



Preliminary Investigation Report

at
Land east of Westergate, Chichester, West Sussex PO20 3RD

for
CALA Homes

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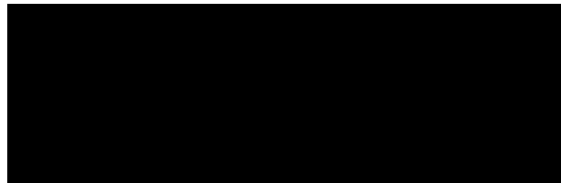
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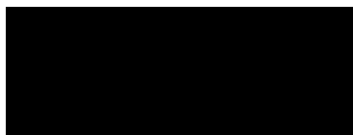
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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

Soils Limited was commissioned by CALA Homes to undertake a Preliminary Investigation on Land east of Westergate, Chichester, West Sussex PO20 3RD. The scope of the investigation was outlined in the Soils Limited quotation reference Q24788, dated 9th June 2021.

Caveat

Whilst reasonable skill and care has been taken to determine the site history and the environmental setting within the time constraints applied by the project, it should be appreciated that uncertainties may occur owing to the natural variability of soil material within a defined area or as a result of unknowns that are associated with contaminated land assessment in general. The site conditions may be different from that indicated by this Preliminary Investigation, particularly on a site with a history of past development. No responsibility can be accepted should such conditions alter the recommendations made in this report.

Without a drainage survey it is not possible to establish if the surface water drainage is to the main drainage system or to soakaways. If there are soakaways on-site, they could act as a potential source. The geology on-site to an extent may determine if soakaways were likely to have been adopted.

This Preliminary Investigation does not include a detailed UXO risk assessment, it does however contain a basic assessment in accordance with CIRIA C681 and C785. In preparing a Preliminary Investigation reference is made to historical maps and web-based sources to assess the risk of the site potentially having been impacted by bombing during the World Wars. The data readily available is not necessarily definitive. Certain areas were bombed heavily such as centres of industrial manufacture, airfields, shipyards, docklands, railways sidings and junctions. The assessment is based on the likely area risk, bomb patterns (i.e. lines of recorded bomb impacts with gaps where an impact would be anticipated) and the age of structures on and in close proximity to the site-

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Section I Introduction

I.1 Objective

The Preliminary Investigation Report was undertaken to advise the client on the risk pertaining to the site, with special reference to historic and current potential contaminative activities and processes. This also included the assessment of their impact on current and future sensitive receptors such as human health, controlled waters, ecological features, building structures and services.

I.2 Site Location

The site was located at Land east of Westergate, Chichester, West Sussex PO20 3RD and had an O.S Land Ranger Grid Reference of SU 94104 04798.

The site location map is presented in Figure 1 and the full Site Walkover is discussed in Section 2.1 of this report.

I.3 Proposed Development

The proposal comprised redevelopment of the site from farmland to housing with gardens and areas of open recreational space. At time of writing only a speculative plan has been provided for the development and this report must be reviewed and revised in relation to actual site-specific proposals if it is to be presented as evidence in pursuit of a planning application. All conclusions and findings in this report will therefore be essentially generic in nature and should be viewed in this light.

The speculative development plans provided by the Client are attached as Appendix A.

I.4 Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. The legislation provides powers in relation to the identification, remediation and apportionment of liability for contaminated land. Part 2A applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

Under Part IIA of the Environment Act 1995, Local Authorities are required to identify contaminated land and serve on every person who is an appropriate person a remediation notice setting out what is to be done by way of remediation and the period within which it must be done.

If the person who caused, or knowingly permitted, the contaminating substance cannot be found, the owner and/or, occupier for the time being, of the property can be the

appropriate person.

Under the legislation, Contaminated Land is defined as: -

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused.”

Where the Act defines harm as:

“harm to the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property.”

and pollution of controlled waters is defined as: -

“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter.”

In addition, The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 introduced the supplementary definition of harm to include: lasting exposure to any person resulting from the after-effects of a radiological emergency, past practice or past work activity.

With regard to contaminated waters, the Environment Act 1995 amends the Water Resources Act 1991 and provides the Environment Agency with the power to force clean-up of historical contamination by issuing a Works Notice, with remediation paid for by the responsible parties.

The Groundwater Regulations (1998) stated that entry of List 1 substances into groundwater must be prevented, and List II substances must be controlled.

1.5 Limitations and Disclaimers

This Preliminary Investigation Report relates to the site located at Land east of Westergate, West Sussex PO20 3RD and was prepared for the sole benefit of CALA Homes (The “Client”) for the brief described in the Commission of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Quotation Q24788, dated 9th June 2021 accepted by the client in their Purchase Order Q24788, dated 8th July 2021.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the contract with the Client, incorporation of our General

Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

There may be other sources of information not included in those listed that hold data relevant to the Preliminary Investigation Report undertaken at the site that could materially affect the conclusions made in this report.

