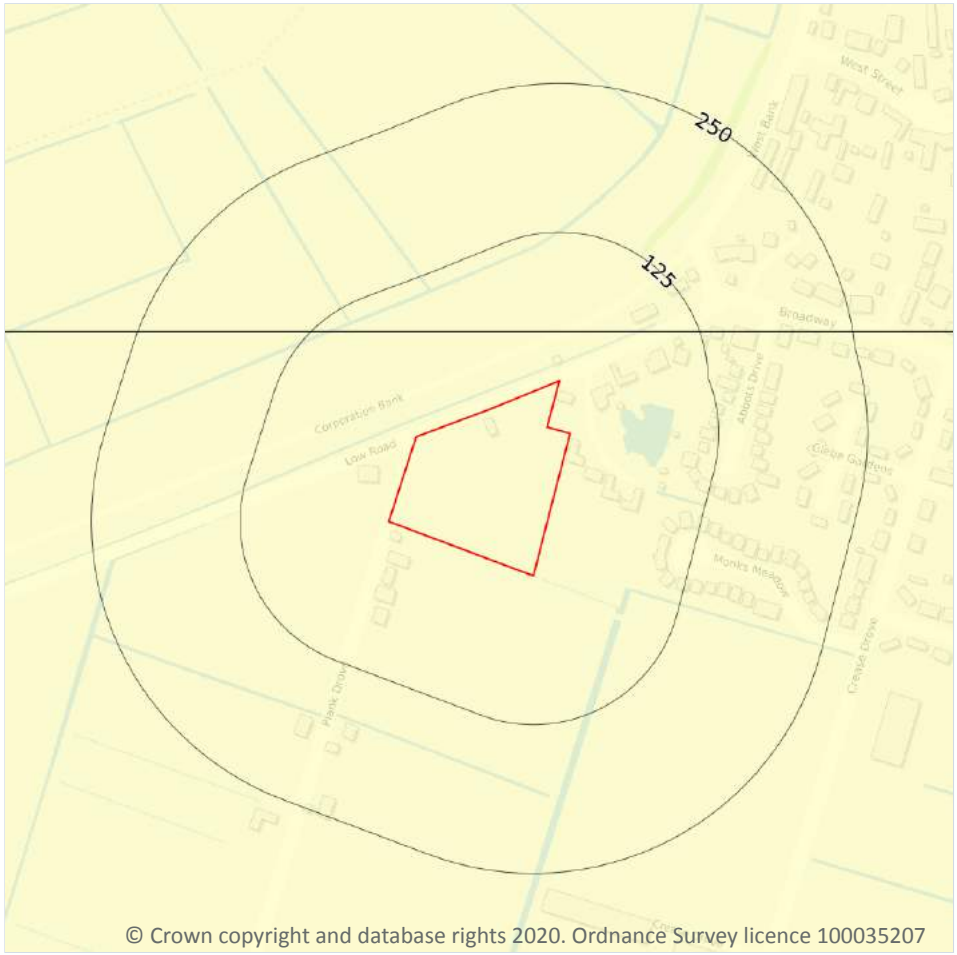
Features are displayed on the Natural ground subsidence - Landslides map on **page 94**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
41m N	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	2

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

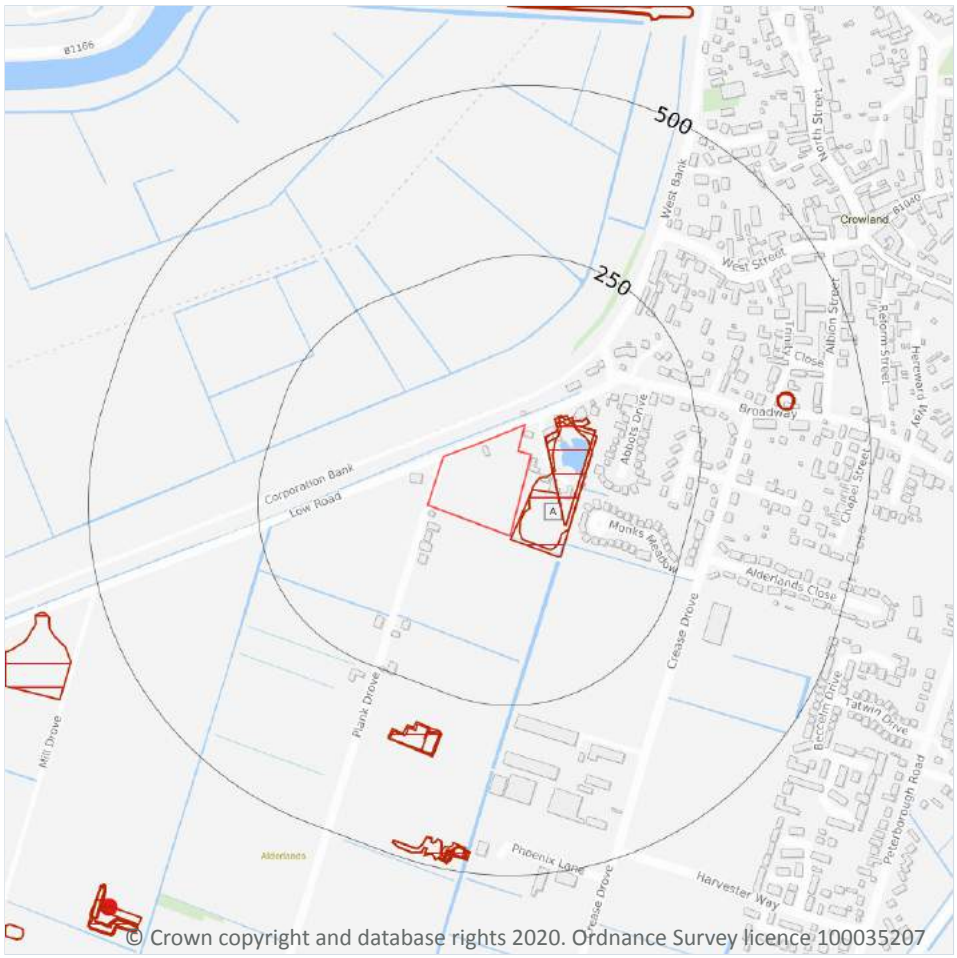
Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 96**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

