
Appendix A.8 – Site Investigations



Proposed residential development
Lower Higham Road
Gravesend

Ground Investigation Report

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**Proposed residential development
off
Lower Higham Road
Gravesend
DA12 2ND**

GROUND INVESTIGATION REPORT

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Aerial photograph of site



The site boundary is shown in red.

Report status and format

Report section	Principal coverage	Report status	
		Revision	Comments
1	Executive summary		
2	Introduction		
3	Desk study information and site observations		
4	Fieldwork		
5	Laboratory testing		
6	Ground conditions encountered		
7	Geotechnical Appraisal		
8	Effects of ground conditions on building materials		
9	Further investigations		

List of drawings

Drawing	Principal coverage	Status	
		Revision	Comments
01	Site location plan		
02	Plan showing existing site features, development proposals and location of exploratory holes		
03	Plan showing site development proposals and location of exploratory points		

List of appendices

Appendix	Content	Status	
		Revision	Comments
A	Definitions of geotechnical terms used in this report		
B1	Insitu testing in boreholes	Details of standard penetration tests (SPT)	
B2		Plot showing SPT test results	
B3		Details of insitu pocket penetrometer testing	
C	Dynamic windowless sampler borehole records		
D	Copies of laboratory test result certificates		
E	Copies of statutory undertakers' replies		
F	Preliminary unexploded ordnance (UXO) risk review		
G	Envirocheck Mining and Ground Stability report		

1 Executive summary

General

We recommend the following executive summary is not read in isolation to the main report which follows.

Site description, history and development proposals

The site is located in Chalk to the east of Gravesend. The general shape of the site is rectangular and is slightly wider on the west side with an access track on the east side of the site connecting with Lower Higham Road.

The site has remained largely unchanged since circa 1960 when the garages were first mapped. Prior to the development, the site was in the grounds of a school and later a parish hall; a building was mapped on the eastern part of the site.

The development proposals for the site are to build three, three-storey residential buildings with parking and rear gardens.

Ground conditions encountered

Ground conditions were Made Ground sequentially overlying suspected Head deposits and Lewes Nodular Chalk. The Lewes Nodular Chalk was generally encountered as Dc grade (gravel) over Dm grade (clay/silt). Potential infill material was encountered in one position which could suggest a possible dissolution feature onsite. Further investigation is recommended to define the presence and shape of such a feature.

Foundation solution

Based on spread foundations extending to into the grade Dc chalk, an allowable bearing capacity of 200kN/m² can be used with settlement unlikely to exceed, say 15mm. The presence of any infilled solution features onsite will impact the required depth of foundations and the anticipated settlement.

Unexploded ordnance

A preliminary risk assessment undertaken to support the investigation concluded a medium risk of encountering UXO onsite. A detailed UXO assessment should be undertaken to support the construction phase.

2 Introduction

2.1	Objectives
2.2	Status of this report
2.3	Client instructions and confidentiality
2.4	Site location and scheme proposals
2.5	Report format and investigation standards
2.6	Report distribution
2.7	Soiltechnics liability

2.1 Objectives

- 2.1.1 This report describes a ground investigation carried out to support a proposed housing development off Lower Higham Road, Gravesend.
- 2.1.2 The objective of the ground investigation was to establish ground conditions at the site, sufficient to identify possible foundation solutions for the development and provide parameters necessary for the design and construction of foundations.

2.2 Status of this report

- 2.2.1 This report is final based on current instructions.

2.3 Client instructions and confidentiality

- 2.3.1 The investigation was carried out in April 2021 and reported in June 2021 acting on instructions received from Mr Omo Ayoade.
- 2.3.2 This report has been prepared for the sole benefit of our above-named instructing client, but this report, and its contents, remains the property of Soiltechnics Limited until payment in full of our invoices in connection with production of this report.
- 2.3.3 Our original investigation proposals were outlined in our letter to Mr Ayoade on 22nd April 2021. The investigation generally followed our original investigation proposals.

2.4 Site location and scheme proposals

- 2.4.1 The National Grid reference for the site is 566954 173010. A plan showing the location of the site is presented on Drawing 01.
- 2.4.2 We understand the scheme will comprise the construction of three, three-storey houses together with an associated access road.

2.5 Report format and investigation standards

- 2.5.1 Sections 2 to 6 of this report describe the factual aspects of the investigation with Section 7 presenting an engineering assessment of the investigatory data and Section 8, a risk assessment relating to construction materials likely to be in contact with the ground.
- 2.5.2 Geotechnical investigations were carried out generally, and where practical following the recommendations of BS EN 1997:2 2007 '*Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing*'. From a geotechnical viewpoint this is deemed to be a Ground Investigation Report (GIR) as set out in BS EN 1997:2. This report does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004+A1:2013 '*Eurocode 7 – Geotechnical Design – Part 1: General Rules*' and in particular will exclude assessment of lifetime actions to buildings from geotechnical influences.

2.6 Report distribution

- 2.6.1 This report has been prepared to assist in the design and planning process of the development and normally will require distribution to the following parties, subject to Soiltechnics liabilities defined below, although this list may not be exhaustive:

Table summarising parties likely to require information contained in this report

Party	Reason
Client	For information / reference and cost planning
Developer / Contractor / project manager	To ensure procedures are implemented, programmed and costed
Planning department	Potentially to discharge planning conditions
Environment Agency	If ground controlled waters are affected and obtain approvals to any remediation strategies
Independent inspectors such as NHBC / Building Control	To ensure procedures are implemented and compliance with building regulations
Project design team	To progress the design
Principal Designer (PD)	To advise in construction risk identification and management under the Construction (design and management) regulations

Table 2.6

2.7 Soiltechnics liability

- 2.7.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the manpower, resources, investigations and testing devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

3 Desk study information and site observations

3.1	General
3.2	Description of the site
3.3	Site history
3.4	Geology and geohydrology of the area
3.5	Unexploded ordnance

3.1 General

3.1.1 We have carried out a desk study, to inform the subsequent geotechnical appraisal, which was limited to a review of readily available information including:

- a) Inspection of geological maps produced by the British Geological Survey together with relevant geological memoirs
- b) Mining and Ground Stability Report produced by Envirocheck
- c) Consultation with Statutory Undertakers
- d) Other relevant published documents

3.2 Description of the site

3.2.1 The site comprises 14 single domestic garages to the east of the town of Gravesend. The main site is roughly rectangular with a steep single width access road extending northward and joining Lower Higham Road. The site is covered in hardstanding except for the base of the access track which is level and rough and unfinished. North of the site is a public car park that is level with the road and ~0.8m lower than the garages.

3.2.2 The topography of the wider area dips north towards the River Thames, with the site located near the base of the slope.

3.2.3 The photos below show the site at the time of investigation.



Photograph 1

The site looking west.



Photograph 2

The site looking north showing access track to site.

3.2.4 A plan showing the locations of exploratory points is presented on Drawing 02.

3.3 History of the site

3.3.1 The site was originally in the grounds of a school and later a parish hall before being developed into garages in circa 1960. There is a building recorded on the historical OS maps at the eastern end of the site between 1936-1954. The site has remained largely unchanged since construction of the garages.

3.3.2 The wider site area has shown a general increase of residential properties since the earliest mapping.

3.4 Geology and geohydrology of the area

3.4.1 Geology of the area

3.4.1.1 We have reviewed geological mapping of the produced by the British Geological Survey (BGS) at a scale of 1: 50,000. A summary of the recorded geological information for the site is presented in the table below:

Summary of Geology and likely aquifer containing strata				
Strata	Bedrock or superficial	Approximate thickness	Typical soil type	Likely permeability
Thanet sands	Bedrock	<8m	Fine sands	Marginally permeable
Chalk	Bedrock	>40m	Chalk	Permeable
Table 3.3.1				

3.4.2 Groundwater levels

- 3.4.2.1 There are no historical boreholes within 250m of the site. Based on the geology and topography we anticipate groundwater to be present within the underlying Chalk. and falling towards the River Thames.

3.4.3 Shallow mining and natural subsidence hazards

- 3.4.3.1 Due to chalk having the tendency to exhibit dissolution features, especially where water could have previously flowed downhill across the site, we have obtained a Mining and Ground Stability Datasheet produced by Envirocheck. This is presented in Appendix G.
- 3.4.3.2 The British Geological Survey present hazard ratings for shallow mining and natural subsidence hazards. The site has the following ratings;

Table summarising mining and subsidence hazards	
Hazard	Rating
Potential for collapsible ground stability hazard	Very low
Potential for compressible ground stability hazard	Very low
Potential for ground dissolution stability hazard	Low
Potential for landslide ground stability hazard	Very low
Potential for running sand ground stability hazard	Low
Potential for shrinking or swelling clay ground stability hazard	No hazard
Table 3.4.3	

- 3.4.3.3 Despite the site having a rating of low potential for ground dissolution stability, there are areas of moderate and high risk in close proximity of the site (<250m).

3.5 Unexploded ordnance

- 3.4.1 We obtained a preliminary risk review in respect of unexploded ordnance prior to fieldwork, limited to the extent of our works only. This risk review suggested a medium risk of encountering UXO onsite and our works were supported by a trained technician.
- 3.4.2 We recommend obtaining a detailed UXO risk assessment to support the project. Further supervision during demolition/excavation may be required.

4 Fieldwork

4.1	General
4.2	Dynamic windowless sampling
4.3	Sampling

4.1 General

- 4.1.1 Fieldwork was undertaken on 7th May 2021 and comprised the formation of three exploratory boreholes using dynamic windowless sampling. Exploratory hole records are presented as Appendix C.
- 4.1.2 A plan of the site showing the position of exploratory points is presented on Drawing 02. The position of exploratory points relative to site development proposals is presented on Drawing 03. The position of exploratory points shown on these plans is approximate only.
- 4.1.3 The extent of fieldwork activities and position of exploratory points were determined by Soiltechnics.
- 4.1.4 Exploratory points were positioned to avoid known locations of underground services and to provide a reasonable coverage of the site.
- 4.1.5 All soils exposed in excavations were described in accordance with BS EN ISO 14688 '*Identification and Classification of soil*', BS EN ISO 14689 '*Identification and classification of rock*' and CIRIA C574 '*Engineering in chalk*'.

4.2 Dynamic windowless sampling

- 4.2.1 Boreholes WLS01 to WLS03 were formed using dynamic windowless sampling equipment which comprises driving 1m long steel sample tubes into the ground with the aid of a weight. The sample tubes are of various diameters, generally commencing with 100mm and reducing, with depth, to 50mm and include a disposable plastic liner which is changed between sampling locations in order to limit the risk of cross contamination. On completion of excavation the liner containing the sample is cut open and the soil sample logged by a geo-environmental engineer. The sample tubes are considered thick walled with reference to BS EN ISO 22475-1:2006 clause 3.3.11.
- 4.2.2 Standard Penetration Testing (SPT) was carried out at regular frequencies in the borehole. The test was carried out in accordance with BS EN ISO 22476-3:2005. Key details of the test, as required by BS EN ISO 22476-3 are recorded in Appendix B. A summary of standard penetration testing is recorded on borehole logs.

4.3 Sampling

4.3.1 In general we adopted a judgemental sampling strategy in relation to geotechnical aspects of the investigation. The location and frequency of sampling was carried out in consideration of the following:

- i) Topography
- ii) Geology (including Made Ground)
- iii) Nature of development proposals

4.3.2 Samples are stored for a period of one month following issue of this report, unless otherwise requested.

5 Laboratory testing

- 5.1 Laboratory testing was carried out on samples retrieved from site. The method of testing is recorded on the laboratory test certificate. The following table summarises the testing scheduled;

Table summarising classification testing			
Exploratory point	Depth (m)	Soil type	Testing scheduled (determination of)
WLS02	3.0	Lewes Nodular Chalk	BRE SD1 Suite C (brownfield-pyrite absent)
WLS03	2.9		Liquid limit/plastic limit/plasticity index (1 point)
WLS02	3.3		Intact dry density and saturation moisture content for chalk
WLS03	1.0-2.0		
Table 5.1.1			

- 5.2 Laboratory test certificates are presented in Appendix D.

6 Ground conditions encountered

6.1	Soils
6.2	Groundwater
6.3	Obstructions and instability

6.1 Soils

- 6.1.1 The exploratory excavations encountered Made Ground over suspected Head deposits, with Lewes Nodular Chalk below.
- 6.1.2 Made Ground was encountered to a maximum depth of 0.5m and generally described as a dense gravelly sand with gravels of flint, brick and concrete.
- 6.1.3 Suspected Head deposits were encountered in WLS01 and WLS03 to 0.85m and 0.65m respectively as dense gravelly sand and sandy silt, with gravels of flint and chalk.
- 6.1.4 At WLS02, suspected Head deposits extended to 1.6m and comprised a soft slightly gravelly clay, with gravels of chalk. We have recorded this as 'possible Head/Infill'. This is discussed further in Section 7 with relation to a possible solution feature/infilled channel onsite.
- 6.1.5 Lewes Nodular Chalk was encountered below suspected Head/infill deposits, generally as a Grade Dc chalk (sandy gravel) over a grade Dm chalk (clay/silt). Grade Dc chalk extended to depths of between 1.65 (WLS01) to 2.7m (WLS02).

6.2 Groundwater

- 6.2.1 No groundwater inflows were observed in any of the exploratory excavations.

6.3 Obstructions and instability

- 6.3.1 No in-ground obstructions or significant instability were encountered during our site investigations.

7 Geotechnical Appraisal

7.1	General
7.2	The geological model
7.3	Building foundation solution
7.4	Dissolution Features

7.1 General

7.1.1 The following assessments are made on the investigatory data presented in the preceding sections of this report and are made with reference to specific nature of the development. Should scheme proposals change then it may be necessary to review the investigation and report.

7.1.2 The project will comprise three, three-storey residential properties.

7.1.3 Definitions of geotechnical terms used in the following paragraphs are provided in Appendix A.

7.1.4 This report is a ground investigation report (GIR) and does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004 '*Eurocode 7 – Geotechnical Design – Part 1: General Rules*' and in particular will exclude assessment of lifetime actions to buildings from geotechnical influences.

7.2 The geological model

7.2.1.1 As discussed in Section 6, of the three boreholes formed at the site, one location (WLS02) had softer, suspected infill soils to a depth of 1.6m whereas WLS01 and WLS03 encountered chalk from 0.85m and 0.65m respectively.

7.2.1.2 It is possible that the softer material represents poorly compacted backfill following demolition of the building that was present on the site in the mid 20th century. However, from prior experience such backfill usually includes demolition rubble and similar. There was no evidence of such material leading us to conclude that the material is naturally derived infill material and therefore possible evidence of a solution feature.

7.2.1.3 For the purposes of foundation assessment we will consider the ground model based on soils observed at WLS01 and WLS03. However, it is essential to consider the potential for a solution feature crossing the site, which is discussed in Section 7.4 below. It is noted that WLS02 is within the footprint of the proposed houses and the potential for a deepening of foundations should be considered by the foundation designer.

7.2.1.4 At WLS01 and WLS03, grade Dc chalk (gravel) was encountered from an average of 0.75m and extended to ~1.8m. Below the grade dc chalk, Dm chalk (clays/silts) was encountered to beyond termination depths of 5m.

7.2.2 Groundwater

- 7.2.2.1 Groundwater was not encountered during the investigation. It is conjectured that groundwater is approximately at sea level, between 15-20m below ground level. Groundwater levels should be expected to vary seasonably and in response to weather conditions.

7.3 Building foundation solution

- 7.3.1 It is important to note that the following assessment assumes that any infill channel/solution feature is relatively shallow in depth.

- 7.3.2 We have referred to the following (industry recognised) publications in the production of this report.