It should be noted that a detailed survey of the possible presence or absence of invasive species, such as Japanese Knotweed, is outside of the scope of investigation.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995.

Where a contaminative use is identified in the Preliminary Investigation Report this does not determine whether contamination has actually occurred, or if it has the degree to which it may have taken place. An intrusive investigation(s) and analysis is required to establish the nature and degree of any contamination present.

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Section 2

Site Conditions

2.1 Site Walkover

A site walkover was undertaken in July 2021, by Soils Limited. During the site walkover observations were made in relation to current activities, evidence of historical activities, sources of potential contamination such as fuel storage tanks, oil drums and chemical storage and evidence of contamination. The walkover also looked for evidence of soil contamination in the form of staining odours and stressed or discoloured vegetation. The notes of the site walkover are presented in Table 2.1 and Table 2.2.

Table 2.1 Site Walkover Record (On-site)

Use of Site	Agricultural Fields and Grassland (Photograph 1)
Structures	None noted within site boundary
Site Topography	Generally flat but undulating (Photograph 2) overall slight local dips (<5°) towards water courses and overall to the SE and E
Site Covering	Vegetation and some dirt tracks
Vegetation	Mature trees and shrubs generally line field boundaries and some areas are completely overgrown (Photographs 1-3)
Potential Contamination Sources	Some minor fly-tipping at entrance from St Richards Road (NW)
Odour	None Noted
Drainage	Assumed to field boundaries and underlying strata

Table 2.2 Site Walkover Record (Off-site)

Use of Land	N: Residential with gardens E: Agricultural Fields (Photograph 4) S: Agricultural Fields W: Residential with Gardens
Area Topography	Local rise (<5°) to slight ridge (Westergate Street) trending N/S to the W of the site and Woodgate to the SE. At the northern end of the site land rises slightly (<5°) to the N and NE towards Eastergate. Undulating and flat overall.
Vegetation	Gardens, agricultural fields, grasslands (some overgrown) and mature shrubs and trees in and on the boundaries of adjacent properties. Some allotments.
Potential Contamination Sources	None identified

2.2 Site Drainage

No evidence of drainage, assumed to water courses by surface or sub-surface flow through superficial deposits.

2.3 Site Photographs

The site photographs have been included within Appendix F.

Section 3

Geology, Hydrogeology, Hydrology and Radon**3.1 Anticipated Geology**

The 1:50,000 BGS Geology map showed the site to be situated on London Clay Formation bedrock, with complex overlying superficial deposits.

The site had a water course running through its centre from west to east, feeding into another water course which ran north to south along the eastern site boundary. Alluvium was recorded adjacent to both water courses, with Raised Beach Deposits evident to the central northwest. To the north of these deposits Head was noted and to the south, River Terrace Deposits are also present. Made Ground was noted on the south eastern boundary as a Railway embankment. Please see Plate 1, below.

3.1.1 Made Ground

Made Ground comprises material that has been placed by man or spread by man. It can comprise demolition material from former structures on the site or imported material placed to raise levels. Its composition can be very variable both laterally and with depth and may contain putrescible matter and voids.

3.1.2 Alluvium

Alluvium is the most recent river or estuarine deposit and generally comprises silty clays usually with an appreciable organic content. Lenses of sand and gravel are also commonly found, as are pockets of peat.

The BSI Code of Practice for Foundations, BS8004: 1986, Clause 2.2.2.3.4 Peat and organic soils, includes the caveat that 'all these soils are highly compressible, and even lightly loaded foundations will be subject to considerable settlements over a long period if placed on them. For this reason, these soils are not suitable for carrying the loads for important structures'.

3.1.3 Head

Head deposit are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted sands gravels and chalk of local derivation.

3.1.4 Raised Beach Deposits

Raised Beach Deposits consist of shingle, sand, silt and clay. Beach deposits may be in the form of dunes, sheets or banks, now above the level of the present shoreline as a result of earth movement or a general fall in sea level.

3.1.5 River Terrace Deposits

The rivers of the south-east of England, including the River Thames and its tributaries, have been subject to at least three changes of level since Pleistocene times. One result has been the formation of a complex series of River Terrace Deposits. These terraces represent ancient floodplain deposits that became

isolated as the river cut downwards to lower levels. The composition of the River Terrace Deposits varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sand and gravel of roughly bedded flint or chert commonly in a matrix of silt and clay.

3.1.6 London Clay

The London Clay Formation in the Hampshire region comprises silty and sandy clay, clayey and sandy silt, silty sand; sporadic claystones and thin beds of flint pebbles. The formation includes the Bognor Sand, Whitecliff Sand, Durley Sand, Portsmouth Sand and Nursling Sand Members. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the London Clay Formation rests on the Lambeth Group.