Location	Hazard rating	Details
41m N	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

BritPits

Surface ground workings

Underground workings

Historical Mineral Planning Areas

Mining Cavities

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	4

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 98**

ID	Location	Land Use	Year of mapping	Mapping scale
A	3m SE	Water Body	1950	1:10560
A	9m E	Water Body	1976	1:10000
A	26m E	Water Body	1906	1:10560
A	26m E	Water Body	1887	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

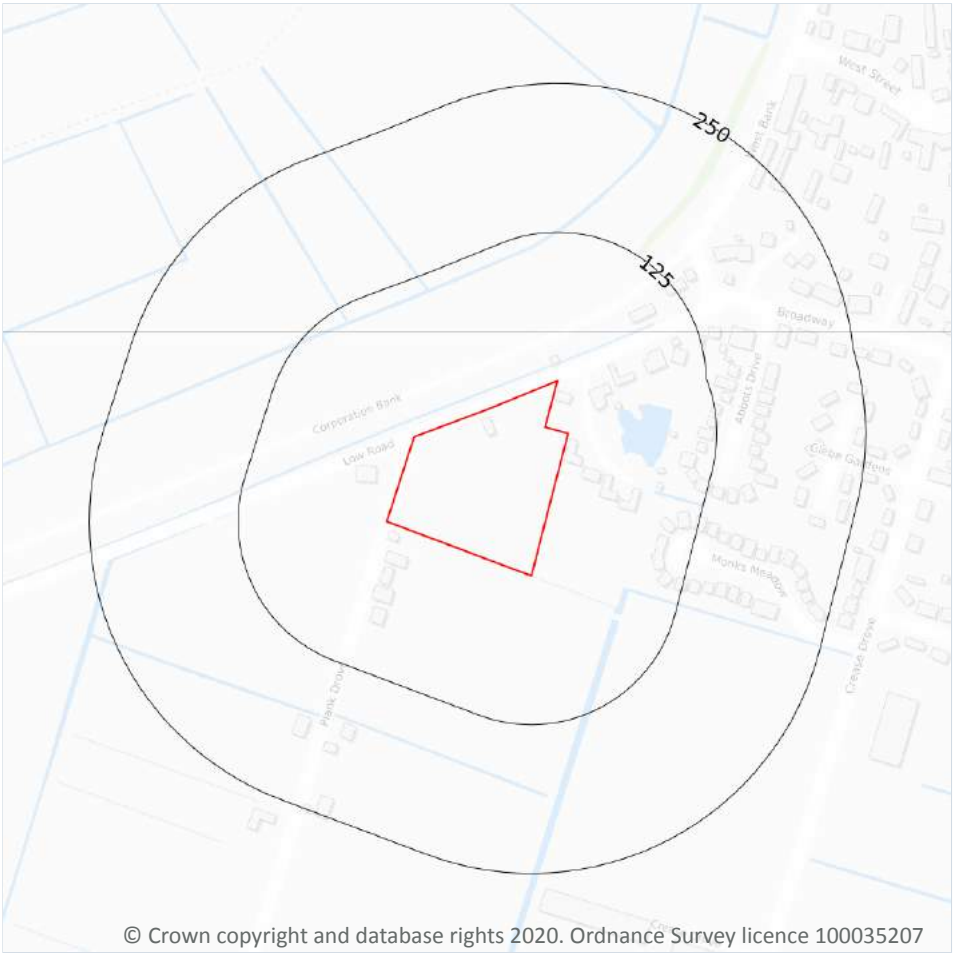
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 102**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	5

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**30 - 45 mg/kg**
22m W	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg
23m SW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	90 - 120 mg/kg	45 - 60 mg/kg
41m N	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg
42m NE	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

