
Phase I Desk Study, Site Reconnaissance & Phase II Site Investigation Report

at Land South of Hanlye
Lane, Cuckfield, Haywards
Heath, RH17 5HN

for Sigma Homes Ltd

Report Reference: LP3210/DSP2

Report Date: 14th March 2023

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EXECUTIVE SUMMARY

The site comprises open fields with mature trees on the northern side and scrubland to the south. It is located to the south of Hanlye Lane, Cuckfield.

Proposals for the site comprise the construction of 55No. one to two and a half storey residential dwellings over the northern half of the site, with the southern section providing public open space.

The site is previously undeveloped although a small structure and a tank were shown on historical maps in the south western corner of the site from 1874 to present.

The site is mapped as being underlain by the Tunbridge Wells Sand Formation in the north eastern corner, the Grinstead Clay over most of the site, and an outcrop of the Cuckfield Stone Bed within parts of the southern half of the site.

In the proposed developable area the investigation confirmed the ground conditions to comprise topsoil to depths of around 0.30 m, but locally 0.70 m, over firm to stiff silty clay deposits. Reworked soils were found in three locations only to a maximum depth of 0.80 m. The silty clays generally extended to between 1.10 m and 1.80 m, although locally deeper and up to +3.0 m. Mudstones, siltstones and locally sandstones were noted below. Softer ground (up to 3.5 m deep) was identified within a surface depression close the central eastern boundary.

In the proposed public open space area to the south, silty clays between 0.60 m to 1.60 m over sandstone (recovered as sand) and siltstone were recorded.

An allowable bearing capacity of 100kPa is recommended for the silty clay and dense sands below about 1.3-1.5 m. However, the clays on site have been classified as MEDIUM VCP and foundations will need to be deepened in accordance with NHBC requirements, where trees are present and to extend beneath shear faces in the clay. Deepening can be terminated on the non-plastic soils at depth.

Further works would be required around the identified soft spot, to determine its full extent and any impacts on nearby foundations.

A preliminary assessment of the foundation type using our carbon calculator indicates that assuming the foundations summarised above are utilised on site then traditional footings would be the less carbon intensive option to depths <1.7 m. Where deepening is required below this depth, piled foundations would be the less carbon intensive option.

Suspended floor slabs are recommended.

Laboratory testing indicates that the soils would be classified by the BRE as sulphate design class DS-I and the ACEC class is AC-I d.

Only one soakaway test was able to be undertaken close to the entrance due to soft ground conditions limiting access to the majority of the site. The results of the test (1.5×10^{-07} m/s) suggests that this part of the site is not suitable for conventional soakaways. Further testing could be undertaken at a later stage to confirm infiltration rates, but based on clay soils soakaways are unlikely to be a viable option for the site.

A preliminary design CBR value of 3% is recommended for the silty clay soils.

The site slopes down towards the south, with an estimated 3° fall where the proposed redevelopment will occur. A more pronounced fall of approximately 6° is present across the southern part of the site. It is recommended that a topographical survey is undertaken together with qualitative assessment on slope stability once final design proposals are known.

No significantly elevated heavy metal or PAH concentrations above assessment criteria for a residential development were recorded and no asbestos was identified. Pesticides and herbicides were also tested and were reported below analytical limits of detection.

It should be noted that some fly-tipped waste was present on the northern part of the site, and there maybe localised contamination beneath these materials. It is recommended that once they are removed limited further testing is undertaken in the area. Likewise around the small historical tank and structure in the south western part of the site limited further testing is recommended to confirm that the soil is not contaminated.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

Recommendations are given for the sustainable reuse on site, where it is not possible to reuse the soils on site or offsite the soils are expected to be classified as non-hazardous waste. Further testing would be recommended to confirm if the soils would be classed as inert waste.

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Countersigned :	 Martin Weil BSc MA C.WEM
	 Richard Brinkworth BEng CEng MICE
Date :	14 March 2023
Revision:	Issue 1

A INTRODUCTION

1 Authority

Leap Environmental Ltd (hereafter referred to as **LEAP**) has been appointed by Sigma Homes Ltd to undertake a Phase I Desk Study, and Phase II intrusive Site Investigation of a site referred to as Land south of Hanlye Lane, Cuckfield, Haywards Heath RH17 5HN (Figure 1, Appendix B). The instruction was given in an email dated 10th January 2023 and signed by Adam Light of Sigma Homes Ltd.

2 Objective

LEAP understands that Sigma Homes proposes to develop the site with 55 No. 1 to 2.5 storey residential dwellings as per the attached layout in Drawing No. 7181-CU-SK02-B, (Figure 2) Appendix B. It is noted that only the northern part of the site is proposed to be developed, with southern section providing public open space.

The proposed development is currently at a preplanning phase and has been assessed in accordance with BS EN 1997¹, as being a Geotechnical Category I structure.

The objectives of this report are to:

- Provide information on the geotechnical and environmental quality of the ground present on the site with respect to the proposed development;
- Assess the potential health and other environmental risks posed by the site to the proposed development and to other specifically identified receptors; and
- Assess the potential for offsite contamination to adversely affect the proposed development.

3 Previous Studies

LEAP has not been made aware of any previous reports pertaining to the site.

A previous investigation by **LEAP** was completed at a site located approximately 85m to the east of the site, referred to as Former Court Meadow School, reference LP2863 for Sigma Homes Ltd, dated 12th April 2022.

¹ BS EN 1997-1(2004)+A1:2013 Eurocode 7:Geotechnical Design: General Rules

4 Scope of Works

This report describes a two-stage process whereby the site is investigated and risks are assessed. The terms geotechnical and geoenvironmental are referred to throughout the report.

Geoenvironmental refers principally to the chemical nature of the ground and the degree of soil, water and/or land gas contamination and the impact that contamination may have on current or future development and also on the wider environment.

Geotechnical refers to all other aspects of the ground conditions and the impact they may have on the physical construction of existing or future development, principally foundations, slope stability, drainage, pavement and road design and groundwater control.

The investigation comprises two phases of work.

4.1 Phase 1 Scope

The first part of this report presents the results of a desk study and site reconnaissance. It provides a review of previous site investigation and remediation validation reports, where they have been made available by the Client or where LEAP has been able to locate that information from third party sources. The previous reports referred to are detailed above. The following publicly accessible sources of information² have also been reviewed:

- British Geological Survey (BGS) 1:50,000 Series Geological Map Sheet 302 'Horsham' Solid and Drift ed. 1972
- BGS Borehole log ref. TQ32NW15 located 174m to the northwest of the site boundary.
- Groundsure.io website accessed on 14/02/23.
- Groundsure database report (reference: GS-9297177)
- Unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica.
- Interrogation of the World Wide Web on 14/02/23 for general information pertaining to the site history.

² The report contains British Geological Survey materials ©UKRI 2019 and public sector information licensed under the Open Government Licence v3.0.

A site reconnaissance was carried out on 23rd January 2023.

The desk study and site reconnaissance have been used to develop an initial conceptual site model, which forms the basis for the site investigation strategy. The initial site conceptual model is used to identify geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In terms of the geo-environmental assessment the conceptual site model is used to identify potential sources of contamination, potential receptors and pathways by which the two may be connected. These are known as possible contaminant linkages and it is these contaminant linkages that are key to contaminated land risk assessment.

The Phase I investigation is also referred to as a Preliminary Investigation³.

4.2 Intrusive Investigation Scope

The Phase II work comprises intrusive investigation, onsite monitoring and laboratory analysis. The results of this and previous investigation reports are used to validate and/or update the initial site conceptual model. This phase of site investigation comprised the following proposed tasks:

- 6 No. 5m deep windowless boreholes drilled with a tracked rig;
- 10 No. 3m deep machine excavated trial pits;
- 6 No. BRE365 soakage tests;
- In-situ geotechnical testing including Standard Penetrometer Tests in the boreholes and field vane tests in the trial pits;
- Geotechnical Laboratory Testing including Atterberg Limit Tests, and Sulphate Tests, and PSD; and
- Chemical Laboratory tests including up to 12 No. LEAP standard soil suite tests, 3 No. pesticide and herbicide screens.

The intrusive works were completed by contractors who have been scrutinised and are on LEAP's approved contractor list. The windowless sampling was carried out by Oakland SI, The machine excavated trial pits were carried out by BPH and supervised by LEAP.

Selected samples of soil were scheduled for laboratory testing for a wide range of potential contaminants including metals, non-metals, polyaromatic and petroleum hydrocarbons,

³ BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites – Code of Practice.

pesticides and asbestos. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex.

Selected soil samples have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford.

The final stage in the geo-environmental assessment comprises a quantitative risk assessment and revision of the preliminary Conceptual Site Model. Preliminary recommendations for remediation have been provided, based on various development assumptions which are detailed in the following section and in the text of this report. The risk assessment has been carried out in accordance with UK industry standards and in particular in accordance with LCRM⁴ and BS10175:2011+A2:2017.

The final stage of the geotechnical assessment is the provision of preliminary soil parameters for use in geotechnical design, and broad recommendations for appropriate foundation options. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in Section 6 of BS EN 1997-2:2007⁵.

5 Sustainability Considerations

5.1 Carbon Reduction

There is an urgent need to optimise redevelopment to significantly reduce the carbon footprint of the process without compromising the requirement for delivering a safe and suitable use of the site. With that in mind, Leap has worked in partnership with the University of Surrey to develop a series of carbon reduction design tools (CReDiT). These provide information on the embodied carbon cost of its report recommendations and encourage the conversation about carbon at an early stage in the design process.

Consideration has been taken throughout the report to align the recommendations with climate protection, circular economy and sustainable materials.

Leap recognises the unique position that it occupies at the very beginning of development projects and the value of informing clients on the carbon cost of design recommendations. As such, headline information from the CReDiT tools will be provided in site investigation reports

⁴ Environment Agency. Land Contamination Risk Management (LCRM), <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

⁵ BS EN 1997 Eurocode 7- Geotechnical Design- Part 2: Ground Investigation and Testing (2007)

without additional cost to the client. This is being done in order to engage furthermore detailed consultation where the full range of Leap's sustainability capabilities can be deployed.

6 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Full details of the limitations are provided in Appendix A.