1. CIRIA project report 11 (PR11) '*Foundations in Chalk*'
2. CIRIA report C574 '*Engineering in chalk*'

- 7.3.3 Chalk is not specifically covered in Eurocode 7 or associated documents such as BS8004. Being a rock (or weak rock) the modulus and density of chalk are the driving factors in establishing an allowable bearing capacity of spread foundations limiting settlements to acceptable levels. Chalk has four classification types A to D, with class A to C relating to intact rock, (A being the strongest) and D being the more weathered classification.

- 7.3.1.4 Based on investigations completed at this site, and with reference to CIRIA C574 "*Engineering in Chalk*", foundations will be constructed on chalk deposits considered to be medium density grade Dc chalk.

- 7.3.1.5 Again, with reference to C574 the suggested allowable bearing pressure for a grade Dc chalk is 225kN/m². At this stress, the settlement is not anticipated to exceed 10-15mm. Given the potential for thinner deposits of grade Dc chalk, giving way to grade dm at the base of the foundations zone of influence, we recommend that an allowable bearing pressure of 200kN/m² is adopted for foundation design.

- 7.3.1.6 The above bearing pressure is provided for foundations limited to a width of 0.6m, to ensure the zone of influence is largely restricted to the upper grade Dc chalk. If this upper limit is not sufficient to spread the proposed building loads on a 0.6m wide foundation, further investigation will be necessary to assess the underlying grade Dm chalk to more accurately assess potential settlement.

- 7.3.1.7 The foundations should extend at least 0.3m into the grade dc chalk present beneath the site, subject to a minimum founding depth of 0.6m, but likely to be ~1.0m (away from suspected solution features).

7.4 Solution Features

7.4.1 Chalk is typically rich in Calcium Carbonate. CIRIA report PR11 (and C574) states 'The presence of solution features should be expected on all calcium carbonate rich chalk sites'.

7.4.2 Assessment of the risk to foundations posed by dissolution features

7.4.2.1 Dissolution features pose a hazard to foundations because of the presence of one or more of the following:

1. Large variations in intact chalk horizon
2. Loose chalk or superficial deposits infilling pipes
3. Cavities or caves within the chalk
4. Dissolution widened discontinuities in the chalk affecting its load carrying capacity

These features are generally located above the groundwater table level.

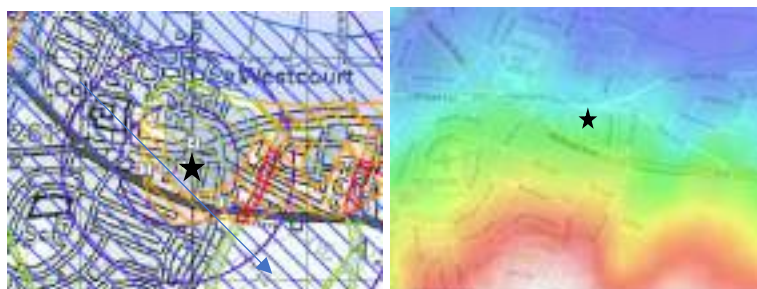
7.4.3 Risk assessment and mitigation

7.4.3.1 We have assessed the risk based on the following:

Item	Observation / enquiry	Assessed risk
Variation in intact chalk horizon	Chalk horizon deeper in WLS02 with soft infill soils above	Possible
Topography	Site toward the base of a slope with historic streams/drainage possible.	Possible
Envirocheck mining and instability report	The site is recorded as being at a low risk of dissolution features, but areas of moderate risk surround the site to the north, east and west with an area of high risk shown ~250m west.	Possible

Table 7.7.3

7.4.3.2 As above, the Envirocheck mining report records the site as low risk, but moderate and high risk exists nearby, likely due to the topography of the site and suspected historic drainage paths from the higher ground to the south. An extract of the Envirocheck report and topographic map is shown below with the approximate site location shown with a black star.



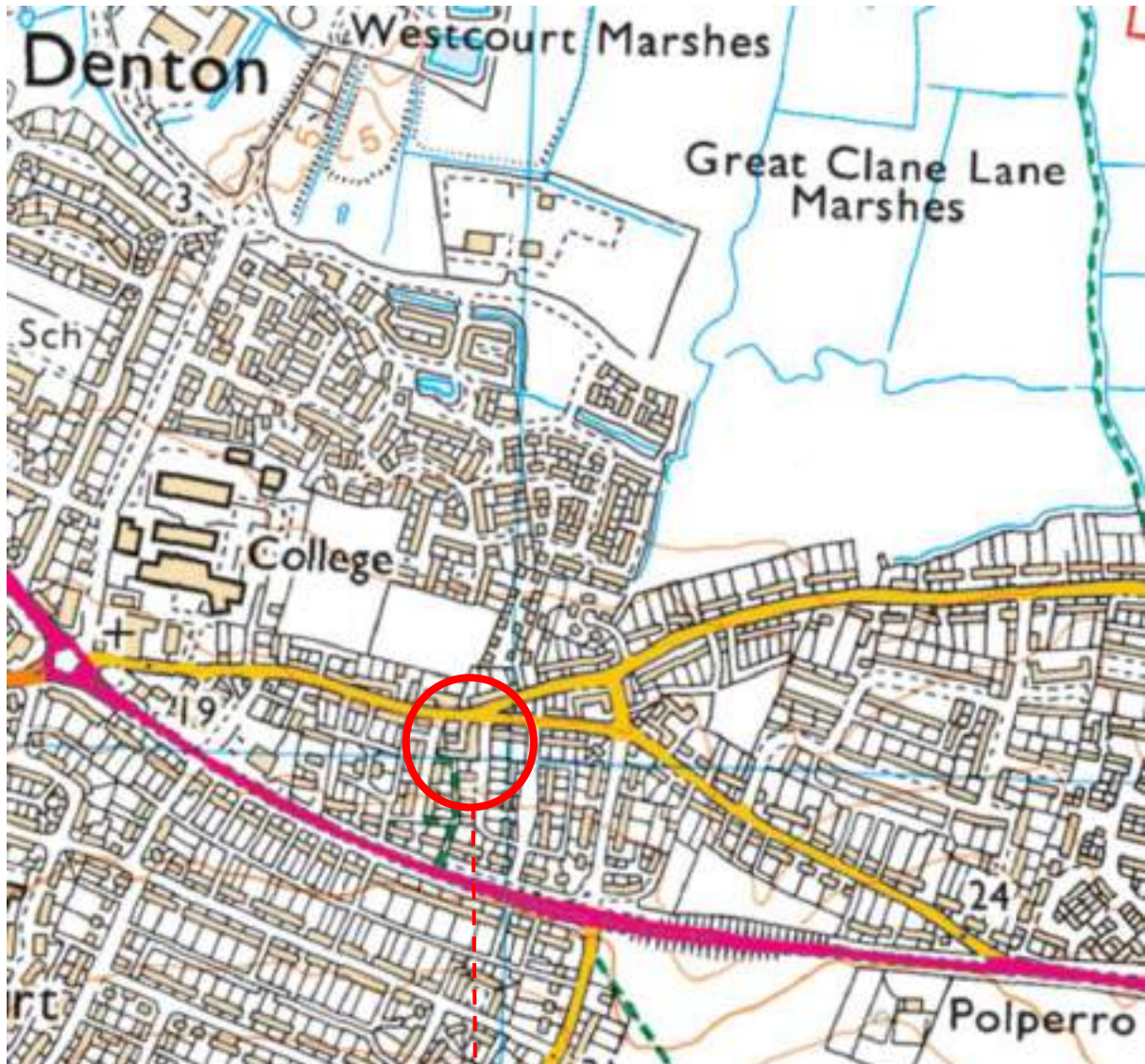
- 7.4.3.3 Based on the above, while it appears that the risks of swallow holes/channels are greater to the east and west of the site, due to the topography, the risk of a feature onsite cannot be discounted. Given the shallow infill soils at WLS02, it is possible that a scour type feature is present in a north/south orientation.
- 7.4.3.4 While it is possible that WLS02 exposed the deepest extent of such a feature, with shallow foundations still viable, it is possible that a much deeper scour is present onsite. The local variation in chalk depths around solution features can be significant.
- 7.4.3.5 We recommend that additional site investigation is undertaken onsite prior to the formation of foundations to refine the ground model in the area of proposed development, and the thickness of grade Dc chalk in areas where the upper horizon is depressed.
- 7.4.4 Future risk mitigation measures**
- 7.4.4.1 There is the potential for new dissolution features to be created as a result of development, primarily through inappropriate drainage systems or water supply leaks.
- 7.4.4.2 If infiltration systems are proposed for the site, it is recommended that water is not concentrated in isolated locations but evenly distributed in say level trench type soakaways to minimise the risk of promoting the formation of dissolution features. Such soakaways need to be positioned remote from buildings and remote from settlement sensitive features. Your drainage designer will be able to comment further in respect of infiltration systems in chalk.
- 7.4.4.3 Water supply pipes should be watertight and flexible to minimise risks of leaks.

8 Effects of ground conditions on building materials

- 8.1 Building materials are often subjected to aggressive environments which cause them to undergo chemical or physical changes. These changes may result in loss of strength or other properties that may put at risk their structure integrity or ability to perform to design requirements.
- 8.2 This report section considers aggressive ground conditions in relation to buried concrete. Ground conditions may affect other materials but have not been considered here.
- 8.3 The aggressiveness of the ground with respect to buried concrete has been assessed in accordance with Building Research Establishment Special Digest 1: Concrete in Aggressive Ground Third Edition (2005).
- 8.4 The site is interpreted to be a brownfield site where pyrite is not likely to be present and laboratory testing has been undertaken on soil samples obtained from the investigation works.
- 8.5 The classification derived for soils onsite is DS-1 and AC-1s.

9 Further investigations

- 9.1 As discussed in preceding sections, there is a suspected dissolution feature onsite. While the feature may be localised and relatively shallow, there is a risk of a deeper scour in the area of proposed development and some additional investigation would mitigate this risk.
- 9.2 We have provided proposals under separate cover for undertaking cone penetrometer testing (CPT), with proposed probes on a grid of ~2.0m in the area of proposed development (which is currently external) to produce a profile of the underlying grade Dc chalk.
- 9.3 It is worth noting that the investigation of the potential scour, post demolition and site strip, using a mechanical excavator may present a more economical option.
- 9.4 We are happy to discuss further works on request.



Site location

Title	Scale	Drawing number
Site location plan	Not to scale	01



Key

WS

Windowless sampling borehole

Site boundary

P

Photographic record

- Notes
1. Base drawing provided by Client

2. Exploratory locations are approximate

A	First issue	SA	OW	ID	17.06.2021
REV	DESCRIPTION	PRODUCED	CHECKED	REVIEWED	DATE

soiltechnics

environmental ■ geotechnical ■ building fabric

PROJECT

Lower Higham Road, Gravesend

TITLE

Exploratory hole plan (current layout)

PROJECT NO.

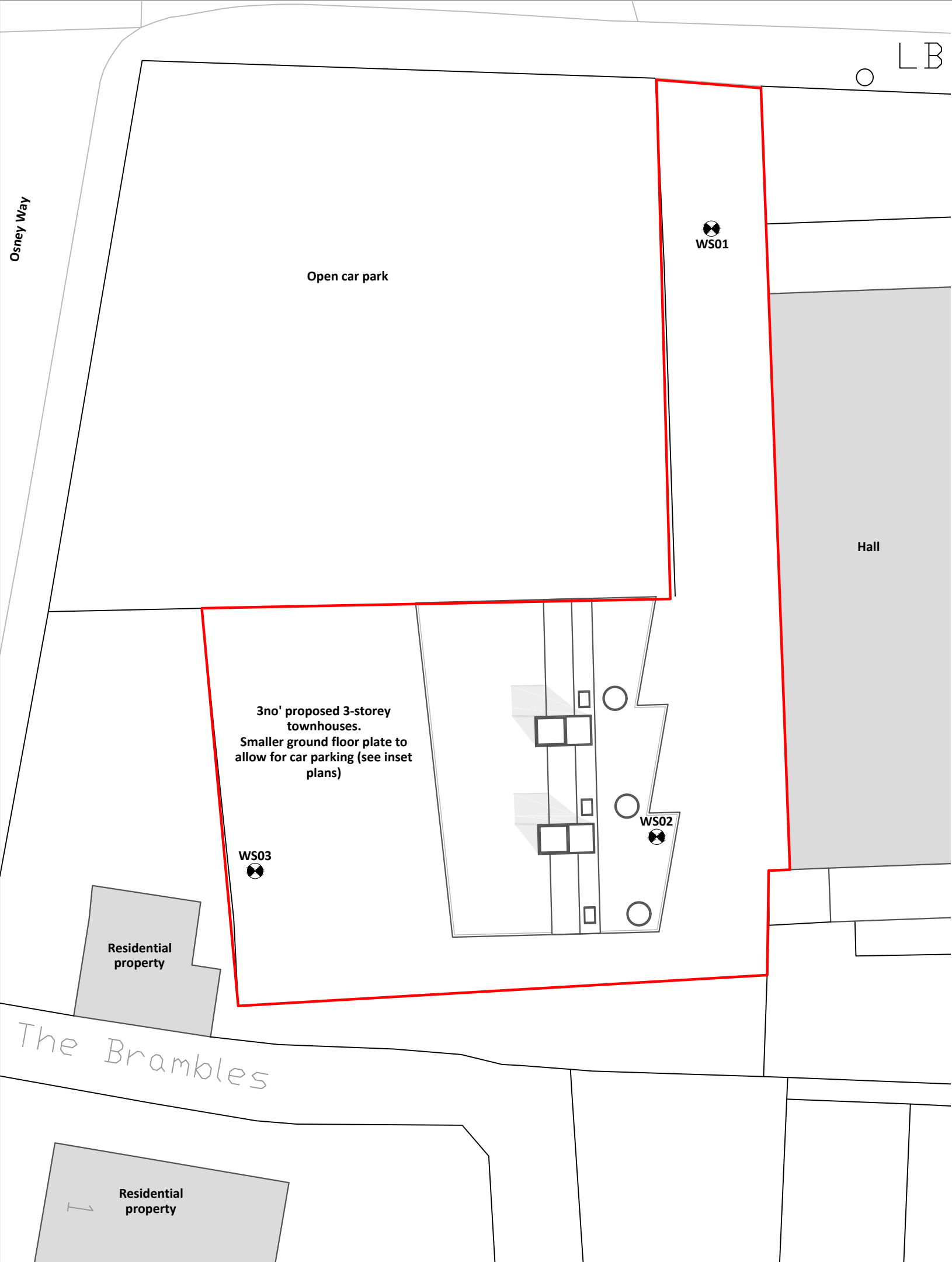
STT5362

SCALE AT A3

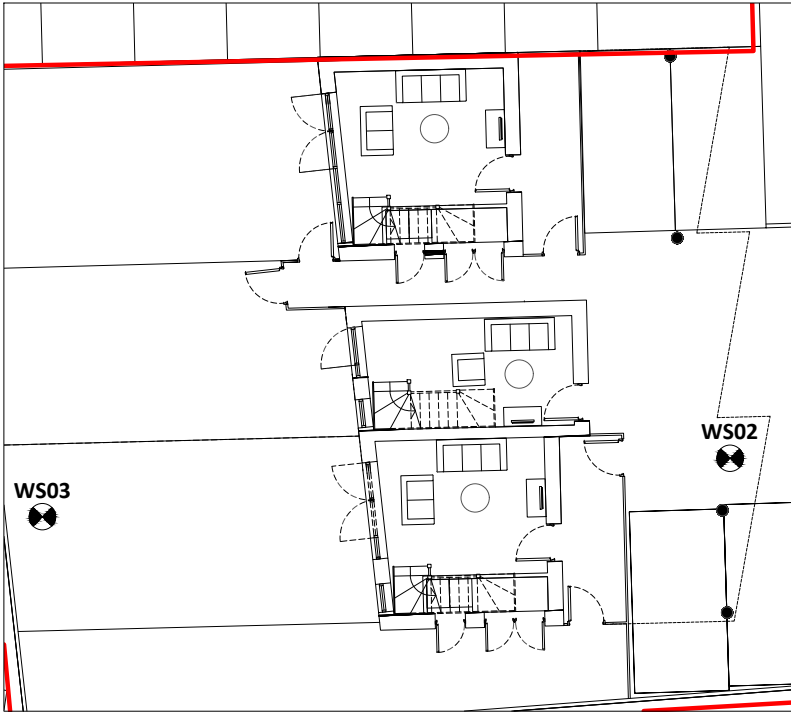
1:200

DRAWING NO.