Appendix 3

C14335: Exploratory Hole Records

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

BOREHOLE BH1

Date: 15/11/17

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.00-0.30	B1				TOPSOIL - Firm, friable, dark brown, slightly gravelly, sandy, clayey, slightly organic SILT. Gravel of angular to sub-rounded flint, quartzite and limestone.		0.30	
0.30-0.60	B2							
0.60-1.00	B3				Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone. (CROWLAND BED)		1.10	
1.00-1.20	B4							
1.20-1.70	B5							
1.35-1.65	C	N21			Medium dense, orange brown, silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.70-2.00	B6							
2.00-2.40	B7				(ABBEY GRAVELS)			
2.15-2.45	C	N8	1.50				2.30	
2.40-2.70	B8				Firm, grey and orange brown mottled, slightly sandy, gravelly CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (REWORKED OXFORD CLAY)		2.70	
2.70-3.15	U1	40	2.70		Stiff, fissured, grey CLAY with occasional fossil shell fragments.			
3.15	D1							
4.00-4.45	U2	45	3.00					
4.45	D2							
5.00-5.45	U3	50	3.00		(OXFORD CLAY)			
5.45	D3			BENEATH INSTALLATION	...Gravel size pyrite nodule at 5.45m depth.			
6.00	D4			BENEATH INSTALLATION				
6.50-6.95	U4	60	3.00	BENEATH INSTALLATION				
6.95	D5			BENEATH INSTALLATION				
7.50	D6			BENEATH INSTALLATION				
8.00-8.45	U5	65	3.00	BENEATH INSTALLATION				
8.45	D7			BENEATH INSTALLATION	Very stiff, closely fissured to stiff, grey CLAY with occasional fossil bivalves.		8.00	
9.00	D8			BENEATH INSTALLATION	(OXFORD CLAY)			
9.50-9.95	U6	75	3.00	BENEATH INSTALLATION				
9.95	D9			BENEATH INSTALLATION			10.00	

REMARKS
1. Excavating a pit from 0.00m to 1.20m for 1 hour
2. Live roots observed to 1.10m depth
3. Borehole cased to 3.00m depth
4. Gas monitoring standpipe installed to 5.00m depth

Project No 14335

Scale 1:50

Page 1/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck	Rose to	Rate	Cased	Sealed
	Depth m				
1	1.90	1.80	slow	1.50	2.50

Groundwater Observations

Date	Depth m Hole	Casing	Water
15/11/17	15.00	3.00	dry
15/11/17	15.00	0.00	dry
24/11/17	5.00	1.00	1.60
01/12/17	5.00	1.00	1.59
08/12/17	5.00	1.00	1.58

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

BOREHOLE BH1

Date: 15/11/17

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
				BENEATH INSTALLATION	Very stiff, closely fissured to stiff, grey CLAY with occasional fossil bivalves.		10.00	
10.50	D10			BENEATH INSTALLATION				
				BENEATH INSTALLATION	(OXFORD CLAY)			
11.20-11.60	U7	80	3.00					
11.60	D11			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
12.30	D12			BENEATH INSTALLATION				
							12.50	
12.80-13.20	U8	80	3.00	BENEATH INSTALLATION	Hard, fissured, grey CLAY with occasional fossil bivalves.			
13.20	D13			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
14.00	D14			BENEATH INSTALLATION	(OXFORD CLAY)			
				BENEATH INSTALLATION				
14.60-15.00	U9	85	3.00					
15.00	D15			BENEATH INSTALLATION			15.00	
					Borehole completed at 15.00m depth			

REMARKS

Project No 14335

Scale 1:50

Page 2/2

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise

N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▽c Level on completion
c▽w Level casing withdrawn
▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

GROUND ENGINEERING LIMITED

Tel: 01733-566586
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

BOREHOLE BH2

Date: 14/11/17

Hole Size: 150mm dia to 10.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.00-0.20	B1				MADE GROUND - Dark brown, clayey, sandy GRAVEL with occasional cobbles of brick. Gravel of angular flint, brick and ash.		0.20	
0.20-0.50	B2							
0.50-1.10	B3				BURIED TOPSOIL - Firm, friable, dark brown, slightly gravelly, sandy, clayey, slightly organic SILT. Gravel of angular to sub-rounded flint, quartzite and limestone.		0.50	
1.10-1.20	B4				Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone. (CROWLAND BED)		1.40	
1.20-1.40	B5							
1.35-1.65	C	N11						
1.40-1.50	B6		▼s					
			▼ 1		Medium dense, orange brown, silty, very gravelly SAND. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (ABBEY GRAVELS)		1.80	
1.80-2.10	B7		▽ 1					
2.10-2.50	B8				Medium dense, orange brown, silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (ABBEY GRAVELS)		2.50	
2.25-2.55	C	N14	2.10					
2.50-2.80	B9				Firm, grey and orange brown mottled, slightly gravelly, sandy CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (REWORKED OXFORD CLAY)		2.80	
2.80-3.25	U1	40	2.80					
3.25	D1				Stiff, fissured, grey CLAY with occasional fossil shell fragments.			
4.00-4.45	U2	50	3.00					
4.45	D2							
5.00-5.45	U3	50	3.00					
5.45	D3			BENEATH INSTALLATION				
6.00	D4			BENEATH INSTALLATION				
6.50-6.95	U4	60	3.00	BENEATH INSTALLATION	(OXFORD CLAY)			
6.95	D5			BENEATH INSTALLATION				
7.50	D6			BENEATH INSTALLATION				
8.00-8.30	U5	90	3.00	BENEATH INSTALLATION				
8.30	D7			BENEATH INSTALLATION			8.50	
9.00	D8			BENEATH INSTALLATION	Very stiff, fissured, grey CLAY with occasional fossil bivalves.			
9.60-10.00	U6	85	3.00	BENEATH INSTALLATION	(OXFORD CLAY)			
10.00	D9			BENEATH INSTALLATION			10.00	

