



Preliminary Investigation Report

at

Leighton Park School, Shinfield Road, Reading, Berkshire RG2 7DG

for

Leighton Park School

Reference: 21640/PIR

October 2024

Control Document

Project

Leighton Park School, Shinfield Road, Reading, Berkshire RG2 7DG

Document Type

Preliminary Investigation Report (PIR)

Document Reference

21640/PIR

Document Status

FINAL

Date

October 2024

Prepared by

Olia Kontogianni BSc, MScEng

(ok@soilslimited.co.uk)



First check by

Eur Ing R B Higginson BSc, PGDip, CEng, MICE, FGS.



Second check by

R Biney BSc (Hons) MSc CEng MICE CEnv CSci MEnvSc MCMI MIET FGS RoGEP



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

This document comprises the Preliminary Investigation Report (PIR) and incorporates the results, discussion, and conclusions to this intrusive works. General site data is recorded below:

Commission Record	
Client	Leighton Park School
Site Name	Leighton Park School, Shinfield Road, Reading, Berkshire RG2 7DG
Grid Reference	SU 73476 71286
Soils Limited Quotation Ref	Q29211rev101, dated 14 th October 2024
Clients Purchase Order	Q29211rev101, dated 16 th October 2024

The record of revision is presented below:

Record Of Revisions		
Revision	Date	Reason
1.0	October 2024	First issue to Client.

Documents associated with this development that must be referred to are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
30774A/01	Leighton Park Location Plan	June 2023	Clague Architects
30774A/03 Rev P1	Proposed Site Plan	January 2024	

Caveats

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 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.

Ordinary watercourses (OWs) are defined as rivers (which are not designated as main rivers), streams, ditches, drains, culverts, cuts and sewers (other than public sewers). This includes all OWs that are not mapped. Ordinary watercourse consent (OWC) is required from the Lead Local Flood Authority (LLFA) when changing/adapting/adding to the cross sections of OWs. Installations of any structure or obstruction into an OW that impedes the flow without consent is prohibited by the Land Drainage Act 1991 Section 23.

Failure to remove obstructions may result in legal action by the LLFA with powers under Section 25 of the Land Drainage Act 1991.

Soils Limited suggest surveying the site for OW usually seen in rural areas as boundary ditches in order to avoid potential impacts to residents downstream and prosecution. OWC can be applied for from your LLFA.

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.

Explanations

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.

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.

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.

The object of the historic map 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.

Dataset survey is undertaken, and 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.

The BGS soil chemistry for environmental assessments dataset coverage, was 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.

In accordance with CIRIA C681 and C785 a review has been undertaken of the historic maps and the Zetica UXO risk website.

Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 2021 (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 2021, 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.

Limitations and Disclaimers

This Preliminary Investigation Report relates to the site located at Leighton Park School, Shinfield Road, Reading, Berkshire RG2 7DG and was prepared for the sole benefit of 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 the Soils Limited Quotation and the subsequent Clients Purchase Order.

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 2021.

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.

All works are undertaken in the context of, and in compliance with, BS10175+A2 2017 and LCRM (EA 2021) and all other pertinent planning, standards, documentation and guidance appropriate to the site at the time of production which may include, but are not necessarily limited to, documents provided by BS/CEN/ISO, NHBC, AGS, CIEH, CIRIA, SoBRA and CLAIRE.

Ownership of copyright of all printed material including reports, survey data, drawings, laboratory test results, trial pit and borehole log sheets, including drillers log sheets remains with Soils Limited. License is for the sole use of the client and may not be assigned, transferred or given to a third party. This license is only valid once we have been paid in full for this engagement. In the event of non-payment for our services, we reserve the right to retract the license for all project data, preventing their use and any reliance upon such data by the client or any other third party. We may also contact parties other than the client to notify them of this retraction.

Contents

Commission	i
Caveats	ii
Explanations.....	ii
Legislation and Liability	iv
Limitations and Disclaimers.....	v
Section 1 Site Conditions and Proposed Development.....	1
1.1 Site Walkover.....	1
1.2 Site Drainage	1
1.3 Site Photographs	2
1.4 Proposed Development	2
Section 2 Geology, Hydrogeology, Hydrology and Radon.....	3
2.1 Anticipated Geology.....	3
2.1.1 River Terrace Deposits	3
2.1.2 Clay Head.....	3
2.1.3 London Clay Formation	3
2.2 Hydrogeology.....	3
2.3 Hydrology.....	4
2.4 Radon Gas.....	4
Section 3 Site History	6
3.1 Historic Map Study.....	6
3.2 Bomb Damage and the Potential for Unexploded Ordnance (UXO).....	7
Section 4 Environmental Records and Consultation.....	8
4.1 Dataset Information.....	8
4.2 Site Sensitivity Maps.....	9
4.3 Regulatory Enquires	9
4.4 Soil Geochemistry.....	9
Section 5 Data Collection Summary.....	10
5.1 General.....	10
Section 6 Preliminary Conceptual Site Model.....	12
6.1 Sources and Pathways of Contamination	12
6.2 Potential Pathways	12
6.3 Potential Sources of On-site Contamination.	12
6.4 Potential Contaminants.....	13

6.5	Potential Exposure Receptors.....	14
6.6	Preliminary Conceptual Site Model and Risk Assessment.....	14
Section 7	Recommendations	16
7.1	General.....	16
7.2	Radon Gas.....	16
7.3	UXO.....	16
7.4	Proposed Further Site Works.....	16
7.5	Discovery Strategy.....	16

List of Figures

Figure 1 – Site Location Map	18
------------------------------------	----

List of Tables

Table 1.1 Site Walkover Record (On-site).....	1
Table 1.2 Site Walkover Record (Off-site).....	1
Table 2.1 Hydrogeological Assessment	4
Table 2.2 Hydrological Assessment	4
Table 3.1 Historic Development of the Site	6
Table 3.2 Historic Off-site Development.....	6
Table 3.3 Potential Sources of Pollution Indicated from Historic Maps.....	7
Table 4.1 Environmental Significance of Data.....	8
Table 4.2 Contemporary Trade Directory	8
Table 4.3 Geological Hazards	9
Table 4.4 Soil Geochemistry	9
Table 5.1 Site Environs	10
Table 5.2 Summary of Potential Contamination Sources	10
Table 6.1 Applicable Pathways	12
Table 6.2 On-site Potential Contamination Sources.....	12
Table 6.3 Off-site Potential Contamination Sources.....	13
Table 6.4 Potential Contaminants	13
Table 6.5 Potential Receptors.....	14
Table 6.6 Preliminary Conceptual Site Model and Risk Assessment Methodology	15
Table 7.1 Proposed Further Environmental Investigation.....	16

Table G.1. Classification of Consequence

Table G.2. Classification of Probability

Table G.3. Comparison of Consequence Against Probability

Table G.4. Risk Classifications

List of Appendices

Appendix A Proposed Development Plans

Appendix B Country Series and Ordnance Survey Maps

Appendix C Landmark Envirocheck Report

Appendix D Site Sensitivity Maps

Appendix E Site Photographs

Appendix F Risk Assessment Criteria

Section I Site Conditions and Proposed Development

I.1 Site Walkover

A site walkover was undertaken in October 2024, by Soils Limited. The notes of the site walkover are presented in Table 1.1 and Table 1.2.

Table 1.1 Site Walkover Record (On-site)

Use of Site	Former private school premises (Leighton Park School Field House).
Structures	1 No. large three-storey Y-shaped main building in the northern and central site area. 2 No. smaller semi-detached buildings of one and two storeys, located close to the main road to the east.
Site Topography	Site presents local dip in the central area. Sloping down from its north-eastern boundary at 74m AOD towards an AOD of 72m in the central area ($\sim 4^\circ$), going up again towards its south-western boundary at 76mAOD, with a slope of $\sim 4^\circ$.
Site Covering	Predominantly grass covered with tarmac in the car park area. Tarmac and concrete paving noted close to the site buildings.
Vegetation	Numerous large mature trees (~ 30 m height) noted on south, north and east boundary and within the south-western site area close to the buildings. Shrubbery scattered within the area.
Potential Contamination Sources	Disused school buildings including boiler room. Potential asbestos roofing noted on buildings. Potential fuel/oil spills on car park. Lock-up garages on-site.
Odour	No signs of olfactory contamination noted.
Drainage	Drains noted on hardstanding areas.

Table 1.2 Site Walkover Record (Off-site)

Use of Land	N: School facilities buildings (The Crescent). S: School sports courts and school building further south. E & SE: 3-storey buildings students' accommodation ('Leighton Court Flats') and 'University of Reading' campus across the 'Pepper Lane'. W: Pond within small, wooded area and fields NW: 'Leighton Park School' facilities' buildings (Oakview & New School House).
Area Topography	Sloping down to the north-east with a slope of $< 1^\circ$.
Vegetation	Small wooded areas surrounding the site. Mature trees within the school premises.
Potential Contamination Sources	None noted.

I.2 Site Drainage

Manhole covers and surface water drains were noted on Pepper Lane to the east of the site, which are anticipated to be connected to the mains system. A drainage ditch was indicated by the historic maps to be present along the eastern boundary of the site where surface water run-off could collect.

I.3 Site Photographs

The site photographs have been included within Appendix E.

I.4 Proposed Development

The proposed development was to comprise the demolition of the existing disused main school building and outbuildings which formed part of the 'Leighton Park School' premises and their replacement with a new 'Sports and Medical Centre' building which was going to include a photovoltaic cells and green roof. The proposed development was to include soft landscaping in the form of communal gardens and hard landscaping with pavements, 26no. new parking spaces, 4no. electric vehicle charging points, 6no. cycle hoops and 8no. drop off spaces.

In compiling this report reliance was placed on drawing with number 30774A/03 Rev P1, dated January 2024 and prepared by Clague Architects. The recommendations provided within this report are made exclusively in relation to the scheme outlined above, and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

The proposed development plans have been provided in Appendix A.

Section 2 Geology, Hydrogeology, Hydrology and Radon

2.1 Anticipated Geology

The 1:50,000 BGS Geology map showed the site to be situated on the London Clay Formation bedrock, with no superficial deposits overlying.

Superficial River Terrace Deposits and Head Deposits were indicated by the geological maps to be present immediately south and ~10m north, east and north-east of the site and therefore might be present on site.

2.1.1 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 Gravels. These terrace Head Deposits present ancient floodplain deposits that became isolated as the river cut downwards to lower levels. The composition of the River Terrace Gravel varies greatly, depending on the source material available in the river's catchment. Deposits generally consist of sands and gravels of roughly bedded flint or chert gravels commonly in a matrix of silts and clays.

2.1.2 Clay Head

Clay Head deposits are drifts produced by solifluxion, the downslope movement of debris outwash during the last periglacial period, and characteristically comprise poorly sorted soils from the London Clay and the Claygate Beds.

2.1.3 London Clay Formation

London Clay comprises a stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. 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 upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

2.2 Hydrogeology

Table 2.1 presents the hydrological data that is relevant to the site.

Table 2.1 Hydrogeological Assessment

Hydrogeological Data		Comment
On-site	Superficial	Unproductive Strata ¹
Aquifers	Bedrock	Unproductive Strata – Associated with the London Clay Formation bedrock.
Groundwater Vulnerability		Unproductive Aquifer – Associated with the London Clay Formation bedrock.
Source Protection Zones (SPZ)		None indicated as being present within >1000m.
Abstraction	Potable	None indicated as being present within >500m.
	Non-potable	
Sensitive Land Uses		None indicated as being present within >400m.
Surface Water Features		On site/E – Drain.
Flood Risk from Rivers or Seas		None indicated as being present within >1000m.
Flood Risk from Surface Water		Low to High – On site.
Flood Risk from Groundwater		None indicated as being present on site.
		Potential for Groundwater Flooding of Property Situated Below Ground Level – 23m/N
		Limited Potential for Groundwater Flooding to Occur – 26m/S

Note(s): ¹Unproductive strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

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.

2.3 Hydrology

The approximate elevation of the site was ranging between 72m in the central area to 74 and 76m Above Ordnance Datum (AOD) on the northern and southern boundary respectively. The anticipated groundwater flow direction is given in Table 2.2.

Table 2.2 Hydrological Assessment

Type	Direction	Notes
Surface water & shallow groundwater (if present)	NE	In line with wider topography – Surface water will locally flow towards the central site area on hardstanding.
Groundwater	NE	Groundwater will be in line with the wider topography at a very low velocity due to the low permeability bedrock of London Clay Formation underlying the site.

Note(s): The London groundwater model was generally split into three aquifers, the Upper, Intermediate and Lower Aquifer. The Upper Aquifer was confined to the River Terrace Deposits, which were anticipated onsite, overlying the London Clay Formation, which acts as an aquiclude. The Intermediate Aquifer was generally associated with granular layers within the Lambeth Group. The Lower Aquifer was principally associated with the chalk but can include the Thanet Sand Formation. Information presented by the Environment Agency classifies the London Clay Formation bedrock as Unproductive Strata.

2.4 Radon Gas

All parts of the 1km grid square on which the site area lies were in the lowest band of radon potential (The property is in a Lower probability radon area i.e. less than 1% of homes are estimated to be at or above the Action Level).

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.

Radon protection measures will not be required within the proposed new development subject to the agreement with the LA.

Section 3 Site History

3.1 Historic Map Study

The historic maps referred to are appended to this report (Appendix B).

Table 3.1 Historic Development of the Site

Site History	Date Range	
	From	To
Site is an irregularly shaped piece of grassland with sparse trees within and on its boundaries.	1877 ¹	1973
The current site building is recorded on site and mentioned as 'Field House' on the map.	1973	2024 ²

Note(s): ¹ Earliest available historic map. ² Most recent available historic map.

Table 3.2 Historic Off-site Development

Off-site Development	Date Range	
	From	To
Grassland with sparse wooded areas and tree lines is noted in all directions within a radius of 250m. Ponds are present at ~13m and ~165m to the west and south-west respectively. 'Pepper Lane' flanks the site to the north-east whilst a drain is running along the eastern boundary of the site. Buildings (potentially commercial) are noted to the south and south-west within 100m to the site. 'Leighton Park' and a potentially commercial building are present to the north-west.	1877 ¹	1899
'Leighton Park School' buildings and a structure labelled as 'Swimming Bath' are outlined at ~200m to the north-west. The buildings to the south-west are labelled as 'Shrublands' on the map.	1899	1911
Sewage tanks are observed at ~70m and ~250m to the east and south-east respectively.	1911	1931
A further building is observed ~110m, south of the site.	1931	1958
A nursery is highlighted at ~50m to the south. Tennis courts and a playing field are present at ~100m, north and north-west. Both sewage tanks to the east and south-east are labelled as 'disused' on the map until 1974 when they stop from being present.	1958	1976
The building premises of 'The University of Reading' are outlined ~70m north-east, including laboratories and boiler room with tanks. 'Leighton Court' and 'The Lodge' buildings potentially used as student accommodation are indicated within 100m from the site to the south-east. Tennis courts are noted to the immediate south and extended residential development is observed to the south-east within 250m from the site. The pond to the south-west is shown as being backfilled. The nursery to the south is no longer present.	1973	1993
Area to the north-west and south-west is now fully commercially developed including 'New School House', 'The Crescent' and 'East Lodge' buildings within 100m from the site. A sports court is present ~150m, west of the site. and 'Reckitt House' and 'Fryer' buildings are noted at ~150m to the south-west and at ~100m to the south. Major development of 'The University of Reading' is observed with several large university buildings highlighted to the north and north-east within 250m to the site. A sports count building is outlined to the immediate south of the site in 2016. 'Whiteknights Energy Centre' and tanks are noted at ~100m to the north-east.	1993	2024 ²

Note(s): ¹ Earliest available historic map. ² Most recent available historic map.

Table 3.3 Potential Sources of Pollution Indicated from Historic Maps

Source	Direction	Distance (m)	Date Range	
			From	To
'Leighton Park School' buildings	NW	Adjacent to site and within 100m.	1899	2024
	SE		1976	2024
Nursery	S	50	1958	1974
Sewage tank	E	70	1911	1958
Disused sewage tank			1958	1974
Electric sub-station	SE	100	1976	2024
Fryer	SW	150	1972	1995
'Whiteknights Energy Centre' and tanks	NE	100	Not clear from maps.	2024
Boiler room with tanks	N	120	1973	Not clear from maps.
Potentially infilled pond	SW	165	1877	1979
Plant science and research laboratory, Kitchen, El. Sub-station (The University of Reading)	NE	170	1973	2024
Sewage tank	NE	250	1911	1958

3.2 Bomb Damage and the Potential for Unexploded Ordnance (UXO)

Based on the assessment of the historical and UXO Zetica (unexploded bomb) maps, it is not considered that a specialist UXO risk assessment should be undertaken to determine the risk to the proposed development.

Section 4 Environmental Records and Consultation

4.1 Dataset Information

A copy of the report is appended to this report in Appendix C and summarised in Table 4.1, Table 4.2 and Table 4.3.

Table 4.1 Environmental Significance of Data

Source	Direction	Distance (m)
Contaminated Land Register Entries and Notices	None	None
Discharge Consents	None	None
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 – Drain (On site)	E	Lining site boundary.
Pollution Incidents to Controlled Waters (Significant Incidents only)	NW ¹	244
Prosecutions Relating to Authorized Processes	None	None
Registered Radioactive Substances	None	None
Substantiated Pollution Incident Register	None	None
Nearest Potable Abstraction Point – within >1000m	None	None
Nearest Non-Potable Abstraction Point – within >500m	None	None
Water Industry Act Referrals	None	None
Source Protection Zones – within >1000m	None	None
Extreme Flooding from Rivers or Sea Without Defences – within >1000m	None	None
Flooding from Rivers or Sea Without Defences – within >1000m	None	None
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 Land (Water)	SW ²	161
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

Note(s): ¹ Authority: Environment Agency, Thames Region, Pollutant: Chemicals – Unknown, Incident Date: 1999 ² Unknown Filled Ground (Pond, marsh, river, stream, dock etc), Date of Mapping: 1962

The contemporary trades listed in Table 4.2 are only those considered to be viable potential sources of contamination that could impact the site.

Table 4.2 Contemporary Trade Directory

Contemporary Trade Directory within 250m	Distance/Direction
Boilers - Servicing, Replacements & Repairs	78m/N

Table 4.3 Geological Hazards

Source	Nearest Distance from Site/Type
Coal Mining Affected Areas	In an area that might not be affected by coal mining.
Mining Instability	Unknown
Natural and Mining Cavities	Unknown
Potential for Collapsible Ground Stability Hazards	Very Low
Potential for Compressible Ground Stability Hazards	No Hazard
Potential for Ground Dissolution Stability Hazards	No Hazard
Potential for Landslide Ground Stability Hazards	Very Low
Potential for Running Sand Ground Stability Hazards	Very Low
Potential for Shrinking or Swelling Ground Stability Hazards	Low

4.2 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 4.1, Table 4.2 And Table 4.3, and copies of which are appended to this report (Appendix C).

4.3 Regulatory Enquires

As part of the Preliminary Investigation Report the local authority (Reading Borough Council – Environmental Health Department) was contacted via phone and asked to provide any information on potential risks pertaining the site. The Council stated that they were unable to undertake research for the site and its close environs regarding any potential risks including waste disposal sites, petroleum licences associated with the site or the possibility that the study area has been affected by UXO.

4.4 Soil Geochemistry

The results of this survey are contoured on the Landmark Environmental check report (Appendix D). The results of the local soil chemistry are presented in Table 4.4.

Table 4.4 Soil Geochemistry

Determinant	Indicated Soil Geochemistry (mg kg⁻¹)
Arsenic	<15
Cadmium	<1.8
Chromium	60 - 90
Lead	<100
Nickel	15 - 30
Note(s): No concentrations noted in excess of the relevant C4SL for a "Public Open Space - Residential" land-use scenario.	

Section 5 Data Collection Summary

5.1 General

Table 5.1 summarises the site Environs, which include geology, hydrogeology, the risk from radon and potential risk from flooding.

Table 5.1 Site Environs

Environs	Summary
Geology	The 1:50,000 BGS Geology map showed the site to be situated on the London Clay Formation bedrock, with no superficial deposits overlying. Superficial River Terrace Deposits and Head Deposits were indicated by the geological maps to be present immediately south and ~10m north, east and north-east of the site and therefore might be present on site.
Hydrogeology	The London Clay Formation bedrock was unproductive strata and act as an aquiclude to the deep groundwater regime.
Source Protection Zone (SPZ)	None indicated as being present within >1000m.
Surface Water & Shallow Groundwater Flow	Surface water was anticipated to flow down to the centre of the site on hardstanding areas. Shallow groundwater, if present, is expected to follow the local and wider topography and flow towards the north-east. A drain was lining the eastern site boundary.
Groundwater Flow	Groundwater was anticipated to be towards the north-east in alignment with the wider topography, however due to the low permeable nature of the cohesive soils of the London Clay Formation underlying the site, groundwater flow was expected at very low velocity.
Radon	No radon risk indicated.
Flooding	The site did not benefit from flood defences and there was no potential risk from flooding of rivers or seas present. There was no flood risk from groundwater present on site.
Geological Hazard	Very Low – Potential for Collapsible Ground Stability Hazards. Very Low - Potential for Landslide Ground Stability Hazards. Very Low - Potential for Running Sand Ground Stability Hazards. Low - Potential for Shrinking or Swelling Ground Stability Hazards.
Local Authority (LPA) Response	At the time of reporting no response could be given by the relevant authority.
Soil Chemistry	None noted in excess of appropriate guidance values for proposed use/development.
Ecological	No identified receptors.

Table 5.2 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 5.2 Summary of Potential Contamination Sources

Contaminative Source	Direction	Distance (m)	Date Range		Data Source
			From	To	
School's boiler room	N, E	On site	Unknown	2024	SW, HM
Potential asbestos roofing on disused site buildings.	N, E	On site	Unknown	2024	SW

Contaminative Source	Direction	Distance (m)	Date Range		Data Source
			From	To	
Spills/leakages from vehicles on car park area.	W	On site	Unknown	2024	SW
Lock-up garages.	N	On site	Unknown	2024	SW
Off-Site					
'Leighton Park School' buildings	NW	Adjacent to site and within 100m.	1899	2024	SW, HM, GE
	SE		1976	2024	
Nursery	S	50	1958	1974	HM
Sewage tank	E	70	1911	1958	HM
Disused sewage tank			1958	1974	HM
Electric sub-station	SE	100	1976	2024	HM
Fryer	SW	150	1972	1995	HM
'Whiteknights Energy Centre' and tanks	NE	100	Unclear	2024	HM
Boiler room with tanks	N	120	1973	Unclear	HM
Potentially infilled pond	SW	165	1877	1962	HM
Plant science and research laboratory, Kitchen, El. Sub-station (The University of Reading)	NE	170	1973	2024	HM
Sewage tank	NE	250	1911	1958	HM
Pollution Incidents to Controlled Waters	NW	244	1999	Unknown	DS
Potentially Infilled Land (Water) ¹	SW	161	Unknown	1962	DS
Boilers - Servicing, Replacements & Repairs	N	78	Unknown	Unknown	DS
Note(s): SW – Site walkover, HM – Historic Maps, DS – Datasheet, GE Google Earth ¹ Potentially associated with the infilled pond indicated by the historic maps from 1877 to 1962.					

Section 6 Preliminary Conceptual Site Model

6.1 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 5.2. An assessment of the likely pathways and the likelihood of each contaminative source that was considered a risk has been presented in Sections 6.2 to 6.5.

6.2 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 6.1.

Table 6.1 Applicable Pathways

Pathway	Present	Comment
Inhalation of dust	✓	Dust retained by site structures and vegetation. Proposed communal areas of soft landscaping.
Inhalation of vapour/gases	✓	Potential off-site sources have been identified.
Ingestion and absorption via direct contact	✓	Contact with soil and made ground.
Migration via surface runoff	✓	Due to the impermeable nature of London Clay Formation underlying the site, lack of superficial deposits and hardstanding areas noted on site.
Migration in solution via groundwater		Unproductive strata of the London Clay Formation.
Migration of gases via permeable soils		Due to the impermeable nature of London Clay.
Direct contact with construction material	✓	Potentially impacted soils impacting foundations.
Services and utilities	✓	Potentially impacted soils impacting services and utilities.

6.3 Potential Sources of On-site Contamination.

The sources are presented in Table 6.2.

Table 6.2 On-site Potential Contamination Sources

Source	Likely	Reasoning
School's boiler room	✓	On site contaminative processes. Potential presence of oil storage tank in boiler room.
Potential asbestos on roofing.	✓	Any potential asbestos present on-site must be removed pre-demolition in full accordance with current guidance.
Spills/leakages from vehicles.	✓	On site contaminative processes.
Lock-up garages.	✓	

Table 6.3 Off-site Potential Contamination Sources

Source	Direction	Distance (m)	Likely	Reasoning
Nursery	S	50		Outside the hydrologic gradient of the site.
Sewage tank	E	70		
Electric sub-station	SE	100		
Fryer	SW	150		Topographically distant. Time passed since operation.
'Whiteknights Energy Centre' and tanks	NE	100		Outside the hydrologic gradient of the site.
Boiler room with tanks	N	120		
Plant science and research laboratory (University of Reading)	NE	170		
Sewage tank	NE	250		Outside the hydrologic gradient of the site. – Topographically distant.
Pollution Incidents to Controlled Waters	NW	244		Outside the hydrologic gradient of the site. – Authorised industrial processes. / Permitted activities are unlikely to give rise to soil or groundwater contamination.
Potentially Infilled Land (Water)	SW	161		Potential source of ground-gas however, due to small scale source and distance from site the likelihood of lateral migration of ground gas over vertical migration through intervening material is considered unlikely.
				Due to distance and nature of source, cannot impact the site via lateral migration of contaminants.
Boilers - Servicing, Replacements & Repairs	N	78		Outside the hydrologic gradient of the site.

6.4 Potential Contaminants

Table 6.4 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 6.4 Potential Contaminants

Potential Contaminative Sources	Contaminants / Chemical Properties
Oil tank on boiler room – On-site sources	PAHs, TPHs, Metals, Semi-metals and non-metals
Potential asbestos roofing on buildings – On-site sources	Asbestos
Car park, lock-up garages – On-site sources	Localised oil & fuel spillages, hydraulic fluids

6.5 Potential Exposure Receptors

The assessment for potential receptors is presented in Table 6.5.

Table 6.5 Potential Receptors

Potential Receptor		Present
Human Health	Future users of the site (End Users)	✓
	Construction workers on-site (Site Workers)	✓
	Service and maintenance workers (Site Maintenance)	✓
	Site neighbours and wider public (Off-site Users)	✓
Groundwater / Controlled Waters	Surface Water	✓
	Shallow Aquifer	
	Deep Aquifer	
Buildings & Materials	Buildings and Confined Spaces	✓
	Buried Structures	✓
	Buried Services	✓
Ecosystems	Flora and fauna	

6.6 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 6.1 to Table 6.5. The preliminary conceptual site model and risk assessment is presented in Table 6.6. 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 F.

Table 6.6 Preliminary Conceptual Site Model and Risk Assessment Methodology

Source (Table 6.2 & Table 6.3)	Potential Contaminant (Table 6.4)	Exposure Pathway (Table 6.1)	Receptor (Table 6.5)	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
Asbestos on buildings On-site historic and current site usage.	PAHs, TPHs, oil & fuel spillages, hydraulic fluids, Metals, Semi-metals and non-metals	Inhalation of dust	Site Workers/Site Maintenance End Users Off-site Users	Minor	Unlikely	Very low	Site located on bedrock of the London Clay Formation, which was classified as unproductive strata and would act as an aquiclude to the groundwater receptors.	Phase II ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.
Car park & lock-up garages On-site historic and current site usage.	Asbestos PAHs, TPHs	Inhalation of vapour/gases	Site Workers/Site Maintenance End Users Off-site Users	Minor	Unlikely	Very low	Very low vapour risk given the nature of source. No residential gardens within the proposed development however, risk to groundworkers remains.	Ground workers should follow regulations on health and safety during development (HSE, 1991).
Boiler Room On-site historic site usage.	PAHs, TPHs, oil & fuel spillages, hydraulic fluids, Metals, Semi-metals and non-metals	Ingestion and absorption via direct contact	Site Workers/Site Maintenance End Users	Minor	Unlikely	Very low	Any asbestos present on-site must be removed in accordance with Control of Asbestos Regulations 2012. However, risk to groundworkers remains and an asbestos specialist advice is sought.	
	Asbestos PAHs, TPHs, oil & fuel spillages, hydraulic fluids, Metals, Semi-metals and non-metals	Migration via surface runoff Migration in solution via groundwater Direct contact with construction material	Surface Water Shallow Aquifer Deep Aquifer Buried Structures Buried Services	Minor	Unlikely	Very low		
		Migration of gases via permeable soils	Site Workers/Site Maintenance End Users Off-site Users Building and Confined Spaces					

Section 7 Recommendations

7.1 General

Based on the information obtained during the compilation of this Preliminary Investigation and the preliminary conceptual site model, a potential for a **very low** risk of contamination has been identified.

7.2 Radon Gas

Radon protection measures will not be required within the proposed new development subject to the agreement with the LA.

7.3 UXO

Based on the assessment of the historical maps and the UXO Zetica (unexploded bomb) maps, a specialist UXO risk assessment is not considered necessary for the site.

7.4 Proposed Further Site Works

The general requirements for further environmental investigation are presented in Table 7.1.

Table 7.1 Proposed Further Environmental Investigation

Proposed Works	General Purpose	Required
Investigatory Holes	To collect sufficient samples for a robust assessment	✓
Laboratory Testing	To quantify the risks identified in the Conceptual Site Model	✓
Risk Assessment	Assess pollutant linkages based on current contaminated land guidance and screening criteria's	✓
Borehole well installation	To allow for continued groundwater and/or gas monitoring	
Remediation	If the site-specific risk assessment reveals that the site was contaminated	TBC
Validation & Verification	To validate and verify the remedial objectives based on the site-specific risk assessment	TBC

Note(s): TBC – To be confirmed

7.5 Discovery Strategy

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

List of Figures

Figure 1 – Site Location Map	18
------------------------------------	----

List of Appendices

Appendix A	Proposed Development Plans
Appendix B	Country Series and Ordnance Survey Maps
Appendix C	Landmark Envirocheck Report
Appendix D	Site Sensitivity Maps
Appendix E	Site Photographs
Appendix F	Risk Assessment Criteria