



CORE GEOTECHNICS LIMITED

Geotechnical and Geoenvironmental Engineers

REPORT

SUBJECT PHASE 1 DESK STUDY

**SITE LAND OFF BIDDESTONE LANE, YATTON
KEYNELL**

PROJECT PROPOSED DEVELOPMENT

CLIENT COTSWOLD HOMES LIMITED

INSTRUCTION via Email

REPORT No. 24031

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1. INTRODUCTION

It is proposed to develop a greenfield site located to the east of Biddestone Lane, Yatton Keynell for residential use. Core Geotechnics Limited (CGL) was instructed by Cotswold Homes Limited to carry out a Phase 1 Geo-environmental Desk Study for the site.

The purpose of this study is to: -

- identify past and present site uses within and around the subject site, which could pose a potential risk due to possible ground contamination or ground instability;
- to identify any vulnerable water sources or abstractions within the locality which might be adversely affected by previous contaminative uses identified within the site;
- identify other potential environmental, ecological or human health receptors.
- identify possible pathways and linkages between potential receptors and potential contaminative sources identified from site uses.
- identify existing ground conditions, subsidence or geo-hazards associated with mining or quarrying activity, slope stability problems or issues, and any other geological issues which may affect the proposed re-development.
- make an initial evaluation of any potential hazards, risks and liabilities to the planned development of the site on the basis of the foregoing studies.

The scope of this report is restricted to potential ground contamination and its environmental impact; it does not cover above ground hazards (e.g. asbestos in buildings; overhead services) potential ecological impacts (e.g. newts or bats), botanical risks (e.g. Japanese Knotweed) or structural hazards (e.g. building or boundary wall stability) unless specifically referred to in the text of this report.

This report makes brief reference to flood risk at the subject site but does not constitute a flood risk assessment in accordance with current planning guidance.

To establish past usages of the site and possible indications of contamination or ground instability, this report relies on publicly available historic maps, published geological information and data provided in a Landmark EnviroCheck report and other sources of data as provided by the client.

2. SITE LOCATION AND DESCRIPTION

The site is located on land adjacent to and to the east of Biddestone Lane, Yatton Keynell, Chippenham, SN14 7FG.

The site is centred on National Grid coordinates 386600, 175890.

A walkover survey of the site was carried out on 29th April 2024.

The site of the proposed development is broadly rectangular in plan shape with approximate maximum dimensions of 230m north-west to south-east and 170m south-west to north-east and comprises a single large field covering an overall site area of approximately 4.1Ha. The site is bounded to the north-west by Biddestone Lane. The site is bounded to the north-east by a hedge/tree lined field boundary beyond which are playing fields. The site is further bounded to the south-east and south-west by field boundaries beyond which are agricultural fields.

A Google Earth image of the site dating to June 2023 (site outlined in red) is presented as Plate 1 below:-



Plate 1 Google Earth aerial image of site dating to June 2023 (site outlined in red)

At the time of site inspection, the site was under crop, thought to be winter wheat. Access into the site was via an open section located approximately mid-way along the field boundary with Biddestone Lane. Pedestrian access could also be gained via a stile and public footpath which runs along the north-eastern field boundary.

Lidar survey data (1m digital terrain model) shows that the field is relatively flat lying with a ditch located along the length of the southern and majority of the eastern boundaries of the field. A small depression containing a pond is located centrally toward the southern boundary.



Plate 2 Lidar Digital Terrain Model (1m resolution), site outlined in red

Ordnance Survey data shows that ground levels lie at around 120-125m with a slight fall toward the east and south-eastern corners of the field.

At the time of site walkover, the ground surface was soft and boggy with localised ponding in the north-west, north-east and south-eastern corners of the site. The crop appeared to be in poor health in areas which had been affected by surface water ponding (Photo 1 and 2).



Photo 1 ponding in north-western corner of site adjacent to public footpath



Photo 2 looking northwest along north-eastern field boundary with ponding in north-eastern corner of field and poor crop health resulting from surface water inundation.

The north-eastern field boundary largely comprised hawthorn of around 5m height interspersed with occasional deciduous trees (Photo 2).

The south-eastern field boundary comprised mixed deciduous hedgerow (including hawthorn) and several trees including oak of around 12-15m in height. Several trees along this boundary appeared to be dead. A ditch approximately 0.75-1.0m deep was located along this boundary (Photo 3).



Photo 3 looking north-east along south-eastern boundary field boundary and area of recent surface water ponding

A small pond lies just outside the site boundary in the south-eastern corner of the site and a small pond lies within a wooded copse located centrally within the site toward the southern boundary (Photo 4).