REMARKS

Borehole completed at 10.00m depth

1. Excavating a pit from 0.00m to 1.20m for 1 hour
2. Live roots observed to 0.50m depth
3. Borehole cased to 3.00m depth
4. Gas monitoring standpipe installed to 5.00m depth

Project No 14335

Scale 1:50

Page 1/1

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▽w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck (Depth m)	Rose to (Depth m)	Rate	Cased	Sealed
1	2.00	1.70	slow		2.50

Groundwater Observations

Date	Depth m Hole	Depth m Casing	Depth m Water
14/11/17	10.00	3.00	dry
14/11/17	10.00	0.00	dry
24/11/17	5.00	1.00	1.49
01/12/17	5.00	1.00	1.49
08/12/17	5.00	1.00	1.49

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

BOREHOLE BH3

Date: 14/11/17

Hole Size: 150mm dia to 10.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.00-0.40	B1				TOPSOIL - Firm, friable, dark brown, slightly gravelly, sandy, clayey, slightly organic SILT. Gravel of angular to sub-rounded flint, quartzite and limestone.		0.40	
0.40-1.10	B2				Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone. (CROWLAND BED)		1.10	
1.20-1.50	B3				Medium dense, orange brown, clayey, gravelly SAND. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (ABBEY GRAVELS)		1.50	
1.20	D1							
1.35-1.65	C	N25						
1.50-1.80	B4			▼s				
2.00-2.50	B5			1 ▼	Medium dense, orange brown, slightly silty, sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
2.15-2.45	C	N26	2.00					
2.50	W1			1 ▽	(ABBEY GRAVELS)		3.00	
3.00-3.50	B6							
3.15-3.45	C	N13	3.00		Firm, grey and orange brown mottled, slightly gravelly CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (REWORKED OXFORD CLAY)		3.50	
3.80-4.25	U1	57	3.50		Stiff, locally very stiff, fissured, grey CLAY with occasional fossil shell fragments.			
4.25	D2							
5.00-5.45	U2	65	3.70					
5.45	D3			BENEATH INSTALLATION				
6.00	D4			BENEATH INSTALLATION				
6.50-6.95	U3	70	3.70	BENEATH INSTALLATION	(OXFORD CLAY)			
6.95	D5			BENEATH INSTALLATION				
7.50	D6			BENEATH INSTALLATION				
8.00-8.45	U4	75	3.70	BENEATH INSTALLATION				
8.45	D7			BENEATH INSTALLATION			8.50	
9.00	D8			BENEATH INSTALLATION	Very stiff, fissured, grey CLAY with occasional fossil bivalves.			
9.50-9.95	U5	85	3.70	BENEATH INSTALLATION	(OXFORD CLAY)			
10.00	D9			BENEATH INSTALLATION			10.00	

REMARKS

Borehole completed at 10.00m depth

1. Excavating a pit from 0.00m to 1.20m for 1 hour
2. Live roots observed to 1.80m depth
3. Water added from 1.50m to 3.00m
4. Borehole cased to 3.70m depth
5. Gas monitoring standpipe installed to 5.00m depth

Project No 14335

Scale 1:50

Page 1/1

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck (Depth m)	Rose to (Depth m)	Rate	Cased	Sealed
1	2.50	2.00	fast		3.50

Groundwater Observations

Date	Depth m Hole	Depth m Casing	Depth m Water
14/11/17	10.00	3.70	dry
14/11/17	10.00	0.00	dry
24/11/17	5.00	1.00	1.64
01/12/17	5.00	1.00	1.63
08/12/17	5.00	1.00	1.63

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

TRIAL PIT
TP1

Date: 17/11/17

Pit Size: 2.00m L x 0.65m W x 2.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - Firm, friable, dark brown, slightly gravelly, sandy, silty CLAY. Gravel of angular brick, flint and ash.			
0.30	D1						
0.30	V1	(75)				0.35	
				Buried TOPSOIL - Firm, friable, dark brown, slightly gravelly, sandy, clayey, slightly organic SILT. Gravel of angular to rounded flint, quartz, quartzite and limestone.			
0.60	D2						
0.60	V2	(62)				0.65	
0.70	D3			Firm, becoming soft, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (CROWLAND BED)			
0.90	V3	(39)					
1.00	D4					1.10	
1.20-1.70	B1			Medium dense, orange brown, silty SAND AND GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.20-1.42	MP1	100					
1.40	D5						
1.50-1.74	MP2	100					
				(ABBEY GRAVELS)			
1.70	D6		▼1				
2.00	D7		▽1			2.00	
				Pit completed at 2.00m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.30m depth
2. Pit sides unstable below 1.70m depth
3. Water met at 2.00m, rising to 1.80m depth
4. Soakaway test undertaken at 2.00m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

