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DESK STUDY / PRELIMINARY RISK ASSESSMENT REPORT

209-219 HENLEY ROAD
READING
RG4 6LJ



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EXECUTIVE SUMMARY

Mr Lloyd Anthony ('The client') commissioned Jomas Associates Ltd to undertake a desk study and preliminary risk assessment at 209-219 Henley Road, Reading, RG4 6LJ. The principal objectives of the study were as follows:

- To determine the nature and where possible the extent of contaminants potentially present at the site;
- To establish the presence of significant contaminant linkages, in accordance with the procedures set out within the Environment Agency (EA) report R&D CLR11 and relevant guidance within the National Planning Policy Framework (NPPF);
- To assess whether the site is safe and suitable for the purpose for which it is intended, or can be made so by remedial action.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	Rear gardens of residential properties.
Proposed Site Use	Construction of 9No. new dwellings to the rear of 209-219 Henley Road, with associated access road and landscaping
Site History	A review of historical maps indicates that the earliest recorded site use (1878) is as undeveloped or agricultural land. By the map dated 1932, the site has been developed to comprise the rear gardens of 6No. residential properties. The western arm of the site is occupied by a single residential building. By the map dated 1956, a few small buildings resembling sheds or garages shown in south of site. Few significant changes then occur to the site until the present day. Historically, the surrounding area has primarily been in use as agricultural land. A chalk pit and gravel pit are shown in close proximity to the site and are labelled as 'old' by the map dated 1913. By the map dated 1932, these former pits were infilled and a large part of the surrounding area was developed into residential use. Few changes then occur until the map dated 1972 when a large gravel pit is shown approximately 500m south-east of site. The gravel pit expands in size and more pits are shown on maps leading up to 2001, when they are all shown to be flooded as man-made lakes.
Site Setting	The British Geological Survey indicates that the site is directly underlain by superficial deposits of alluvium in the southern half of site. These superficial deposits are underlain by solid deposits of Undifferentiated Chalk which outcrops in the northern half of site. No artificial deposits are reported within the site, though a thickness of Made Ground should be anticipated. The results of the ground investigation for the neighbouring site (Jomas, 2019) revealed a ground profile comprising Topsoil up to 0.40mbgl; overlying cohesive Head deposits up

Desk Study	
	to 2.80mbgl; overlying undifferentiated deposits of the Seaford Chalk Formation and Newhaven Chalk Formation to the base of the borehole at 20mbgl The superficial deposits underlying the site are identified as a Secondary A Aquifer with the underlying solid deposits identified as a Principal Aquifer. A review of the EnviroInsight Report indicates that the site is located within and EA Source Protection Zone 2 and 3. The nearest potable water abstraction is located 1238m north-east of site. The nearest groundwater abstraction is located 742m east of site. The nearest surface water abstraction is located 969m east of site. Berry Brook flows along the southern boundary of site. There are large man-made lakes approximately 400m south-east of site. The site is located within Environment Agency Flood Zones 2 and 3.
Potential Sources	• Potential for Made Ground associated with previous development operations – on site (S1) • Potential asbestos containing materials within existing buildings – on site (S2) • Potential asbestos impacted soils from demolition of previous buildings – on site (S3) • Potential infilled chalk pit - on site boundary (S4) • Potential ground gas generation (S5): ○ Infilled chalk and gravel pits
Potential Receptors	• Construction workers (R1) • Maintenance workers (R2) • Neighbouring site users (R3) • Future site users (R4) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled waters (R6): ○ Berry Brook ○ Principal Aquifer ○ Secondary A Aquifer ○ Potable water abstraction and SPZ 3
Preliminary Risk Assessment	The risk estimation matrix indicates a low to moderate risk. Due to the potential presence of asbestos containing materials, an asbestos survey should be undertaken, with any asbestos containing materials found, removed under suitably controlled conditions. There should be no risk to end users from asbestos if the potential asbestos containing materials are removed by suitably qualified and experienced specialists under controlled conditions. It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors.

Desk Study	
	Soil gas monitoring should be undertaken due to the infilled chalk and gravel pits, potentially on and in the vicinity of the site. This should be undertaken in accordance with CIRIA C665.
Potential Geological Hazards	The Groundsure data identifies the underlying Alluvium as being at 'moderate risk' of 'compressible deposits' and at 'low risk' of 'running sand'. An old chalk pit dated 1901 encroaches into the east of site. A Ground Investigation to including both in-situ and laboratory geotechnical testing recommended to confirm ground conditions and parameters for foundation design. The site lies within a Flood Risk Zone 1 and 2. A Flood Risk Assessment is recommended.
Recommended Further Work	An intrusive investigation is recommended to confirm the preliminary geo-environmental risks identified and to provide geotechnical information for use in design. The investigation should assess the thickness of any made ground, and allow samples of made ground and natural soils to be taken for laboratory analysis. A preliminary investigation may comprise a series of windowless sampler holes. Given the ground conditions encountered by the previous Ground Investigation next door (Jomas, 2019), it is recommended that a deep cable percussive borehole is drilled as piles may be required. Due to the site constraints, the cable percussive borehole may need to be drilled on the driveway of a property in the north of the site. A programme of soil gas monitoring should be undertaken due to the proximity infilled chalk and gravel pits, and deposits of alluvium and chalk anticipated. A Flood Risk Assessment is recommended.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Mr Lloyd Anthony ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as 209-219 Henley Road, Reading, RG4 6LJ, prior to redevelopment of the site.

1.1.2 To this end a desk based assessment has been undertaken in accordance with Jomas Associates Limited's email proposal dated 28 January 2020.

1.2 Proposed Development

1.2.1 The proposed development is to comprise the construction of 9No. new dwellings to the rear of 209-219 Henley Road, with associated access road and landscaping.

1.2.2 A plan of the proposed development is included in Figure 4.

1.2.3 For the purposes of the contamination risk assessment, the proposed development is classified as 'Residential with plant uptake'.

1.2.4 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1. GC 2 projects are defined as involving:

- Conventional structures.
- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

1.2.5 This will be reviewed at each stage of the project

1.3 Objectives

1.3.1 The objectives of Jomas Associates Limited's investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;
- To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas, with respect to potentially contaminative land uses;
- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;

- To assess the potential presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA report R&D CLR 11;
- To identify and assess geotechnical issues that may affect the site.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site;
- A desk study, which included the review of third party environmental database reports (attached in Appendix 2 and Appendix 3);
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Previous Reports

1.5.1 A number of reports previously prepared by Jomas Associates have been produced for the same client at a neighbouring site. Table 1.1 details the documents supplied:

Table 1.1: Previous Reports - Jomas

Title	Author	Reference	Date
199 – 207 Henley Road, Caversham, Reading - Results of Soakage Testing	Jomas	P9413J811/mw	September 2016
199 - 207 Henley Road, Reading – Ground Investigation and Infiltration Results	Jomas	P9413J811/te	27th September 2016
Geo-environmental Desk Study / Preliminary Risk Assessment for 199-207 Henley Road, Reading, RG4 6LJ	Jomas	P9413J811 Final v1.0	5 th January 2018
Geo-environmental & Geotechnical Assessment Ground Investigation Report for 199-207 Henley Road, Reading, RG4 6LJ	Jomas	P9413J811/PS Final v2.0	29 th March 2019

1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Mr Lloyd Anthony in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas Associates Limited. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

- 1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.
- 1.6.3 Whilst effort has been made to ensure the accuracy of the data supplied, and analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.
- 1.6.4 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.
- 1.6.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.
- 1.6.6 *Our investigations exclude surveys to identify the presence of injurious and invasive weeds.*
- 1.6.7 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	-
Address of Site	209-219 Henley Road Caversham Reading RG4 6LJ
Approx. National Grid Ref.	473084,175210
Site Area (Approx)	0.4313ha
Site Occupation	Residential
Local Authority	Reading Borough Council

2.2 Walkover Survey

2.2.1 A site walkover survey was undertaken by Jomas Associates on 29 January 2020.

Table 2.2: Site Description

Area	Item	Details
On-site:	Current Uses:	Site consists of 6No two-storey brick construction houses, 4No are semi-detached and 2No detached. Each property has long gardens extending southwards to the site boundary at a stream / brook flowing in a west to east direction. No evidence of contamination or fly tipping.
	Evidence of historic uses:	There was no evidence of historic uses of the site.
	Surfaces:	Driveways are hardstanding – asphalt, brick paving and concrete. There are soft landscaped areas in both the front and rear of properties. There are patio areas in the rear of the houses.
	Vegetation:	There are various hedges and shrubs across the site. Trees range from small fruit trees to ~20m tall coniferous trees and are found across the site.
	Topography/Slope Stability:	The site slopes relatively steeply down towards the south. Several retaining walls and steps are present across the site.
	Drainage:	The site appears to be connected to normal drainage facilities. No drainage issues were noted.
	Services:	Site is assumed to be connected to all normal services as the buildings are mostly occupied residential properties.

Area	Item	Details
Neighbouring land:	Controlled waters:	Berry Brook along southern boundary of site.
	Tanks:	No tanks were noted on site.
	North:	Henley Road and residential
	East:	Residential
	South:	Berry Brook and field
	West:	Residential and Petrol station approx. 150m away

2.2.2 Key features noted during the walkover are shown on a site walkover plan in Figure 2, together with site photos.

2.3 Historical Mapping Information

2.3.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from GroundSure, and provided in Appendix 3 of this report.

2.3.2 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1878-79 1:2,500 1:10,560	Site is undeveloped land.	Road forms site boundary to the north. Berry Brook along southern boundary of site. Chalk Pit that appears to be a quarry is located 50m west of site. Gravel pit is shown 120m NW of site. A Well is shown 500m SW of site. Surrounding area is predominantly agricultural land – farm located 250m north and 250m east of site.
1898-1900 1:2,500 1:10,560	No significant change.	Chalk pit 50m west of site now labelled as 'old chalk pit'. Expansion of Gravel pit is shown 120m NW of site. Sewage works 500m SW of site. Fields south of site labelled as 'Liable to Flood'.
1913-14 1:2,500 1:10,560	No significant change.	Gravel pit 120m NW of site now labelled as 'old gravel pit'. Filter beds now shown at the sewage works 500m south-west of site.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1932 1:2,500	Site has been developed to comprise the rear gardens of 6No. residential properties. The western arm of the site is occupied by a single residential building.	Houses built to north, north-east and north-west of site, all similar detached properties. Old chalk pit 50m west of site is now a small wooded area (potentially infilled land). Houses built on old gravel pit 120m NW of site (potentially infilled land), some ground working still shown 100m NW.
1938 1:10,560	No significant change.	Extensive residential development of land to west of site.
1956 1:1,250 1:2,500	Few small buildings resembling sheds or garages shown in south of site.	Ruin 120m north - possible WWII bomb damage.
1962 1:10,560	No significant change.	Further residential development shown to the west and NE of site.
1972-73 1:1,250 1:10,000	No significant change, although most of site is not shown on large scale map.	Large gravel pit 500m SE of site. Large residential development in area of former woodland, 500m to 1km north.
1979 1:10,000	Site not shown.	North of map not shown. Gravel pit 500m SE of site enlarged (approx. doubled in size)
1990-94 1:1,250 1:10,000	Only 1No. small buildings (shed/garage) is now shown in south of site.	Large gravel pit 300m SE of site. Gravel pit 750m south of site is now labelled as a nature reserve.
2001-03 1:1,250 1:10,000	No significant change.	Large old gravel pits to SE of site are shown as lakes
2010/14 1:10,000	No significant change.	No significant change.

Potentially polluting/contaminating uses/activities shown in **bold**

- 2.3.3 An aerial photograph supplied as part of the GroundSure EnviroInsight report and taken in 2015 shows the site to comprise rear gardens of residential properties, sheds/greenhouses can be seen.

2.4 Historical Industrial Sites

- 2.4.1 Groundsure have provided some information on historical industrial sites on and in the vicinity of the site. Table 2.4 below summarises the information provided, which is presented in further detail in the Enviroinsight in Appendix 2. Where the identified features have appeared on more than one map, they have been counted multiple times and therefore the reported numbers are higher than the actual count.

Table 2.4: Industrial and Statutory Consents

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Potentially Contaminative Uses identified from 1:10,000 scale mapping	'Old chalk pit' encroaching into east of site	25No. entries, nearest reported as a gravel pit 7m north-west of site.	✓
Historical Tank Database	None reported	3No. entries, nearest reported as an unspecified tank 413m west of site.	X
Historical Energy Features Database	None reported	16No. entries, nearest reported as an electricity sub-station 152m north-west of site.	X
Historical Petrol & Fuel Site Database	None reported	None reported	X
Historical Garage & Motor Vehicle Repair Database	None reported	3No. entries, nearest reported as a garage 167m west of site.	X
Potentially infilled land	'Old chalk pit' encroaching into east of site	26No. entries, nearest reported as a gravel pit 7m north-west of site.	✓
Tunnels	None reported	None reported within 250m	X

2.4.2 With reference to Table 2.4, the chalk pit recorded by the Groundsure report to be encroaching on the eastern boundary of the site is not shown on the available historical mapping obtained by Jomas Associates.

2.5 Industrial and Statutory Consents

2.5.1 The Groundsure EnviroInsight Report also provides information on various statutory and industrial consents on and in the vicinity of the site. The following section summarises the information collected from the available sources.

Table 2.5: Industrial and Statutory Consents

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Discharge Consents	None reported	3No. entries, nearest reported for trade discharges - mineral workings into Eyemarsch Ditch (tributary of Berry Brook) 409m south-west of site. All 3No. licensed discharge consents have been revoked/have expired.	X
Water Industry Act Referrals	None reported	None reported	X
Red List Discharges	None reported	None reported	X
List 1 and List 2 Dangerous Substances	None reported	None reported	X
Control of Major Accident Hazards (COMAH) and Notification of	None reported	None reported	X

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Installations Handling Hazardous Substances (NIHHS) Sites			
Planning Hazardous Substance Consents	None reported	None reported	X
Category 3 or 4 Radioactive substances Authorisations	None reported	None reported	X
Pollution Incidents (List 2)	None reported	1No. entry reported as inert materials and wastes causing a Category 4 impact (no impact) on land, water and air 459m south-west of site.	X
Pollution Incidents (List 1)	None reported	None reported	X
Contaminated Land Register Entries and Notices	None reported	None reported	X
Registered Landfill Sites	None reported	8No. historic landfill sites reported within 1500m of the site. Nearest reported 980m south from 1992-2010.	X
Waste Treatment and/or Transfer Sites	None reported	8No. licensed waste sites reported within 1500m of the site. Nearest reported 1098m south.	X
Fuel Station Entries	None reported	Active BP fuel station reported 180m west of site. Obsolete fuel station reported 348m south-west of site.	X
Current Industrial Site Data	None reported	3No. entries within 250m of site; reported as: Electricity sub-stations 61m south-west and 156m north-west of site. Fuel station 188m west of site.	X

* From a land contamination perspective

2.6 Previous Site Investigations

2.6.1 Jomas Associates Ltd previously undertook works at the neighbouring site in from 2016 to 2019. The reports are detailed in Table 1.1. A summary of the findings is presented below.

P9413J811/mw – September 2019

2.6.2 On 12th & 13th September 2016 7No trial pits were excavated and soil infiltration testing undertaken in general accordance with BRE 365 (P9413J811/mw).

2.6.3 STP1-3 were excavated in the north of the site. The general ground conditions comprised topsoil (up to 0.5m thick), overlying an off white to white clayey gravel of intact structureless chalk (considered to represent Grade Dc Chalk), which was encountered to the base of the pits at depths of between 1.6m and 1.9mbgl.

Infiltration rates of 8.6×10^{-6} m/s and 2.0×10^{-4} m/s were calculated for these locations.

- 2.6.4 STP4-7 were excavated in the south of the site. The general ground conditions comprised topsoil (up to 0.4m thick), overlying a generally clayey gravel of chalk and flint (up to 0.8m - 1.4mbgl) followed by a yellow/brown/orange sandy gravelly clay to clayey gravelly sand and silt to the base of the pits at depths of between 1.6m and 1.9m bgl. No significant infiltration was noted to occur within soakage test pits STP5 and STP6. Within test pits STP4 and STP7 infiltration rates of 9.91×10^{-7} m/s and 4.65×10^{-6} m/s were calculated respectively, although in both cases the time take to reach 25% effective depth was extrapolated due to the slow soakage rates.

- 2.6.5 The investigation concluded that shallow soakaways may be used in the north of the site where chalk deposits were encountered.

P9413J811/te – 27th September 2016

- 2.6.6 On 23rd September 2016 4No window sample boreholes were drilled at the site in similar locations to STP4-7. The boreholes were drilled so that in-situ falling head permeability testing could be undertaken. The results are reported in Jomas report ref: P9413J811/te.

- 2.6.7 The ground conditions were generally found to comprise topsoil (up to 0.4m thick) overlying clay and sands. Chalk bands and flints were observed within the clay horizons. Chalk was observed within WS2, WS3 and WS4 towards the base of the borehole between 6.7-6.9mbgl to the terminal depth at 7.0mbgl. WS1 could not achieve the same depth as the WS2-WS4, but it is considered likely that the chalk is present at a similar depth in the area of WS1.

- 2.6.8 Water was reported at 3.2mbgl and 3.1mbgl in WS1 and WS4 respectively, rising to 1.8m and 1.4mbgl respectively. Permeability rates between 1.07×10^{-4} m/sec and 8.27×10^{-6} m/sec were calculated for the boreholes.

P9413J811 – 5th January 2018

- 2.6.9 It was recommended that an intrusive investigation be undertaken to clarify potential risks to the identified receptors, and assess the extent of made ground soils present at the site, as well as to inform geotechnical design.

- 2.6.10 Soil gas monitoring was recommended to the presence of infilled gravel and chalk pits in close proximity to the site.

P9413J811/PS – 29th March 2019

- 2.6.11 The ground investigation was undertaken from 3rd to 6th April 2018, and consisted of the following:

- 11No. windowless sampling boreholes, drilled up to 5.0m below ground level (bgl), with associated in situ testing and sampling;

- 5No. California bearing ratio tests, carried out using the dynamic probe methodology;
- 3No. cable percussion boreholes, to determine the permeability of the underlying soil.
- Laboratory analysis for chemical and geotechnical purposes;
- 1No. return visit to monitor ground gas concentrations and groundwater levels was completed.

2.6.12 The results of the ground investigation revealed a ground profile comprising Topsoil up to 0.40mbgl; overlying cohesive Head deposits up to 2.80mbgl; overlying undifferentiated deposits of the Seaford Chalk Formation and Newhaven Chalk Formation to the base of the borehole at 20mbgl.

2.6.13 Following generic risk assessments, no concentrations of any chemical determinands were detected in soils in excess of generic assessment criteria for the protection of human health within a 'residential with plant uptake' end-use scenario. However, asbestos in the form of chrysotile (loose fibres) was detected in 1No. sample out of 4No. analysed in the laboratory.

2.6.14 Remedial measures were recommended given the identified asbestos. However, it was also recommended that additional shallow soil sampling and analysis for asbestos could be undertaken in order to delineate areas of asbestos contamination.

2.6.15 The site was determined CS1, where no formal gas protection measures are required. However, this assessment was based only 1No. visit.

2.6.16 A piled foundation solution was recommended.

2.6.17 Reference should be made to the full reports for more detailed information.

2.7 Planning Information

2.7.1 A review of the local authority's planning portal was undertaken on 29th January 2020 at <http://planning.reading.gov.uk/>.

2.7.2 A few minor planning applications were found for the properties at 209-219 Henley Road, however no documentation relating to geo-environmental investigations or studies was found.

2.8 Unexploded Ordnance

2.8.1 Publicly available information has been assessed regarding the risk of Unexploded Ordnance affecting the site.

2.8.2 The initial data indicates that there is a low risk.

2.8.3 Low-risk regions are those that show a bomb density of up to 10 bombs per 1000 acres and that may contain potential WWII targets.

-
- 2.8.4 On the map dated 1956, there is a feature labelled as 'Ruins' 120m north of site. This feature may indicate localised WWII bomb damage. There is no indication of damage to the site.
- 2.8.5 This does not comprise a full UXO risk assessment.

3 GEOLOGICAL & ENVIRONMENTAL SETTING

3.1.1 The following section summarises the principal environmental resources (geological, hydrogeological and hydrological) of the site and its surroundings.

3.1.2 The data discussed herein is generally based on the information given within the EnviroInsight Report and published information provided by the Environment Agency and British Geological Survey.

3.2 Solid and Drift Geology

3.2.1 The British Geological Survey indicates that the site is mainly directly underlain by solid deposits of Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated), but that superficial deposits of alluvium are present in the south of site.

3.2.2 The BGS describes Alluvium as consisting of:

“Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.”

3.2.3 The BGS describes the Seaford Chalk Formation as consisting of:

“Firm white chalk with conspicuous semi-continuous nodular and tabular flint seams. Hardgrounds and thin marls are known from the lowest beds. Some flint nodules are large to very large.”

3.2.4 The BGS describes the Newhaven Chalk Formation as consisting of:

“...soft to medium hard, smooth white chalks with numerous marl seams and flint bands, including abundant Zoophycos flints (notably at levels near the base). The formation is known to contain distinct phosphatic chalks of limited lateral extent. Equivalent beds, the Margate Chalk of north Kent, are marl-free and contain little flint.”

3.2.5 Although not indicated to be present by BGS, given that there is a significant downward slope from north to south on site, hillwash/soil creep could have led to the formation of Head deposits in the south of site.

3.3 British Geological Survey (BGS) Borehole Data

As part of the assessment, publicly available BGS borehole records were obtained and reviewed from the surrounding area. No records were found within 250m of site, however, ground conditions encountered by Jomas during previous intrusive investigations are summarised in Section 2.7.

3.4 Hydrogeology & Hydrology

3.4.1 General information about the hydrogeology of the site was obtained from the EnviroInsight and / or the DEFRA “MAGIC” website.

Groundwater Vulnerability

- 3.4.2 The EA operates a classification system to categorise the importance of groundwater resources (aquifers) and their sensitivity to contamination. Aquifers were formerly classified as major, minor and non-aquifers, based on the amenity value of the resource. A major aquifer is a significant resource capable of producing large quantities of water suitable for potable supply. Minor aquifers produce water in varying quantities or qualities, and if utilised are of local importance. Non aquifers are low permeability strata, which contain no significant exploitable groundwater and have very limited capacity to transmit contaminants.
- 3.4.3 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;
- **Secondary A** - 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. These are generally aquifers formerly classified as minor aquifers;
 - **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
 - **Secondary Undifferentiated** - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
 - **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.
 - **Unproductive Strata** - These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zones (SPZ)

- 3.4.4 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.
- Zone I - or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
 - Zone II - or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
 - Zone III - or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Hydrology

- 3.4.5 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.
- 3.4.6 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.
- 3.4.7 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:
- Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:
- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
 - or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.
- (For planning and development purposes, this is the same as Flood Zone 3, in England only.)
- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.
- (For planning and development purposes, this is the same as Flood Zone 2, in England only.)
- 3.4.8 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.
- 3.4.9 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)
- 3.4.10 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.
- 3.4.11 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 3.1: Summary of Hydrogeology & Hydrology

Feature		On Site	Off Site	Potential Receptor?
Aquifer	Superficial:	Secondary A (Alluvium)	Secondary A (Lynch Hill Gravel Member)	✓
	Solid:	Principal (Undifferentiated Chalk)	N/A	✓
Source Protection Zone		SPZ II & SPZ III	-	✓
Abstractions	Groundwater	None	20No. entries within 2000m. Nearest reported for mineral washing 742m east of site.	X
	Surface water	None	11No. entries within 2000m. Nearest reported for process washing 969m east of site.	X
	Potable	None	3No. entries within 2000m. Nearest reported 1238m north-east of site.	✓
	Surface Waters	1No. identified along southern border of site (Berry Brook)	Large man-made lakes located approximately 400m SE of site.	✓
Flood Risk	EA Flood Zone 2	Yes	-	-
	EA Flood Zone 3	Yes	-	-
	RoFRaS	High	-	-
	Flood Defences	There are no areas benefiting from Flood Defences within 250m of the study site.		-
	BGS	BGS has a "High" confidence that there is the potential "Clearwater" flooding to occur at the surface.		-

3.5 Sensitive Land Uses

3.5.1 The site is located within a Nitrate Vulnerable Zone.

- 3.5.2 A Nitrate Vulnerable Zone (NVZ) is a conservation designation of the Environment Agency for areas of land that drain into nitrate polluted waters, or waters which could become polluted by nitrates. Nitrate Vulnerable Zones were introduced by the UK government in response to the EU mandate that all EU countries must reduce the nitrate in Drinking Water to a maximum of 50 mg/l.
- 3.5.3 The NVZs cover large areas of land that have been identified as exceeding or being at risk of exceeding 50 mg NO₃/l.
- 3.5.4 Ancient Woodland is reported 372m south-east of site.
- 3.5.5 No other sensitive land use was identified within 1000m of the site.
- 3.6 Radon**
- 3.6.1 As reported, the site is not within a Radon affected area, as less than 1% of properties are above the action level.
- 3.6.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2015).

4 POSSIBLE GEOLOGICAL HAZARDS

4.1 Database Information Review

4.1.1 The following are brief findings extracted from the GroundSure GeoInsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

Table 4.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell	Very low (Alluvium)	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.	No
	Negligible (Chalk)		
Landslides	Very low (Alluvium)	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.	No
	Negligible (Chalk)		
Ground dissolution soluble rocks	Very low (Alluvium)	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks.	No
	Very low (Chalk)		
Compressible deposits	Moderate (Alluvium)	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property – possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.	Yes
	Negligible (Chalk)		
Collapsible Rock	Negligible (Alluvium)	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.	No
	Very low (Chalk)		
Running sand	Low (Alluvium)	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming	Yes
	Negligible (Chalk)		

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
		pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.	
Coal mining	None	The study site is not located within the specified search distance of an identified coal mining area.	No
Shallow mine workings	Rare	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered. An old chalk pit dated 1901 encroaches into the east of site. The pit was small, but further investigation will be required if new buildings are to be built close to it.	Yes – Ground Investigation
Brine affected areas	None	The study site is not located within the specified search distance of an identified brine affected area.	No

- 4.1.2 In addition, the GeolInsight report notes the following:
- 12No. historical surface ground working features are reported within 250m of the site. 1No. on-site entry reported as an old chalk pit encroaching into east of site dated 1901. The next nearest entry is reported 7m northwest of the site for gravel pit (also dated 1901).
 - No historical underground working features are reported within 1000m of the site.
 - 19No. BGS Current Ground Working Features are reported within 1000m of the site. The nearest is reported 72m south-west of the site, identified as producing Chalk. The operational status is given as Ceased.
 - 13No. natural cavities are reported within 1000m of the site. The nearest is reported 766m west of the site, identified as being within the Lynch Hill Gravel Member.
- 4.1.3 Existing hardstanding and foundations will need to be removed and grubbed out ahead of the development. This may require the use of hydraulic breaking.
- 4.1.4 The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site.

-
- 4.1.5 Foundations should not be formed within Made Ground or organic rich material (e.g. Alluvium or topsoil) due to the unacceptable risk of total and differential settlement.
 - 4.1.6 Foundations must be designed so as not to load nor undermine adjacent boundary walls and buildings.
 - 4.1.7 The presence of Made Ground derived from demolition material may be a source of elevated sulphate, associated with plaster from the previous structures. If such levels are noted then sulphate resistant concrete may be required.
 - 4.1.8 The resultant thickness of Made Ground and the potential for cohesive deposits beneath the proposed footprint may mean that a suspended floor slab would be required.
 - 4.1.9 A geotechnical investigation is recommended to inform foundation design.

5 QUALITATIVE RISK ASSESSMENT

5.1 Legislative Framework

5.1.1 A qualitative risk assessment has been prepared for the site, based on the information collated. This highlights the potential sources, pathways and receptors. Intrusive investigations will be required to confirm the actual site conditions and risks.

5.1.2 Under Part IIA of the Environmental Protection Act 1990, the statutory definition of contaminated land is:

"land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused, or there is significant possibility of such pollution being caused."

5.1.3 The Statutory Guidance provided in the DEFRA Circular 04/2012 lists the following categories of significant harm to **human health**:

- death; life threatening diseases (e.g. cancers); other diseases likely to have serious impacts on health; serious injury; birth defects; and impairment of reproductive functions.

5.1.4 Other health effects may also be considered by the local authority to constitute significant harm with a wide range of conditions that may or may not constitute significant harm (alone or in combination) including: physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts.

5.1.5 In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health there are four categories to be considered. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.

5.1.6 For non-human receptors the following types of harm should be considered to be significant harm:

Ecological System Effects

- Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or
- Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.

- In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the Conservation of Habitats and Species Regulations 2010.

Property Effects

- Crops: A substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.
- Buildings: Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled.

- 5.1.7 Contaminated land will only be identified when a 'pollutant linkage' has been established.
- 5.1.8 A 'pollutant linkage' is defined in Part IIA as:
"A linkage between a contaminant Source and a Receptor by means of a Pathway".
- 5.1.9 Therefore, this report presents an assessment of the potential pollutant linkages that may be associated with the site, in order to determine whether additional investigations are required to assess their significance.
- 5.1.10 In accordance with the National Planning Policy Framework, where development is proposed, the developer is responsible for ensuring that the development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:
- whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model;
 - whether the development proposed will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors; and
 - what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable development and future occupancy of the site and neighbouring land.

- 5.1.11 A potential developer will need to satisfy the Local Authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

5.2 Conceptual Site Model

- 5.2.1 On the basis of the information summarised above, a conceptual site model (CSM) has been developed for the site. The CSM is used to guide the investigation activities at the site and identifies potential contamination sources, receptors (both on and off-site) and exposure pathways that may be present. The identification of such potential “pollutant linkages” is a key aspect of the evaluation of potentially contaminated land.
- 5.2.2 The site investigation is then undertaken in order to prove or disprove the presence of these potential source-pathway-receptor linkages. Under current legislation an environmental risk is only deemed to exist if there are proven linkages between all three elements (source, pathway and receptor).
- 5.2.3 This part of the report lists the potential sources, pathways and receptors at the site, and assesses based on current and future land use, whether pollution linkages are possible.
- 5.2.4 Potential pollutant linkages identified at the site are detailed below:

Table 5.1: Potential Sources, Pathways and Receptors

Source(s)	Pathway(s)	Receptor(s)
- Potential for Made Ground associated with previous development operations – on site (S1) - Potential asbestos containing materials within existing buildings – on site (S2) - Potential asbestos impacted soils from demolition of previous buildings – on site (S3) - Potential infilled chalk pit - on site boundary (S4) - Potential ground gas generation (S5): - Infilled chalk and gravel pits	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4) - Accumulation and Migration of Soil Gases (P5) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled waters (R6): - Berry Brook - Principal Aquifer - Secondary A Aquifer - Potable water abstraction and SPZ 3

5.3 Qualitative Risk Estimation

5.3.1 Based on information previously presented in this report, a qualitative risk estimation was undertaken.

5.3.2 For each potential pollutant linkage identified in the conceptual model, the potential risk can be evaluated, based on the following principle:

Overall contamination risk = Probability of event occurring x Consequence of event occurring

5.3.3 In accordance with CIRIA C552, the consequence of a risk occurring has been classified into the following categories:

- Severe
- Medium
- Mild
- Minor

5.3.4 The probability of a risk occurring has been classified into the following categories:

- High Likelihood
- Likely
- Low Likelihood
- Unlikely

5.3.5 This relationship can be represented graphically as a matrix (Table 5.2).

Table 5.2: Overall Contamination Risk Matrix

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Low Risk
	Likely	High Risk	Moderate Risk	Moderate Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate Risk	Low Risk	Very Low Risk
	Unlikely	Low Risk	Low Risk	Very Low Risk	Very Low Risk

5.3.6 The risk assessment process is based on guidance provided in CIRIA C552 (2001) *Contaminated Land Risk Assessment – A Guide to Good Practice*. Further information including definitions of descriptive terms used in the risk assessment process is included in Appendix 4.

5.3.7 The degree of risk is based on a combination of the potential sources and the sensitivity of the environment. The risk classifications can be cross checked with reference to Table A4.4 in Appendix 4.

5.3.8 Hazard assessment was also carried out, the outcome of which could be:

- Urgent Action (UA) required to break existing source-pathway-receptor link.
- Ground Investigation (GI) required to gather more information

- Watching Brief there is no evidence of potential contamination but the possibility of it exists and so the site should be monitored for local and olfactory evidence of contamination.
- No action required (NA)

5.3.9 The preliminary risk assessment for the site is presented in Table 5.3 below.

SECTION 5

QUALITATIVE RISK ASSESSMENT

Table 5.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment
• Potential for Made Ground associated with previous development operations – on site (S1) • Potential asbestos containing materials within existing buildings – on site (S2) • Potential asbestos impacted soils from demolition of previous buildings – on site (S3) • Potential infilled chalk pit - on site boundary (S4) • Potential ground gas generation (S5): ○ Infilled chalk and gravel pits	• Ingestion and dermal contact with contaminated soil (P1) • Inhalation or contact with potentially contaminated dust and vapours (P2) • Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	• Construction workers (R1) • Maintenance workers (R2) • Neighbouring site users (R3) • Future site users (R4) • Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Medium	Low	Moderate	GI – Ground Investigation
	• Accumulation and migration of soil gases (P5)		Severe for Asbestos	Low	Moderate	
			Severe	Low	Moderate	
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) • Horizontal and vertical migration of contaminants within groundwater (P4)	• Neighbouring site users (R3) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled waters (R6): ○ Berry Brook ○ Principal Aquifer ○ Secondary A Aquifer ○ Potable water abstraction and SPZ 3	Medium	Low	Low	

- 5.3.10 It should be noted that the identification of potential pollutant linkages does not necessarily signify that the site is unsuitable for its current or proposed land use. It does however act as a way of focussing data collection at the site in accordance with regulatory guidance in CLR 11.

5.4 Outcome of Risk Assessment

- 5.4.1 The risk estimation matrix indicates a low to moderate risk as defined above.
- 5.4.2 The proposed development is to comprise the construction of 9No. new dwellings to the rear of 209-219 Henley Road, with associated access road and landscaping.
- 5.4.3 Due to the potential presence of asbestos containing materials within the existing buildings on site, an asbestos survey should be undertaken, with any asbestos containing materials found, and removed under suitably controlled conditions. There should be no risk to end users from asbestos within the fabric of the existing building if the potential asbestos containing materials are removed by suitably qualified and experienced specialists under controlled conditions.
- 5.4.4 A review of historical maps indicates that the earliest recorded site use (1878) is as undeveloped or agricultural land. By the map dated 1932, the site has been developed to comprise the rear gardens of 6No. residential properties. The western arm of the site is occupied by a single residential building. By the map dated 1956, a few small buildings resembling sheds or garages shown in south of site. Few significant changes then occur to the site until the present day.
- 5.4.5 Historically, the surrounding area has primarily been in use as agricultural land. A chalk pit and gravel pit are shown in close proximity to the site and are labelled as 'old' by the map dated 1913. By the map dated 1932, these former pits were infilled and a large part of the surrounding area was developed into residential use. Few changes then occur until the map dated 1972 when a large gravel pit is shown approximately 500m south-east of site. The gravel pit expands in size and more pits are shown on maps leading up to 2001, when they are all shown to be flooded as man-made lakes.
- 5.4.6 It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors, and assess the extent of made ground soils present at the site.
- 5.4.7 A preliminary investigation may comprise a series of windowless sampler holes. Given the ground conditions encountered by the previous Ground Investigation next door (Jomas, 2019), it is recommended that a deep cable percussive borehole is drilled as piles may be required. Due to the site constraints, the cable percussive borehole may need to be drilled on the driveway of a property in the north of the site.
- 5.4.8 Soil gas monitoring should be undertaken due to the infilled chalk and gravel pits, potentially on and in the vicinity of the site. This should be undertaken in accordance with CIRIA C665.

5.5 List of Key Contaminants

- 5.5.1 The possible contamination implications for both on-site and off-site sources have been assessed based on the information presented in the report. This has been achieved using guidance publications by the Environment Agency, together with other sources.
- 5.5.2 In the case of the site uses identified as part of the desk study research, reference to DoE industry profiles would not indicate a specific use reference, although reference has been made to the miscellaneous industries profile
- 5.5.3 Based on recommendations within the guidance publications, an initial soil and water chemical testing suite would need to consider a range of contaminants as follows:
- *Metals*: cadmium, chromium, copper, lead, mercury, nickel, zinc;
 - *Semi-metals and non-metals*: arsenic, boron, sulphur;
 - *Inorganic chemicals*: cyanide, nitrate, sulphate and sulphide;
 - *Organic chemicals*: aromatic hydrocarbons, aliphatic hydrocarbons, petroleum hydrocarbons, phenol, polyaromatic hydrocarbons;
 - *Others*: pH, Asbestos.

6 REFERENCES

- BRE Report BR211; Radon: Guidance on protective measures for new buildings, 2015
- CL:AIRE; Petroleum Hydrocarbons in Groundwater, 2017
- Code of Practice for Ground Investigations BS5930: 2015
- Department of Environment Industry Profiles (1996) - Miscellaneous Land ISBN 1 85112 313 X
- Environment Agency (2004) *Model procedures for the management of land contamination*. CLR11. Bristol: Environment Agency
- Groundsure EnviroInsight Report Ref HMD-377-6582268 January 2020
- Groundsure GeoInsight Report Ref HMD-377-6582269 January 2020
- Investigation of Potentially Contaminated Sites – Code of Practice BS10175: 2011
- Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

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