B PHASE I – DESK STUDY

7 Environmental Setting

7.1 Site Location and Description

The site is located to the south of Hanlye Lane, Cuckfield, Haywards Heath RH17 5HN as shown in Figure 1, Appendix B.

The approximate National Grid Reference of the site is 531096, 125614. The site is moderately rectangular in shape and covers an area of approximately 5.5 Ha.

7.1.1 General Description and Boundaries

The current site layout is shown in Figure 2, Appendix B. A walkover survey was carried out on 23/01/2023 and photographs are included within Appendix C. The Groundsure report is provided as Appendix D.

The site is situated to the northeast of Cuckfield town and comprises an open field with a paddock in the northeast corner. There is a footpath aligned west to east across the central part of the site with access via a metal gate located in the centre of the western boundary. At the time of the walkover survey and intrusive investigation (which were preceded by a week of freezing conditions followed by a rapid thaw) the ground surface close to this access point was muddy and soft underfoot. At the time of the walkover the land was used to keep a number of horses and in the far northeast corner a small fenced area and evidence of hay troughs were noted.

The southern part of site comprises scrubland (dense brambles, shrubs and mature trees). A small rectangular brick feature containing logs was located along the south western boundary and in the south west corner of the site relict brick walls relating to a former structure were present. No visual or olfactory evidence of ground contamination was noted at either feature.

Mature trees line the site boundaries, with more trees through the centre of the site trending east to west and through the northwest quadrant trending north to south. An area used for fly tipping and anecdotally bonfires is located in the northeast quadrant of the site. Fly tipped materials noted included mattresses, laminate flooring, textiles, plastics, concrete and plasterboard were observed in this area. Overhead communications cables were noted aligned north to south along the eastern boundary and a number of manhole covers were noted in the western half of the site, associated with water supply pipes. A manhole cover was also present centrally in the northern half of the site, but it was not possible to discern what service it was related to.

The northern boundary of the site lies at an estimated elevation of between 120m and 125m Above Ordnance Datum (mAOD) whilst the southern boundary ranges between 104 and 110

mAOD. The slope falls approximately 10m from the northern boundary to the central part of the site over 160m (approximately 3.5°). A more pronounced and steeper slope was noted from the central part of the site to the southern boundary, around 10m drop over 90m (approximately 6.3°). A small ground depression was noted centrally on the eastern boundary.

The site is bound by fields to the south and south east, a scouts building and residential housing development to the west, residential housing and a former school to the north east and Hanlye Lane to the north. A small structure, possibly associated with a local scout group is present offsite to the north of the site entrance.

7.2 Geology

The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey sheet EW_320 Horsham, solid and drift edition, the BGS website (www.bgs.ac.uk) and the Groundsure report. The site is mapped as being underlain by Upper Tunbridge Wells Sand in the north east corner, Upper Grinstead Clay across much of northern part of the site and the Cuckfield Stone Bed across the centre and southern areas. The Lower Grinstead Clay is also present to the south of the Cuckfield Stone Bed and the boundary between the two appears to visually follow the slopes and valleys noted during the site walkover. A fault trending west to east is located 250m north of the site.

7.2.1 Upper Tunbridge Wells Sand

The Upper Tunbridge Wells Sand unit comprises a complex succession of interbedded thinly bedded silty mudstones, siltstones, silty sandstones and fine-grained sandstones which are laterally persistent over long distances. Sandstones, which form prominent scarp and dip slope features, are typically fine-grained and quartzose, weathering to a pale yellowish grey or brown colour. In the Cuckfield area, silt is the dominant component. Here, grey and greenish grey silty mudstones and siltstones, red-mottled in part, dominate in the lower part of the unit, whereas pale grey to yellowish grey sandstone mostly appear in the upper part.

7.2.2 Grinstead Clay

Grey to greenish grey mudstones, commonly very silty with subordinate thin beds of siltstone, nodular clay ironstone and shelly limestone. Rootlet horizons and plant-rich beds common. Over part of its outcrop the member is divided by a bed of calcareous sandstone, the Cuckfield Stone Bed, into the informally named lower and upper Grinstead Clay. In places, the Cuckfield Stone Bed cuts out the lower Grinstead Clay entirely and rests on the Ardingly Sandstone Member.

The upper boundary is placed at the up-section conformable change from mudstones (Upper Grinstead Clay unit) up into the silt and sand rhythms of the upper unit of the Tunbridge Wells Sand Formation. The top of the Grinstead Clay unit is commonly red stained, which helps to emphasise the contact.

7.2.3 Cuckfield Stone Bed

Sandstone, fine-grained, calcareous in part, pale yellow brown, fissile and flaggy (Tilgate Stone) with some parts showing trough cross-bedding ("festoon-bedding"), load casts and flute casts. Thin mudstone containing carbonaceous plant debris partings. Rare peletal and ferruginous shelly limestones developed in places towards base of unit.

7.2.4 BGS Boreholes

The online BGS Geoindex (<http://www.bgs.ac.uk/geoindex/>) has been reviewed for detailed local geological and hydrogeological information. 1 No. Boreholes have been identified within 250m of the site. The borehole was undertaken in January 1965.

Borehole ref TQ32NW15, located 174m NW of the site indicates ground conditions comprise Cuckfield Stone to 4.4m bgl over Lower Grinstead Clay to 9m bgl over Lower Tunbridge Wells Sand to 36m bgl over Wadhurst Clay to 105m bgl over Ashdown Beds to end of excavation at 137m bgl. No groundwater was recorded within the borehole.

7.3 Hydrogeology

Table 1: Hydrogeology

Bedrock	Upper Tunbridge Wells	Secondary A- high vulnerability
	Cuckfield Stone Bed	Secondary A- high vulnerability
	Grinstead Clay	Unproductive
Source Protection Zone	None on site	
Licensed Abstractions	None on site	

The hydrogeology of the site has been ascertained from the Groundsure data report. The source of the data is reported to be the Environment Agency groundwater vulnerability mapping.

The bedrock deposits soils which are mapped beneath the site are classified as Secondary A aquifers in the northwest and south of the site and an unproductive aquifer mapped in the centre of the site.

The site is not situated within a Groundwater Source Protection Zone (SPZ). The Groundsure report lists no active abstraction licences within 2000m of the subject site.

7.4 Hydrology

Horsgate Pond lies immediately north east of the site. The Groundsure report lists the nearest surface water feature as an inland river, located 211m to the south of the site. The site is within the catchment of the 'Scrase Bridge Stream' river.

The Groundsure report indicates that there are two discharge consents within 500m of the site, the nearest is 265m south of the site and is for the discharge of final treated effluent into the land from the sewage discharges of Horsgate Farm.

7.5 Flooding

According to the Environment Agency, the site is not located within a flood zone. The highest risk from surface water flooding on site resulting in ponding or flooding is for a 1 in 30 year rainfall event. This appears to relate to the ground depression noted centrally along the eastern boundary.

The risk from groundwater flooding on site is reported as negligible.

7.6 Designated Environmentally Sensitive Sites

A review of designated environmentally sensitive sites presented within the Groundsure report has been carried out. The dataset makes reference to a number of sensitive sites including the following:

- Sites of Special Scientific Interest (SSSI);
- Records of National Nature Reserves (NNR);
- Areas of Special Conservation (SAC);
- Records of Special Protection Areas (SPA);
- Records of Ramsar Sites;
- Records of Local Nature Reserves;
- Ancient Woodland Records.

According to the Groundsure report, 1 No. Designated Ancient Woodland is located on site, which relates to Horsgate which is located just on the south-eastern boundary of the site. A further 20 No. Designated Ancient Woodland sites are located within 1000m of the site. The site is located within an Area of Outstanding Natural Beauty the 'High Weald'.

The site is not located within a Nitrate Vulnerable Zone.

7.7 Ground Workings

According to the Groundsure report, 11 No. surface ground workings are present on site including unspecified pits, old sand pits, and ponds dating from 1874 to 1992. Most of these pits refer to small scale open sandstone pits along the southern boundary and north western corner. A pit dating from 1874 is also located on the central eastern boundary. The excavation immediately north west of the site is the current pond. The workings shown along the southern boundary were sandstone pits and may relate to the topographical valleys noted during the site walkover.

7.8 Mining, Extraction and Natural Cavities

The Groundsure report indicates the site is not situated within an area affected by coal mining. Two records of iron ore mining is located within 500m of the site, the nearest of which is 400m southeast of the site boundaries.

No natural cavities have been noted within 500m of the site.

7.9 Chemical Storage

According to the Groundsure report, a historic tank is located along the western site boundary, which is mapped in 1874, 1911, 1938, 1955 and 1970. Given the age and location of this tank, which corresponds with the brick structure noted in the walkover survey, it was most likely a water storage tank. Although hydrocarbons were not observed during the walkover it is not possible to rule out fuel storage.

8 Site History

8.1 Site History

The contaminative and development history of the site has been ascertained with reference to the Ordnance Survey historical maps, Groundsure report, the world wide web and Google Earth.

In summary, the site has been mapped as an undeveloped field since the earliest available historical maps (1874). A tank is mapped on the southwestern boundary from 1874 and a small building is mapped in the southwest corner of the site from 1896. A windpump in the northwest is mapped on site between 1910 and 1967.

The areas surrounding the site during 1874 were mapped as fields with farm buildings, residential houses a union workhouse to the west. Various clay pits and sand pits were mapped during the 19th and 20th centuries. Only one is shown on present day maps which relates to a pond to the south of the site. A building associated with a miniature rifle range is mapped immediately west of the site from the mid-20th Century. The surrounding area has undergone considerable residential development, particularly around the town of Cuckfield to the southwest of the site.

8.1.1 Historical Map Evidence

The historical Ordnance Survey maps provided spanned the period from 1874 to present day (2023) at scales of 1:10,000, 1:2,500 and 1:1,250. The maps are included in full in Appendix D.

Table 2: Summary of Historical Map Evidence

Year	On site	Surrounding area
1874	The site is mapped as a field with trees in the south and centre of the site. Footpaths are present across the centre of southern and eastern part of the site. boundary. A pit (presumably an old sand pit) is shown on the eastern part of the site in the location of the depression noted during the site walkover. A tank is mapped along the southwestern boundary.	The surrounding site is mainly fields used as farmland. A road aligns with the northern site boundary. A farm comprising of 3 farm buildings and a lodge is situated to the east. Residential housing and a pond is located immediately northwest of the site boundary. A union workhouse mapped 100m east of the site. Pug Mill is located 120m southwest of the site. Two clay pits are mapped 20m southwest of the site boundary. Gore wood is mapped 120m north of the site, with a brick field located east of it (120m NW of the site). A pond/pit is located 110m northwest of the site.
1897	The pit in the east of the site is no longer mapped. A small building is mapped in the south western corner of the site with a small enclosure (possibly an animal pen?)	Only one pit is mapped 20m southwest of the site. One pit is mapped 100m east of the site. Two pits are mapped 10m south east of the site boundary, one is labelled old sand pit. A small building is located in between these two pits. The town of Cuckfield has developed and is mapped 350m southwest of the site. The brick work 120m north of the site is no longer mapped
1910	A windpump is located in the north west of the site.	The union workhouse is mapped as a P.A. institute.
1938	No significant change on site- Only 1:10,560 map available.	The road on the northern site boundary is labelled Hanlye Lane.
1955	The site is shown as being spilt into field boundaries approximately following the treelines currently present on site.	Only 1:2,500 map available. Buildings have been developed associated with the former P.A institute for use as a hospital. A tennis court is located 100m north east of the site. A miniature rifle range is mapped immediately west of the site.
1962	No significant change on site- Only 1:10,560 map available.	The P.A. institute is renamed Cuckfield Hospital
1976	The tank is no longer mapped on site. The windpump is no longer mapped on site.	The south of 1:10,000 map is incomplete. The pits off the southwest of the site are not mapped. Meadow court school is mapped 90m northeast of the site. Both pits in the southwest and one pit in the south east are no longer mapped. The remaining pit in the southeast is now mapped as a pond.

		Residential houses, a reservoir and a council depot have been developed 50m north west of the site. The tennis court is no longer mapped, a school is now mapped.
1993	No significant change on site.	No significant change.
2001	Only 1:10,000 map available. No significant change on site.	The hospital, depot and reservoir are no longer mapped, and have been developed into residential housing.
2010	Only 1:10,000 map available. No significant change on site.	No significant change.
2023	Only 1:10,000 map available. No significant change on site.	The pond southeast of the site is no longer mapped.

8.2 Unexploded Ordnance (UXO)

The risks from unexploded ordnance have been assessed in accordance with CIRIA guidance⁶. A non-UXO specialist preliminary screening assessment has been carried out. The risks have been assessed by considering firstly the likelihood of military activities on, or in the vicinity of the site as determined from the desk study and historical review. Secondly the risk of UXO has been assessed by reference to the unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica.

The Zetica risk maps indicate a low risk. Hence the overall risk of UXO is rated as low.

8.3 Waste Planning and Landfill Records

8.3.1 Recorded Landfill Sites

The Environment Agency website and Groundsure report contain details on areas of historic and active landfilling in the vicinity of the site.

There are no areas of historic or active landfill listed within 500m of the subject site. According to the Groundsure report, landfill records have been provided by Mid Sussex District Council.

8.3.2 Waste Management Facilities

According to the Groundsure report, there are no waste management facilities within 250m of the site.

8.3.3 Waste Transfer or Treatment Sites

According to the Groundsure report, there are no waste transfer or treatment sites within 250m of the site.

⁶ CIRIA C681 2009. Unexploded ordnance (UXO) - A guide for the construction industry

8.4 Other Regulatory Records

According to Groundsure report, there are 3No. pollution incidents to controlled waters within 250m of the site. The nearest is located 9m north of the site and consisted of inert material and waste pollution and occurred in September 2003. The incident had a minor impact to land but no impacts to air or water.

8.5 Radon

According to the Groundsure report database search, the site is not within a radon affected area (less than 1% of homes are above the action level for radon). Therefore, no special protective measures are required in the construction of buildings on this site, in respect of radon gas.

9 Previous Investigations

A neighbouring site, located approximately 85m to the east, has been the subject of an investigation undertaken by LEAP, the findings of which are summarised below.

9.1 LEAP Phase 1 Desk Study, Site Reconnaissance & Phase II Site Investigation Report at Former Meadow Court School, Hanlye Lane, Cuckfield, RH17 5HN

At the time of the investigation, the site was occupied by the disused buildings of the former Meadow Court School, and included areas of hardstanding associated with the car park and former playgrounds. The desk study identified a number of potential sources of contamination associated with the site's former use, including asbestos within existing structures on site, made ground on site, potential coal tar and PAH compounds within the blacktop hardstanding, hydrocarbons associated with below ground and above ground storage tanks Ground gases associated with a backfilled swimming pool were also identified as a potential risk.

The ground conditions encountered on that site comprised made ground to a maximum depth of 0.9m bgl over firm to very stiff sandy clayey silt and sandy silty clay to the full depth of investigation. Very weak to weak silty sandstones were noted in one excavation in the north of the site. The shallow soils appeared desiccated in several excavations. Groundwater seepages were encountered between 0.50m and 0.35m bgl. Groundwater monitoring recorded standing groundwater levels between 1.17m and 3.30m bgl.

An allowable bearing capacity of 125kPa was recommended for the stiff silts and clays below about 1m bgl. The soils were classified as Medium Volume Change Potential (VCP) and thus it was recommended that foundations were deepened in accordance with NHBC Chapter 4. Preliminary assessment of the laboratory testing results indicated that the shallow soils are desiccated. A CBR value of 3% was recommended for the shallow soils beneath the site.

Elevated concentrations of lead, arsenic and benzo(a)pyrene were encountered during the investigation on site.

C PRELIMINARY RISK ASSESSMENT

10 Preliminary Geoenvironmental Conceptual Site Model

10.1 Approach

A risk-based approach is used in the UK to assess contaminated or potentially contaminated land. For a potential risk to exist, there must be a contaminant linkage in place, i.e., there must be a source of contamination, a potential receptor, and a pathway linking the two. The purpose of this preliminary conceptual site model (CSM) was to systematically identify all of the potential contaminant linkages using the information provided in Section B of this report. The preliminary CSM was then used to enable uncertainties and further assessment requirements to be identified to allow a suitable intrusive investigation to be scoped.

10.2 Potential Sources of Contamination

Based on a review of the available information discussed in Section B of this report and Annex 3 of R&D66⁷, Table 3 provides a summary of the potential plausible current and historical on- and off-site sources with the anticipated nature and distribution of the sources:

Table 3: Potential Plausible Sources of Contamination

Potential Source	Potential Contaminants of Concern	Anticipated Distribution
On-Site		
Former use of the site as agricultural land	Pesticides, herbicides and heavy metals	Potentially site wide
Potential infilling of historical pit	Ground gases (carbon dioxide and methane)	Located near to the eastern boundary.
Historical tank	Petroleum hydrocarbons	Potential for localised leaks and spills of hydrocarbons if used for fuel storage.
Made ground associated with the building in the southwest of the site	Wide range of contaminants possible including asbestos, metals, polycyclic aromatic hydrocarbons (PAH), petroleum hydrocarbons, ground gases	Likely to be localised in the vicinity of the building.

⁷ NHBC and Environment Agency 'Guidance for the Safe Development of Housing on Land Affected by Contamination' R&D Publication 66: 2008.

Bonfires and fly tipped waste	Metals PAHs Asbestos,	Localised to fly tipping and bonfires.
Off-Site		
Potential infilling of clay and sand pits. of various	Ground gases (carbon dioxide and methane)	Localised to any areas of backfill

The whole site is mostly open fields and there is the possibility that it had been used for agricultural purposes and as such pesticides and herbicides may have been used. It is likely that if there were any such chemicals present, could be site wide.

The former pit shown historically on the site, but not shown after 1897 may have had some backfilling. However, a depression is still visually noticeable on site in this area and is also shown on readily available LIDAR data suggesting that backfilling may not have occurred or was very limited.

A small tank was shown historically on the south western boundary of the site (1910-1970), close to small structures. The walkover identified a small brick rectangular structure filled with logs, broadly in the position of the mapped historical tank. No visual or olfactory signs of hydrocarbon were noted in the structure or surrounding soils.

Made ground associated with the relict structures in the south western corner of the site are likely to be highly localised. No visual or olfactory signs of hydrocarbon were noted during the walkover. The area has only been built on once and therefore this risk from made ground here is considered to be negligible and this potential source of contamination has been discounted.

The fly tipped materials and potential burning of waste on the northern part of the site may have led to localised heavy metal, PAH, petroleum hydrocarbon and asbestos contamination.

Several off site clay and sandstone pits have been identified to the south east of the site. Inspection of LIDAR data for the area, suggests that these depressions are still present and mostly likely not backfilled. Additionally the distance between these pits and the proposed development, (which is restricted to the areas ~120m to the north) together with age of the pits indicates that they are unlikely to pose a significant gas risk to the proposed development.

10.3 Potential Receptors

In the context of the proposed future land use, the following potential receptors of ground contamination were identified:

Human Health

- Future residents and site users
- Construction workers

Controlled Waters

- The Tunbridge Wells Sand and Cuckfield Stone are both Secondary A aquifers (No SPZ)
- Surface waters are not considered to be at risk from the site due to the topography.

Other

- Material construction of buildings and infrastructure

10.4 Potential Contaminant Linkages

The potential plausible contaminant linkages are summarised in the table appended in Appendix E and were assigned a qualitative risk classification in line with the guidance presented in Annex 4 of R&D66. The preliminary risk levels were determined following a review of the available desk-based information with the significance of contaminant linkages being dependant both upon the likelihood of exposure occurring and the severity of that exposure.

10.4.1 Human Health

The proposed development comprises residential housing with private gardens and public open space, etc. Therefore, all the generic Contaminated Land Exposure Assessment (CLEA)⁸ exposure linkages between humans and potential contaminants in the ground are plausible i.e., direct ingestion of soil, ingestion of homegrown produce, and inhalation of indoor and outdoor vapours and dusts. Groundworkers could be potentially exposed via all these pathways, except for those involving edible plants. However, due to the low likelihood for high concentrations of contaminants to be present on-site, the potential for unacceptable risks to human health via these pathways is considered to be low.

The assessment of future on-site users is considered to be protective of the surrounding off-site residents and off-site commercial workers.

⁸ Environment Agency 'Updated technical background to the CLEA model' Science Report: SC050021/SR3. January 2009.

10.4.2 Ground Gases

No onsite sources of ground gases have been identified by the desk study and the off-site pits are not considered a gas risk to the site.

10.4.3 Controlled Waters

The site is underlain by a Secondary A aquifers in the northern eastern and south western areas, with most of the central area being mapped as underlain by clay. The risk to these aquifers from any potential on site contamination is likely to be very low.

10.4.4 Below Ground Infrastructure

The site is unlikely to be significantly contaminated and so the potential for unacceptable impacts to below ground infrastructure, including concrete and plastic pipework is considered to be very low.

11 Geotechnical Risk Assessment

11.1 Preliminary Ground Model

Based on the findings of the desk study, the preliminary ground model for the site is summarised in Table 4 below.

Table 4: Preliminary Ground Model

Ground Model	Characteristics	Notes
Ground Conditions	Tunbridge Wells Sand	Interbedded fluvial deposits comprising sands, gravels, and clays
	Grinstead Clay	Typically, plastic over consolidated clays
	Cuckfield Stone	Sand and siltstones
Groundwater	Shallow	Perched groundwater anticipated within granular horizons
Surface Water features	Pond to the north west	
Topography	Down toward the south	Typical slopes over the northern part of the site are around 3° with steeper slopes of around 6° over the southern parts of the site.
Existing structures	Two small derelict features remain in the southwest of the site	Where derelict structures remain, no development proposed.

History	Open fields and possibly paddocks/ agricultural use. One small (possible) clay pit located within the central eastern boundary and other offsite historical pits to the southwest and southeast.	Possible infilling of ground with unknown materials.
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11.2 Geotechnical Risk Register

In order to establish the minimum requirements for geotechnical investigations, designs and post construction monitoring, it is necessary to establish the complexity of the geotechnical design and the associated risks.

The preliminary geotechnical risk register for the proposed development is summarised in the table in Appendix E.

11.3 Summary of Preliminary Geotechnical Risk Register

The following geotechnical hazards have been identified as substantial to intolerable risks:-

Table 5 Geotechnical Risk Register Summary

Geotechnical Hazard	Overall Risk
Groundwater Level	Significant
Frost Susceptible soils	
Aggressive Ground Conditions	
Slope stability	

A geotechnical investigation is required to quantify the risks.

On the basis of the initial review and preliminary risk assessment, the site is given a Geotechnical Classification of **Geotechnical Category I** in accordance with EN1997-1 §2.1(14)-(21).

12 Sustainability Considerations

The geological, geotechnical and hydrological conditions of the site along with the potential for contamination can significantly influence the suitability of sustainable options on site.

The mapped ground conditions indicate high/medium/low plasticity clay can be anticipated. A piled foundation be the less carbon intensive option.

The site slopes gently to the south across the proposed development area with more pronounced slopes across the proposed open space area. The effect of potential adverse effects of climate change on slope stability may present a risk to the proposed development with anticipated drier summers and more intense winter rainfall events.

The conceptual site model has indicated a number of potential historic sources of contamination on site and anticipated widespread contamination across the site as such it is anticipated that some remediation will be required. / The conceptual site model has indicated a low risk of contamination on site as such it is anticipated subject to testing that the soils will be suitable for reuse on site and caution should be taken to limit the disturbance of natural soils.

D PHASE II - INTRUSIVE INVESTIGATION

13 Investigation Rationale

The key objective of the intrusive investigation was to aid the design and construction of the proposed development plan (Figure 2 and to determine any constraints associated with ground contamination/,foundation design and slope stability.

The main purpose of the site investigation was to collect preliminary geo-environmental and geotechnical information to support the development of the site.

To achieve the investigation rationale, the scope of works comprised a total of 16 investigation locations across the site:

- 10 No. machine excavated trial pits to a maximum depth of around 3m with 6No. soakage tests.
- 6 No. windowless sampler boreholes to depths of up to 3.0m

The scope of the investigation was non-targeted for the majority of positions to give general coverage with four locations targeting potential sources of contamination. The positions were, in accordance with BS10175, located with consideration the proposed development plans and the preliminary geoenvironmental and geotechnical risk assessments that were developed in Section C.

The spacing of the investigation locations was consistent with the recommended density of 25 to 50m for an exploratory investigation.

Investigation locations were spread evenly across the site to provide non-targeted coverage

The site investigation locations are provided in Figure 3, Appendix B and Table 6 provides a summary of the rationale, proposed scope and what was achieved in the field:

Table 6 Rationale and Scope for Investigation Locations

Trial Hole/Test Location	Rationale	Proposed Depth (m bgl)	Achieved Depth (m bgl)	Additional Comments
TP1,TP3-TP7	Provide information on ground conditions and geotechnical parameters. Investigate potential soil contamination) non targeted.	3-4m	1.8m-3m	Terminated at Depths of between 1.8m and 3m due to slow progress in the mudstone.
WS1-WS5	Provide information on ground conditions.	3m-4m	2-4m	

Trial Hole/Test Location	Rationale	Proposed Depth (m bgl)	Achieved Depth (m bgl)	Additional Comments
	Install groundwater monitoring well. Investigate potential soil contamination.			
WS6	Targeted to provide information on ground conditions within depression	3-4m	4m	Water monitoring standpipe installed
TP2-4, 7 & 9	Locate to carry out BRE365 soakage testing (shallow and deep)	1-2m	1-2m	

Due to an overhead cable in the proximity to TP8 this was not excavated. Ground conditions around TP2 were very soft at the time of the investigation, as such it was not possible to excavate the location.

Access for plant onto and across the site was hampered by the presence of soft ground conditions near the only entrance on the western boundary. Despite the use of track mats, 4x4 water tanker and use of a JCB for towing, the water tanker for the BRE365 tests could not get safely on to site. Because of this the BRE 365 soakage tests were not undertaken, in any pit other than TP9 where 70m+ of hosing was used and water was pumped from the tanker near the entrance. Whilst testing was not able to be carried out in the remaining pits, they were constructed and backfilled with gravel ready for testing at a later date when safe access for plant is more viable.

14 Site Work

14.1 Date and Weather Conditions

The intrusive investigations were undertaken over two days, 24th and 25th January 2023. At the time of the investigations, the weather was cold and overcast. It should be noted that the works were undertaken immediately following a period of very cold freezing conditions which had resulted in the surface soils around the entrance to the site freezing and then rapidly thawing becoming very soft and unstable.

14.2 Site Work Methods

14.2.1 Windowless Sampler

The Windowless sampling rig consists of a tracked barrow with a sampling unit mounted on the top. When in the required position, the mast was raised to a height allowing a mechanised

drop weight to fall repeatedly onto an anvil, and drive attached sample tubes or probe rods into the ground to produce reasonably intact continuous samples which were then extracted using the integrated hydraulic ram.

To reduce any tendency of the tubes to stick in the ground, a succession of smaller diameters may be used to obtain full depth. Excavated soils were placed aside for inspection and sampling.

On completion the trial hole was backfilled with excavated material, placed in reverse order, and the surface reinstated unless Groundwater monitoring standpipes were installed as specified on the logs specified.

14.2.2 Trial Pitting

Trial pits were dug by a tracked excavator. Trial pit dimensions are shown on the trial pit logs, included as Appendix F. Spoil was placed adjacent to trial pits. Following discussions with the client on site and the need to minimise ground disturbance for the land owners and horses in the field, it was decided to level and smooth over the trial pits and adjacent areas where the machine had tracked over.

14.2.3 Soil Logging and Sampling

Soil samples were recovered from the boreholes and trial pits for field screening, logging and sampling.

Boreholes were logged in general accordance with the requirements of BS 5930:⁹ and BS EN ISO 14688¹⁰. Borehole logs are presented in Appendix F.

Visual and olfactory evidence of contamination was noted if encountered. These observations were used to aid scheduling of samples for chemical laboratory analyses, and are included on the borehole logs in Appendix F.

Samples were collected with a clean sampling trowel or by hand (using dedicated nitrile gloves for each sampling location). Samples were placed into laboratory supplied sampling containers, specific to the type of analyses required.

All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

14.2.4 Monitoring Well Installation

Six No. groundwater monitoring wells were installed during this investigation within the windowless sample boreholes. The monitoring wells were constructed of 50mm diameter

⁹ BS5930:2015+A1:2020 Code of Practice for Ground Investigation

¹⁰ BS EN ISO 14688 Parts 1-2 (2018) Geotechnical Investigation and Testing. Identification and classification of soil

HDPE pipe. The response zone was typically targeted to intercept the groundwater surface and was surrounded by washed filter gravel. The top of the plain zone was surrounded with bentonite to provide a seal. The monitoring wells were finished with bungs and raised steel covers. Sampling and Field Tests

14.2.5 Soil Sampling

Geo-environmental soil samples were selected to ensure that near-surface exposure of human health via direct contact was targeted, as well as to spatially and vertically delineate possible sources of contamination.

Geotechnical soil samples were targeted to characterise the geological sequence, and to obtain characteristic soils properties and specific geotechnical design parameters as per the proposed development.

14.2.6 Standard Penetration Tests

Standard penetration tests were undertaken in the window sample boreholes at 1m centres. Uncorrected blow counts, 'N values', are recorded on the borehole logs in Appendix F.

14.2.7 Field Vane Test

In-situ field vane tests were undertaken in cohesive soils in the trial pits in accordance with BS EN ISO 22476-9 (Draft). The results are recorded on the trial pits logs in Appendix F.

14.2.8 BRE365 Soakage Tests

Due to access issues for the plant testing was only undertaken in TP9. The test was carried out in general accordance with BRE Digest 365¹¹. However, given the time restrictions, it was only possible to fill and test the pit location once.

14.3 Groundwater Monitoring

To assess the groundwater level beneath the site six standpipes were installed and monitored following installation and then a further three times at monthly intervals.

14.4 Laboratory Analysis

14.4.1 Geotechnical Laboratory Testing

Selected samples of the soils have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford, in accordance with BS1377¹² and BS EN ISO17892¹³. The sampling technique, type,

¹¹ Building Research Establishment DG365 Digest Soakaway Design (2016)

¹² BS1377 Parts 1-9:1990 Methods of test for Soils for Civil Engineering Purposes

¹³ BS EN ISO 17892 Parts 1-12 Geotechnical Investigation and Testing. Laboratory testing of soil

storage and transport and the number of laboratory tests have been undertaken where possible in accordance with BS EN 1997-2:2007 and BS EN ISO 22475

The following laboratory tests have been undertaken:-

Table 7 Geotechnical Laboratory Testing

Test	Number of Tests
Moisture Content	9
Atterberg Limit Test	9
Particle Size Distribution Test	3
California Bearing Ratio	3
Sulphate Determination	5
pH	5

The geotechnical laboratory test results are provided in Appendix I.

14.4.2 Chemical Soil Analysis

Selected samples of soil subjected to laboratory testing.

The suite of soil contaminant analysis took into account the potential contaminants of concern identified in the CSM (heavy metals, PAHs, asbestos, herbicides and pesticides. Soil samples were also analysed for pH and total organic carbon (TOC) to support the selection of assessment criteria in the subsequent quantitative risk assessment (QRA) for human health.

Sampling techniques and storage have been undertaken as per BS 10175:2011+A2:2017 Code of Practice for Investigation of Potentially Contaminated Sites. The laboratory testing was carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex. Where available, the tests for soils procedures were UKAS and MCERTS accredited.

The following analyses were completed on selected soil samples based on field observations and for general vertical and lateral coverage:

- 9 No. metals (As, Cd, Cr, CrVI, Cu, Pb, Hg, Ni, Se, Zn)
- 9 No. USEPA 16 PAHs
- 9 No. Asbestos identification
- 3 No. Organochlorine and organophosphorus pesticide suites.
- 9 No. pH
- 9 No. TOC

15 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix F.

For the purpose of the assessment the ground model is divided into two areas, the proposed development area in the north and the public open space land in the south. A summary of the soil conditions in the developable northern part of the site were as follows:

Table 8: Summary of soils encountered in the northern half of the site

Depth From (m)	Depth To (m)	Soil Type	Description
GL	0.2 / 0.7	TOPSOIL	Dark brown silty clay TOPSOIL
0.2- 0.7	0.80	MADE GROUND/ Reworked soils	MADE GROUND/Reworked soils were only encountered in WS2 and WS3 where some fine brick gravel was recorded to between 0.70 to 0.8m bgl, and at WS6 which was located in a ground depression and where fine brick and glass fragments were also recorded to 0.8m below ground level.
0.2 / 1.2	0.7*-4.0*	CLAY	Firm to stiff sandy silty CLAY with some fine to coarse gravel of siltstone and sandstone were generally recorded across the majority of the site with the exception of WS6, where soft clays were encountered to 3.5 m
0.8/1.4	1.2/+2.0	SAND	Grey mottled orange gravelly clayey SAND (WS4) to brown mottled grey gravelly clayey SAND (WS6) and pale grey / orange fine SAND (TP1)
1.1-1.8	4+	MUDSTONE / SILTSTONE / SANDSTONE	Recovered as mottled greyish yellow to grey gravelly SAND and gravels of weak coarse SANDSTONE, dark grey silty gravel MUDSTONE, and pale grey orange fine gravel SAND with coarse gravel of weak SILTSTONE or very sandy gravelly grey SILT with weak thinly laminated SILTSTONE or pale yellow grey SILTSTONE, recovered as a gravel.

It is noted that WS4 located in the north eastern corner of the site is mapped as being underlain by the Upper Tunbridge Wells Sand. The borehole recorded stiff clay to 1.10m over gravelly clayey sand with very weak sandstone gravel.

It is noted that shear faces were recorded within the clay at TP5 and TP6 located on the eastern half of the site at depths of between 1.2m and 1.6m.

WS6 was located within a noticeable ground depression and reworked soils were noted to 0.80m below ground level. The clay encountered below the reworked soils were recorded as wet and soft to a depth of around 3.5m bgl which was underlain by very stiff grey sandy silty clay.

TP9 and WSI are located on the Cuckfield Stone Beds in the south of the site, recorded sand and/clay to 1.9 and 1.6mbg/ (112.3 and 112.4m mAOD) before the siltstone and sandstones were encountered.

15.1.1 Groundwater

Groundwater strikes were recorded in the following trial holes:-

Table 9: Groundwater Strikes

Trial Hole	Date of water strike	Depth to Groundwater strike (mbGL)	Comments
WSI	24/01/23	1.4	
WS6	24/01/23	0.8	At boundary between reworked ground and Sand

Groundwater monitoring results are summarised as follows:-

Table 10: Groundwater Monitoring Results

Monitoring well	Depth to groundwater (mbgl)			
	25/01/2023	27/01/2023	20/02/2023	09/03/2023
WS1	0.67	0.63	1.09	0.15
WS2	Dry	Dry	Dry	1.46
WS3	-	Dry	Dry	1.69
WS4	1.0	0.99	1.26	0.99
WS5	Dry	Dry	Dry	Dry
WS6	-	0.44	0.89	0.05

The water within the standpipes was located where sands and sandstone/siltstone was identified in WSI and WS4, no groundwater was recorded at positions where clay was present throughout the borehole. Water and organic/alluvial odours were recorded in WS6, where made ground soils and the depression in the ground level was noted. It is likely that this was a historical clay extraction pit that provided a low point and subsequently filled with water.

The full monitoring results are provided in Appendix H.

15.1.2 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of significant contamination was encountered during the intrusive investigation or groundwater monitoring visits other than the organic odours noted at WS6.

E GEOTECHNICAL INFORMATION

16 Strata Encountered

The soils encountered have been compiled for both northern and southern areas of the site and is summarised below. It is noted that the Tunbridge Wells Sands were encountered in the north east of the site.

16.1 Made Ground

The site is generally underlain by undisturbed soils with made ground / reworked soils only recorded at WS2 to 0.70m and WS3 and WS6 to 0.8m. Whilst not found to be extensive by the investigation, it may be prudent to expect localised areas of made ground.

Made ground or fill is by nature highly variable in both composition and bearing capacity, and can be subject to large differential settlements when loaded. It is therefore generally unsuitable for use as a bearing stratum. In addition, made ground may contain contaminated and/or putrescible material. It can therefore be potential source of contamination and landfill gas.

16.2 Clay

The topsoil / made ground was underlain by firm to stiff plastic clays to depths of between 0.7m and 4.0m. The results of the geotechnical laboratory testing are summarised in Table 11 below.

Table 11: Summary of Geotechnical Test Results for Clay

Test	Range
SPT 'N value'	3-74
Moisture Content (%)	17.2-31.9
Liquid Limit (%)	33-68
Plastic Limit (%)	14-24
Plasticity Index (%)	16-45
Californian Bearing Ratio (lab soaked) (%)	2.2-3.6
Sulphate Content (g/l)	<0.010
pH	7.3-8.4

Hand shear vane testing recorded undrained shear strength values of between 71-108 and hand penetrometers reported 90-470 kPa indicative of firm to very stiff soils.

The results of Atterberg limit testing indicate that shallow soils comprise intermediate to high plasticity clays and silts. The plasticity testing results are presented on an A line plot available in Figure 4 Appendix B.

16.3 Sands

Two standard penetration tests were undertaken within the sands on the northern part of the site. The results indicates dense to very dense soils.

Table 12: Summary of Geotechnical Test Results for granular soils

Test	Range
SPT 'N value'	46 & 76

A single particle size distribution test was undertaken on a sample collected from TP7 at 1.90 m bgl. TP7 is located at the mapped boundary between the Grinstead Clay and the Tunbridge Wells Sand. The results of the geotechnical laboratory testing are summarised in Table 13, below.

Table 13: Summary of Particle Size Distribution tests for Sand/Gravel at TP7

Strata	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
SAND	13.5	19.7	32.2	34.6	0

On the Cuckfield Stone Bed encountered on the southern part of the site SPT values of 59, 33 and 66+ were recorded at 1m, 1.5m and 2.5m.

16.4 Siltstone/Mudstone/Sandstone

The clays were underlain by interbedded mudstones/ siltstones and sandstones to the full depth of borehole. Laboratory testing of the siltstone / mudstone / sandstone was beyond the scope of works. However, based on the field tests the siltstone / mudstone / sandstone is classified as extremely weak to very weak.

F GEOTECHNICAL APPRAISAL

17 Geotechnical Design

The foregoing geotechnical appraisal does not constitute a Geotechnical Design Report in accordance with BSEN1997. The following recommendations are for preliminary design purposes only.

For the detailed design, the short-term and long-term design situations must be considered. Where relevant, the following limit states should be considered:-

- Loss of equilibrium of the structure or the ground, considered as a rigid body, in which the strengths of structural material and the ground are significant in providing resistance (EQU)
- Internal failure or excessive deformation of the structure or structural elements in which the strength of structural materials is significant in providing resistance (STR)
- Failure or excessive deformation of the ground, in which the strength of soil or rock is significant in providing resistance (GEO)
- Loss of equilibrium of the structure or the ground due to uplift by water pressure or other vertical actions (UPL)
- Hydraulic heave, internal erosion and piping in the ground caused by hydraulic gradients (HYD)

The following factors should also be considered.

- Overall stability and ground movements
- Nature and size of the proposed construction including the design life
- Conditions with regards to the surroundings (e.g. neighbouring structures, traffic, utilities, vegetation, contamination etc.)
- Ground and groundwater conditions
- Influence of the environment.

18 Geotechnical Appraisal

18.1 Swelling and Shrinkage

Based on the highest recorded laboratory test results in Section E, an overall classification of NHBC **HIGH** Volume Change Potential (VCP) is recommended for the clay soils. However, some mitigation of this requirement may be possible following further testing on a plot by plot basis. Furthermore, deepening may be terminated where the dense sand or siltstones are encountered at depth.

Foundations will require deepening in accordance with NHBC Chapter 4.2 where clay soils are encountered near trees. Foundation depths should be calculated based on the mature height of the tree, however, the existing height is relevant for trees which are to be removed.

The BGS GeoClimate study (UKCPI8)¹⁴ indicates the potential change in subsidence due to changes in climate. The results project a 6.5% of properties will be affected by swelling and shrinkage by 2030, rising to 11% by 2070 (compared to 3% in 2020).

18.2 Sulphates

5 No. samples were tested for sulphate content and pH. All recorded the water soluble sulphate contents to be <0.010 g/l

Based on the results detailed in Section E and the above, the soils are classified by the BRE as sulphate design class DS-I, and, assuming a mobile groundwater table, the ACEC class is AC-I d.

18.3 Groundwater

The groundwater monitoring results/observations are given in Section D15.1.1. On the basis of these results, groundwater at about 1m below ground level should be anticipated within areas of sandy geology

Long term groundwater monitoring was beyond the scope of works and would be required to fully assess the groundwater regime.

Winter groundwater levels are anticipated to rise in some areas of southern England. Storage on site will be reduced and may make conventional soakaways inappropriate for this development.

18.4 Soakage Potential

18.4.1 Test Results

1 No. soakage test was undertaken on site in accordance with BRE365¹⁵. Given the time restrictions, it was only possible to fill and test TP9 pit once. The pits have been prepared for soakaway testing and will be ready for testing at such time that tankers are able to access the site. The results are attached in Appendix G and are summarised below:

¹⁴ <https://www.bgs.ac.uk/news/maps-show-the-real-threat-of-climate-related-subsidence-to-british-homes-and-properties/>

¹⁵ Building Research Establishment DG365: 2016. Digest Soakaway Design

Table 14: Summary of soakage tests

Test Location	Soakage Rate (m/s)	Comments
TP9	1.58×10^{-07}	Test not BRE365 compliant. Water did not fall to 75% max water depth therefore calculations are based on the actual fall of the water. Only one test undertaken

The single test undertaken in TP9 was carried out within the Cuckfield Stone Beds which are only located in the southern section of the site. The calculated soakage rate of 1.5×10^{-07} m/s suggests that this part of the site is not suitable for conventional soakaways.

Gravel filled soakage pits have been constructed ready for testing across other parts of the site. However much of the site was underlain by clays, mudstone and siltstone and as such significant soakage rates might not be anticipated. Sandier horizons were encountered locally and these may produce better rates, although high groundwater levels may indicate that soaks are not viable.

Further testing will be undertaken when weather conditions allow safe access for plant. The findings of this testing will be reported on under a separate cover.

18.4.2 Sustainable Considerations for soakage design

Winter groundwater levels are anticipated to rise in some areas of southern England. Storage on site will be reduced and may make conventional soakaways inappropriate for this development.

Design of a SUDS scheme which can incorporate biodiversity net gain into the development and will support the NPPF requirement for multifunctionality managing water quality and design while improving diversity.

18.5 Bearing Capacity and Foundations

18.5.1 Shallow Foundations

Allowable Bearing Capacity or Pressure is a conservative estimate of the ultimate bearing resistance of the ground, selected on the basis of the soil/rock description, and taking a presumed degree of settlement into account. It has traditionally been used to check simple foundation designs. The use of this method is acceptable under BS EN 1997-1¹⁶ as a

¹⁶ BS EN 1997-1(2004)+A1:2013 Eurocode 7:Geotechnical Design: General Rules

“prescriptive method”, with the allowable bearing pressures now termed “presumed bearing resistance”.

The presumed bearing resistance is highly dependent on proposed depth of foundation, width of foundation and the structure’s tolerance for settlement. The following section provides a preliminary presumed bearing resistance assuming a stated depth and width of foundation and assumes that settlements of up to 25mm can be tolerated by the structure. Should alternative foundation depths and dimensions be required, or the proposed structure have different long term movement requirements then the following assessment should be re-evaluated.

All loads should be transferred beneath any topsoil, made ground, loose, soft, low strength, desiccated or disturbed soils and transferred onto the firm to stiff clays or dense to very dense sands and siltstone/mudstones which were generally encountered at depths of around 1.3-1.5m. On the basis of the findings of the intrusive investigation to date, a preliminary presumed bearing resistance of 100kPa may be assumed for a 600mm wide foundation on the firm clays and dense sands below about 1.30 m. However, foundations will require deepening in the clay soils near trees to NHBC MEDIUM VCP precautions. Several mature trees are present close to proposed residential properties where clays soils have been encountered. It should also be noted that shear faces were recorded within the clays at TP5 and TP6, to depths of 1.5m and 1.6m, and it may be prudent to err on the side of caution and extend foundations to below this level.

Soft soils were encountered in the vicinity of WS6 to a depth of 3.5m below ground level and that houses are proposed nearby. Foundations in this part of the site will need to be extended below any soft soils or the distance to the soft soils considered in their design.

Further information will likely be required for the detailed design stage, including the foundation design details and further investigation to meet the requirements of BS EN 1997 and BS 8004¹⁷.

Where foundations are stepped or span different soil types, allowance should be made for nominal reinforcement.

18.5.2 Construction Supervision

Foundation excavations should be inspected by a suitably qualified engineer prior to pouring concrete to ensure competent soils, in this case the firm to stiff clays or dense sands are encountered at formation level.

18.5.3 Sustainability Considerations for Foundations

LEAP’s foundation carbon calculator has been used to assess the relative embodied carbon output of the recommended foundation options. The tool considers the intrinsic carbon

¹⁷ BS 8004:2015+A1:2020 Code of Practice for foundations

dioxide generated from the materials which make up the foundation as well as emissions associated with onsite plant, earthworks and the disposal of trench/pile arisings.

Based on the limited information available to date on the proposed construction, the carbon calculator indicates that assuming the foundations summarised above are utilised on site then traditional footings would be the less carbon intensive option.

The model also indicates that where traditional foundations are to be extended below 1.7 m bgl then piled foundations are the less carbon intensive foundation option.

Further more detailed calculations and wider sustainability assessments can be provided and you can register your interest in such an assessment via the sustainability section of our website [here](#).

18.6 Floor Slabs

With reference to NHBC Standard 5.2, suspended floor slabs are recommended:-

- Where the depth of fill exceeds 600mm
- Where foundations are deepened below 1.5m in accordance with NHBC Standards Chapter 4.2
- Where desiccated soils are encountered
- Where vibratory ground improvement techniques have been used
- On sloping sites
- Where foundations have been piled.

Suspended floor slabs are therefore recommended on site.

18.7 Roads

18.7.1 Test Results

Three laboratory CBR tests were undertaken on samples of the shallow silty clays, and returned CBR values in the range 2.2%-3.6%. The results are attached in Appendix I.

The shallow soils are assessed as frost susceptible, based on the results of the plasticity testing (see Section E).

18.7.2 Recommendations

A design CBR value of 3% is recommended for a silty clay subgrade.

Further confirmatory testing may be required if the proposed roads are to be adopted.

18.8 Excavations

Excavations in the silty clays should be stable in the short term. However, groundwater seepages should be anticipated along the more granular sandy horizons in the north eastern and southern most parts of the site and long term groundwater levels at or above 1m below ground level in these areas should be anticipated. Excavations will therefore be unstable in the long term and should be backfilled as soon as possible. Allowance should be made for light pumping.

Appropriate Health and Safety precautions must be adhered to where man entry into excavations is required. Even stiff clay soils at shallow depth can collapse, particularly following wet weather. Alternative foundation methods may need to be adopted where trench footings cannot be safely or satisfactorily constructed.

18.9 Filling

The preliminary recommendations contained within this report assume that ground levels are to remain at a similar level across the site for the proposed development, and that no significant changes in level are proposed. In the event that ground levels are to be raised, this may induce significant settlement, particularly across the area of soft clays on the eastern part of the site. which could adversely effect foundation design, drainage etc. Where significant changes in ground levels are proposed then further investigation will be required to assess the impact of such earthworks on the above recommendations.

18.10 Slope Stability

The site is sloping down from the north to the south, with an estimated 3° fall across most of the northern part of the site where the proposed redevelopment will occur with a more pronounced fall of approximately 6° to the south. Shear surfaces were identified in the near surface clays in the north of the site indicating that historic landslip has occurred and that soils will be at residual strength. It is recommended that a qualitative assessment for the site is made once final design proposals are known and a topographical survey undertaken to ensure that the proposed development does not constitute a slope stability risk, which at this stage would be considered to be low. General recommendations for developing on slopes include the following:

- Care must be taken to ensure that any cut and fill operations do not destabilise the slope. As a general principal, loading at the crest and cutting at the toe would have such an effect.
- Retaining walls should be avoided if possible, kept to a maximum height of 600mm where necessary, and include adequate drainage. Retaining walls exceeding 600mm in height should be designed by a suitably qualified engineer..
- Filling of subfloor voids should be avoided

- Drainage of the site will be crucial.
- All drains should be laid at twice the normal fall to accommodate any local ground movement.
- Where houses include partial basements, allowance should be made for the design of the walls as retaining structures.
- Vegetation will have stabilising effect and should be maintained for as long as possible.
- Whilst soakaways are unlikely to be viable at the site, it is worth reiterating that the introduction of water into the slope must be avoided.
- Excavations across the slope should be avoided if possible. Where necessary, they should be kept to short lengths, say 5m, and backfilled immediately.

Global stability checks will be required when developing on slopes and allowance should be made for slope stability analyses at the design stage.

Caution should be taken to ensure that your slope design factors in climate resilience. Climate change modelling indicates drier summers and more intense wet weather periods in future.

18.11 Retaining Walls

Retaining walls should be avoided if possible. Care should be taken to ensure that if present they are founded on competent soils and do not upset the overall stability of the slope. Low retaining walls up to 600mm high may be used providing the overall safe slope is not exceeded. Retaining walls exceeding 600mm in height should be designed by a suitably qualified engineer.

Care must be taken to ensure any loads are kept remote from the retaining walls, or extend below the base of the retained soils.

Retained soils must be adequately drained to prevent the build up excess porewater pressures. For some of the smaller retaining structures proposed, alternatives such as gabion walls, soil nailing or the use of ground improvement techniques may be considered as an alternative.

18.12 Settlement

Based on the presumed bearing resistance given in Section 18.5, settlements should be within typical tolerable limits for the low rise development proposed.

If soft clays are encountered at formation level or below, significant settlement should be anticipated and serviceable limit state analyses will be required. For Geotechnical Category 2 and 3 structures, detailed settlement analyses are usually required.

At this stage it is assumed that ground levels will remain at the current level for the proposed development. If significant level raises are proposed, this may induce significant settlement in the natural soils and detailed settlement analyses will be required.

Where foundations are stepped or span different soil types, differential settlement should be anticipated and allowance should be made for nominal reinforcement.

18.13 Heave and Uplift

In accordance with NHBC Standards Chapter 4.2, precautions against heave should be used where foundations are within the influence of trees and the resulting foundation depth is greater than 1.5m. Compressible material must be provided against the inside faces of all external wall foundations greater than 1.5m in depth. For pier and beam foundations, additional voids are required below ring beams.

Heave may also occur where shrinkable soils are unloaded, in say, basement excavations. To avoid uplift pressures, voids or buffer zones should be left beneath floor slabs. As a preliminary guide, allowance should be made for a 300mm void for highly shrinkable clays, reducing for lower plasticity soils. This should be confirmed at the detailed design stage.

19 Geotechnical Recommendations

Further assessment including a geotechnical design report and qualitative stability assessment will be required once the details of the proposed construction are known.

At this stage foundations will require deepening in the clay soils near trees to NHBC HIGH VCP precautions and to bear below pre-existing shear faces in the clay.

Further intrusive works are needed around the soft spot in WS6 to assess its extent.

G GEO-ENVIRONMENTAL QUANTITATIVE RISK ASSESSMENT

20 Revised Conceptual Site Model

20.1 Introduction

The preliminary conceptual site model in Section C identified a number of plausible contaminant linkages. The revised CSM provides an updated understanding of the site based on the findings of the site investigation and analytical results and was used to inform the quantitative risk assessment (QRA) undertaken in Sections 21 to Section 22 in the context of the proposed residential land use.

Following completion of the preliminary site investigation no revisions to the CSM are considered necessary before carrying out the generic quantitative risk assessment (GQRA).

20.2 Human Health

Given the nature of the contaminants encountered, plausible contaminant linkages for exposure to future residents and groundworkers at the site are confirmed as follows:

- Ingestion of contaminated soils.
- Inhalation of contaminated soil particles/dust and asbestos fibres.
- Dermal contact with contaminated soils.
- Ingestion of homegrown produce (future residents only).

As no evidence of VOCs was encountered, the inhalation of soil and groundwater-derived vapours was excluded as a plausible contaminant linkage. Ground gas risks were excluded in the preliminary risk assessment.

20.3 Controlled Waters

The site is mostly underlain by clay deposits with some sand and sandstones beneath the southern part of the site and the north easternmost corner. There is no evidence of a continuous shallow groundwater body being present beneath the site and no evidence of significant land contamination that would affect controlled waters.

21 Human Health Risk Assessment

21.1 Rationale and Approach

The generic quantitative risk assessment (GQRA) for human health was conducted in line with the CLEA methodology by comparing the soil analytical results from the ground investigation with Generic Assessment Criteria (GAC). The GACs were selected using the rationale and assumptions provided in Appendix L.

Sets of soil GACs are available for SOMs of 1%, 2.5% and 6%. Recorded TOC in samples that were analysed ranged from 0.4% to 2.4%. Using the conversion of $SOM = TOC \times 1.72$, this equates to a SOM range of 0.7% to 4%. 1% SOM was considered to be appropriate to maintain conservatism.

The risk assessment did not include statistical analysis. CL:AIRE 2020¹⁸ provides guidance on the appropriate sample sizes for particular statistical distributions of data and non-targeted soil sampling approaches. The number of soil samples collected in the site investigation indicates that statistics are not appropriate to use in this case.

21.2 Evaluation of Potential Risks to Future Residents

The soils that were analysed comprised topsoil and underlying shallow soils. The laboratory analytical results were assessed to determine the potential risks to future site users under a generic residential land use scenario assuming that home grown produce are consumed. The quantitative risk assessment is provided in Appendix J and the laboratory certificates are provided in Appendix K. A summary table is provided in Table 15 below.

Table 15: Summary of Soil Contamination Test Results

Determinand	Number of samples	Maximum Conc. (mg/kg unless otherwise stated)	Generic Assessment Criteria (mg/kg)	Number of Exceedances
Arsenic	9	9.7	37	0
Cadmium	9	<0.5	22	0
Chromium	9	20.6	910	0
Hexavalent Chromium	9	<0.8	21	0
Copper	9	34.4	2,400	0
Lead	9	84.2	200	0
Mercury ¹	9	<0.5	40	0
Nickel	9	12.5	130	0

¹⁸ CL:AIRE, 2020 'Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration.' CL:AIRE, Buckinghamshire. ISBN 978-1-905046-35-5.

Determinand	Number of samples	Maximum Conc. (mg/kg unless otherwise stated)	Generic Assessment Criteria (mg/kg)	Number of Exceedances
Selenium	9	<1	250	0
Zinc	9	62.7	3,700	0
Asbestos	9	None detected	Presence	0
Benzo(a)pyrene ²	9	0.27	5.0	0
Naphthalene	9	0.06	2.3	0
Total PAHs	9	4.61	n.v.	-

Notes to table

1. Assessment criterion based on inorganic mercury
 2. As a surrogate marker for genotoxic PAH
 3. As a marker compound for threshold PAH
- n.v. – no appropriate value

None of the recorded heavy metal or PAH concentrations were above the GAC for a residential development and no asbestos was identified at any location investigated. Selected soil samples were also screened for the presence of pesticides and herbicides and no sample reported pesticides / herbicides above the lower detection limit of the test.

It should be noted that some fly-tipping was present on the northern part of the site, and there maybe localised contamination beneath these materials. It is recommended that once they are removed some testing is undertaken in this area. Likewise, the small historical tank and relict structure in the south-western corner may have localised made ground and or localised contamination and as such when they are removed inspection and possible testing beneath their footprint would be prudent.

21.3 Evaluation of Potential Risks to Groundworkers

Whilst no significant contamination has been identified to date, there is a legal duty for employers to ensure that suitable health and safety controls should be in place to protect groundworkers and they should evaluate the potential for exposure including using data provided in this report which should be included in any future Health and Safety file for the site under The Construction (Design and Management) Regulations 2015.

22 Controlled Waters Risk Assessment

22.1 Testing

Significantly elevated concentration of contaminants that are likely to pose a risk to controlled waters have not been identified. There is the possibility that as yet unidentified contamination may be present. If this is the case then a revised controlled water risk assessment may be required.

23 Geo-Environmental Conclusions & Recommendations

The works to date have not identified any significant contamination with respect to identified human health receptors or controlled waters. No evidence of significant made ground soils have been recorded, however localised shallow pockets of reworked soils were present.

Whilst the assessment has not found any other significant contamination, there remains the possibility that as yet unidentified contamination may be present, particularly beneath the fly-tipping and former small structures. It is recommended that some further testing in these areas once the materials and structures have been removed, are undertaken.

23.1 Groundwater

Based on the investigation undertaken and the samples that were analysed, it is not anticipated that there are any contaminants on site that will pose a risk to groundwater.

24 Waste Reduction

24.1 Soil Retention

Soil contain approximately three times as much carbon as the atmosphere. As such minimising its disturbance on site not only minimises the loss of soil for carbon storage but retaining as much soil as possible allows for biodiversity net gain and reduces the risk of surface flooding.

Where possible disturbance of soil functionality during earthworks needs to be minimised. Poorly managed soils that has been compacted in storage will have a degraded physical structure and reduced capacity to maintain above and below ground biodiversity.

The proposed layout indicates public open space and where possible the excavation from soils in these areas should be avoided.

24.2 Soil Reuse

Prior to development, consideration should be given to any on-site materials and their potential for re-use as part of, or during construction of, the proposed development.

24.3 Topsoil Re-use

Site-won topsoil is a resource and should, where possible, be treated as such to prevent damage to the soil structure. Where topsoil is to be stripped, stockpiled and re-used such activities should be undertaken during dry weather (generally June to September). Once stockpiled topsoil should be kept dry. Significant working of topsoil whilst wet can damage the soil structure, reducing the soils' ability to drain and resulting in anaerobic rather than aerobic soil conditions.

Anaerobic soil conditions can have a negative impact on plants and their roots, which will impact the ability of plants to take root once the soil has been placed for its proposed end use. Machinery tracking over recently placed topsoil should be avoided. Should prolonged poor storage result in degradation of the soil some treatment is likely to be required. This may include sand amelioration to improve the soil structure or the addition of composts to reduce nutrient deficiency.

Re-use of Made Ground and contaminated natural materials at the site, as well as importation of uncontaminated natural materials from a different site will require a Materials Management Plan (MMP) to be produced and a declaration made to CL:AIRE under DoWCoP. The declaration is required before any material movements are made and requires the RMS to have been approved through planning.

APPENDIX A – Limitations

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7¹⁹, although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and

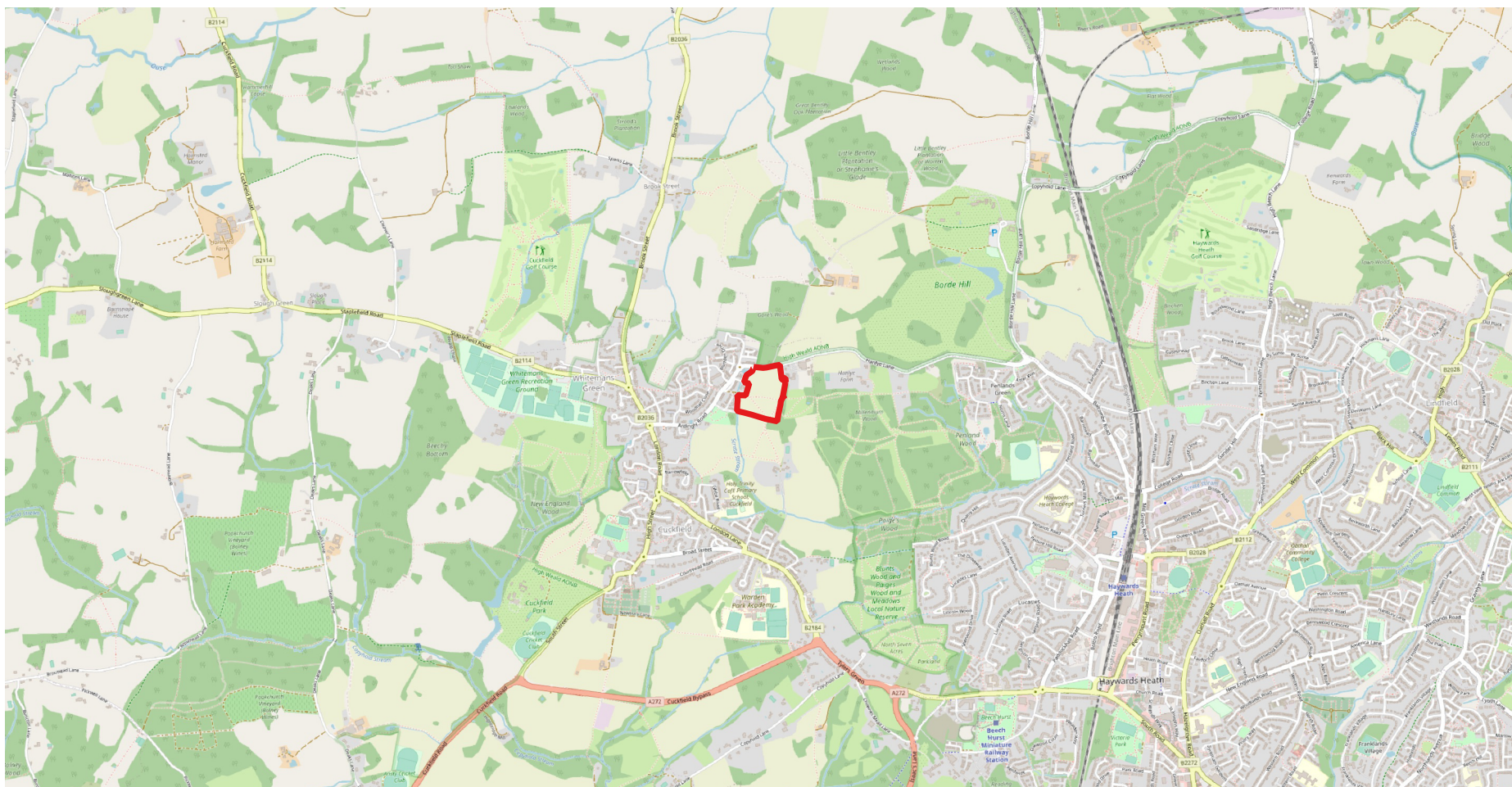
¹⁹ BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

APPENDIX B – Figures and Drawings

Figures and Drawings



Basemap: © OpenStreetMap contributors

Client: Sigma Homes

Project: LP3210

Project ID:

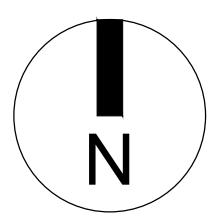
LP3210

Location: Land south of Hanlye Lane, Cuckfield

Date: March 2023

Figure No.

1



CDM 2015 Health & Safety Information

- This information relates only to 'Significant Hazards' identified on this drawing and is to be read in conjunction with the Designer's Hazard Register.
- Conflict between construction traffic / work and pedestrians, cyclists and vehicles using Hanlye Lane.
 - All site boundaries to be suitably fenced and provided with warning signage during construction works.
 - Public Rights of Way to remain open during construction stage with the site suitably secured to avoid conflict.
 - Off-site pond to be secured and protected at all times in accordance with British Standards regarding trees and construction.
 - All retained trees should be protected at all times in accordance with British Standards regarding trees and construction.
 - All underground services and structures should be identified and surveyed prior to any on-site works with these clearly marked on the ground. Water main runs north to south along western boundary.
 - Assessment of existing drainage ditch and condition of sidings to be reviewed and protected and secured during construction works to avoid contamination or damage. Upgrading of culvert to be carried out.
 - New site entrance and driveway works to be undertaken to be carried out by suitable highways contractor with risk assessments.
 - New sub-station to be located and secured with design and specification undertaken by suitable specialist.

Accommodation Schedule

Affordable Dwellings 17no. (20.9%)

4no.	1-Bedroom Apartments	Apartment Block
3no.	2-Bedroom Apartments	Apartment Block
4no.	2-Bedroom Houses	
6no.	3-Bedroom Houses	

Open Market Dwellings 38no. (59.1%)

2no.	1-Bedroom Maisonettes	Apartment Block
3no.	1-Bedroom Bungalow	
22no.	2-Bedroom Houses	
4no.	3-Bedroom Houses	
4no.	4-Bedroom Houses	
4no.	5-Bedroom Houses	

Total: 55 Dwellings

Notes:
Car Parking 1/2 spaces per 1/2 bedroom apartment
2 spaces per 2/3 bedroom houses
3 spaces per 3-5 bedroom houses (inc. garage)
19 Visitors spaces

Cycle Parking 1 space per apartment or 2 spaces per house/
bungalow in rear garden stores or garages

KEY

- Site Boundary
- Proposed Tree to be removed
- Ancient Woodland Buffer

I	03.10.23	Issued for approval	JR	NF
H	02.10.23	Updated layout and housing mix	JR	NF
G	27.09.23	Updated housing mix	NF	JR
F	13.09.23	Updated housing mix	NF	JR
E	08.09.23	Revised parking arrangements	NF	JR
D	08.09.23	Revised site layout, changes to parking and types	NF	JR
C	06.09.23	Amended parking arrangements	NF	JR
B	05.09.23	Revised layout to client comments	NF	JR
A	31.08.23	Updated layout to match house type, highways and drainage information	NF	JR

Rev	Date	Revision Details	Dr	Ch
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Client's Name
Sigma Homes

Job Title
Land South of Hanlye Lane Cuckfield

Drawing Title
Proposed Site Layout

Scale
1:500 @ A0 / 1:1000 @ A2

metres 10 20 30 40 50

Drawn AX Checked NF Date 01.08.23

Job No 7343 Drawing No PL-04 Rev I

Status
APPROVAL

CAD Plot date: 4/10/2023 - 10:46:51 7343 - completed site plan_post submission.dwg



Key:

- WS positions
- ✕ TP positions
- ▭ Site boundary

Basemap:

©

Note 1: Exploratory holes have been positioned by handheld GPS survey / 3rd party surveyors and should therefore only be taken as approximate

Note 2: Exploratory holes shown are not to scale

Note 3: Elevations not shown

OpenStreet



Client: Sigma Homes

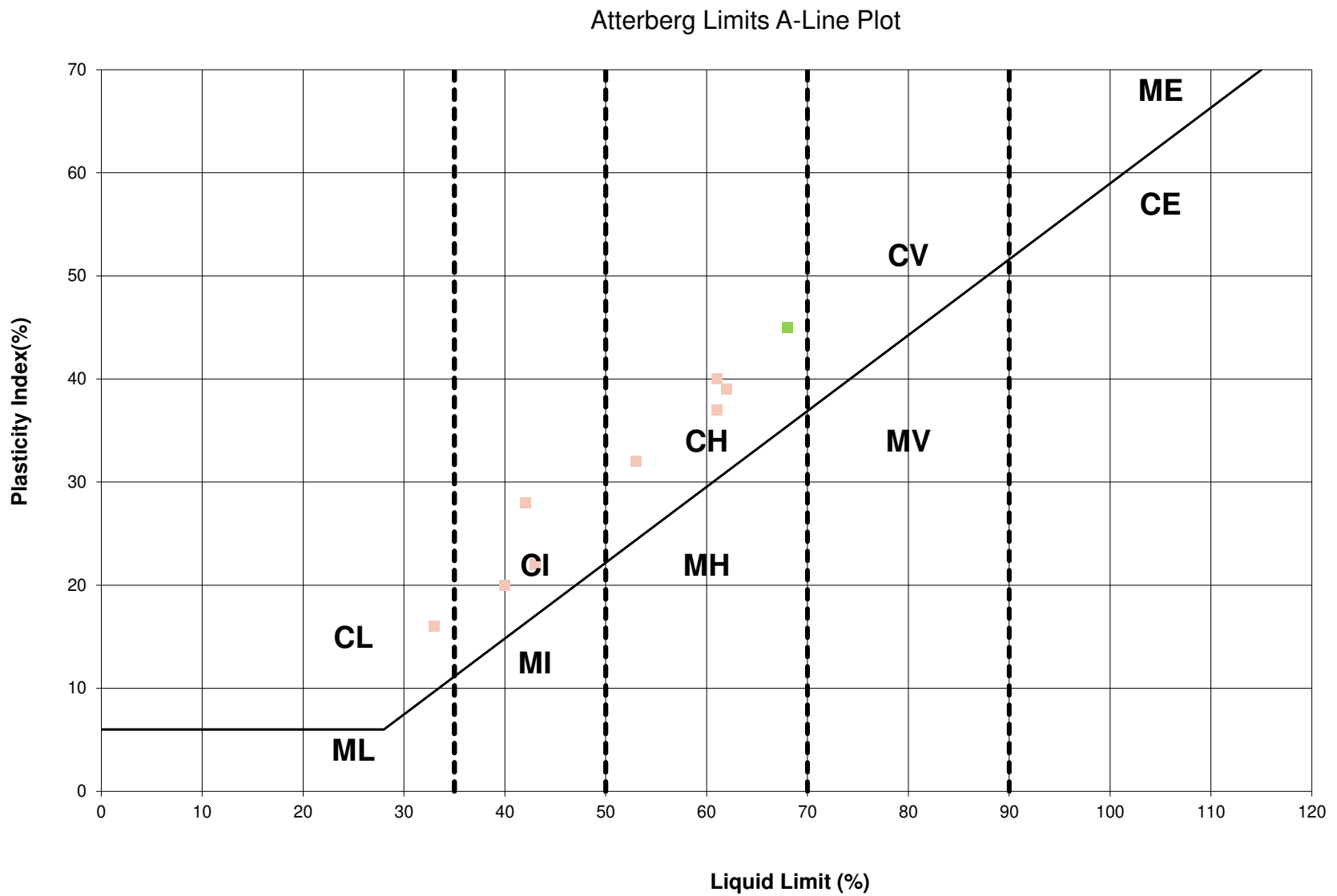
Title: SI locations

Project ID: LP3210

Project: Land south of Hanlye Lane, Cuckfield

Date: 10/03/2023

Figure No. 3



APPENDIX C – Photographic Record

Photographic Record