TRIAL PIT
TP2

Date: 17/11/17

Pit Size: 2.00m L x 0.65m W x 2.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.20	D1			MADE GROUND - Firm, friable, dark brown, slightly gravelly, sandy, silty CLAY. Gravel of angular flint, brick and ash.			
0.30	V1	(71)				0.35	
0.50	D2			Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone. (CROWLAND BED)		0.70	
0.80-1.30	B1			Medium dense, orange brown and light brown, silty SAND AND GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
0.80	D3						
1.10	D4			(ABBEY GRAVELS)			
1.40	D5			...Pocket of firm, orange brown and light grey mottled, slightly gravelly, sandy clay at 1.50m to 1.70m depth.			
1.60	D6						
1.60	V2	(48)					
1.70-2.00	B2						
1.70-1.42	MP1	100	1 ▼				
2.00	D7		1 ▽			2.00	
				Pit completed at 2.00m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.20m depth
2. Pit sides unstable below 1.30m depth
3. Water met at 2.00m, rising to 1.80m depth
4. Soakaway test undertaken at 2.00m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

TRIAL PIT
TP3

Date: 17/11/17

Pit Size: 2.10m L x 0.65m W x 2.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - Firm, friable, brown, slightly gravelly, sandy, silty CLAY. Gravel of angular, brick, flint and ash.			
0.30	D1						
0.30	V1	(65)					
0.50	V2	(55)				0.60	
				Buried TOPSOIL - Firm, friable, brown, grey, sandy, slightly organic SILT.			
0.75	D2						
0.80	V3	(55)					
1.10	D3					1.15	
1.20	V4	(20)		Firm, becoming soft, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.40-1.74	MP1	100					
1.50	V5	(30)		(CROWLAND BED)			
1.60	D4		▼1			1.70	
				Medium dense, orange brown, silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (ABBEY GRAVELS)			
2.00	D5		▽1			2.00	
2.00-2.30	MP2	100		Pit completed at 2.15m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.30m depth
2. Pit sides unstable below 1.50m depth
3. Water met at 2.00m, rising to 1.70m depth
4. Soakaway test undertaken at 2.00m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-586586
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

TRIAL PIT
TP4

Date: 17/11/17

Pit Size: 2.20m L x 0.65m W x 3.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - Stiff, friable, dark brown, slightly gravelly, sandy CLAY. Gravel of angular brick and ash.			
0.30	D1						
0.30	V1	(94)				0.40	
0.50	D2			Buried TOPSOIL - Firm, friable, brown, sandy, clayey, organic SILT.			
0.60	V2	(68)					
0.80	D3					0.85	
0.90	V3	(35)		Soft, light brown, orange brown and light grey, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.00	D4			(CROWLAND BED)			
1.30	V4	(35)					
1.40	D5					1.50	
1.60-1.89	MP1	100		Medium dense, orange brown, clayey, very gravelly SAND. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.70-2.20	B1						
1.70	D6			(ABBEY GRAVELS)			
2.00-2.21	MP2	100				2.00	
2.20	D7			Medium dense, orange brown, slightly silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
2.40-2.70	B2						
2.40	D8		▼1	(ABBEY GRAVELS)			
2.50-2.70	MP3	100					
2.70	D9		▽1			2.75	
2.90	D10			Firm, grey and orange brown mottled, slightly sandy, gravelly CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (REWORKED OXFORD CLAY)		2.95	
3.00	D11						
3.00	V5	(95)		Stiff, fissured, grey CLAY with occasional fossil shell fragments. (OXFORD CLAY)		3.00	
				Pit completed at 3.00m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.60m depth
2. Pit sides unstable below 2.00m depth
3. Water met at 2.70m, rising to 2.50m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: **LAND AT LOW ROAD & PLANK DROVE, CROWLAND**

TRIAL PIT
TP5

Date: 17/11/17

Pit Size: 2.00m L x 0.65m W x 3.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.30	D1			MADE GROUND - Firm, friable, brown, slightly gravelly, sandy CLAY. Gravel of angular brick and ash.			
0.30	V1	(68)				0.50	
0.60	V2	(52)		Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone.			
0.70	D2			(CROWLAND BED)		0.90	
1.00	D3			Medium dense, orange brown, silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.20-1.48	MP1	100					
1.30	D4						
1.50	D5			(ABBEY GRAVELS)			
1.70-1.97	MP2	100					
1.80	D6					1.80	
2.00	D7			Medium dense, brown and grey, silty SAND AND GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
2.20-2.51	MP3	100	▼1	(ABBEY GRAVELS)			
2.50	D8		▽1			2.70	
2.80	D9			Soft, grey and brown mottled, slightly gravelly CLAY. Gravel of angular flint. (REWORKED OXFORD CLAY)			
2.80	V3	(35)				2.90	
3.00	D10			Stiff, fissured, grey CLAY with occasional fossil shell fragments. (OXFORD CLAY)		3.00	
3.00	V4	(102)					
				Pit completed at 3.00m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS
1. Live roots observed to 0.70m depth
2. Pit sides unstable below 2.10m depth
3. Water met at 2.50m, rising to 2.30m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: LAND AT LOW ROAD & PLANK DROVE, CROWLAND

TRIAL PIT
TP6

Date: 17/11/17

Pit Size: 2.20m L x 0.65m W x 3.00m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.30	D1			MADE GROUND - Firm, friable, brown, slightly gravelly, sandy CLAY. Gravel of angular brick and ash.			
0.30	V1	(62)				0.50	
0.60	D2			Firm, becoming locally soft, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
0.60	V2	(70)					
0.90	D3						
0.90	V3	(74)		(CROWLAND BED)			
1.20	D4			...Occasional cobble size pockets of clayey sand and gravel below 1.20m depth.			
1.20	V4	(25)					
1.50	D5						
1.50	V5	(68)					
1.80	D6						
1.80	V6	(38)				2.00	
2.20	D7			Medium dense, orange brown, slightly silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
2.20-2.46	MP1	100					
			1	(ABBEY GRAVELS)			
2.60-2.82	MP2	100	2				
2.70	D8					2.90	
3.00	D9			Stiff, fissured, grey CLAY with occasional fossil shell fragments. (OXFORD CLAY)		3.00	
3.00	V7	(85)					
				Pit completed at 3.00m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.80m depth
2. Pit sides unstable below 2.30m depth
3. Water met at 2.60m, rising to 2.50m depth