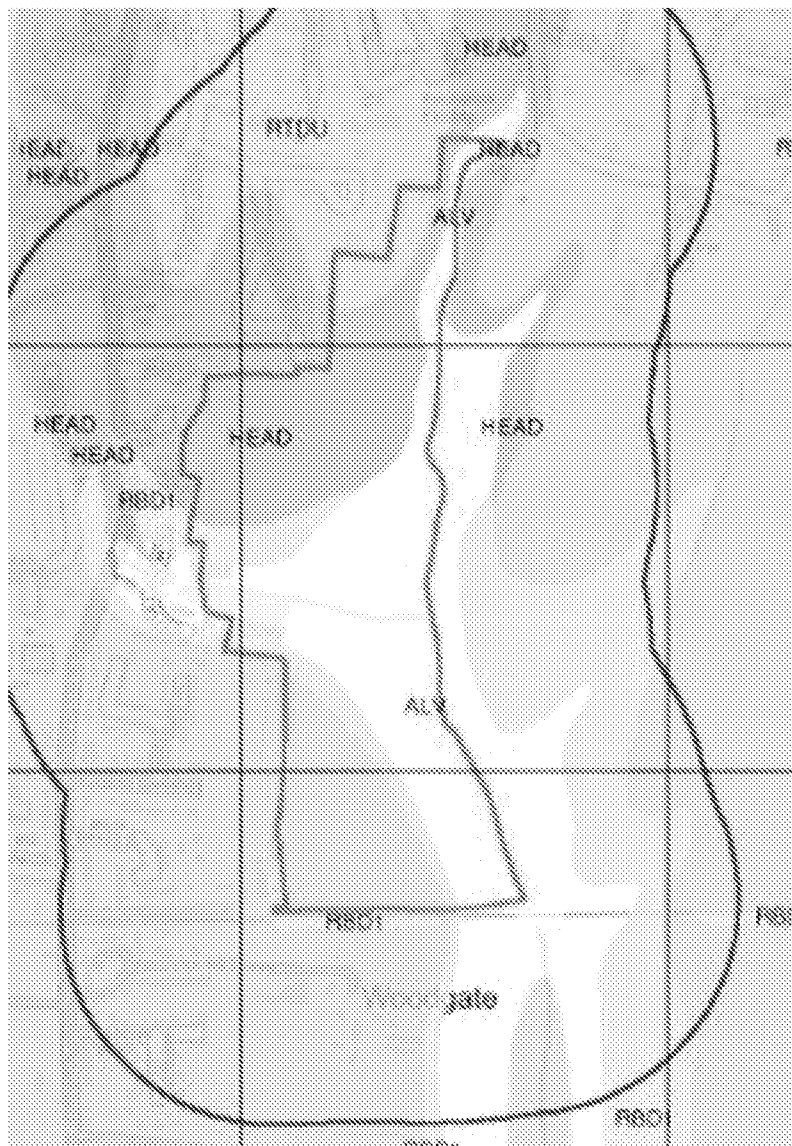


Plate 1 Geology

3.2 Hydrogeology

To assess the vulnerability of groundwater to contamination, consideration must be given to the leaching characteristics of the overlying soils and the characteristics of the strata in the unsaturated zone. Information on the geological strata such as lithological type and permeability characteristics has been combined with the physical properties of the soil to produce varying degrees of vulnerability.

Table 3.1 presents the hydrological data that is relevant to the site.

Table 3.1 Hydrogeological Assessment

Hydrogeological Data		Comment
On-site	Superficial	Secondary A ¹ or undifferentiated
Aquifers	Bedrock	Unproductive ²
Groundwater Vulnerability		Superficial aquifers medium to highly vulnerable, bedrock unproductive
Source Protection Zones (SPZ)		Zone IIc (Outer Protection Zone) 640m N
Abstraction	Potable	None noted within 1 km
	Non-potable	Spray Irrigation from surface waters 45-56m SE
Sensitive land uses		Nitrate Vulnerable Zone - Surface Waters – on site
Surface Water Features		On Site – Inland Rivers – 5no noted
Flood Risk from Rivers or Seas		Potential for flooding on site ³
Flood Risk from Surface Water		Potential for flooding on site ³
Flood Risk from Groundwater		Potential for flooding on site ³

Notes: ¹Secondary A are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. ² Unproductive strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. ³ A Detailed Flood Risk Assessment is strongly indicated as the site may be at potentially significant risk from flooding.

Any works or development which has the potential to have an impact on surface water, aquifer or groundwater quality must be approved by the Environment Agency prior to implementation.

3.3 Hydrology

The approximate elevation of the site was variable due to the presence of local watercourses and undulating ground but varied between 2m and 8m above Ordnance Datum (AOD). The anticipated groundwater flow direction is given in Table 3.2.