Photo 4 looking north toward pond within small wooded copse within site

The south-western field boundary is mostly defined by a ditch interspersed with hedgerow and occasional ash suffering dieback (Photo 5).



Photo 5 looking north-east along south-western field boundary

The north-western field boundary with Biddestone Lane comprised mixed deciduous hedgerow with a horse chestnut located part way along its length (Photo 6).



Photo 6 looking south-west along north-western field boundary with Biddestone Lane

There was no observed presence of tanks on the site. There were no areas of obvious surface staining or distressed vegetation in the vicinity of the site which could be attributed to former contaminative activity.

There was no observed presence of Japanese Knotweed on the site.

3. PROPOSED DEVELOPMENT

Current proposals are to develop the site for residential housing. A preliminary proposed site layout plan is presented in the Figures section of this report. Details of proposed structural loadings were not known at the time of writing.

4. SITE HISTORY

4.1 Historical Map Review

The history of the site was largely determined from an “Envirocheck” report commissioned from Landmark Information Group. The Envirocheck report incorporates historical Ordnance Survey plans covering the period 1886 to 2024, together with information relating to various geo-environmental databases. Historical map extracts are included as Appendix A. It should be noted that historical mapping provides a snapshot of the site history at the time of survey and so there may be gaps in the record between surveys.

The following review has been predominantly based upon the larger scale maps as these are easier to interpret.

Relevant information obtained from the historical maps is detailed below:

Date	Scale	Summary
1886-87	1:2,500 1:10,560	- The earliest available survey dating to 1886 shows Biddestone Lane in its approximate modern-day alignment. - The boundaries of the field largely coincide with those which exist today albeit with some re-alignment along the north-eastern boundary. - A pond is shown located centrally toward the southern boundary together with a pond located just outside the south-eastern corner and some 20-30m to the north of the north-western corner of the site (as currently). - Small earthwork, presumed to be a quarry located 500m to north-west. - The site is located within a rural area surrounded by fields and located approximately 200m to the south of the village of Yatton Keynell at this time. A smithy and school are shown located some 200m to the north-east.
1900	1:2,500 1:10,560	- Little change shown from earlier survey. - Earthwork now confirmed to be an old quarry.
1921-23	1:2,500 1:10,560	- Little change shown from earlier survey. - Smithy no longer identified as such.
1947-48 Air photo	1:10,560	- Little change from earlier surveys on the site. - What appears to be an airfield is shown located approximately 1 kilometre to the north-west.
1955	1:10,560	- Little change shown on the site. - Limited residential development some 100m to north-east.
1977 1975-76	1:2,500 1:10,000	- Little change shown on the site. - A works is now identified (use unknown) some 150m to the north-east.

Date	Scale	Summary
1981-82	1:10,000	• Little change from earlier survey shown on site. • Airfield now identified as Castle Combe Circuit.
1994	1:2,500	• Little change from earlier survey on the site. • The former works is now identified as a depot. • A village hall, surgery and playing fields are now identified some 300m to the north-east.
1999 Air photo		• Little change from earlier survey shown on the site. • The works /depot appears to have been demolished and replaced with residential housing.
2000-2006	1:10,000	• Little change from earlier surveys on the site. A school has now been constructed to the north-east and the adjacent field to the north east is now identified as a playing field.
2024	1:10,000	• Little further change and site and local environment essentially shown as it exists today.

An internet search revealed that the inferred airfield to the north-west was formerly RAF Castle Combe. The airfield was opened in May 1941 and operated as a practice landing ground associated with nearby RAF Hullavington (home of No. 9 Service Flying Training School). The airfield was operational until October 1948.

4.2 Unexploded Ordnance (UXO)

In general accordance with CIRIA Report C681, a non UXO specialist screening exercise has been carried out for the site. This indicates that there is no former military use at the site and the site and surrounding area is indicated to have a low bombing density (<15 bombs per 1000 acres or less). Given that RAF Castle Combe was utilised for training purposes only, it is likely that there is a low UXO risk for the site. A Zetica UXO Risk map procured for the site is included in Appendix A.

5. GEOLOGY

5.1 Geology

Geological Survey data shows the site to be directly underlain by the Forest Marble Formation (FMF) of Jurassic age. Limestones of the FMF are shown to outcrop close to the western boundary and may underlie the site beneath a shallow clay covering. The FMF is typically described as greenish grey weathering brown and orange-brown, variably calcareous mudstones/clay.

Geological map extracts as provided in an Envirocheck report procured for the site are included as Appendix B. There are no areas of potentially infilled or made ground identified on the map extracts within likely influence zone of the site.

5.2 Mining, Extraction & Natural Cavities

The Envirocheck report indicates that the site does not lie in an area which may be affected by coal mining activity. There is inconclusive evidence of rock mining in the area and an adit entry to a stone mine associated with the Inferior Oolite is referenced some 462m to the north-west.

The report indicates low through very low to no hazard with regard to collapsible ground, compressible ground, dissolution, landslide, shrinking or swelling clay and running sand ground stability hazards. Given that clays of the FMF are thought to underlie the site at shallow depth a moderate risk of shrinking or swelling clays is considered more appropriate.

5.3 Radon

It is reported that the site appears to fall within a one kilometre grid square where <1% of homes are estimated to be above the radon action level. The Envirocheck report indicates that no radon gas protection measures are necessary in the construction of new dwellings or extensions.

5.4 Ground Workings

There is one recorded BGS mineral site located within 500m of the site. The site is located 489m to the north-west where underground working of the Combe Down Oolite (Inferior Oolite) took place.

5.5 Historical Ground Investigation Records

A search of British Geological Survey Records and our own database revealed no useful data in close proximity to the site.

6. ENVIRONMENTAL DATA

The Envirocheck report presents environmental data for the site and surrounding area and is included as Appendix C of this report. The pertinent data is summarised below.

Industrial Site holding Licences and/or Authorisations

There are no LAPPC, IPC or IPPC Authorisations referenced within 1000m of the site.

There are no Water Industry Act Referrals or Part A(1) Authorisations within 1000m of the site.

There are no Part A(2) and Part B Activities/Enforcements within 1000m of the site.

There are no hazardous substance sites, consents or enforcements located within 1000m of the site.

There are no sites classified as contaminated land under Part IIA within 1000m of the site.

There are no active Radioactive Substance Licenses located within 1000m of the site.

Landfill and other Waste Sites

There are no referenced historical or BGS recorded landfill sites located within 1000m of the site.

There are no referenced waste management facilities identified within 1000m of the site.

There are no references to potentially infilled land (pit, quarry etc) within 1000m of the site. There is one reference to potentially infilled water (pond, river stream etc) located 635m to the east and dating to mapping of 1955.

Hydrogeology & Hydrology

The solid geology underlying the site is indicated to be a Secondary A Aquifer of high vulnerability.

Source Protection Zone

The site is indicated to lie within a groundwater source protection zone (Zone 2/2a).

Discharge Consents

There is one active discharge consent relating to trade discharges to Doncombe Brook located 342m to the north-west.

Abstraction Licenses

There are no licensed water abstractions noted within 1000m of the site. The nearest abstraction lies 1502m to the north and relates to abstraction of groundwater via single point (borehole) for general agricultural use. There are no public water supply abstractions referenced.

Surface Water Features

The nearest surface water feature is the pond located on the site. The nearest significant water feature appears to be a small section of stream located some 220m to the south-west.

The local topography would suggest a preferential groundwater flow direction to the west.

Substantiated Pollution Incident Register

There are no referenced Substantiated Pollution incidents referenced within 1000m of the site.

There are no references to pollution incidents to controlled water within 1000m of the site.

Flood Risk

The site is not shown to lie within a zone considered to be at risk from flooding or extreme flooding from rivers or sea.

There is an area located within the site, close to the south-western field boundary which is indicated to be susceptible to surface water flooding with a worst case high (30 year) return period. The recent exceptionally rainfall and evidence from the walkover survey suggests that surface water flooding has been more extensive than shown on the plans. A further area at low risk (1000 year return) is shown bordering the site to the north-east.

No significant risk of groundwater flooding at surface is identified.

Designated Environmentally Sensitive Sites

The site is indicated to lie within an area of environmental sensitivity. An area of Outstanding Natural Beauty is however identified to the west of Biddestone Lane.

Surrounding Land Use

There are no active Contemporary Trade Directory entries within 500m of the site.

There are no current or obsolete fuel filling station listed within 1000m of the site.

Consultations

The Local Authority was not separately consulted as part of the review process.

7. DISCUSSION AND CONCLUSIONS

7.1 Environmental Sensitivity Assessment

Introduction

Historical contamination of land may present a risk to human health and the environment. Current UK legislation stipulates that the risk associated with potential land contamination is assessed and remediated, if necessary. Under the Town and Country Planning Act 1947 (as amended), potential land contamination is a "material planning consideration" which means that a planning authority must consider contamination when it prepares development plans or considers individual applications for planning permission.

It is the responsibility of the developer to carry out remediation (where it is required) and satisfy the Local Authority that the remediation has been carried out as agreed. Additionally, Part 2A of the Environmental Protection Act 1990 requires that a significant source-pathway-receptor linkage exists to determine a site as contaminated land. This means that there has to be a contaminant present, a receptor that could be harmed by this contaminant, and a pathway linking the two.

Part 2A deals with the contamination risk from a site in its current use, however the planning system requires that the proposed use is considered. Where remediation is carried out under the planning system, it should be ensured that the site is in such a condition that it would still not meet the definition of contaminated land under Part 2A.

Preliminary Conceptual Model

A conceptual model is a testable representation of environmental processes on a site and its vicinity. Its purpose is to identify potential contaminants, pathways and receptors with a view to assessing pollutant linkages.

Potential Sources of Contamination

Potential contamination sources can include current and historical activities on the site. A review of the site history has been undertaken to determine historic uses that may have had an impact to potentially result in land contamination.

The desk study has highlighted that the site has remained undeveloped and has changed very little since at least the 1880's and the field appears to principally be used for agriculture. It is therefore considered that the site has a negligible to low risk of potential contaminants from the past and current land use. The principal risks will relate to possible current or former use of pesticides/herbicides, together with unidentified activities.

There are no landfill sites within likely influence zone of the site therefore the risk of ground gas migration from such a source is considered to be negligible.

The site is in the main bounded by agricultural land with playing fields and the village of Yatton Keynell to the north-east. These features indicate a negligible risk for off-site migration of contaminants on to the site.

Potential Pathways of Contamination

The mechanisms or routes by which potential contaminants may be brought into contact with potential receptors may include:

- Movement of infiltrating waters, shallow interflow and groundwater
- Surface runoff following rainfall or spillages
- Inhalation of dust and fibres
- Direct ingestion and/or contact with contaminated soil
- Migration of soil gas

Potential Receptors of Contamination

Potential targets or receptors of contamination associated with the site may include:

- Soils at the site; soils of potentially high leaching potential exist on the site

- Surface water and groundwater; the site is identified as being underlain by a Secondary Aquifer.
- Groundworkers during re-development
- End users of the site
- Utility services
- Users of adjacent sites
- Buildings
- Vegetation

Based on the desk study data the following source, pathway, receptors are identified.

Source	Hazard	Pathway	Receptor
Possible presence of made ground from unknown activities and use of pesticides and herbicides on site.	Toxic effects	Direct contact with contaminated soils or inhalation of vapours	Site ground workers, end users of site

Preliminary Conceptual Model

A qualitative risk assessment has been undertaken based on the findings of the Conceptual Site Model and the potential pollutant linkages that may exist at the site in accordance with Contaminated Land Report (CLR) 11¹. The risks identified are in accordance with the DEFRA and Contaminated Land Report (CLR) 6², site prioritisation and categorisation rating system which is summarised in the table below.

Risk Rating	Description
High Risk	- Contaminants very likely to represent an unacceptable risk to identified targets. - Site probably not suitable for proposed use. - Enforcement action possible. - Urgent action required.
Medium Risk	- Contaminants likely to represent an unacceptable risk to identified targets. - Site probably not suitable for proposed use. - Action required in the medium term.
Low Risk	- Contaminants may be present but unlikely to create unacceptable risk to identified targets. - Site probably suitable for proposed use. - Action unlikely to be needed whilst site remains in current use.
Negligible Risk	- If contamination sources are present they are considered to be minor in nature and extent. - Site suitable for proposed use. - No further action required.

Based on the above terminology, an assessment of the risks posed by the potential pollutant linkages at the site are outlined in the table below which is based on the proposed end use of the site for residential housing. Future site users and construction workers represent a sensitive receptor for potential on-site ground contamination via the identified pathways.

¹ The Environment Agency (2004) Model Procedures for the Management of Land Contamination, CLR 11

² M.J. Carter Associates (1995) Prioritisation and Categorisation Procedure for Sites which may be Contaminated, Department of the Environment, CLR 6

ENVIRONMENTAL HAZARDS		
Potential Environmental Hazards identified at the site from this desk study:		
• Site essentially comprising farmland • Unknown nature of any made ground present from unidentified activities		
ENVIRONMENTAL RISKS		
POTENTIAL PATHWAYS	RISK CATEGORY	COMMENTS
Contamination from on site sources	NEGLIGIBLE TO LOW	Unknown constituents of any potential made ground
Contaminant migration off-site	NEGLIGIBLE TO LOW	Infiltration and groundwater flow. Site underlain by Secondary Aquifer. No likely sources of significant contamination on site
Contamination from off-site sources	NEGLIGIBLE TO LOW	No significant risk identified
Ground gas	NEGLIGIBLE	No significant risk identified. No radon protection necessary
POTENTIAL RECEPTORS	RISK CATEGORY	COMMENTS
Human Health	MEDIUM	Potential inhalation, ingestion & dermal contact to ground workers and future occupiers.
Soils	NEGLIGIBLE TO LOW	Very low permeability clays likely to underlie the site
POTENTIAL RECEPTORS	RISK CATEGORY	COMMENTS
Groundwater	LOW	Secondary Aquifer underlying the site
Surface Water	LOW TO MEDIUM	Ditches bordering site
Buildings & Foundations	MEDIUM	Likely presence of clay soils which could require deepening of foundations in proximity of existing trees/hedgerow. Presence of pyrite/sulphates in soil
Fauna and Flora	NEGLIGIBLE	Majority of vegetation appears healthy.
CURRENT OVERALL RISK		NEGLIGIBLE- LOW

In summary the potential for contamination on site from historic activities is considered to represent a negligible to low risk. In general, the potential for off-site contamination to migrate onto the subject site is considered negligible to low. The risk associated with ground gas migration is considered negligible.

7.2 Preliminary Geotechnical Assessment

Geological mapping suggests that the site is likely to be directly underlain by a weathered profile of the Forest Marble Formation which typically comprises brown mottled light grey and orange brown fissured clays, passing into mudstone at depth. The clays should be underlain by limestone which should be shallowest toward the western boundary of the development area. These deposits are likely to have reasonable to good ground bearing characteristics but the clays are likely to have a shrinkage potential which may require deepened trench fill or potentially piled foundations in close proximity to trees or hedgerows.

Current layout plans show that housing units will be fairly remote from boundary trees/hedgerows and will avoid areas at risk of surface water flooding. The main risks to development will be desiccation relating to any housing units located within likely influence zone of existing hedgerows and trees.

The clay soils are unlikely to have a significant soakaway potential and recourse to a positive drainage solution together with attenuation storage is likely to be required. The underlying limestones could have soakaway potential but depends on the overlying thickness of clay soils which may make this material inaccessible or only suitable for borehole soakaways.

7.3 Recommendations for Phase 2 Investigations

A trial pitting exercise is initially recommended to assess general ground conditions across the site given the lack of identified targets. Soakaway testing is recommended to confirm design assumptions together with California Bearing Ratio tests to inform road pavement design. This work should be accompanied by geotechnical classification testing to determine shrinkage potential (if applicable) together with sulphate analysis for concrete design. More targeted investigation may subsequently be required to assess residual desiccation in relation to any proposed housing units within influence zone of existing trees/hedgerows.

With regard to contamination, potential issues relate to the possibility of made ground from unidentified activities. It is recommended that samples of any made ground together with natural topsoil/subsoil from across the site should be tested for a range of metal and non-

metalloid contaminants together with herbicide and pesticides to confirm assumptions made.

If soil or groundwater contamination above guideline values for residential end use with gardens is subsequently identified, it is likely that some form of remedial treatment will be required. This may take the form of removal of contaminated materials from site to a suitably licensed landfill, in-situ or ex-situ remediation and capping with clean inert topsoil/subsoil in garden areas. Validation of any remedial works will be required.

It is recommended that this report be submitted and ratified by the Local Authority prior to carrying out any Phase 2 physical investigations.

8 GENERAL REMARKS

The comments given in this report and the opinions expressed are largely based on a desk study survey using a number of data sources which CGL believe to be reliable, but cannot guarantee their authenticity and reliability. There may however, be information for the site and its surrounding area that has not been obtained in this study and therefore has not been considered in this report.

Accordingly, a careful watch should be maintained during any future development and the comments of this report reviewed as necessary.

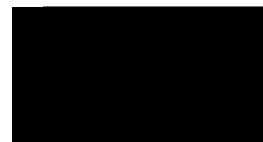
This report has been prepared for the Client and their agents in accordance with the terms and conditions of the appointment of CGL. This report shall not be relied upon or transferred to other parties without the written consent of CGL. Should any information contained within this report be used by any unauthorised third party it is done so at their own risk and shall not be the responsibility of CGL.

The recommendations given in this report should not be used for any other schemes on or adjacent to this site without further reference to this Company.

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FIGURES