Project No	
14335	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: **LAND AT LOW ROAD & PLANK DROVE, CROWLAND**

TRIAL PIT
TP7

Date: 17/11/17

Pit Size: 2.20m L x 0.65m W x 2.90m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.30	D1			MADE GROUND - Firm, friable, brown, slightly gravelly, sandy CLAY. Grave of angular brick and ash.			
0.30	V1	(65)					
						0.50	
0.60	D2			Firm, light brown, orange brown and light grey mottled, slightly gravelly, sandy, silty CLAY. Gravel of angular to rounded flint, quartz, quartzite and limestone. (CROWLAND BED)			
0.70	V2	(57)					
0.80	D3					0.90	
1.10	D4			Medium dense, orange brown, silty, very sandy GRAVEL. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone.			
1.50	D5			(ABBEY GRAVELS)			
			▼1				
2.00	D6						
			▼1				
2.40	D7						
						2.50	
2.55	D8			Firm, grey and orange brown mottled, slightly gravelly CLAY. Gravel of angular to rounded flint, quartz, quartzite, limestone and ironstone. (REWORKED OXFORD CLAY)			
2.60	V3	(53)				2.70	
2.70	D9			Stiff, fissured, grey CLAY with occasional fossil shell fragments. (OXFORD CLAY)			
2.70	V4	(97)				2.90	
				Pit completed at 2.90m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. Live roots observed to 0.20m depth
2. Pit sides unstable below 2.30m depth
3. Water met 2.30m, rising to 1.80m depth

Project No	
14335	
Scale	Page
1:25	1/1

Appendix 4

C14335: Chemical Test Results

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	17-31784-1
Initial Date of Issue:	05-Dec-2017
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	James Davies
Project	C14335 Land at Low Road & Plank Drove, Crowland

Quotation No.:		**Date Received:**	29-Nov-2017
Order No.:	C14335	**Date Instructed:**	29-Nov-2017
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	05-Dec-2017
Date Approved:	05-Dec-2017		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Water

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited				Chemtest Job No.:	17-31784
Quotation No.:				Chemtest Sample ID.:	546583
Order No.: C14335				Client Sample Ref.:	BH1
				Client Sample ID.:	W1
				Sample Type:	WATER
				Top Depth (m):	1.49
				Bottom Depth (m):	
				Date Sampled:	24-Nov-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	7.6
Boron (Dissolved)	U	1450	µg/l	20	140
Sulphate	U	1220	mg/l	1.0	91
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	[B] < 0.050
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	1.7
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	1.7
Zinc (Dissolved)	U	1450	µg/l	1.0	2.0
Acenaphthene	N	1700	µg/l	0.010	< 0.010
Acenaphthylene	N	1700	µg/l	0.010	< 0.010
Anthracene	N	1700	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010
Chrysene	N	1700	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1700	µg/l	0.010	< 0.010
Fluoranthene	N	1700	µg/l	0.010	< 0.010
Fluorene	N	1700	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010
Naphthalene	N	1700	µg/l	0.010	< 0.010
Phenanthrene	N	1700	µg/l	0.010	< 0.010
Pyrene	N	1700	µg/l	0.010	< 0.010
Total Of 16 PAH's	N	1700	µg/l	0.20	< 0.20
Total Phenols	U	1920	mg/l	0.030	< 0.030
Total Hardness as CaCO3	U	1270	mg/l	15	510
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Water

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited			Chemtest Job No.:		17-31784
Quotation No.:			Chemtest Sample ID.:		546583
Order No.: C14335			Client Sample Ref.:		BH1
			Client Sample ID.:		W1
			Sample Type:		WATER
			Top Depth (m):		1.49
			Bottom Depth (m):		
			Date Sampled:		24-Nov-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N–dimethyl-pphenylenediamine.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GC FID detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Chemtest
The right chemistry to deliver results

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

2183

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	17-31240-1
Initial Date of Issue:	29-Nov-2017
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	James Davies
Project	C14335 Land at Low Road & Plank Drove, Crowland

