

**Desk Study, Preliminary
Site Investigation & Risk
Assessment Report**

Project Name: Roundwood

Location: Back Lane, Great Ashby,
Hertfordshire

Client: Croudace Homes

Project ID: JN1631

Report Date: 11 January 2022

SUMMARY

The site in Great Ashby, Hertfordshire, which extends to 10.82ha, comprises arable farmland. It is proposed to redevelop the site with residential properties.

Geological records indicate the site to be underlain by Clay-with-flints formation (Unproductive Strata) and Lowestoft Formation (a Secondary Undifferentiated Aquifer), over Lewes Nodular Chalk (Principal Aquifer). The site is in a zone of moderate chalk dissolution stability hazard. The site is also located in a SPZ III (Total Catchment).

A desk study was carried out and indicates that the site has a history of agricultural use since at least 1882. No significant sources of contamination have been identified on or off-site.

An Unexploded Ordnance (UXO) risk assessment was not included in our brief.

A single phase of intrusive investigation was carried out, comprising eight JCB excavated trial pits, with some soakage testing.

The soils encountered comprised a covering of topsoil (gl-0.3/0.45) over sandy gravelly Clay (-3m+).

Groundwater was not encountered during the investigation.

Reinforced spread foundations are viable for this site. Reinforcement may need to be upgraded to address local loss of support - beams. On balance, an allowable bearing capacity of 125kPa is recommended. NHBC High Volume Change Potential precautions will apply.

The sulphate content of the fill and natural soil analysed was found to fall within Class DS-1. The ACEC classification for the site is AC-1

No significant groundwater conditions requiring de-watering of excavations are anticipated

Suspended floor slabs are advised particularly in areas with densely vegetated surroundings.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

No significant contamination was reported in the soils analysed, which concurs with the site history and observations made during the investigation. Some additional screening for Pendmethalin is, however, recommended to confirm the low concentrations reported to date.

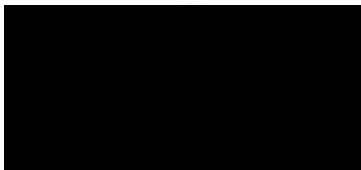
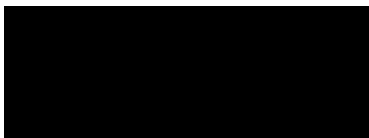
The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

As with any site, areas of contamination not identified during investigation works may come to light during the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site. The presence of contamination may affect the classification of waste soils, or the potential for their re-use.

A formal remediation strategy and verification plan may need to be agreed with the regulatory authorities prior to commencement of any remedial works. This will likely be restricted to implementation of a discovery strategy.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Croudace Homes Limited and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Author	O J DE JONG BSc MSc FGS	
Check / Review	Joe Kelly BSc PhD DIC	

For and on behalf of Southern Testing Laboratories Limited

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in two project order forms completed by Richard Kelly of Croudace Strategic Limited. Dated 5th November 2021 ref. Q211779 Phase 1 and Q211779 Phase 2.

2 Location

The site is located to the north-west of Great Ashby, a district connected to the greater Stevenage urban area in Hertfordshire. The site is approximately 4km from Stevenage town centre. The approximate National Grid Reference of the site is TL 25150 27700. The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to develop the site with housing. Ground loadings have not been given.

For the purposes of the contamination risk assessment, the proposed development land use is classified as Residential with consumption of Homegrown Produce CLEA Model Ref [1] / C4SL Report Ref [2].

The gas sensitivity of the proposed development is therefore rated as High CIRIA C665 Ref [3].

4 Object

This is a Phase 1 Desk Study and Walkover and Phase II geotechnical and contamination (risk estimation and evaluation) investigation (Tier 1).

This investigation follows from a previous investigation carried out on the site (ref. JN0624 – dated 2014) to provide up-to-date information on the site conditions and improve trial hole coverage.