Table 3.2 Hydrological Assessment

Type	Direction	Notes
Surface water	East/South	Following and feeding into local water courses or into underlying superficial aquifers
Groundwater	East/South	Following and feeding into local water courses through underlying superficial aquifers, flow into and through London Clay negligible – Unproductive Strata

3.4 Radon Gas

The Landmark Report indicated that the site was not situated within an area where additional risk assessment required with risk being low (<1%) to intermediate (1-3%). Radon protection measures will not be required within the proposed new development. It is not possible in the course of a survey or inspection to determine whether radon gas is present as the gas is colourless and odourless. Tests can be undertaken to assess the concentration of radon in existing structures.

Section 4

Site History

4.1 Historic Map Study

The object of this study was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Landmark Environmental.

The published maps only represent a “snap-shot” of the site and its environs at the date of the survey. The detail of the information recorded can vary between epochs, map scale and county areas. It should be noted that changes in land uses, processes or activities may have occurred outside of published epochs and these may not have been recorded on subsequent epochs. Also note that as methods of projection, production and recording have changed over time, this can result in geo-reference errors that may indicate the established site boundary is off-centre from its true location on older historical maps. Where this is potentially significant it will be noted.

Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. Where dates have been noted in brackets, these are the actual dates applicable to the map editions and may not reflect the date of the original survey it is based on. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and/or other data commented on in this report is subjective.

As part of the review of the historical plans, only features considered to have or to have had a potential contaminative impact on the site and usually within a notional 250m radius are discussed. The north point and approximate extent of the site are indicated on each figure. The historic maps referred to are appended to this report (Appendix B).

Table 4.1 Historic Development of the Site

Site History	Date Range	
	From	To
The site is agricultural and open land adjacent and to the west of a north to south trending un-named watercourse. An east to west trending Railway Line forms the southern boundary. The only notable construction activity on site is a small Sewage Works noted on the eastern boundary adjacent to the un-named watercourse on maps dating 1974-1979 but not present from 1986 onwards.	1876 ¹	2021 ²

Notes: ¹ Earliest available map ² No small-scale maps (1:2500) available for period 1937-1974

Table 4.2 Historic Off-site Development

Off-site Development	Date Range	
	From	To
The site lies between the settlements of Westergate to the northwest and west, Eastergate to the northeast and Woodgate to the southwest. Land to the east and south over the Railway Line is also agricultural.	1876 ¹	1913

Off-site Development	Date Range	
	From	To
A Nursery and Orchard have been developed directly east and southeast of the site and similar developments are occurring around Eastergate 250m-1 km northeast.	1913	1949
The Aerial Photograph noted the start of development of new housing and garages adjacent to the north western corner of the site but does not indicate any obvious evidence of military activities or wartime damage on or around the site.	1949	1951
A Brickfield has been established 300m south of the site across the Railway Line. Westergate School is established 100m northwest of the northern boundary of the site.	1951	1974
Eastergate School has been developed to the east across the un-named watercourse at the northern end of the site. The former Brickfield is not longer marked but Ryefield Piggeries has now been developed 100m south of the site.	1974	1986
As the 1970's progress, new housing is being developed along the eastern and south eastern boundaries of the site as Westergate and Woodgate continue to expand.		
Allotment Gardens are noted directly north of the site from 1979		
The former Piggeries is now noted as a Farmhouse	1986	1999
The Westergate School to the northwest is being redeveloped with the addition of an adjacent Sports Centre including the area of former allotments to the north. This site is renamed Ormiston Six Villages Academy by 2021.	1999	2021
Notes: ¹ Earliest available map ² No small-scale maps (1:2500) available for period 1937-1974		

Table 4.3 Potential Sources of Pollution Indicated from Historic Maps

Source	Direction	Distance (m)	Date Range	
			From	To
Railway Line and Embankment	S	Adjacent	1876	2021
Sewage Works	On Site	N/A	1974	1986
Nurseries	SW	20	1913	2006
Piggeries	S	100	1974	1986
Brickfield	S	300	1951	1974

4.2 Bomb damage and the potential for Unexploded Ordnance

In accordance with CIRIA C681 and C785 a review has been undertaken of the historic maps and aerial photographs which none of which has indicated that the site has been/or lies in an area that is likely to have been subject to bombing, shelling or has had significant military use. Online ZeticaUXO maps accessed in August 2021 indicated that the site is in a low-risk area with less than 15 incidents per 100 acre or less and no immediate targets or incidents are noted within 1km of the site.

Based on this assessment further specialist UXO risk assessment is not required.

Section 5

Environmental Records and Consultation

5.1 Dataset Information

The Landmark Envirocheck Report was obtained by Soils Limited and includes site specific information. The extent of the search has initially been limited to a radius of 250m as it is considered that sources of contamination beyond 250m are unlikely to impact on the site. This search radius may however, be increased if a significant source of contamination or sensitive receptor is identified within 1000m of the site. A copy of the report is appended to this report in Appendix summarised in Table 5.1, Table 5.2 and Table 5.3.

Table 5.1 Environmental Significance of Data

Source	Direction	Distance (m)
Contaminated Land Register Entries and Notices	None	None
Discharge Consents – Eastergate Primary School	On Site	
Integrated Pollution Prevention and Control	None	None
Local Authority Pollution Prevention and Controls	None	None
Local Authority Pollution Prevention and Control Enforcements	None	None
Nearest Surface Water Feature	On Site	
Pollution Incidents to Controlled Waters (Significant Incidents only)	None	None
Prosecutions Relating to Authorized Processes	None	None
Registered Radioactive Substances	None	None
Substantiated Pollution Incident Register	None	None
Nearest Potable Abstraction Point	None	None
Nearest Non-Potable Abstraction Point – Spray Irrigation	SE	45-56
Water Industry Act Referrals	None	None
Source Protection Zones	None	None
Extreme Flooding from Rivers or Sea Without Defences	On Site	
Flooding from Rivers or Sea Without Defences	On Site	
Areas Benefiting from Flood Defences	None	None
Flood Water Storage Areas	None	None
Flood Defences	None	None
BGS Recorded Landfill Sites	None	None
Historical Landfill Sites	None	None
Licensed Waste Management Facilities	None	None
Local Authority Recorded Landfill Sites	None	None
Potentially Infilled Land (Non-Water)	None	None
Potentially Infilled Lane (Water) 5 No	On Site	
Registered Landfill Sites	None	None
Registered Waste Transfer Sites	None	None
Registered Waste Treatment or Disposal Sites	None	None
Control of Major Accident Hazards Sites (COMAH)	None	None
Notification of Installations Handling Hazardous Substances	None	None
Planning Hazardous Substance Consents	None	None

Table 5.2 Contemporary Trade Directory

<i>Contemporary Trade Directory within 250m</i>	<i>Direction</i>	<i>Distance (m)</i>	<i>Status</i>
Time for You – Home Laundry	NW	18	Inactive
Scotts Direct – Car Dealer	SW	62	Inactive
Smarter Blinds	N	101	Inactive
Dimensions – Office furniture and equipment	NW	117	Inactive
Davon Ports – Cabinet makers	S	123	Inactive
Polishedact – Antique repair	S	127	Inactive
Emberleaf Workshops – Tool design	NW	128	Active
DW Transport Refrigeration – Servicing and parts	W	147	Inactive
LJM Transport – Haulage	N	154	Inactive
Weston Heating Services	S	159	Inactive
Prettywaste – Shredders	N	177	Inactive
Polishedact – Furniture repair	SW	233	Inactive
The Cleaning Biz – Domestic	NW	238	Inactive

Table 5.3 Geological Hazards

<i>Source</i>	<i>Nearest Distance from Site/Type</i>
Coal Mining Affected Areas	Unlikely / No Hazard
Mining Instability	None noted
Natural and Mining Cavities	None noted
Potential for Collapsible Ground Stability Hazards	None to Low ¹
Potential for Compressible Ground Stability Hazards	None to Moderate ¹
Potential for Ground Dissolution Stability Hazards	None
Potential for Landslide Ground Stability Hazards	Very Low
Potential for Running Sand Ground Stability Hazards	Very Low to Low ¹
Potential for Shrinking or Swelling Ground Stability Hazards	Very Low to Low ¹

Notes: ¹ The variability is due to the wide range of superficial deposits noted on site (See Section 3)

5.2 Site Sensitivity Maps

No other significant potential sources of contamination were shown on the Landmark Envirocheck Site Sensitivity Maps, which have not been listed in Table 5.1, Table 5.2 and Table 5.3, and copies of which are appended to this report (Appendix C).

5.3 Regulatory Enquires

As this is a speculative enquiry the local authority was not contacted on this occasion to provide information on potential risks pertaining the site, but it is recommended that when the report is reviewed (considering a final application) that the regulator be consulted as part of the application process.

However, Soils Limited are aware from works undertaken in this area that the regulator has few concerns in relation to contaminated land in general other than the from the former Piggery to the south which has been investigated previously as part of a proposed development regarding the potential for buried animals due to a swine flu

outbreak in the late 1970's, which in fact caused the Piggery to close. At that time, they also noted that they had no concerns in relation to contamination from the Railway Line and associated structures based on the age of the railway infrastructure development and a lack of sidings or storage in the immediate area.

5.4 Soil Geochemistry

The BGS soil chemistry for environmental assessments dataset coverage, has been developed from BGS G-BASE and Imperial College Wolfson Atlas data. It contains estimated ambient As, Cd, Cr, Ni and Pb background concentrations for rural topsoils across Great Britain. It also contains the locations and measured concentrations (mg kg⁻¹) of As, Cd, Cr, Cu, Ni, Pb, Sn and Zn in urban topsoil samples, collected from geochemical surveys in 23 major urban centres.

The results of this survey are contoured on the Landmark Environmental check report (Appendix C). The results of the local soil chemistry are presented in Table 5.4.

Table 5.4 Soil Geochemistry

Determinant	Estimated Soil Geochemistry (mg kg ⁻¹)
Arsenic	<15
Cadmium	<1.8
Chromium	60-90
Lead	<100
Nickel	15-30

Note: None of the results noted approaches current residential guidance values

Section 6

Data Collection Summary

6.1 General

The findings of the data collection are summarised below:

Table 6.1 summarises the site Environs, which include geology, hydrogeology, the risk from radon and potential risk from flooding.

Table 6.1 Site Environs

Environs	Summary
Geology	Variable superficial deposits overlying London Clay Formation bedrock.
Hydrogeology	Superficial aquifers Secondary A or Secondary Undifferentiated and could support shallow groundwater. The London Clay Formation bedrock was Unproductive Strata and would act as an aquiclude to any deeper groundwater regime.
Source Protection Zone (SPZ)	Zone IIc (Outer Protection Zone) 640m N.
Surface Water Flow	Anticipated to be vertically down into the granular superficial deposits or direct into local watercourses east and south.
Groundwater Flow	Superficial Aquifers only following trend of local watercourses east and south.
Radon	No radon risk identified.
Flooding	The site does not benefit from flood defences and there are potential risks from Rivers and Seas, Surface Waters and (due to the underlying superficial aquifers) groundwater as well. On this basis a detailed Flood Risk assessment is strongly recommended.
Geological Hazards	Potential for Collapsible Ground Stability Hazards None to Low Potential for Compressible Ground Stability Hazards None to Moderate ¹ Potential for Ground Dissolution Stability Hazards None Potential for Landslide Ground Stability Hazards Very Low Potential for Running Sand Ground Stability Hazards Very Low to Low Potential for Shrinking or Swelling Ground Stability Hazards Very Low to Low
Local Authority Response	Not undertaken on this occasion.
Soil Chemistry	None of the results noted approaches current residential guidance values.

Notes: ¹ The variability is due to the wide range of superficial deposits noted on site

Table 6.2 provides a summary of potential on-site and off-site contamination sources identified during the study of the historic maps, the Landmark Envirocheck Dataset Report and the Site Walkover

Table 6.2 Summary of Potential Contamination Sources

Contaminative Sources/Environmental Impact	Direction	Distance (m)	Date Range		Data Source
			From	To	
On-Site					
Sewage Works	E	N/A	1974	1986	HM
Railway Line Embankment	S	Adjacent	1876	2021	HM
Off-Site					
Nurseries	SW	20	1913	2006	HM

Contaminative Sources/Environmental Impact	Direction	Distance (m)	Date Range		Data Source
			From	To	
Piggeries	S	100	1974	1986	HM
Brickfield	S	300	1951	1974	HM
Time for You – Home Laundry	NW	18			DS
Scotts Direct – Car Dealer	SW	62			DS
Smarter Blinds	N	101			DS
Dimensions – Office furniture and equipment	NW	117			DS
Davon Ports – Cabinet makers	S	123			DS
Polishedact – Antique repair	S	127			DS
Emberleaf Workshops – Tool design	NW	128			DS
DW Transport Refrigeration – Servicing and parts	W	147			DS
LJM Transport – Haulage	N	154			DS
Weston Heating Services	S	159			DS
Prettywaste – Shredders	N	177			DS
Polishedact – Furniture repair	SW	233			DS
The Cleaning Biz – Domestic	NW	238			DS

Notes:, HM – Historic Maps, DS – Datasheet,,

Section 7 Preliminary Conceptual Site Model

7.1 General

Environment Agency guidance provided in CLR11 indicates that the Conceptual Site Model should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment. The following sections present potential contaminants, pathways and receptors based on the information collected during the desktop study. Pathways have been established based on scientific knowledge of the behaviour of the contaminants in the ground.

7.2 Sources and Pathways of Contamination

The Landmark Site Specific Envirocheck Report and Site Walkover have been used to identify potential contaminative sources. These sources have been presented in Table 6.2. An assessment of the likely pathways and the likelihood of each contaminative source that was considered a risk has been presented in Sections Potential Pathways to 7.2.5

7.2.1 Potential Pathways

A review of the potential pathways on and off the site has been undertaken based on the site, ground conditions, hydrology and scientific knowledge of the behaviour of the contaminants in the ground. The pathways applicable to the site and the proposed development have been marked in Table 7.1.

Table 7.1 Applicable Pathways

Pathway	Present	Comment
Inhalation of dust	Yes	
Inhalation of vapour/gases	Yes	
Ingestion and absorption via direct contact	Yes	
Migration via surface runoff	Yes	
Migration in solution via groundwater	Yes	
Migration of gases via permeable soils	Yes	
Direct contact with construction material	Yes	
Services and Utilities	Yes	
Notes:		

7.2.2 Potential Sources of On-site Contamination.

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential on-site sources of contamination which may present a risk to future uses of the proposed development.

The sources are presented in Table 7.2.

Table 7.2 On-site Potential Contamination Sources

Source	Likely	Reasoning
Sewage Works		Only a small temporary structure (associated discharge consent dated 1972 and revoked by 1979). No evidence of any associated contamination or incident associated with this historic use. Site adjacent to the watercourse any contamination or pollution would enter the watercourse and/or been leached. Some remaining foundations etc. may be present at depth but are not likely to be significant.
Railway Line Embankment		South of site downgradient and technically off site. Age of emplacement (pre 1880's) suggests no significant contamination possible to remain. Ground Gas risk pathway (above surface) not viable even if present. Surface / groundwater flow would go to adjacent watercourse and/or flow downstream (S) away from site.

7.2.3 Potential Off-site Sources of Contamination

A study of Landmark Envirocheck Report and Site Walkover has identified the following potential off-site sources of contamination which may present a risk to future uses of the proposed development.

These sources have been presented in given in Table 7.3.

Table 7.3 Off-site Potential Contamination Sources

Source	Direction	Distance (m)	Likely	Reasoning
Nurseries	SW	20		Some glasshouses and possible storage no evidence of oil heating or related pollution incidents
Piggeries	S	100		Topographically and spatially distant, downgradient across Railway Line, only active for 10 years, investigated previously – no risk
Brickfield	S	300		Topographically and spatially distant (>250m), downgradient across Railway Line, only active for short period but probably infilled
Time for You – Home Laundry	NW	18		Inactive, no process licence, home working so unlikely to be significant storage of chemicals. No associated pollution incidents
Scotts Direct – Car Dealer	SW	62		Spatially distant and no evidence of on-site fuel storage, works or breaking activities. No associated pollution incidents and now inactive
Smarter Blinds	N	101		Spatially distant no evidence of licenced activities or associated pollution incidents and now inactive
Dimensions – Office furniture and equipment	NW	117		
Davon Ports – Cabinet makers	S	123		Topographically and spatially distant and downgradient no evidence of licenced activities or associated pollution incidents and now inactive
Polishedact – Antique repair	S	127		Topographically and spatially distant and downgradient no evidence of licenced activities or associated pollution incidents and now inactive

Source	Direction	Distance (m)	Likely	Reasoning
Emberleaf Workshops – Tool design	NW	128		Topographically and spatially distant no evidence of licenced activities or associated pollution incidents but remains active
DW Transport Refrigeration – Servicing and parts	W	147		Topographically and spatially distant no evidence of licenced activities or associated pollution incidents and now inactive
LJM Transport – Haulage	N	154		Spatially distant and no evidence of on-site fuel storage, works or breaking activities. No associated pollution incidents and now inactive
Weston Heating Services	S	159		Topographically and spatially distant and downgradient no evidence of licenced activities or associated pollution incidents and now inactive
Prettywaste – Shredders	N	177		Topographically and spatially distant no evidence of licenced activities or associated pollution incidents and now inactive
Polishedact – Furniture repair	SW	233		
The Cleaning Biz – Domestic	NW	238		

7.3 Potential Contaminants

To ascertain the chemicals associated with identified potential onsite and offsite sources, the Department of the Environment Industry Profiles have been reviewed. In cases where the DOE profiles have no, or limited information other sources have been reviewed detailing the processes involved in the activity carried out on-site.

Table 7.4 presents the range of possible contaminants associated with the onsite and off-site activities and sources identified following a review of historical maps and datasets.

Table 7.4 Potential Contaminants

Potential Contaminative Sources	Contaminants / Chemical Properties
None Identified	

7.4 Potential Exposure Receptors

The receptors to any potential contamination have been evaluated from our understanding of the current and planned land use of the site, an assessment of surrounding land uses and currently available information pertaining to the site.

The assessment for potential receptors is presented in Table 7.5.

Table 7.5 Potential Receptors

Potential Receptor	Present
Human Health	Future users of the site

Potential Receptor		Present
	Construction workers on-site	Yes
	Service and maintenance workers	Yes
	Site neighbours and wider public	Yes
Groundwater/Controlled Waters	Surface Water	Yes
	Groundwater/Future Potable Water Supply	Yes
Buildings & Materials	Buildings and confined spaces	Yes
	Construction materials	Yes
	Services and Utilities (e.g. drinking water pipes)	Yes
Ecosystems	Flora and fauna	None Identified

7.5 Preliminary Conceptual Site Model and Risk Assessment

A preliminary risk assessment has been undertaken based on the proposed development. The assessment has been based on the likelihood of the presence of a pollutant linkage.

A pollutant linkage is the relationship between a contaminant source, a pathway and a receptor. Unless all three elements of a pollutant linkage are present, a risk is not considered to exist. Each of the three elements has been considered within Table 7.1 to Table 7.5. The preliminary conceptual site model and risk assessment is presented in Table 7.6. The classification tables on which the level of risk has been determined have been modified from 'Contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552' and are presented in Appendix G.

Table 7.6 Preliminary Conceptual Site Model and Risk Assessment Methodology

Source (Table 7.2 and Table 7.3)	Potential Contaminant (Table 7.4)	Exposure Pathway (Table 7.1)	Receptor (Table 7.5)	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
None Identified		Inhalation of dust	Site Workers/Site Maintenance				Site located on bedrock of the London Clay Formation, which was classified as unproductive strata and would act as an aquiclude to underlying Deep Aquifer groundwater receptors.	Additional investigation to confirm these conclusions may be required by the regulator
			End Users					
			Off-site Users					
		Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance				No identified source to affect superficial deposits.	
			End Users					
			Off-site Users					
		Ingestion and absorption via direct contact	Site Workers/Site Maintenance					
			End Users					
		Migration via surface runoff	Surface Water					
		Migration in solution via groundwater	Surface Water					
			Shallow Aquifer					
			~~Deep Aquifer~~					
		Direct contact with construction material	Buried structures					
			Buried Services					
		Migration of gases via permeable soils	Site Workers/Site Maintenance					
			End Users					
			Off-site Users					
			Building and confined spaces					

Section 8

Recommendations

8.1 General

Based on the information obtained during the compilation of this Preliminary Investigation and the preliminary conceptual site model, no potentially significant sources have been either identified or confirmed based on the known site history, further intrusive investigation is therefore not considered to be necessary to further quantify the risks identified.

However, unknowns do remain and a precautionary investigation to confirm these findings and conclusions is recommended, possibly in combination with a geotechnical investigation to determine the extent of the variables in response from the different superficial strata identified, which could have significant effects on the foundation solutions proposed for different areas of the site.

Any subsequent intrusive investigation may reveal additional on-site sources of contamination that were not identified in the Preliminary Investigation and Site Walkover. Any additional sources of contamination or unexpected ground conditions that may promote the migration of contamination will be included and assessed in terms of significance within an updated Conceptual Site Model.

8.2 UXO

Based on the assessment further specialist UXO risk assessment is not required.

8.3 Proposed Further Site Works

Intrusive investigation as part of other works is advised to clarify the remaining uncertainties that have been identified within the preliminary CSM. The preliminary CSM usually identifies the test parameters relevant to the sources that have a pathway to a receptor but in this case (as no specific sources have been identified) generic screening suites are considered more appropriate. Dependant on the findings of an intrusive investigation, the test parameters may be modified. The intrusive investigation will be designed to investigate and assess the pollutant linkages identified in the preliminary Conceptual Site Model.

The general requirements for further environmental investigation are presented in Table 8.1.

Table 8.1 Proposed Further Environmental Investigation

<i>Proposed Works</i>	<i>General Purpose</i>	<i>Required</i>
Investigatory Holes	To collect sufficient samples for a robust assessment	✓
Laboratory Testing	To quantify the risks identified in the Conceptual Site Model	✓

Proposed Works	General Purpose	Required
Risk Assessment	Assess pollutant linkages based on current contaminated land guidance and screening criteria's	✓
Borehole well installation	To allow for groundwater and/or gas monitoring if relevant	✓
Remediation	If the site-specific risk assessment reveals that the site was contaminated	TBA
Validation & Verification	To validate and verify the remedial objectives based on the site-specific risk assessment	TBA

8.4 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the groundworks and construction phases for the development of the site.

Care should be taken during excavation works especially to investigate any soils which appear by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded, and the Local Authority and a competent and appropriate third-party Engineer/Environmental consultant notified immediately. An approval from the Local Authority must be sought prior to implementing any proposed mitigation action.

The discovery strategy must remain on-site at all times and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.



Figure 1 – Site Location Map



Job Number
19522

Project
Land east of Westergate, West Sussex PO20 3RD

Client
CALA Homes

Date
September 2021

Soils Limited
Geotechnical & Environmental Consultants

**Newton House
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Surrey KT20 5SR**



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