Quotation No.:		**Date Received:**	23-Nov-2017
Order No.:	C14335	**Date Instructed:**	23-Nov-2017
No. of Samples:	12		
Turnaround (Wkdays):	5	**Results Due:**	29-Nov-2017
Date Approved:	29-Nov-2017		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited			Chemtest Job No.:	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240
Quotation No.:			Chemtest Sample ID.:	544060	544061	544062	544063	544064	544066	544067	544068
Order No.: C14335			Client Sample Ref.:	BH1	BH2	BH3	TP1	TP1	TP3	TP3	TP4
			Client Sample ID.:	B1	B1	B1	D1	D2	D1	D2	D1
			Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):	0.00	0.00	0.00	0.30	0.60	0.30	0.50	0.30
			Bottom Depth (m):	0.30	0.20	0.40					
			Date Sampled:	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017
			Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY		
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
pH	U	2010		N/A	7.5	8.0	6.4	7.9	7.9		8.2	7.8
Moisture	N	2030	%	0.020	31	32	26	22	27	30	12	28
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020		< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.3	2.1	1.4	1.6	1.9		0.45	1.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.024	0.060	< 0.010	0.010	0.034		< 0.010	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50	79	41	9.9	12	3.3		4.0	2.7
Arsenic	U	2450	mg/kg	1.0	30	37	31	30	34		7.9	33
Cadmium	U	2450	mg/kg	0.10	0.22	0.26	0.15	0.19	< 0.10		< 0.10	0.23
Chromium	U	2450	mg/kg	1.0	49	37	60	48	30		14	56
Copper	U	2450	mg/kg	0.50	31	26	32	26	20		4.0	36
Mercury	U	2450	mg/kg	0.10	0.17	0.58	0.21	0.14	< 0.10		< 0.10	0.19
Nickel	U	2450	mg/kg	0.50	35	31	41	39	27		8.4	40
Lead	U	2450	mg/kg	0.50	59	120	72	47	17		10	68
Selenium	U	2450	mg/kg	0.20	0.74	< 0.20	0.50	0.49	0.86		< 0.20	0.67
Zinc	U	2450	mg/kg	0.50	110	220	110	100	56		27	120
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	8.5	10	8.1	6.7	5.6		< 0.40	7.2
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	0.19	< 0.10	0.17	< 0.10		< 0.10	0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.16	0.73	< 0.10	0.64	< 0.10		< 0.10	0.41
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	0.85	< 0.10	0.71	< 0.10		< 0.10	0.47
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.85	< 0.10	0.94	< 0.10		< 0.10	0.42
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	0.93	< 0.10	0.94	< 0.10		< 0.10	0.31
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.28	< 0.10	0.27	< 0.10		< 0.10	0.11
Chrysene	U	2700	mg/kg	0.10	0.24	0.54	< 0.10	1.1	< 0.10		< 0.10	0.57
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.43	1.9	0.36	1.9	< 0.10		< 0.10	0.88
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	0.58	< 0.10	0.43	< 0.10		< 0.10	0.26
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	0.33	0.88	0.25	0.85	< 0.10		< 0.10	0.41
Pyrene	U	2700	mg/kg	0.10	0.44	1.7	0.41	1.7	< 0.10		< 0.10	1.1
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	9.4	< 2.0	9.7	< 2.0		< 2.0	5.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited					Chemtest Job No.:	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240	17-31240
Quotation No.:					Chemtest Sample ID.:	544060	544061	544062	544063	544064	544066	544067	544068
Order No.: C14335					Client Sample Ref.:	BH1	BH2	BH3	TP1	TP1	TP3	TP3	TP4
					Client Sample ID.:	B1	B1	B1	D1	D2	D1	D2	D1
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.00	0.00	0.30	0.60	0.30	0.50	0.30
					Bottom Depth (m):	0.30	0.20	0.40					
					Date Sampled:	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017	17-Nov-2017
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY		
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Total Phenols	U	2920	mg/kg	0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30		< 0.30	< 0.30
ACM Type	U	2192		N/A		-	-	-		-	-		
Asbestos Identification	U	2192	%	0.001		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		
Total TPH >C6-C40	U	2670	mg/kg	10		< 10	< 10	< 10			< 10		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited				Chemtest Job No.:	17-31240	17-31240	17-31240
Quotation No.:				Chemtest Sample ID.:	544069	544070	544071
Order No.: C14335				Client Sample Ref.:	TP5	TP6	TP7
				Client Sample ID.:	D1	D1	D1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.30	0.30	0.30
				Bottom Depth (m):			
				Date Sampled:	17-Nov-2017	17-Nov-2017	17-Nov-2017
				Asbestos Lab:			
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
pH	U	2010		N/A	7.9	7.1	6.4
Moisture	N	2030	%	0.020	31	28	26
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	2.3	2.0	1.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.013	0.013	< 0.010
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50	2.4	1.9	2.0
Arsenic	U	2450	mg/kg	1.0	28	29	30
Cadmium	U	2450	mg/kg	0.10	0.12	0.25	0.23
Chromium	U	2450	mg/kg	1.0	65	52	55
Copper	U	2450	mg/kg	0.50	30	33	33
Mercury	U	2450	mg/kg	0.10	< 0.10	0.18	0.18
Nickel	U	2450	mg/kg	0.50	47	37	39
Lead	U	2450	mg/kg	0.50	35	63	63
Selenium	U	2450	mg/kg	0.20	0.91	0.62	0.68
Zinc	U	2450	mg/kg	0.50	110	110	110
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	4.8	7.9	7.8
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.30	0.33
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	0.17	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10	0.32	0.24
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: C14335 Land at Low Road & Plank Drove, Crowland