5 Scope

This report presents our desk study findings, exploratory hole logs and test results and our interpretation of these data. Reference is also made to our previous intrusive investigation on site (JN0624 – dated 2014), in particular.

A UXO risk assessment was not requested within our brief for the investigation.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The ground/site investigation has been completed with reference to BS 5930 Ref [4] and BS 10175 Ref [5].

Waste Classification of soils has not been included within the brief for the investigation.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Croudace Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources.

- Online Geological Maps Ref [6] & Ref [7]
- Online Hydrogeological Maps Ref [8]
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- BGS Online Historical Borehole Records Ref [9]
- Environment Agency / Gov.UK Website Flood Risk Ref [10]
- UK Radon Ref [11] and BRE Radon Ref [12]
- Google Earth (for old aerial photographs)

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendix F and G, a summary of the salient features is included in the following sections of this report.

6.1 Geology

The British Geological Survey Map No 221 (Hitchin) indicates that the site geology consists of Clay-with-Flints Formation and Lowestoft Formation over Lewes Nodular Chalk Formation.

6.1.1 Clay-with-Flints Formation

A residual deposit formed from the dissolution, decalcification and cryoturbation of bedrock strata of the Chalk Group and Palaeogene formations and, in the extreme west of the outcrop, the Upper Greensand Formation. It is unbedded and heterogenous. The dominant lithology is orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint. Angular flints are derived from the Chalk, and rounded flints, sand and clay from Palaeogene formations. There is commonly a discontinuous basal layer up to 10 cm thick, with dark brown to black matrix, stiff, waxy and fissured, with relatively fresh flint nodules stained black or dark green with manganese or glauconite. The deposit locally includes bodies of yellow fine- to medium- grained sand, reddish brown clayey silt, and sandy clay with beds of well-rounded flint pebbles, derived from Palaeogene formations.

6.1.2 Lowestoft Formation

The Lowestoft Formation forms an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.

6.1.3 Lewes Nodular Chalk

Composed of hard to very hard nodular chalks and hardgrounds (which resist scratching by finger-nail), with interbedded soft to medium hard chalks (some grainy) and marls; some griotte chalks. The softer chalks become more abundant towards the top. Nodular chalks are typically lumpy and iron-stained (usually marking sponges).

Brash is rough and flaggy or rubbly, and tends to be dirty. First regular seams of nodular flint, some large, commence near the base and continue throughout.

6.2 Historical Borehole Records

There are no historical borehole records in the British Geological Survey Database [9]. There are several Southern Testing in-house records for the site, however. A summary of these records are presented below.

Depth	Soil Type	Description
GL – 0.20/0.45m	TOPSOIL	TOPSOIL composed of black brown silty CLAY with rootlets and rare fine flint gravel.
– 0.25/2.10m	CLAY	Stiff buff brown silty CLAY with frequent fine to coarse gravel (absent in places).
– 1.50/3.00m	CLAY	Stiff red brown silty fine sandy CLAY with frequent fine to coarse flint gravel.
– 1.70/2.10m	CHALK	Structureless CHALK composed of medium dense, off white sub angular to angular fine to coarse gravel within a silty sandy matrix. CIRIA Grade Dc.

6.3 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Envirocheck report, derived from various generic BGS sources, **which are not considered as site-specific**. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

Data Source	Hazard	Hazard Potential to Site	Remarks
BGS	Potential for Collapsible Ground Stability Hazard	Very Low	
	Potential for Compressible Ground Stability Hazard	No Hazard	
	Potential for Ground Dissolution Stability Hazard	Moderate	
	Potential for Landslide Ground Stability Hazard	Very Low	
	Potential for Running Sand Ground Stability Hazard	Very Low	
	Potential for Swelling or Shrinkage Clay Ground Stability Hazard	Low risk	Possibly higher, given the mapped geology.
	Shallow Mining Hazard	Possible	
	BGS recorded mineral site	Possible	BGS recorded mineral site recorded 92m north-east (opencast for Chalk)
ARUP [Ref [13]]	Mining Instability	N/A	None recorded.
PBA	Natural & Mining Cavities	N/A	None recorded.

6.4 Radon Risk

With reference to the Envirocheck report, UK Radon Ref [11] and BRE Radon Ref [12]. The property is in a lower probability radon area (less than 1% of homes are estimated to be at or above the action level). Guidance: No radon protective measures are necessary in the construction of new dwellings or extensions.

6.5 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

Data		Remarks	Possible Hazard to/from Site (Y/ N)
Aquifer Designation	Superficial Deposits	Secondary Undifferentiated & Unproductive Strata	Y
	Bedrock	Principal Aquifer	Y
Groundwater Vulnerability		Medium Vulnerability – Principal Aquifer Immediately bounding high vulnerability zone	Y
Abstractions	Surface Water	None recorded within 1km.	N
	Groundwater	F & D Allen Well at Manor Farm (for general farming and agriculture) Permit start- 1 st February 1995 369m North-west	N
Source Protection Zones		Total Catchment - SPZ 3	Y
Surface Water Feature		A small pond/lake located 278m to the east	N
Surface Water Flood Risk*		No reported risk of surface water flooding.	N
Groundwater Flood Risk*		Limited potential for groundwater flooding to occur.	Y
Discharge Consents		None recorded within 450m.	N

* These sections are provided for information only, this report does not constitute a formal flood risk assessment and specialist advice should be sought in relation to potential flooding issues.

Hydrogeological Map 14 infers the water table within the deep chalk aquifer is at around 75m AOD, some 70m below site levels.

6.6 Historical Ordnance Survey Maps

Copy extracts of historical Ordnance Survey plans dating from 1881 to 2021 were obtained and are presented in Appendix F. A summary of the salient features is presented below.

1881 (1:2,500) – This record is the first map produced covering the site and shows it to comprise an open field surrounded in all directions by further open land. To the west and north-east are two small wooded area (Round Wood and Parsongreen Wood, respectively). Numerous old chalk pits are referenced regionally and Tilekiln wood is located further off to the north-east.

No significant changes appear on any maps until 1979 (1:10,000) which shows the first series of residential developments of Great Ashby to the south of the site.

2006 (1:10,000) Residential properties in Great Ashby are now located immediately next to the southern boundary.

2021 (1:10,000) Great Ashby residential properties now immediately bound the eastern edge of the site.

6.7 Environmental Databases

Data Source	Distance (m)	Direction	Details	Possible Hazard to Site (Y/N)
Contemporary or Historic Trade Directories (within 250m)	86	SE	Personalised Cardboard cut outs (Printers).	N
Current and Historical Landfills	-	-	None recorded within 1km of the site.	N
Infilled land (non-water)	89	NE	Potentially infilled land – Unknown filled ground (pit, quarry, etc).	N
Infilled land (water)	-	-	None recorded within 300m of the site.	N
Fuel Sites	-	-	None recorded within 1km of the site.	N
Pollution Incidents	-	-	None recorded 1km of the site.	N
IPPC/LAPPC Authorisations	-	-	None recorded within 750m of the site.	N
Hazardous Substances Consents	-	-	None recorded within 1000m of the site.	N
Sensitive Land Uses	0	-	Area of adopted green belt	Y
	0	-	Area of unadopted green belt	Y
	0	-	Nitrate Vulnerable Zone	Y
	26	E	Ancient Woodland – Tilekiln Wood	Y

The environmental databases and historic map search have not highlighted any significant potentially contaminative land-use, either on-site or in the immediate vicinity.

Some old chalk pits were shown on the historic maps, although none with proximity to the site; if these were backfilled, given their size, the amount of time that has elapsed and the mapped geology (Clay soils are anticipated), a credible gas source and pathway are not anticipated.

The site is set within a sensitive area (green belt and woodland) and overlies Principal and Secondary Aquifers. However, it does not pose a significant contamination risk to these, on the basis of the current and former uses, both on site and in the surrounding area.

6.8 UXO Risk Management

The possibility of unexploded ordnance (UXO) being encountered on a site falls within the category of a potentially significant risk and should be addressed as a legal duty under the Construction (Design and Management) Regulations by the Client as early as possible in a project.

The CIRIA publication C681 Ref [14] has been developed to provide a consistent framework for the management of potential risks posed by UXO during site investigation and groundwork phases of construction. The process adopts a tiered approach, divided into four distinct stages; Preliminary risk assessment, Detailed risk assessment, Risk mitigation and Implementation.

The agreed scope of work did not allow for either a preliminary or detailed UXO risk assessment; however, a review of the Zetica Online Risk Assessment maps indicates a low risk for UXO. It should be noted that these maps have been reviewed for information purposes only and should not be perceived as part of a preliminary or detailed UXO risk assessment.

7 Previous Investigations

The site has been subject to three previous investigations comprising a Phase I investigation (ref. DS2287 – March 2008), Boreholes soakage testing (ref. BS375 – February 2010) and a later Phase II Site investigation (ref. JN0624 – October 2014). A summary of the salient features from of these are presented below.

7.1 Phase I – Desk Study (DS2287 – March 2008)

Historical maps indicate the site to have been an agricultural field since at least 1881. The surrounding land was also primarily agricultural land although, by 1979, expansion of Stevenage town had commenced locally. The 2007 OS map showed residential properties directly bordering the site.

As a result of its agricultural history, as a precaution, the preliminary conceptual model indicated potential contamination from heavy metals, pesticides/herbicides and asbestos. However, this risk was considered low.

7.2 Borehole Soakage Testing (BS375 – February 2010)

Borehole soakage tests were completed in three boreholes at depths of 18mBGL. The soils found generally consisted of Boulder Clay & Clay with Flints (-3.60/9.50m) over Lewes Nodular Chalk. The Soakage rates were measured using the constant head method within the underlying chalk. The soakage rates recorded were between 360–450 litres/minute.

7.3 Phase II Investigation (JN0624 – October 2014)

A series of 20No. Trial pits were excavated across the site in September 2014 alongside DCP CBR and laboratory testing. The soils encountered generally comprised topsoil over stiff clays. In three of the pits, the Lewes Nodular Chalk was encountered as shallow as 1.7m. When encountered it was recovered as CIRIA grade Dc with low density chalk lumps recorded.

The sulphate classification of the soils encountered was DC-1/AC-1. An NHBC High Volume Change Potential was determined for the underlying soils. No significant sources of contamination were encountered.

8 Site Walkover Survey

8.1 General Site Description and Boundaries

The site is situated to the north of Great Ashby and comprises a roughly rectangular arable field. Access to the site is located in the north-east. All of the site boundaries are densely vegetated with mature trees and shrubs. Beyond the northern boundary is a public bridleway, a small mature woodland and further arable land; beyond the western boundary is more arable land. Great Ashby village bounds the eastern and southern boundaries.

8.2 Topography and Drainage

The site feels flat underfoot; however, when viewed from afar, a gentle slope can be seen dipping towards the south. Maps infer a spot-height of 144m AOD midway along the eastern boundary, and regionally land falls gently to the south, west and east.

Drainage of surface water appears to be primarily controlled by surface run-off into ditches that line the eastern and southern boundaries. The topsoil on site was very soft and large puddles had formed within the north, despite a lack of significant recent rainfall, suggesting percolation into the underlying soils is negligible.

8.3 Vegetation

The site is used as arable land. All notable vegetation is located around the site boundaries. The dominant tree species identified across the site comprised Oak, Beech and Ash. A formal vegetation survey is required by specialist contractors.

8.4 Buildings and Land Use on Site and Nearby

There are no buildings on-site and it appears to have remained as arable land since at least 1881 when first mapped.