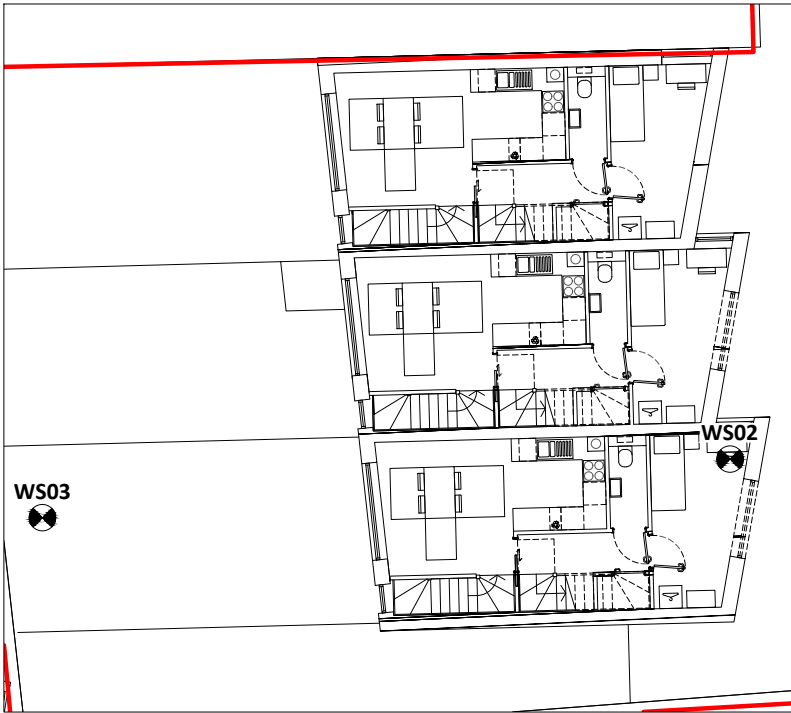
02



Inset - Proposed ground floor level



Inset - Proposed first floor level



Key

 **WS** Windowless sampling borehole

 Site boundary

- Notes**
- 1. Base drawing provided by Client
 - 2. Exploratory locations are approximate

A	First issue	SA	OW	ID	17.06.2021
REV	DESCRIPTION	PRODUCED	CHECKED	REVIEWED	DATE

soiltechnics
environmental ■ geotechnical ■ building fabric

PROJECT
Lower Higham Road, Gravesend

TITLE
Exploratory hole plan (proposed layout)

PROJECT NO. STT5362	SCALE AT A3 1:200	DRAWING NO. 03
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Definition of geotechnical terms used in this report - foundations

Strip foundations.

A foundation providing a continuous longitudinal ground bearing.

Trench fill concrete foundation.

A trench filled with mass concrete providing continuous longitudinal ground bearing.

Pad foundation.

An isolated foundation to spread a concentrated load.

Raft foundation.

A foundation continuous in two directions, usually covering an area equal to or greater than the base area of the structure.

Substructure.

That part of any structure (including building, road, runway or earthwork) which is below natural or artificial ground level. In a bridge this includes piers and abutments (and wing walls), whether below ground level or not, which support the superstructure.

Piled foundations and end bearing piles. A pile driven or formed in the ground for transmitting the weight of a structure to the soil by the resistance developed at the pile point or base and the friction along its surface. If the pile supports the load mainly by the resistance developed at its point or base, it is referred to as an end-bearing pile; if mainly by friction along its surface, as a friction pile.

Bored cast in place pile.

A pile formed with or without a casing by excavating or boring a hole in the ground and subsequently filling it with plain or reinforced concrete.

Driven pile.

A pile driven into the ground by the blows of a hammer or a vibrator.

Precast pile.

A reinforced or pre-stressed concrete pile cast before driving.

Driven cast in place pile.

A pile installed by driving a permanent or temporary casing, and filling the hole so formed with plain or reinforced concrete.

Displacement piles.

Piled formed by displacement of the soil or ground through which they are driven.

Skin friction.

The frictional resistance of the surrounding soil on the surface of cofferdam or caisson walls, and pile shafts.

Downdrag or negative skin friction. A downwards frictional force applied to the shaft of a pile caused by the consolidation of compressible strata, e.g. under recently placed fill. Downdrag has the effect of adding load to the pile and reducing the factor of safety.

Definition of geotechnical terms used in this report – bearing values

To Eurocode 7

Formal definitions of Eurocode terms are provided in BS EN 1990:2002 '*Eurocode – Basis of Structural Design*'. The following are considered informal definitions relating to the context of the geotechnical design report.

Bearing resistance

Calculated ability of a foundation to resist applied actions considered for ultimate and serviceability limit states.

Ultimate limit state (ULS) considerations

Partial factors applied to soil parameters, and actions (applied loads) in bearing resistance calculations to avoid risk of failure of the foundation in bearing.

Serviceability limit state (SLS) considerations

Calculations to determine bearing resistance of a foundation which will generate acceptable levels of settlement under applied actions

Characteristic geotechnical parameters

These are based on results and derived values from laboratory field tests, complemented by well-established experience.

Pre-Eurocode 7 methods.

Ultimate bearing capacity.

The value of the gross loading intensity for a particular foundation at which the resistance of the soil to displacement of the foundation is fully mobilised.

Presumed bearing value.

The net loading intensity considered appropriate to the particular type of ground for preliminary design purposes. The particular value is based on calculation from shear strength tests or other field tests incorporating a factor of safety against shear failure.

Allowable bearing pressure.

The maximum allowable net loading intensity at the base of the foundation, taking into account the ultimate bearing capacity, the amount and kind of settlement expected and our estimate of ability of the structure to accommodate this settlement.

Factor of safety.

The ratio of the ultimate bearing capacity to the intensity of the applied bearing pressure or the ratio of the ultimate load to the applied load.

Definition of geotechnical terms used in this report – road pavements

The following definitions are based on Transport and Road Research Laboratory (TRRL) Report LR1132.

Equilibrium CBR values.

A prediction of the CBR value, which will be attained at formation level under the completed pavement.

Thin pavement.

A thin pavement (which includes both bound and unbound pavement construction materials) is 300mm thick (very lightly trafficked road) and a thick pavement is 1200mm thick (typical of motorway construction).

Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)	Penetration (mm)					
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
WLS01	1.00	5/6	6/6/5/6	11	23	150	300
WLS01	2.00	3/5	4/7/4/3	8	18	150	300
WLS01	3.00	4/5	6/6/7/7	9	26	150	300
WLS01	4.00	5/7	7/7/8/7	12	29	150	300
WLS01	5.00	4/4	5/6/6/6	8	23	150	300
WLS02	1.00	0/0	1/0/1/2	0	4	150	300
WLS02	2.00	1/2	3/3/3/3	3	12	150	300
WLS02	3.00	1/3	5/5/4/5	4	19	150	300
WLS02	4.00	2/3	4/4/4/11	5	23	150	300
WLS02	5.00	2/3	6/6/9/8	5	29	150	300
WLS03	1.00	2/8	8/9/11/12	10	40	150	300
WLS03	2.00	3/3	3/3/4/6	6	16	150	300
WLS03	3.00	4/6	7/7/7/6	10	27	150	300
WLS03	4.00	2/4	6/6/7/7	6	26	150	300
WLS03	5.00	2/4	5/7/5/6	6	23	150	300

Plot summarising Standard Penetration Test (SPT) results versus depth filtered by geology

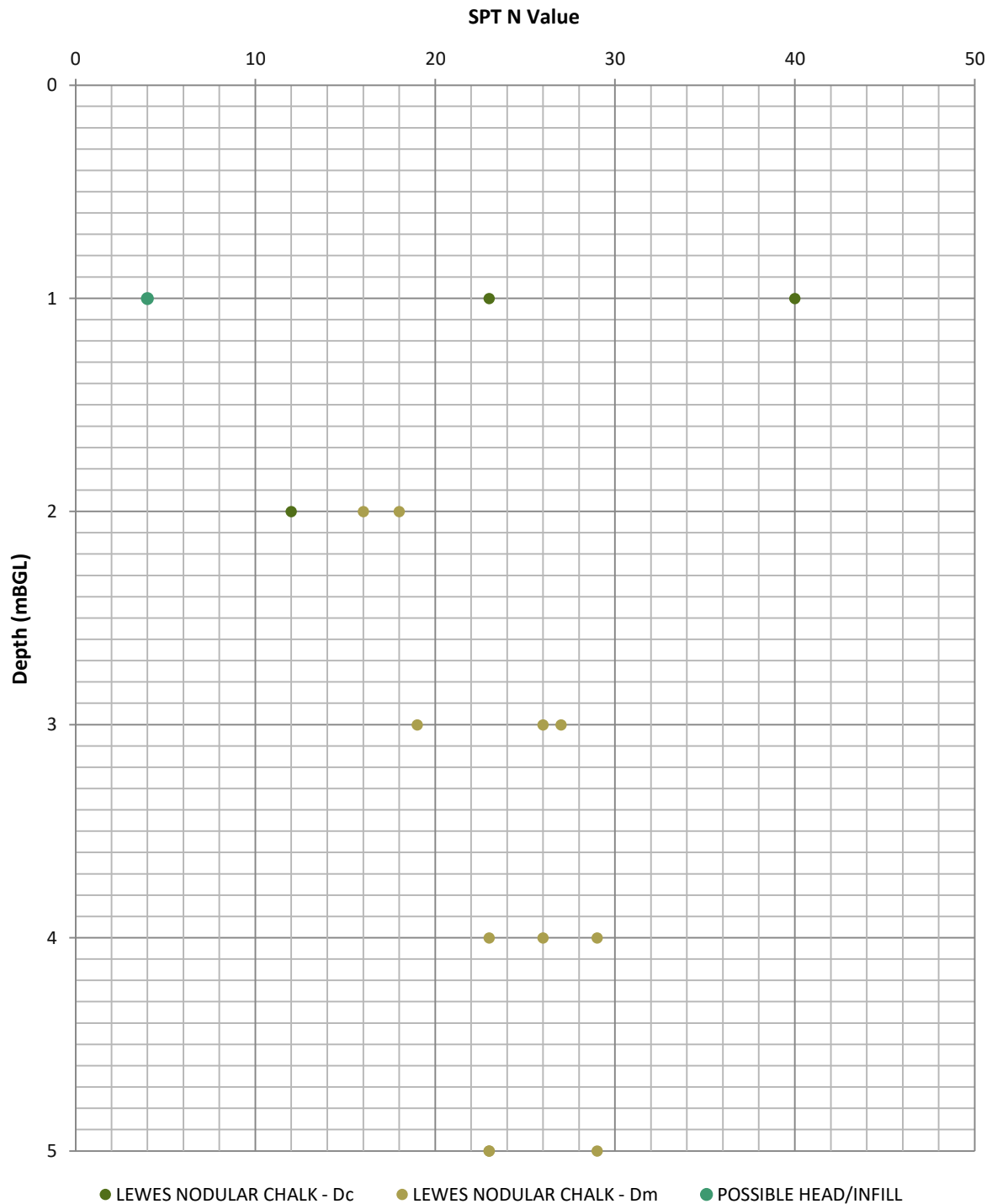


Table summarising Pocket Penetrometer results

* Signifies that instrument limit reached.

Location	Start Depth (m)	Results 1-3	Average	Undrained Shear Strength (kN/m ²)
WLS01	3.70	1.5/1.5/1.5	1.50	75
WLS01	4.10	1/1/1	1.00	50
WLS01	4.50	1/1.5/1	1.17	58
WLS01	4.80	1/1.5/1.5	1.33	67
WLS02	4.60	0/0/0	0.00	0
WLS02	4.80	0/0/0	0.00	0
WLS03	3.20	1/1.5/1.5	1.33	67
WLS03	3.40	2/2/1.5	1.83	92
WLS03	3.70	3/2.5/2.5	2.67	133

Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		Sampling	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	From (m) To (m)	Records depth of sampling
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m ²) by applying a factor of 50.		D Disturbed sample
	SV – Hand held shear vane result reported as an undrained shear strength (kN/m ²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.		B Bulk disturbed sample
	SPT – Standard Penetration Test result (N value) (uncorrected) ^{1,2,3} SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected) ^{1,2,3}		ES Environmental sample
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample	Type	W Water sample
			U Undisturbed thick-walled sample 100mm diameter sampler
			UT Undisturbed thin walled sample 100mm diameter sampler
			UTF Failed undisturbed sample

Water observations

Described at foot of log and shown in the 'water strike' column.

- Water level observed after specified delay in drilling
- Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

Density

Density recorded in brackets determined by qualitative field assessment or inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass onto gravelly SAND. Gravel is fine to coarse angular to subrounded brick, flint and concrete. (MADE GROUND)	0.10										0.10	0.40	B
	Dense brown gravelly SAND. Gravel is fine to coarse angular to subrounded flint and chalk. (SUSPECTED HEAD DEPOSITS)													
	Structureless CHALK composed of slightly silty sandy angular GRAVEL. Clasts are very weak to weak medium density white with black specks. (LEWES NODULAR CHALK - Dc)	0.85				S 1.00 - 1.45	(11) 23					1.00	2.00	B
	Structureless CHALK composed of whitish cream gravelly sandy SILT. Gravel is medium density white chalk with black specks. (LEWES NODULAR CHALK - Dm)	1.65				S 2.00 - 2.45	(8) 18					2.10		D
	Structureless CHALK composed of whitish cream slightly gravelly slightly sandy SILT. Gravel is medium density white chalk with black specks. (LEWES NODULAR CHALK - Dm)	3.00				S 3.00 - 3.45	(9) 26					2.60		D
												3.40		D
						S 4.00 - 4.45	(12) 29			PP 3.70	PP=75			
										PP 4.10	PP=50	4.20		D
										PP 4.50	PP=58			
	BOREHOLE TERMINATED AT 5.00m	5.00				S 5.00 - 5.45	(8) 23			PP 4.80	PP=67			

Notes	Title			Date(s)	
	Dynamic windowless sampling record			07/05/2021	
	Recovery details		Method	Logged by	Sheet number
	Range (m)	Recovery (%)	Windowless sampling	OW	Sheet 1 of 1
Groundwater observations No groundwater encountered.	0.00 - 1.00	100	Level (m OD)	Compiled by	Revision
	1.00 - 2.00	95	-	SA	
	2.00 - 3.00	95			
	3.00 - 4.00	95	Co-ordinates	Checked by	
	4.00 - 5.00	90	-	ID	WLS01

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. (CONCRETE)													
	Dense brownish grey gravelly SAND. Gravel is fine to coarse angular to subrounded flint and brick. (MADE GROUND)	0.30												
	Soft brown slightly gravelly silty CLAY. Gravel is fine to coarse subangular to rounded chalk. (POSSIBLE HEAD/INFILL)	0.50										0.60	1.00	B
						S 1.00 - 1.45	(0) 4					1.20		D
	Structureless CHALK composed of slightly silty sandy angular GRAVEL. Clasts are very weak to weak medium density white with black specks. (LEWES NODULAR CHALK - Dc)	1.60				S 2.00 - 2.45	(3) 12					2.00	3.00	D B
	Structureless CHALK composed of whitish cream gravelly sandy clayey SILT. Gravel is medium density white chalk with black specks. (LEWES NODULAR CHALK - Dm)	2.70				S 3.00 - 3.45	(4) 19					3.30		D
						S 4.00 - 4.45	(5) 23					3.80		D
	Structureless CHALK composed of whitish cream slightly gravelly slightly sandy clayey SILT. Gravel is medium density white chalk with black specks. (LEWES NODULAR CHALK - Dm)	4.50								PP 4.60	PP=0	4.70		D
										PP 4.80	PP=0			
	BOREHOLE TERMINATED AT 5.00m	5.00				S 5.00 - 5.45	(5) 29							

Notes	Title			Date(s)	
	Dynamic windowless sampling record			07/05/2021	
	Recovery details		Method	Logged by	Sheet number
	Range (m)	Recovery (%)	Windowless sampling	OW	Sheet 1 of 1
Groundwater observations No groundwater encountered.	0.40 - 1.00	100	Level (m OD) -	Compiled by SA	Revision
	1.00 - 2.00	90			
	2.00 - 3.00	80	Co-ordinates -	Checked by ID	WLS02
	3.00 - 4.00	90			
	4.00 - 5.00	50			

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. (MADE GROUND)	0.20												
	Dense orangish brown gravelly SAND. Gravel is fine to coarse angular to subrounded brick, concrete and flint. (MADE GROUND)	0.45									0.50			D
	Dense brown sandy SILT. (SUSPECTED HEAD DEPOSITS)	0.65												
	Structureless CHALK composed of slightly silty sandy angular GRAVEL of flint and chalk. Clasts are very weak medium density white with black specks. (LEWES NODULAR CHALK - Dc)					S 1.00 - 1.45	(10) 40					1.00	2.00	B
														
														
														
														
						S 2.00 - 2.45	(6) 16					2.30		D
														
														
						S 3.00 - 3.45	(10) 27			PP 3.20 PP 3.40 PP 3.70	PP=67 PP=92 PP=133	2.90		D
														
														
						S 4.00 - 4.45	(6) 26							
														
														
														
														
														
														
						S 5.00 - 5.45	(6) 23							
														



SOCOTEC

Environmental Chemistry
SOCOTEC UK
Ashby Rd, Bretby,
Burton-on-Trent, UK
DE15 0YZ

Certificate of Analysis

Project No: 21052087

Client: SOCOTEC Materials Testing

Quote Number: BEC210417972

Project Reference: Soiltechnis Limited

Site Name: STT5362 - Lower Higham Rd, Gravesend

Contact: Darren Berrill

Address: SOCOTEC Central
Leofric Business Park
Progress Close
Coventry

Post Code: CV3 2TF

E-Mail: Darren.Berrill@socotec.com

Phone No: 02475 310700

Number of Samples Received: 2

Date Received: 28/05/2021

Analysis Date: 07/06/2021

Date Issued: 09/06/2021

Job Status: Complete

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

Account Manager

Emily Jones

Authorised by the Operations Manager
Becky Batham



Client: SOCOTEC Materials Testing

Project Name: STT5362 - Lower Higham Rd, Gravesend

Project No: 21052087

Date Issued: 09/06/2021

Samples Analysed

<u>Sample Reference</u>	<u>Text ID</u>	<u>Sample Date</u>	<u>Sample Type</u>
45381832-19-D-2.00	21052087-001	07/05/2021 00:00:00	SOLID
45381835-16-D-2.90	21052087-002	07/05/2021 00:00:00	SOLID



Client: SOCOTEC Materials Testing
 Project Name: STT5362 - Lower Higham Rd, Gravesend
 Project No: 21052087
 Date Issued: 09/06/2021

Analysis Results

					Project ID	
					21052087	
					Sample ID	
					001	002
					Customer ID	
					45381832-19-D-2.00	45381835-16-D-2.90
					Sample Type	
					SOLID	SOLID
					Sampling Date	
					07/05/2021	07/05/2021
Analysis	Method Code	MDL	Units	Accred		
pH (2.5:1 extraction)	PHSOIL	1	pH units	N	9.0	9.3
Chloride as Cl	KONECL	2	mg/kg	N	17	41
Nitrate as NO3	KONENO3	2	mg/kg	N	3.8	<2.0
Magnesium as Mg (2:1 Extract)	ICPWSMG	0.1	mg/l	N	1.5	1.9
Water Soluble Sulphate as SO4 2:1 Ext	ICPWSS	10	mg/l	N	15	31
Total Moisture at 35°C	CLANDPREP	0.1	%	N	22.6	23.5
Description of Solid Material	CLANDPREP		-	N	CHALK	CHALK



Client: SOCOTEC Materials Testing

Project Name: STT5362 - Lower Higham Rd, Gravesend

Project No: 21052087

Date Issued: 09/06/2021

Deviating Sample Report

Sample Reference	Text ID	Reported Name	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
45381832-19-D-2.00	21052087-001	PHSOIL						✓
45381835-16-D-2.90	21052087-002	PHSOIL						✓

Analysis Method

Analysis

CLANDPREP
ICPWSMG
ICPWSS
KONECL
KONENO3
KONENS
KONENS.
PHSOIL

Analysis Type

PHYS
METALS
METALS
INORGANIC
INORGANIC
INORGANIC
INORGANIC
INORGANIC

Analysis Method

As Received
Air Dried & Ground
Air Dried & Ground
Air Dried & Ground
Air Dried & Ground
Air Dried & Ground
Air Dried & Ground
As Received



Client: SOCOTEC Materials Testing

Project Name: STT5362 - Lower Higham Rd, Gravesend

Project No: 21052087

Date Issued: 09/06/2021

Additional Information

This report refers to samples as received, and SOCOTEC Uk Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the codes are as follows:

U = UKAS accredited analysis

M = MCERT accredited analysis

N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 105° c

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° c.

This report shall not be reproduced except in full and with approval from the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis

NA = Sample is not amenable for the required analysis

ND = Results cannot be determined

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the Subcontracted lab for information regarding any deviancies for this analysis.

HWOL Acronym Key

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

End of Certificate of Analysis

Liquid and Plastic Limits and Plasticity Indices

Report No: DAM0081290/833/M1

Report Date: 4 June 2021

Client: SOILTECHNICS LIMITED
Address: CEDAR BARN
WHITE LODGE
WALGRAVE
NORTHAMPTON, NORTHANTS
NN6 9PY
Client Contact: Not Advised
Site: STT5362 - Lower Higham Road, Gravesend

Our Contract Ref: 51062714
Tested By: SOCOTEC Central

Date Sampled: 7 May 2021
Date Received: 12 May 2021
Date Tested: 19 May 2021

Material Supplier: Client
Material Source: Site
Method of preparation: BS1377-1:1990 7.4.3 & BS 1377-2:1990 4.2

Sample Type: BULK
Sampling Certificate: Not Received
Samples Submitted by: Client
Sampled by: Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing on 425 µm
45381833	10	WLS02 3.30 - 3.30	Clayey CHALK	N/A	31	Non Plastic	N/A	**100

* Washed over 425µm BS Test Sieve

** As received, coarse particles removed by hand prior to test

Certified that the Liquid and Plastic Limits and Plasticity Indices were determined in accordance with BS1377-2:1990
Clauses 4.4, 5.0 and 5.4 respectively
Certified that the Moisture Content was determined in accordance with BS1377-2:1990 3.2

Signed:



Maria Chandler - Laboratory Manager
for and on behalf of SOCOTEC UK Limited



Determination of Saturated Moisture Content

Client: Soiltechnics Ltd
Client Address: Cedar Barn,
White Lodge,
Walgrave,
Postcode: NN6 9PY

Report No: 51062714/21/01
Batch Number: DAM0081290

Site: STT5362 - Lower Higham Road

Test Results:

Date Received: 12.05.21
Tested From: 27.05.21
Type of Sample: Bulk
Description: Chalk

Date Sampled: 07.05.21
Sampled By: Client
Sampling Certificate: Not Received

Laboratory Reference	Location	Depth	Bulk Density [Mg/m³]	Dry Density [Mg/m³]	Moisture Content [%]	Saturated Moisture Content (%)
45381834	WLS03	1.00-2.00	1.97	1.65	20	24

Comments:

Certified that the laboratory testing was carried out in accordance with BS 1377-2: 1990: Method 3.3

Page: 1 of 1
Date: 02.06.21

Signed:

A handwritten signature in black ink, appearing to read 'D. Berrill'.

[✓] D. Berrill - General Manager
[] M. Chandler - Laboratory Manager

For and on behalf of SOCOTEC UK Limited

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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Contact Us

SGN Safety Admin Team:
0800 912 1722
Email:
plantlocation@sgn.co.uk

Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve

Syphon

Depth of Cover

Digsite:

Line:

Area:

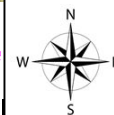
LAS

GTs

SSSIs

Diameter Change

Material Change



This information is given as a guide only and its accuracy cannot be guaranteed.



This plan shows the location of those pipes owned by Scotia Gas Networks (SGN) by virtue of being a licensed Gas Transporter (GT). Gas pipes owned by other GTs or third parties may also be present in this area but are not shown on this plan. Information with regard to such pipes should be obtained from the relevant owners. No warranties are given with regard to the accuracy of the information shown on this plan. Service pipes, valves, siphons, sub-connections etc. are not shown but their presence should be anticipated. You should be aware that a small percentage of our pipes/assets may be undergoing review and will temporarily be highlighted in yellow. If your proposed works are close to one of these pipes, you should contact the SGN Safety Admin Team on 0800 912 1722 for advice. No liability of any kind whatsoever is accepted by SGN or its agents, servants or sub-contractors for any error or omission contained herein. Safe digging practices, in accordance with HS (G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that plant location information is provided to all persons (whether direct labour or sub-contractors) working for you on or near gas apparatus. Information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA

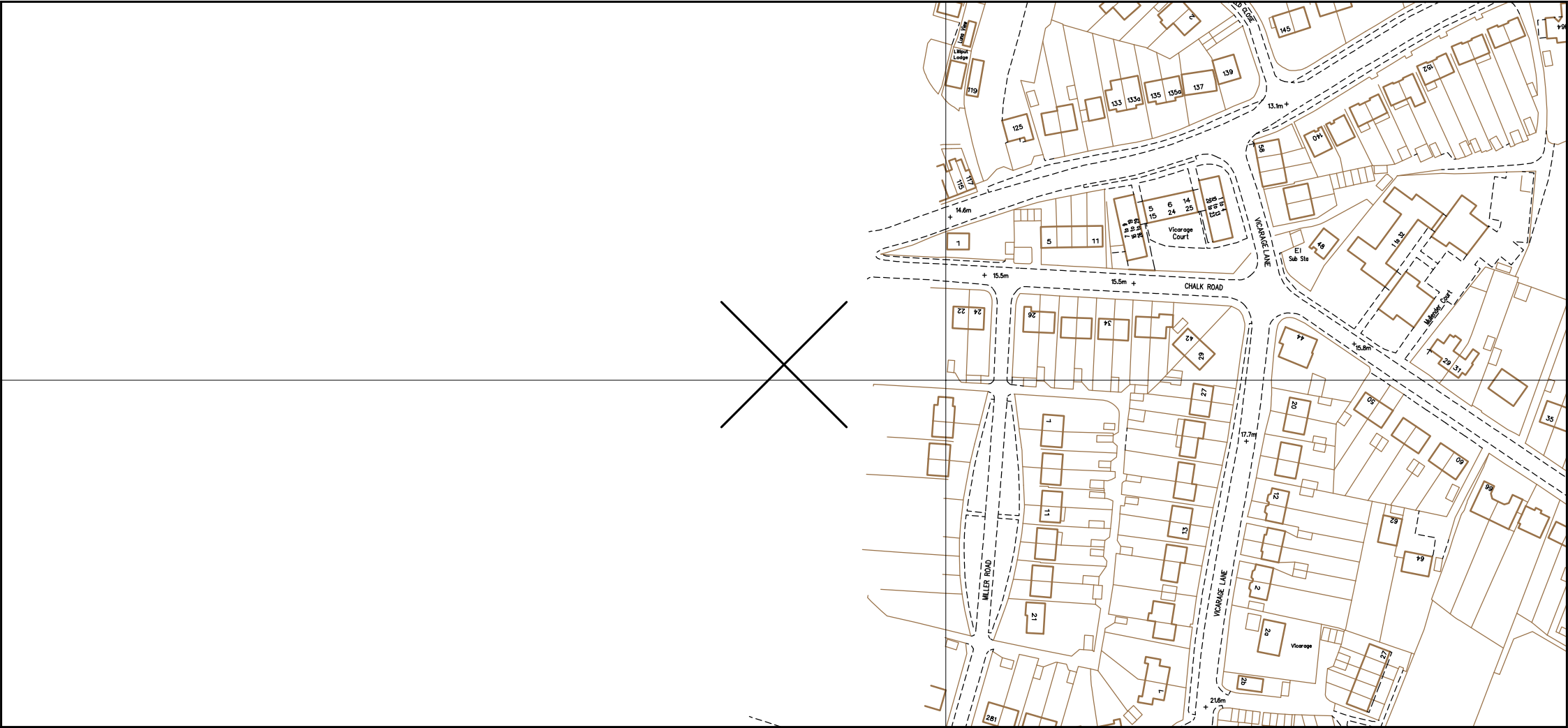
0800 111 999

This plan is reproduced from or based on the OS map by Scotia Gas Networks plc, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved. Southern Gas – 100044373 and Scotland Gas – 100044366.

Plans generated by DigSAFE Pro (tm) software provided by LineasearchbeforeUdig

Date Requested: 04/05/2021
Job Reference: 22012134
Site Location: 566931 173018
Requested by:
Miss Alexa Band
Your Scheme/Reference:
STT5362

Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site



SCALE: Not to scale USER ID: ABand DATE: 04/05/2021 EXTRACT DATE: 01/03/2021 MAP REF: TQ6673 CENTRE: 566938, 173006		LP MAINS MP MAINS IP MAINS LHP MAINS	This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate. Valve Depth of Cover Syphon Discontinuity Change Material Change Out of Standards Service	MAPS Viewer Version 5.8.0.1 Local Machine This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.
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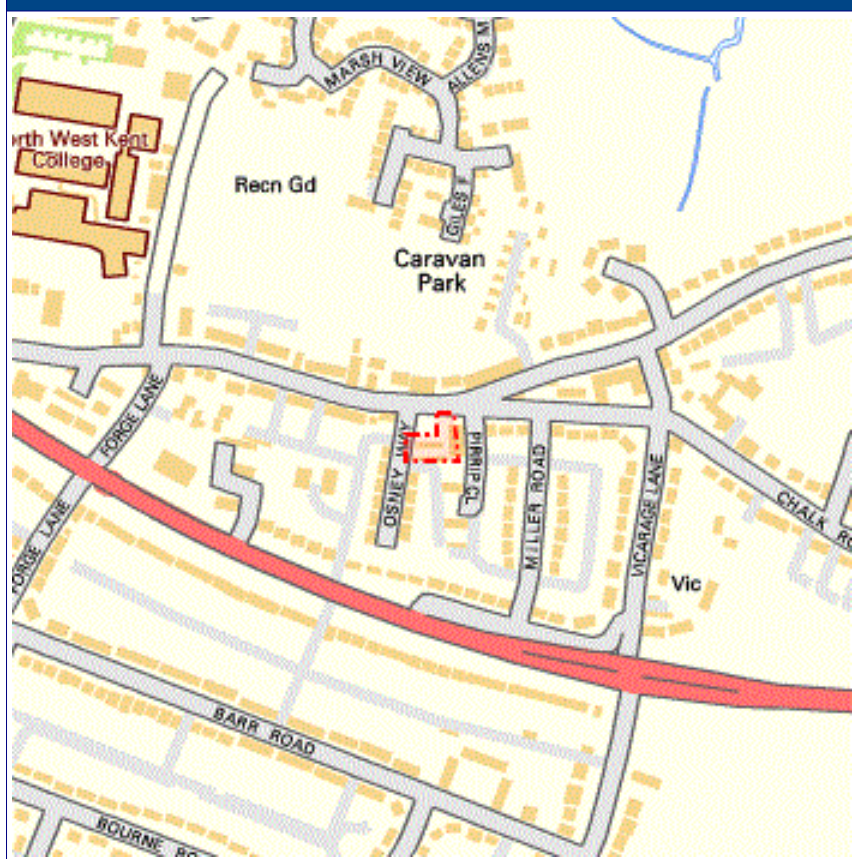
Enquirer

Name	Miss Alexa Band	Phone	01604 781877
Company	Soiltechnics	Mobile	Not Supplied
Address	Cedar Barn White Lodge Walgrave Northamptonshire NN6 9PY		
Email	Alexa.Band@soiltechnics.net		

Enquiry Details

Scheme/Reference	STT5362		
Enquiry type	Initial Enquiry	Work category	Development Projects
Start date	05/05/2021	Work type	Commercial/industrial
End date	05/05/2021	Site size	1192 metres square
Searched location	XY= 566938, 173006	Work type buffer*	25 metres
Confirmed location	566931 173009		
Site Contact Name	Not Supplied	Site Phone No	Not Supplied
Description of Works			

* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.

Site Map


Asset Owners

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.lineasearchbeforeudig.co.uk ("Terms of Use") and the disclaimer at the end of this document. Please note that in the event of any conflict or ambiguity between the terms of this Enquiry Confirmation and the Terms of Use, the Terms of Use shall take precedence.

Notes. Please ensure your contact details are correct and up to date on the system in case the LSBUD Members need to contact you.

Validity and search criteria. The results of this enquiry are based on the confirmed information you entered and are valid only as at the date of the enquiry. It is your responsibility to ensure that the Enquiry Details are correct, and LineasearchbeforeUdig accepts no responsibility for any errors or omissions in the Enquiry Details or any consequences thereof. LSBUD Members update their asset information on a regular basis so you are advised to consider this when undertaking any works. It is your responsibility to choose the period of time after which you need to resubmit any enquiry but the maximum time (after which your enquiry will no longer be dealt with by the LSBUD Helpdesk and LSBUD Members) is 28 days. If any details of the enquiry change, particularly including, but not limited to, the location of the work, then a further enquiry must be made.

Asset Owners & Responses. Please note the enquiry results include the following:

1. "LSBUD Members" who are asset owners who have registered their assets on the LSBUD service.
2. "Non LSBUD Members" are asset owners who have not registered their assets on the LSBUD service but LSBUD is aware of their existence. Please note that there could be other asset owners within your search area.

Below are three lists of asset owners:

1. **LSBUD Members who have assets registered within your search area. ("Affected")**
 - a. These LSBUD Members will either:
 - i. Ask for further information ("Email Additional Info" noted in status). The additional information includes: Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.
 - ii. Respond directly to you ("Await Response"). In this response they may either send plans directly to you or ask for further information before being able to do so, particularly if any payments or authorisations are required.
2. **LSBUD Members who do not have assets registered within your search area. ("Not Affected")**
3. **Non LSBUD Members who may have assets within your search area.** Please note that this list is not exhaustive and all details are provided as a guide only. It is your responsibility to identify and consult with all asset owners before proceeding.

National Grid. Please note that the LSBUD service only contains information on National Grid's Gas above 7 bar asset, all National Grid Electricity Transmission assets and National Grid's Gas Distribution Limited above 2 bar asset.

For National Grid Gas Distribution Ltd below 2 bar asset information please go to www.beforeyoudig.nationalgrid.com

LSBUD Members who have assets registered on the LSBUD service within the vicinity of your search area.

List of affected LSBUD members

Asset Owner	Phone/Email	Emergency Only	Status
SGN	08009121722	0800111999	Await response
UK Power Networks	08000565866	08000565866	Await response

LSBUD Members who do not have assets registered on the LSBUD service within the vicinity of your search area. Please be aware that LSBUD Members make regular changes to their assets and this list may vary for new enquiries in the same area.

List of not affected LSBUD members

AWE Pipeline	Balfour Beatty Investments Limited	BOC Limited (A Member of the Linde Group)
Box Broadband	BP Exploration Operating Company Limited	BPA
Carrington Gas Pipeline	CATS Pipeline c/o Wood Group PSN	Cemex
Centrica Storage Ltd	Chrysaor Production (UK) Limited	CNG Services Ltd
Concept Solutions People Ltd	ConocoPhillips (UK) Teesside Operator Ltd	Diamond Transmission Corporation
DIO (MOD Abandoned Pipelines)	DIO (MOD Live Pipelines)	E.ON UK CHP Limited
EirGrid	Electricity North West Limited	ENI & Himor c/o Penspen Ltd
EnQuest NNS Limited	EP Langage Limited	ESP Utilities Group
ESSAR	Esso Petroleum Company Limited	Exolum Pipeline System
Fulcrum Pipelines Limited	Gamma	Gas Networks Ireland (UK)
Gateshead Energy Company	Gigaclear Ltd	Gtt
Heathrow Airport LTD	Humbly Grove Energy	IGas Energy
INEOS FPS Pipelines	INEOS Manufacturing (Scotland and TSEP)	INOVYN ChlorVinyls Limited
INOVYN Enterprises Limited	Intergen (Coryton Energy or Spalding Energy)	Jurassic Fibre Ltd
Last Mile	Mainline Pipelines Limited	Manchester Jetline Limited
Manx Cable Company	Marchwood Power Ltd (Gas Pipeline)	Melbourn Solar Limited
Murphy Utility Assets	National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission	Northumbrian Water Group
NPower CHP Pipelines	NYnet Ltd	Oikos Storage Limited
Ørsted	Perenco UK Limited (Purbeck Southampton Pipeline)	Petroineos
Phillips 66	Portsmouth Water	Premier Transmission Ltd (SNIP)
Redundant Pipelines - LPDA	RWE - Great Yarmouth Pipeline (Bacton to Great Yarmouth Power Station)	RWEpower (Little Barford and South Haven)
SABIC UK Petrochemicals	Scottish and Southern Electricity Networks	Scottish Power Generation
Seabank Power Ltd	SES Water	Shell
Shell NOP	SSE Enterprise Telecoms	SSE Generation Ltd
SSE Utility Solutions Limited	Tata Communications (c/o JSM Construction Ltd)	Total Colnbrook Pipelines
Total Finaline Pipelines	Transmission Capital	Uniper UK Ltd

University of Cambridge Granta Backbone
Network

Vattenfall

Veolia ES SELCHP Limited

Veolia ES Sheffield Ltd

VPI Power Limited

Wales and West Utilities

West of Duddon Sands Transmission Ltd

Western Power Distribution

Westminster City Council

Zayo Group UK Ltd c/o JSM Group Ltd

The following Non-LSBUD Members may have assets in your search area. It is **YOUR RESPONSIBILITY** to contact them before proceeding. Please be aware this list is not exhaustive and it is your responsibility to identify and contact all asset owners within your search area.

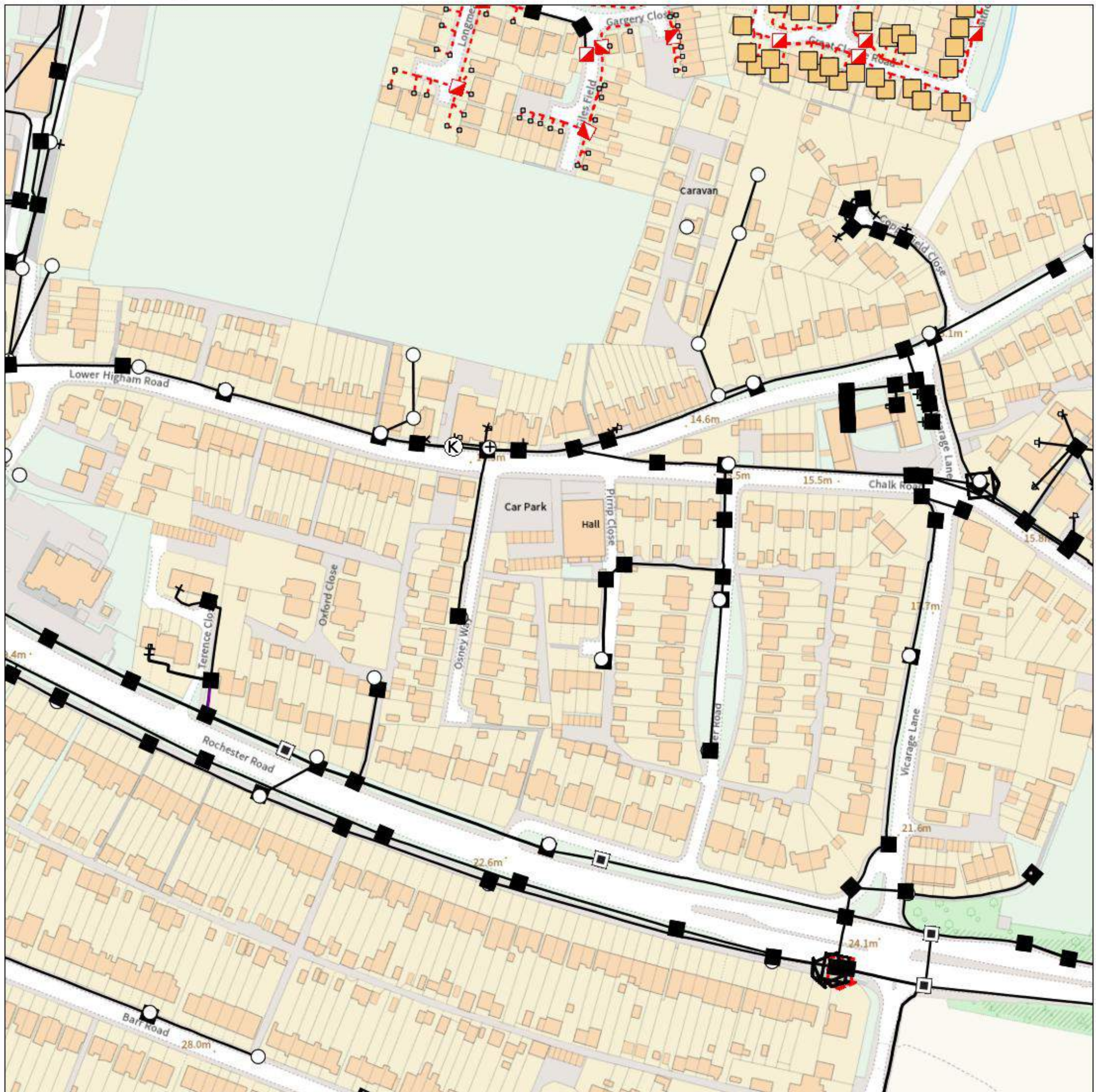
Non-LSBUD members (Asset owners not registered on LSBUD)			
Asset Owner	Preferred contact method	Phone	Status
Anglian Water	http://www.digdat.co.uk	01480323891	Not Notified
BT	https://www.swns.bt.com/pls/mbe/welcome.home	08000232023	Not Notified
CenturyLink Communications UK Limited	plantenquiries@instalcom.co.uk	02087314613	Not Notified
CityFibre	asset.team@cityfibre.com	033 3150 7282	Not Notified
Colt	plantenquiries@catelecomuk.com	01227768427	Not Notified
ENGIE	nrsua.uk@engie.com	01293 549944	Not Notified
GTC	https://pe.gtc-uk.co.uk/PlantEnqMembership	01359240363	Not Notified
Mobile Broadband Network Limited	mbnl.plant.enquiries@turntown.com	01212 621 100	Not Notified
Sota	SOTA.plantenquiries@instalcom.co.uk		Not Notified
Southern Water	www.digdat.co.uk	08452700212	Not Notified
Utility assets Ltd	enquiries@utilityassets.co.uk		Not Notified
Verizon Business	osp-team@uk.verizonbusiness.com	01293611736	Not Notified
Virgin Media	http://www.digdat.co.uk	08708883116	Not Notified
Vodafone	osm.enquiries@atkinsglobal.com	01454662881	Not Notified

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The results of this Enquiry are personal to the Enquirer and shall not be shared with or relied upon by any other party. The asset information on which the Enquiry results are based has been provided by LSBUD Members, therefore LineSearchbeforeUdig will provide no guarantee that such information is accurate or reliable nor does it monitor such asset information for accuracy and reliability going forward. There may also be asset owners which do not participate in the enquiry service operated by LineSearchbeforeUdig, including but not exclusively those set out above. Therefore, LineSearchbeforeUdig cannot make any representation or give any guarantee or warranty as to the completeness of the information contained in the enquiry results or accept any responsibility for the accuracy of the mapping images used. LineSearchbeforeUdig and its employees, agents and consultants accept no liability (save that nothing in this Enquiry Confirmation excludes or limits our liability for death or personal injury arising from our negligence, or our fraud or fraudulent misrepresentation, or any other liability that cannot be excluded or limited by English law) arising in respect thereof or in any other way for errors or omissions including responsibility to any person by reason of negligence.

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.



openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

Accidents happen

If you do damage any Openreach equipment please let us know by calling 0800 023 2023 (opt 1 + opt 1) and we can get it fixed ASAP

KEY TO BT SYMBOLS

			State	Hatchings
	<i>Planned</i>	<i>Live</i>	Split Coupling	
PCP			Duct Tee	
Pole			Building	
Box			Kiosk	
Manhole			Other proposed plant is shown using dashed lines. BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.	
Cabinet				

	<i>Pending Add</i>	<i>In Place</i>	<i>Pending Remove</i>	<i>Not In Use</i>
Power Cable				
Power Duct				N/A

BT Ref : MUI10164C

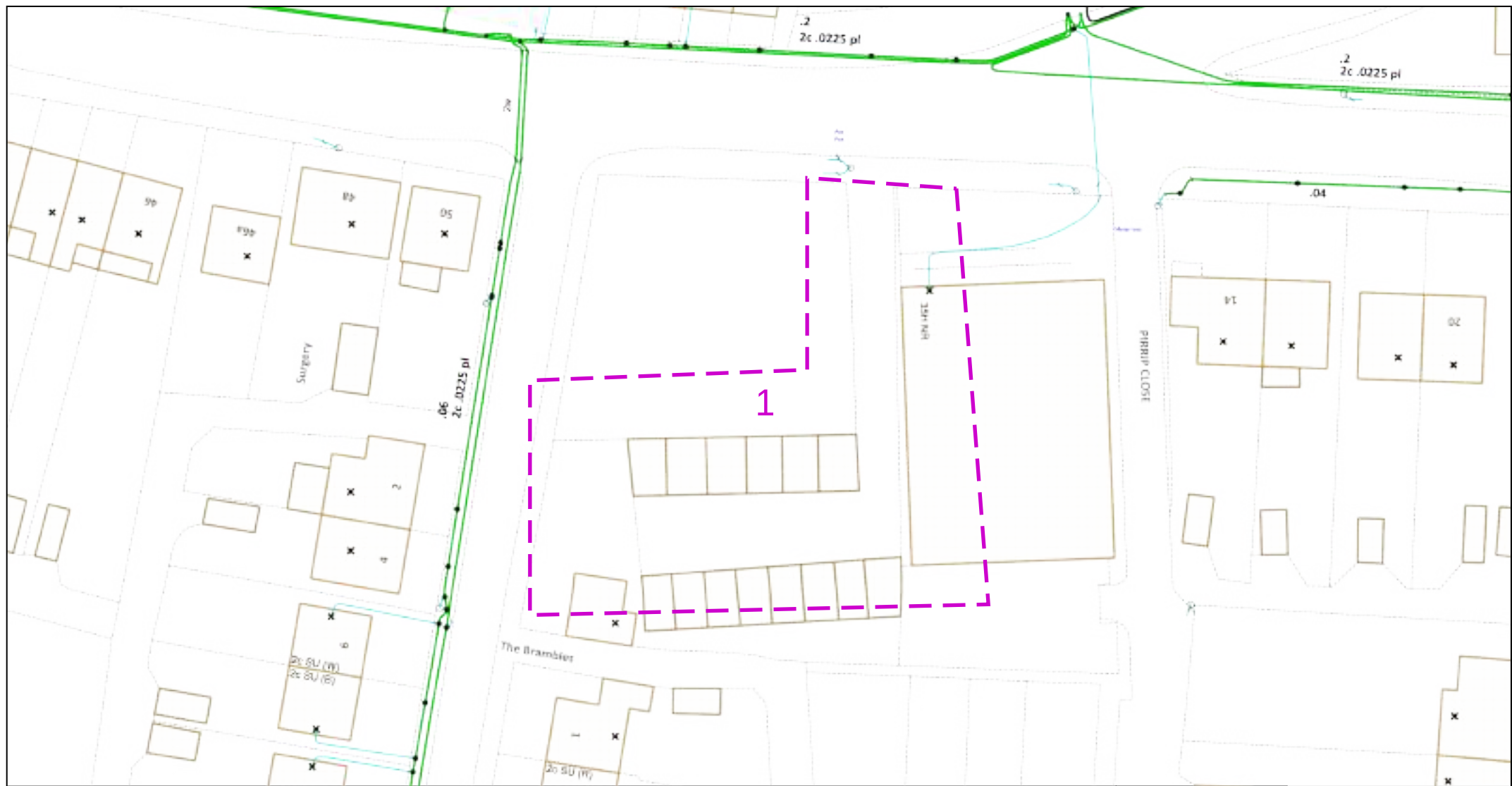
Map Reference : (centre) TQ6693873006

Easting/Northing : (centre) 566938,173006

Issued : 04/05/2021 10:17:03

Reproduced from the Ordnance Survey map by BT
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WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk



0 12.5 25
metres

Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 04/05/2021

Job Reference: 22012134

Site Location: 566890 172987

Requested by: Miss Alexa Band

Your Scheme/Reference:

STT5362

Scale: 1:500 (When plotted at A4)

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all the cables have been determined.
4. It must be assumed that there is a service cable into each property, lamp column and street sign, etc.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.
8. Please be aware the Low Voltage Overhead power lines are not currently displayed for the Eastern Region via this service, if you require records on the location of these please contact our Plan Provision team directly via plans@ukpowernetworks.co.uk.

1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
5. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.
6. Please Note: The Overview map does not display UK Power Networks electricity network and should not be used for the location of UK Power Networks assets. For detail of the electricity network please view the relevant page as highlighted in the Overview map.



IF IN DOUBT - ASK! PHONE
0800 056 5866
EMERGENCY - If you damage a
cable or line
Phone 0800 783 8838 (24hrs)
URGENTLY



ALWAYS LOOK UP
BEFORE
YOU START WORK
Refer to HSE Guidance
note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

UK Power Networks Feedback Tool

Please help UK Power Networks improve the accuracy of their network records and help make it safer for all those working around them in future.

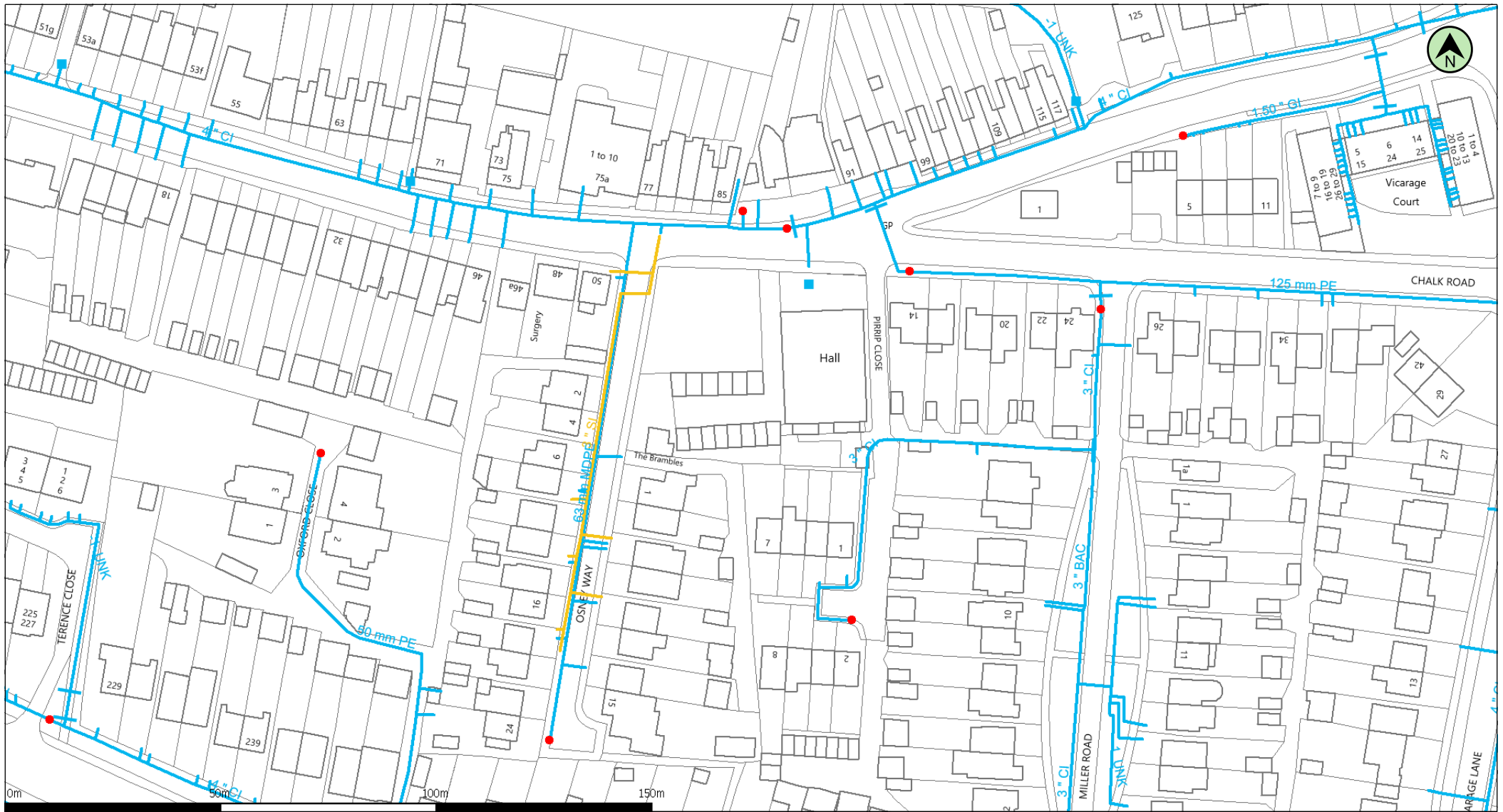
All you need to do is:

1. Use your phone camera to scan the QR code:
2. Provide feedback on what you have found on site (good or bad)
3. Upload a photo if needed



Thank you for making the area a safer place to dig.

UK Power Networks, working with LSBUD

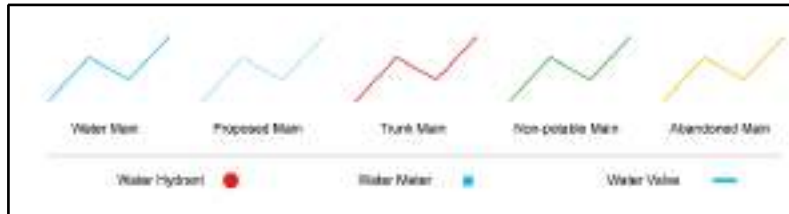


(c) Crown copyright and database rights 2021 Ordnance Survey 100031673 Date: 04/05/21 Scale: 1:1250 Map Centre: 566938,173006 Data updated: 19/04/21 Our Ref: 550929 - 1 Clean Water Plan A4

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2021 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



alex.band@soiltechnics.net

STT5362

for avoidance only, not for commercial use.





MACC International Ltd, Camilla Court, Nacton, Ipswich, Suffolk, IP10 0EU, UK

Alexa Band
Receptionist
Soiltechnics Ltd

Your Reference:

Our Reference: JM/3536/673

Email 1st Instance: Alexa.Band@soiltechnics.net

Date: 06/05/2021

Unexploded Ordnance Preliminary Risk Review
Lower Higham Road, Gravesend, DA12 2ND

MACC International Ltd (MACC) has conducted a preliminary risk review for the site footprint. The review has drawn on open source and in-house information, references have been provided where available (See Annex A).

The review has been conducted to provide Soiltechnics Limited with a review of the risk which may be posed by UXO while conducting investigations on the site.

This document has been produced in the United Kingdom by MACC International Limited and has been provided solely as an aid in decision making. It is not intended to be used by any person for any purpose other than that specified. Any liability arising out of use by a third party of this document for purposes not wholly connected with the above shall be the responsibility of that party, who shall indemnify MACC International Limited against all claims, costs, damages and losses arising out of such use.

Records were found to confirm that the surrounding area was subjected to high explosive bombing attacks during WWII. Post war mapping identifies a ruin (believed to be wartime bombing damage) immediately north of the site footprint. Whilst considering the history of the site and the level of post-war development, the following conclusions have been reached:

It is considered that there is a credible likelihood of encountering UXO on the plot.
Consequently, the UXO risk is considered to be Medium within the site boundary.

It is recommended that a Detailed UXO Risk Assessment is conducted to more accurately define the risk levels within the site footprint. Alternatively, the stated preliminary risk level is accepted and the following mitigation procedures are implemented:

1. All site personnel are provided with a UXO Safety Awareness Talk before intrusive works are commenced.
2. All intrusive investigations into post war un-worked ground should be supported by specialist EOD services.

I trust this document has provided you with sufficient information to meet your immediate needs, should you require anything further, please do not hesitate to contact me.

Yours Sincerely

John Morrison
Operations Manager

Unexploded Ordnance Preliminary Risk Review

Site location 	Site Address: Lower Higham Road, Gravesend, DA12 2ND Grid Reference: 566937, 173007 
Scope of Intended works	Preliminary review of the risk that may be posed by UXO to geotechnical investigations.
History	Wartime Use: The site footprint was undeveloped land within a residential area during WWII. Post War Development: The majority of the site footprint has undergone some level of post-war development.
Wartime History	Enemy Bombing: RAF Gravesend was located approximately 600m south of the site. The airfield was a likely bombing target and records indicate that it was bombed on at least one occasion. Records indicate at least one HE bomb strike at Rose Avenue approximately 450m north-west of the site, and incendiary bombs fell in the Westcourt area to the south-west of the site. Post war mapping indicates a ruin, assumed to be bombing damage, immediately north of the site footprint. Heavy-Aircraft Guns: No guns were recorded to have been positioned on site. The nearest Heavy Anti-Aircraft Gun Site was located approximately 1km north of the site footprint. Military Use: RAF Gravesend (Active 1932-1956) was located approximately 600m south of the site boundary. However, no records were found to indicate military use within the site footprint.
Unexploded Ordnance (UXO) Finds	No records were found to confirm a UXO find within the site footprint.

Envirocheck[®] Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:

279078967_1_1

Customer Reference:

STT5362

National Grid Reference:

566930, 173010

Slice:

A

Site Area (Ha):

0.06

Search Buffer (m):

1000

Site Details:

Lower Higham Road, Gravesend

Client Details:

Ms S Ltd
Soiltechnics
Cedar Barn
White Lodge
Walgrave
Northampton
NN6 9PY

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).	
Mining and Natural Cavities Data	1
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.	
Historical Land Use Information (1:2,500)	-
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.	
Historical Land Use Information (1:10,000)	2
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.	
Ground Stability Data (1:50,000)	3
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.	
Historical Map List	4
The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.	
Data Currency	5
Data Suppliers	6
Useful Contacts	7

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The brine subsidence data relating to the Droitwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

The Mining Instability data was obtained on licence from Ove Arup & Partners Limited (for further information, contact mining.review@arup.com). No reproduction or further use of such Data is to be made without the prior written consent of Ove Arup & Partners Limited. The supplied Mining Instability data is derived from publicly available records and other third party sources and neither Ove Arup & Partners nor Landmark warrant the accuracy or completeness of such information or data.

Report Version v53.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites	pg 1				1
Coal Mining Affected Areas			n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 1	Yes		n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)				n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts					
Disturbed Ground					
General Quarrying					
Heap, unknown constituents					
Mineral Railway					
Mining & quarrying general					
Mining of coal & lignite					
Quarrying of sand & clay, operation of sand & gravel pits	pg 2			1	2
Former Marshes					
Potentially Infilled Land (Non-Water)	pg 2			1	2
Potentially Infilled Land (Water)	pg 2			1	
Ground Stability Data (1:50,000)					
CBSCB Compensation District			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 3	Yes		n/a	n/a
Salt Mining Related Features					

Report Version v53.0

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	BGS Recorded Mineral Sites Site Name: Chalk Chalk Pit Location: Chalk, Gravesend, Kent Source: British Geological Survey, National Geoscience Information Service Reference: 131055 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Cretaceous Geology: White Chalk Subgroup Commodity: Chalk Positional Accuracy: Located by supplier to within 10m	A12SW (W)	909	1	566068 172684
	Coal Mining Affected Areas In an area which may not be affected by coal mining				
	Non Coal Mining Areas of Great Britain Risk: Rare Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1909	A13SW (SW)	326	-	566728 172734
3	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1909 - 1946	A7NE (SW)	597	-	566449 172632
4	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1898	A7NW (W)	914	-	566070 172663
5	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1982	A13SW (SW)	326	-	566728 172734
6	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1946	A7NE (SW)	596	-	566450 172631
7	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1982	A7NW (W)	905	-	566077 172670
8	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1923	A18SW (NW)	387	-	566777 173388

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	CBSCB Compensation District The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
9	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015
10	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	238	1	567132 172851
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015
11	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015
12	Potential for Ground Dissolution Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	37	1	566881 173003
13	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	143	1	566778 172999
14	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015
15	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	238	1	567132 172851
	Potential for Landslide Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	37	1	566881 173003
16	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015
17	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	238	1	567132 172851
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	37	1	566881 173003
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (NW)	0	1	566935 173015

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Kent	010_07	1874
Kent	010_11	1874
Kent	010_12	1882
Kent	010_11	1896
Kent	010_12	1896
Kent	010_07	1897
Kent	010_07	1909
Kent	010_11	1909
Kent	010_12	1909
Kent	010_07	1936
Kent	010_11	1936
Kent	010_12	1936
Ordnance Survey Plan	TQ6772	1963
Ordnance Survey Plan	TQ6773	1964

The following mapping has been analysed for Historical Land Use Information (1:10,000):

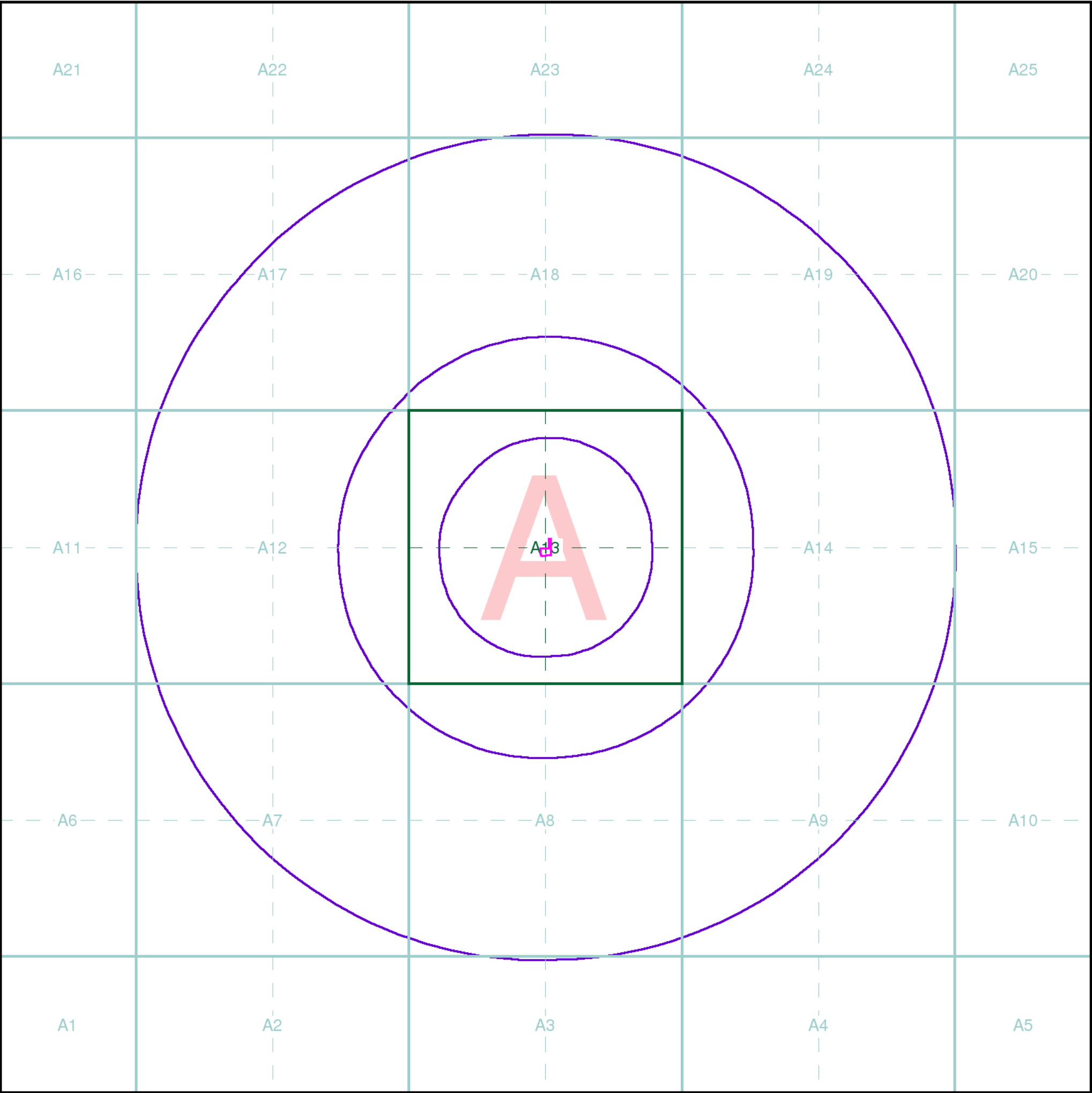
1:10,560	Mapsheet	Published Date
Kent	010_00	1869
Essex	089_00	1872
Kent	010_SE	1898
Kent	010_NE	1899
Essex	089_NW	1899
Kent	010_NE	1909
Kent	010_SE	1909
Essex	095_SE	1923
Essex	096_SW	1923
Kent	010_NE	1938
Essex	095_SE	1938
Kent	010_SE	1946
Ordnance Survey Plan	TQ67SE	1961
1:10,000	Mapsheet	Published Date
Ordnance Survey Plan	TQ67SE	1982

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	November 2020	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Man Made Mining Cavities Stantec UK Ltd	November 2020	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Stantec UK Ltd	November 2020	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Historical Land Use Information (1:2,500)	Version	Update Cycle
Subterranean Features Landmark Information Group Limited	February 2020	Bi-Annually
Ground Stability Data (1:50,000)	Version	Update Cycle
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Brine Subsidence Solution Area Johnson Poole & Bloomer	December 2020	Annual Rolling Update

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	 British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
The Coal Authority	 The Coal Authority
Ove Arup	
Stantec UK Ltd	 Stantec
Wardell Armstrong	 wardell armstrong your earth our world
Johnson Poole & Bloomer	

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	Ove Arup & Partners Central Square, Forth Street, Newcastle upon Tyne, Tyne and Wear, NE1 3PL	Telephone: 0191 261 6080 Fax: 0191 261 7879
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details
Ms S Ltd, Soiltechnics, Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Order Details
Order Number: 279078967_1_1
Customer Ref: STT5362
National Grid Reference: 566930, 173010
Site Area (Ha): 0.06
Search Buffer (m): 1000

Site Details
Lower Higham Road, Gravesend

Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>

566800

566800

567000

567200

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Historical Land Use Information (1:2,500)

General

Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

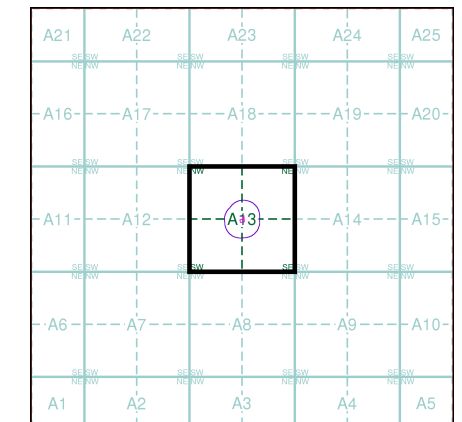
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	■
Extractive Industries Activity from 1893 - 1915	▲	—	■
Extractive Industries Activity from 1906 - 1937	▲	—	■
Extractive Industries Activity from 1924 - 1949	▲	—	■
Extractive Industries Activity from 1950 - 1980	▲	—	■

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	---	■

Mining and Ground Stability - Segment A13



Order Details

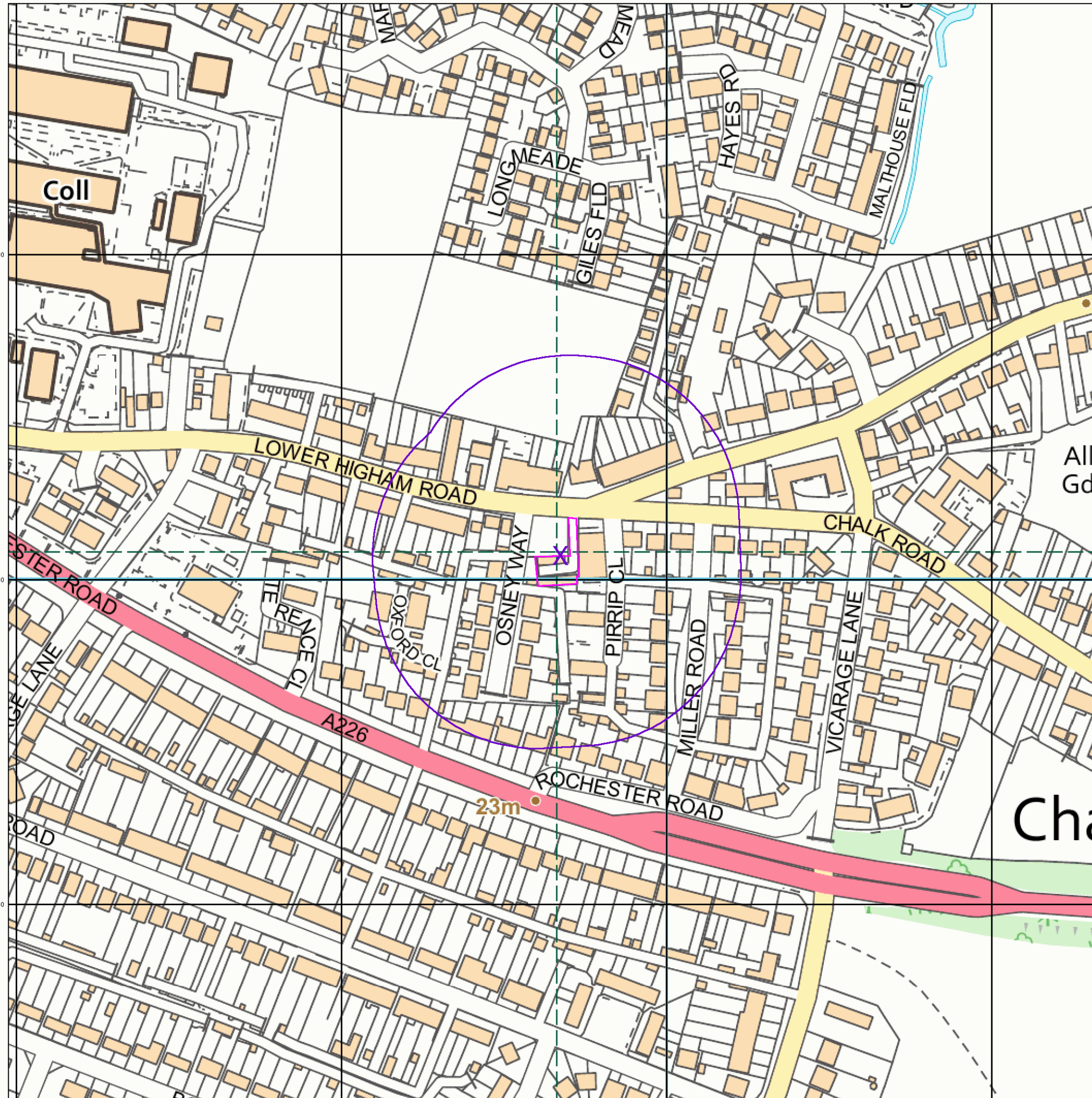
Order Number: 279078967_1_1
Customer Ref: STT5362
National Grid Reference: 566930, 173010
Slice: A
Site Area (Ha): 0.06
Plot Buffer (m): 100

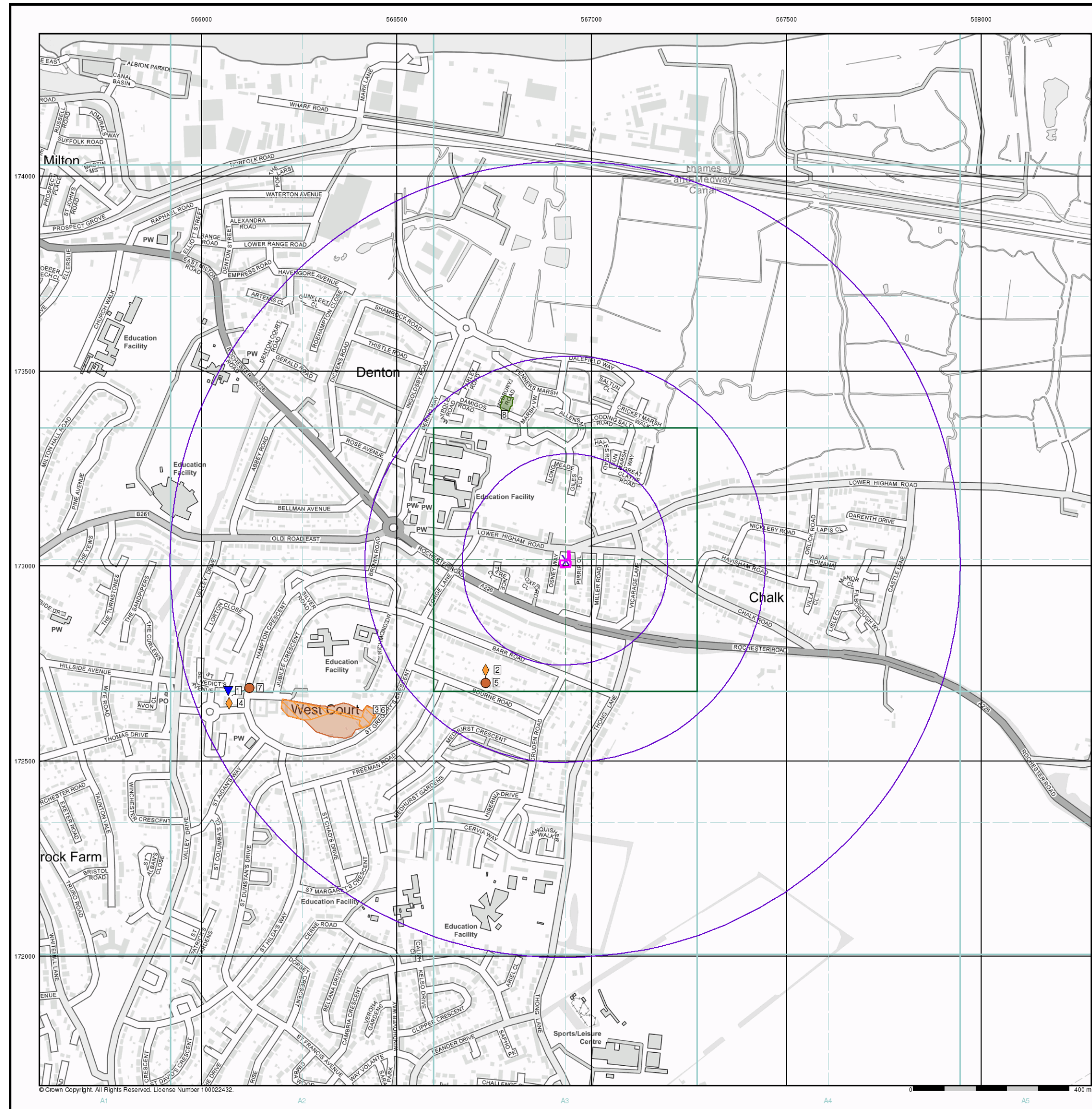
Site Details

Lower Higham Road, Gravesend

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk





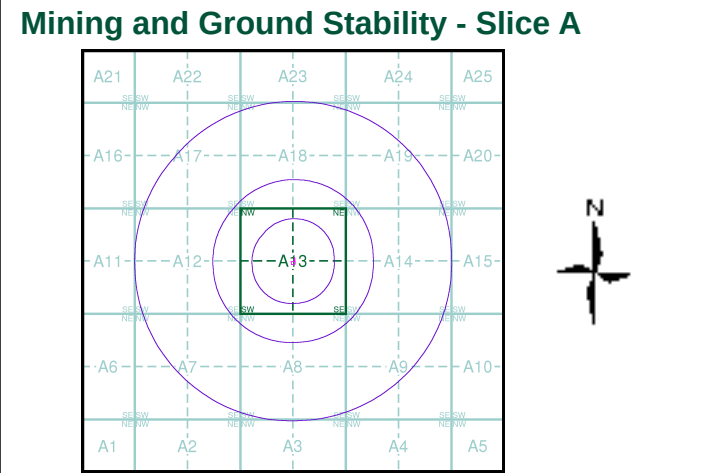
Historical Land Use Information (1:10,000)

General
Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)
Air Shafts
Disturbed Ground
General Quarrying
Heap, unknown constituents
Mineral Railway
Mining and Quarrying General
Mining of Coal & Lignite
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits

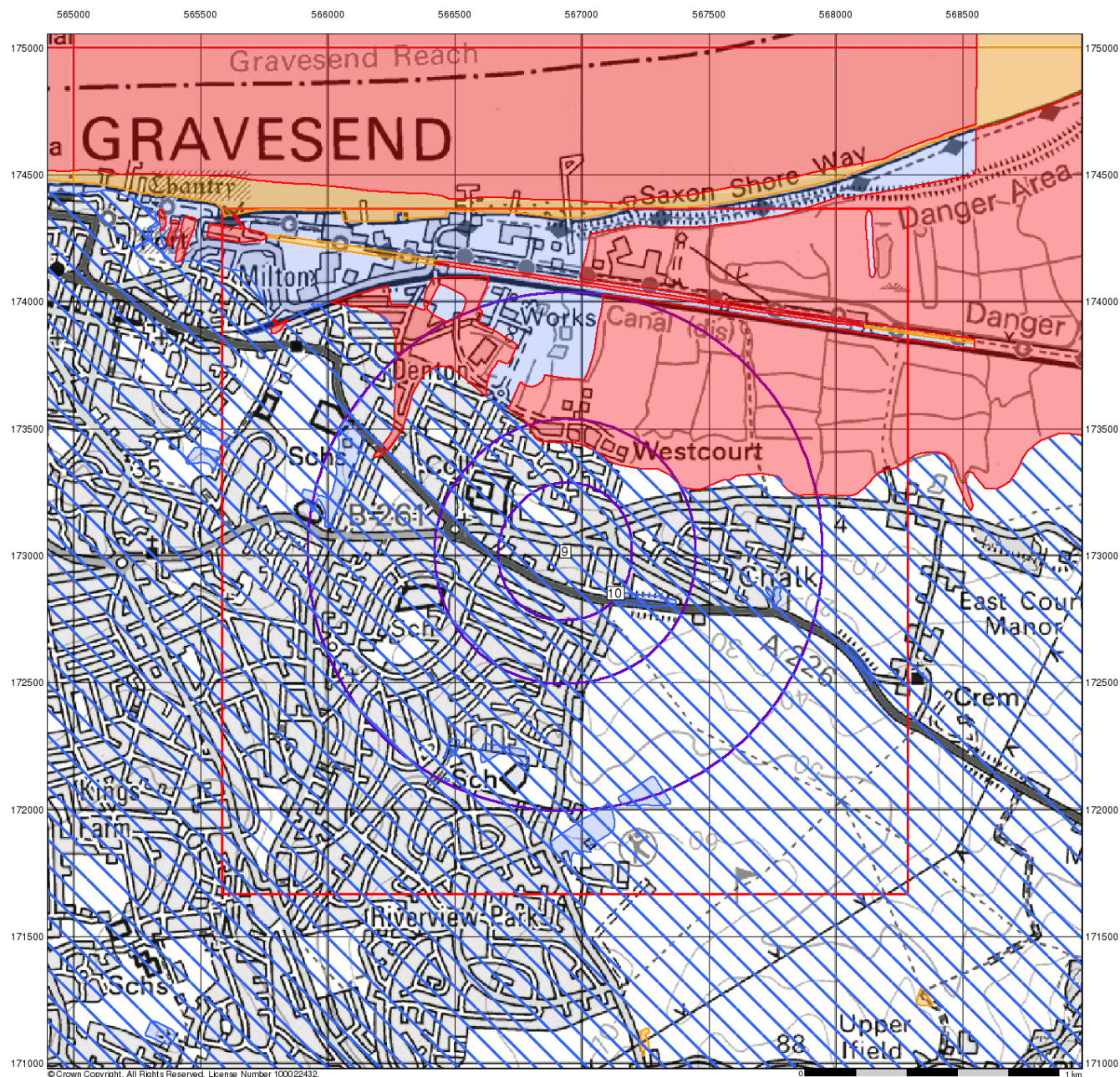
Historical Land Use
Potentially Infilled Land (Non-Water)
Potentially Infilled Land (Water)
Former Marsh

Mining Data
Potential Mining Area
BGS Recorded Mineral Site



Order Details

Order Number: 279078967_1_1
Customer Ref: STT5362
National Grid Reference: 566930, 173010
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000



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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Potential for Compressible Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

Potential for Collapsible Ground Stability Hazards

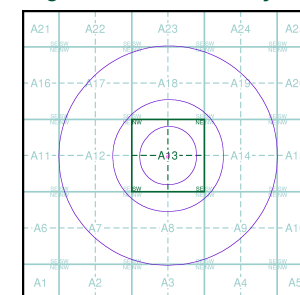
- High
- Moderate
- Low
- Very Low

Brine Pumping and Salt Mining

- Brine Pumping Related Feature
- Salt Mining Related Feature

- Point
- Polygon

Mining and Ground Stability - Slice A



Order Details

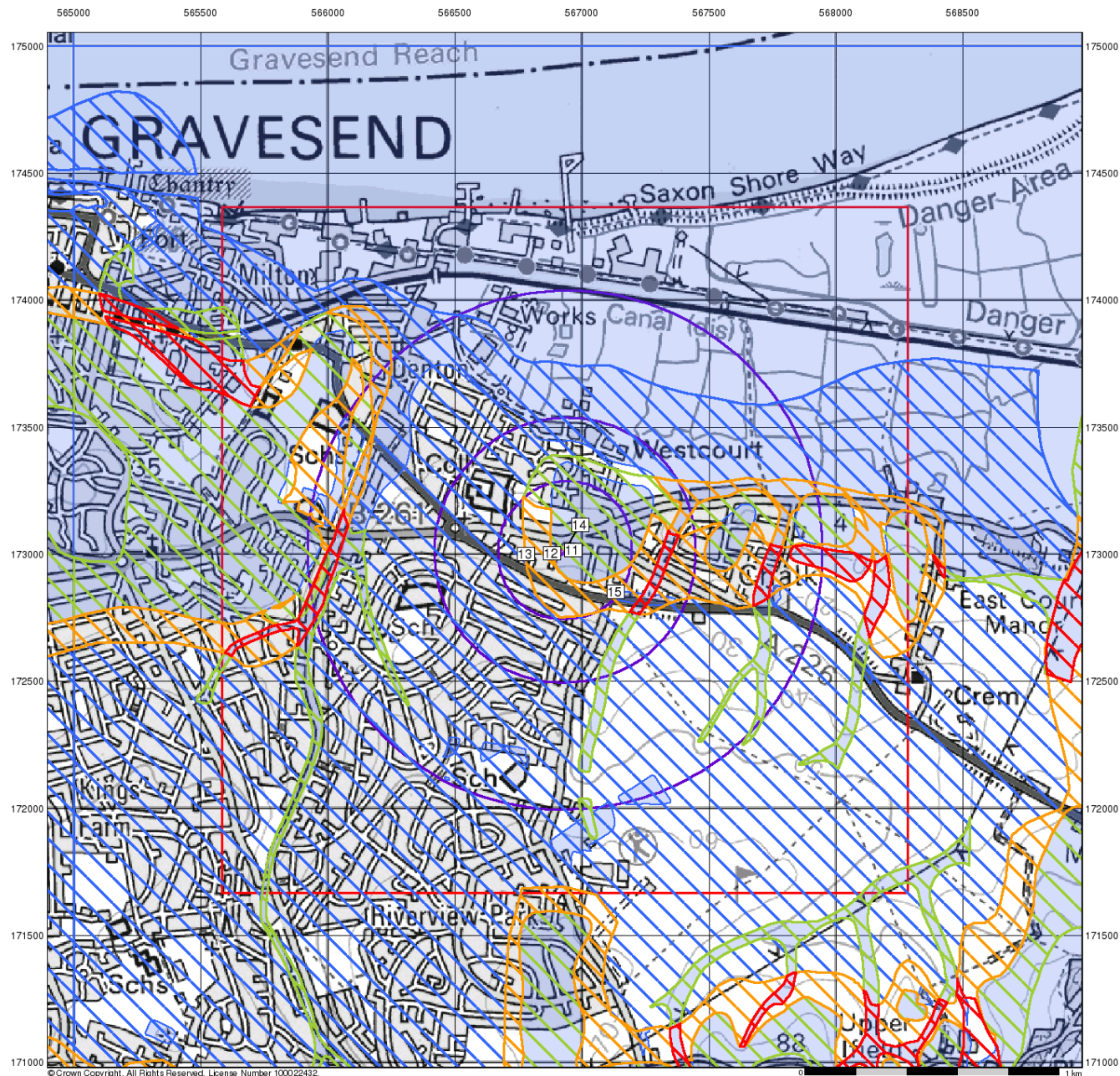
Order Number: 279078967_1_1
 Customer Ref: STT5362
 National Grid Reference: 566930, 173010
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

Lower Higham Road, Gravesend

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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

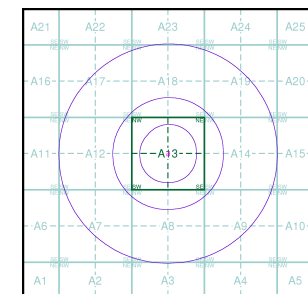
Potential for Landslide Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

Potential for Ground Dissolution Stability Hazards

- High
- Moderate
- Low
- Very Low

Mining and Ground Stability - Slice A



Order Details

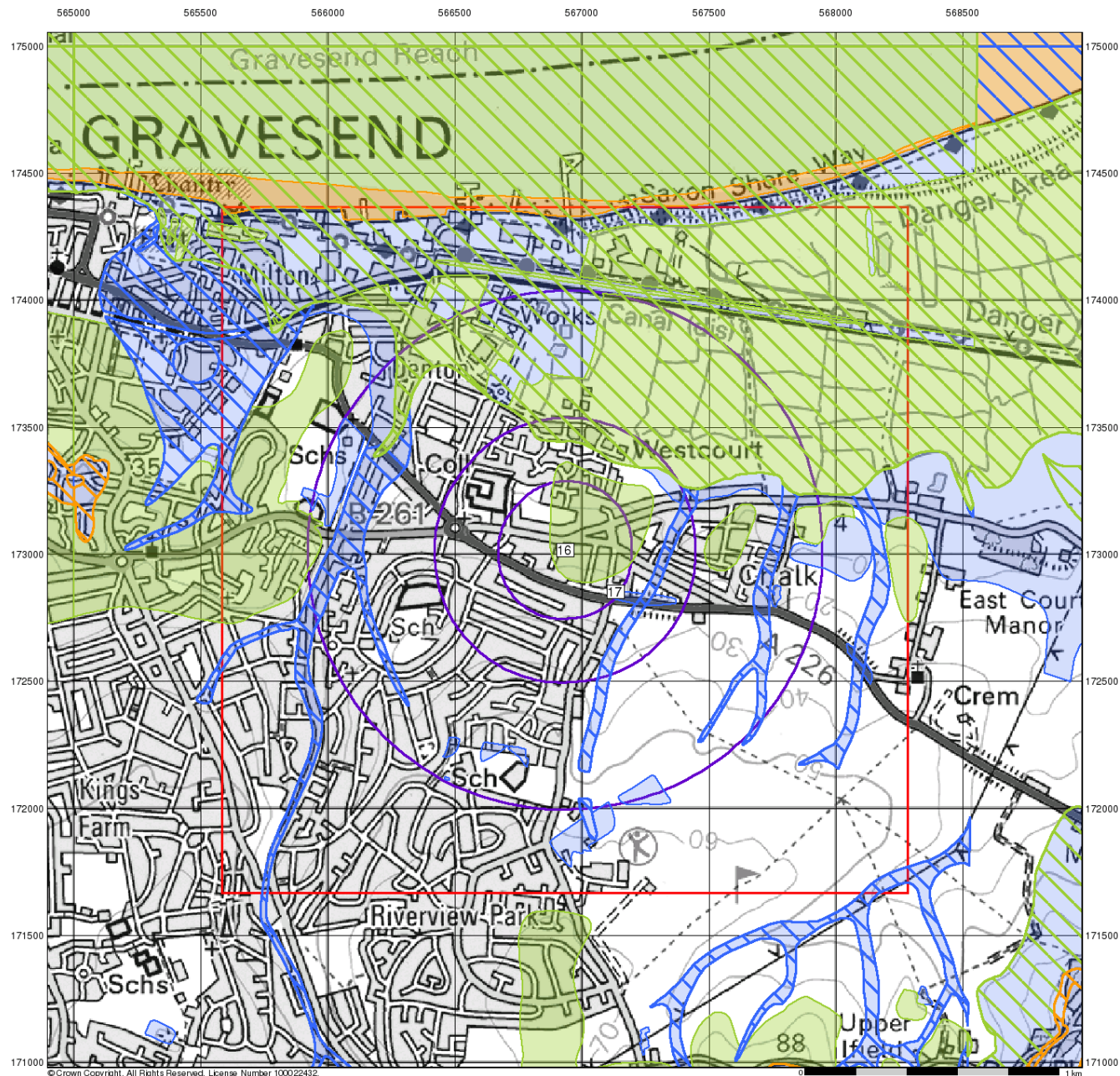
Order Number: 279078967_1_1
 Customer Ref: STT5362
 National Grid Reference: 566930, 173010
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

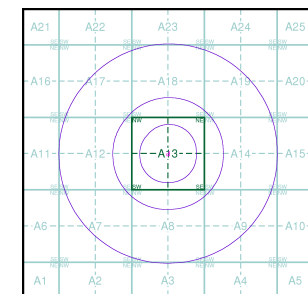
Potential for Running Sand Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

Mining and Ground Stability - Slice A



Order Details

Order Number: 279078967_1_1
 Customer Ref: STT5362
 National Grid Reference: 566930, 173010
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

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Appendix A.9 – Indicative Foul Drainage Layout Plan



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GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS' DRAWINGS AND THE SPECIFICATION.
2. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, EUROPEAN NORMS, CODES OF PRACTICE AND BUILDING PRACTICE.
3. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING THE WORKS ON SITE. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
4. INFILTRATION FEATURES WILL BE SUBJECT TO SITE SPECIFIC INFILTRATION TESTING AND TRIAL HOLES.
5. ALL DRAINAGE SYSTEMS WILL NEED TO BE INSTALLED AND DESIGNED FOR SUITABLE LOADING REQUIREMENTS.
6. THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL AND ALL NECESSARY LICENCES FROM THE HIGHWAY AUTHORITY AND/OR SEWERAGE UNDERTAKER BEFORE CARRYING OUT ANY WORKS.

KEY:

- 1:225 1:500 EXISTING FOUL WATER SEWER
EXCL. XX.XX EXCL. XX.XX EXISTING FOUL WATER CHAMBER
1:100 1:500 FOUL WATER DRAIN
CL. XX.XX PL. XX.XX FOUL WATER PPIC



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Unit D
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London
SE1 3QB

Rev	Description	Author	Checked	Date
P3	Updated drawing after layout changes	JK	SMB	28/10/21
P2	Updated drawing after clients comment	JK	SB	18/12/20
P1	First issue	JK	SB	20/02/20

CLIENT

DRATFORD GARAGES LIMITED

PROJECT

SWMS - LOWER HIGHAM ROAD, CHALK, GRAVESHAM

SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:100	2914	JK	SMB

DWG REF	DWG No.
INDICATIVE DRAINAGE LAYOUT	HC-2914-501

SCALE 1 : 100 @ A1
1 m 0 10 m