Client: Ground Engineering Limited				Chemtest Job No.:	17-31240	17-31240	17-31240
Quotation No.:				Chemtest Sample ID.:	544069	544070	544071
Order No.: C14335				Client Sample Ref.:	TP5	TP6	TP7
				Client Sample ID.:	D1	D1	D1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.30	0.30	0.30
				Bottom Depth (m):			
				Date Sampled:	17-Nov-2017	17-Nov-2017	17-Nov-2017
				Asbestos Lab:			
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30
ACM Type	U	2192		N/A			
Asbestos Identification	U	2192	%	0.001			
Total TPH >C6-C40	U	2670	mg/kg	10			

Chemtest
The right chemistry to deliver results

Results - Single Stage WAC

Project: C14335 Land at Low Road & Plank Drove, Crowland

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	17-31240						
Chemtest Sample ID:	544065						
Sample Ref:	TP2						
Sample ID:	D1						
Top Depth(m):	0.20						
Bottom Depth(m):							
Sampling Date:	17-Nov-2017						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	4.7	3	5	6
Loss On Ignition	2610	U	%	15	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	U		6.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.026	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0035	< 0.050	0.5	2	25
Barium	1450	U	0.027	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0053	0.053	0.5	10	70
Copper	1450	U	0.0076	0.076	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0032	< 0.050	0.5	10	30
Nickel	1450	U	0.0058	0.058	0.4	10	40
Lead	1450	U	0.0061	0.061	0.5	10	50
Antimony	1450	U	0.022	0.22	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.020	< 0.50	4	50	200
Chloride	1220	U	5.5	55	800	15000	25000
Fluoride	1220	U	1.1	11	10	150	500
Sulphate	1220	U	57	570	1000	20000	50000
Total Dissolved Solids	1020	N	65	640	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	24	240	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	30

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Chemtest
The right chemistry to deliver results

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Appendix 5

C14335: Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values

Ground Engineering report C14335: December 2017
Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values (SSVs)

The results of the laboratory chemical testing on near surface soil samples have primarily been compared to soil screening values (SSVs) produced by Land Quality Management Limited (LQM) and the Chartered Institute for Environmental Health (CIEH) presented in their document 'The LQM/CIEH S4ULs for Human Health Risk Assessment: 2015 (Publication Number S4UL3608)'. The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and are transparently-derived and cautious 'trigger values' above which further assessment of the risks or remedial action may be needed. The S4ULs (Suitable for Use Levels) have been derived, in accordance with UK legislation and Environment Agency policy, using a modified version of the Environment Agency CLEA 1.06 software.
Reference has also been given to ATRISKsoil soil screening values produced by Atkins Limited and provided under licence to Ground Engineering Limited. Atkins SSVs have been derived in line with the Environment Agency 2009 guidance using the CLEA 1.04 and 1.06 software. With the absence of a S4UL for cyanide the ATRISKsoil SSV has been used as the soil screening criteria within this report.
In 2014 the Department for Environment Food and Rural Affairs (DEFRA) published, in their document SP1010, Category 4 Screening Levels (C4SL) for several contaminants including lead. The C4SL represent screening levels below which the land could be considered suitable for a specified use and definitely not contaminated land in respect of those determinands. With the absence of S4UL for lead the C4SL has been used as the soil screening criteria within this report.

For each contaminant the adopted soil screening criteria have been calculated for the following land uses:

- Residential use with home grown produce
- Residential use without home grown produce
- Commercial and industrial usage

The intended purpose of the SSVs are as "intervention values" in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards, but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Table A compares the test results for the made ground with the SSVs in relation to the specified uses. The number of test results, which exceed these values, are also provided.

Ground Engineering report C14335: December 2017

Table A: Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values (SSVs)

Determinand	Number of Samples	Min Value (mg/kg)	Max Value (mg/kg)	Number of Samples Exceeding SSVs for:			Measured 95th Percentile (mg/kg)	Soil Screening Values (SSVs) (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Commercial / Industrial		Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Commercial/ Industrial (mg/kg)
Organic matter	10	<0.40%	10%	-	-	-	-	-	-	-	-
Arsenic	10	7.9	37	0	0	0	33.56	S4UL	37	40	640
Cadmium	10	<0.10	0.26	0	0	0	0.22	S4UL	11	85	190
Trivalent* Chromium	10	14	65	0	0	0	55.55	S4UL	910	910	8,600
Hexavalent Chromium	10	<0.50	<0.50	0	0	0	<0.50	S4UL	6	6	33
Lead	10	10	120	0	0	0	69.95	C4SL	200	310	2330
Mercury	10	<0.10	0.58	0	0	0	0.28	S4UL	11	15	320
Selenium	10	<0.20	0.91	0	0	0	0.73	S4UL	250	430	12,000
Nickel	10	8.4	47	0	0	0	40.63	S4UL	130	180	980
Phenols	10	<0.30	<0.30	0	0	0	<0.30	S4UL	120	440	440
Benzo[a]pyrene	10	<0.10	0.85	1	0	0	0.44	S4UL	0.79	1.2	15
Copper	10	4.0	36	0	0	0	32.51	S4UL	2400	7100	68,000
Zinc	10	27	220	0	0	0	135.98	S4UL	3,700	40,000	730,000
Free Cyanide	10	<0.50	<0.50	0	0	0	<0.50	ATRISK	34	34	34

Notes

*The concentration of Trivalent Chromium is assumed to be equivalent to the Total Chromium concentration. This is because most naturally occurring chromium is in the trivalent (chromic) state.

S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM.

LQM/CIEH S4ULs 'Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3608. All rights reserved'.

ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited.