Phase I Contaminated Land Assessment Haydon House, 296 Joel Street, Pinner, HA5 2PY

On behalf of:
Hyde Park Construction Ltd

Project Reference:
022-1903

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D J Rudland, R. M. (2001). *Contaminated land risk assessment. A guide to good practice (C552).* CIRIA.

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Executive Summary

Earth & Marine Environmental Consultants Ltd (EAME) were instructed by Hyde Park Construction Ltd (the "Client") to undertake a Phase I Contaminated Land Assessment of Haydon House, 296 Joel Street, Pinner, HA5 2PY (the "Site"). The report is required to support the proposed redevelopment of the Site and associated planning permission requirements.

No potentially contaminative activities have been identified as having taken place on-site. The only minor items of note are:

- **Building/Structure** – An irregular (unusual) shaped building or structure was located on-site from c. 1896 until the Site was redeveloped into its current form and layout (Haydon House). There is no documentary evidence to suggest that this structure represents a source of ground contamination; and
- **Car Parking** – Since the Site was redeveloped into its current form (Haydon House) the gravelled rear of the Site has been used for car parking. No evidence of surface staining was observed during the Site tour.

Based on the above information the potential for significant contamination to have arisen at the Site because of the historic use is **VERY LOW**.

No potentially significant pollutant linkages have been identified. As the development will occur within the footprint of the current building minimal ground works will occur.

It is recommended that a watching brief is applied to the excavation and relaying of the existing car park (during the construction phase) in case hydrocarbon impacted ground is uncovered (although there is no visible evidence to suggest that this is the case).

It is important to remember that this conclusion only remains valid if the current proposals are implemented. Any changes to the proposed scope of works would invalidate the presented assessment.

1 Introduction

1.1 Background

Earth & Marine Environmental Consultants Ltd (EAME) were instructed by Hyde Park Construction Ltd (the "Client") to undertake a Phase I Contaminated Land Assessment of Haydon House, 296 Joel Street, Pinner, HA5 2PY (the "Site"). The report is required to support the proposed redevelopment of the Site and associated planning permission requirements.

1.2 Scope of Works

For there to be a significant contamination risk requiring further investigation; a source, pathway and receptor must all be present. To assess whether this is the case, background research is required to obtain relevant information about the site and surroundings and to assess the findings qualitatively. The scope of the assessment examined whether there is the potential for current and historic soil and/or groundwater contamination to be present, both at and near the Site, and its significance in terms of the potential to pose a risk to human health, controlled waters, building infrastructure, the wider environment and any associated potential liabilities.

The scope of the Phase I Contaminated Land Assessment includes:

- a Site visit by an experienced EAME Environmental Consultant to identify areas of potential environmental concern;
- review of available historic maps to determine the land use history in the context of potentially contaminative activities;
- a review of environmental data relating to the Site and its surroundings using a proprietary third-party environmental database;
- desk-based assessment of site geology, hydrogeology and hydrology from published mapping and web-based sources to determine the Site's environmental setting and sensitivity;
- a web-based search of the Environment Agency (EA) website and other freely available sources of information to identify any potential issues relating to the Site and surrounding areas;
- requests for statutory information held by the Local Authority;
- interrogation of EAME's internal geographic information system (GIS) with regards to pertinent environmental information; and

- conclusions and recommendations based on the outcome of the findings together with a qualitative contaminated land risk assessment based on Source-Pathway-Receptor as per Land Contamination Risk Management (LCRM) guidance.

2 Environmental Assessment

2.1 Introduction

The Phase I Contaminated Land Assessment of the Site comprised the following elements:

- a review of historical land uses and activities at the Site and associated with neighbouring land;
- a search of environmental regulatory databases;
- requests for statutory information from the Local Authority and Environment Agency (EA); and
- a Site walkover and surrounding area inspection.

The following information was derived from a Site inspection undertaken by EAME on 27th April 2022. All other information in this report has been obtained via public sources or from the Client's records.

2.2 Site Location and Setting

The Site is a 0.07-hectare (ha) parcel of land located off Joel Street, Pinner (**Figure *2-1***) at National Grid Reference (NGR) TQ 10476 88833.

Figure 2-1: *Site location (1:25,000)*

It is located approximately 1.7-km southwest of central Pinner a suburb in the borough of Harrow, Greater London. The Site is in urban predominately residential area. The following current activities have been identified surrounding the Site:

- **North** – Residential properties beyond which is Wentworth Drive.
- **East** – Joel Street beyond which is the Haydon Hall Park and Eastcote Cricket Club.
- **South** – Residential properties beyond which is Deerings Drive.
- **West** – Residential properties.

The Site is in the jurisdiction of the London Borough of Hillingdon (the "Council"), Eastcote and East Ruislip Ward.

2.3 Site Description and Layout

The Site is irregular in shape occupying 0.07 ha. The Site topography is flat lying, at approximately 50 metres Above Ordnance Datum (AOD) (***Figure 2-2***).

Figure 2-2: *Site layout (Aerial Photograph March 2020)*

2.4 Prevailing On-site Environmental Conditions

The following section has been wholly derived from the Site inspection undertaken by EAME on 27th April 2022 and summarises the prevailing on-site environmental conditions. All areas were accessed *i.e.* there were no excluded or inaccessible areas.

The Site was, until December 2021, occupied and used as offices by Splendid Hospitality Group LLP (privately owned hotel group).

Photograph 2-1: *View of Site from Joel Street*

Photograph 2-2: *Front of building*

Photograph 2-3: *Southern side of the main building*

Photograph 2-4: *Northern side of the main building (with drainage covers)*

2.4.1 Underground Storage Tanks (USTs)

During the Site inspection, no evidence of current or historic USTs (*i.e.* fill points, unexplained manhole covers, vent pipes, *etc.*) were observed.

2.4.2 Above Ground Storage Tanks (ASTs)

During the Site inspection, no evidence of historic or current ASTs (*i.e.* fill points, bunds, pipework, *etc.*) were observed.

2.4.3 Other Material Storage

The storage of (potentially environmentally hazardous) drums and Integrated Bulk Containers (IBCs) was not identified during the inspection.

2.4.4 Air Emissions

No air emissions were identified associated with the current Site use.

2.4.5 Environmental Permitted Activities

No activities potentially requiring an environmental permit were observed on-site.

2.4.6 Waste

No significant volumes of waste, either hazardous or non-hazardous, were identified during the Site tour.

2.4.7 Drainage and Wastewater

A formal drainage plan for the current Site has not been made available. A topographic survey of the Site was conducted by Cadmap Ltd in March 2022 (Ref. CM21738, March 2022). The plan outlines:

- a gravelled rear car park with no drainage or manholes; and
- a series of manholes located within tarmac surfacing on the north, south sides of the main building and within the front (tarmac) car park.

2.4.8 Water Abstraction

With respect to water supply, it is anticipated that this is supplied from the municipal mains. EAME did not visually identify any on-site boreholes or abstraction wells, and none were noted in the information reviewed.

2.4.9 Refrigerant Gases

The most harmful ozone-depleting substances (*e.g.* CFCs like R12) were banned in the 1990s. New equipment using less harmful HCFC refrigerants like R22 was banned in 2001 (or 2004

for small air-conditioning systems). From the end of 2009, the use of virgin HCFCs to service and maintain existing refrigeration and air-conditioning equipment (RAC) was banned in all EU Member States. Since 1st January 2010 it has been illegal to use virgin HCFCs to service RAC equipment. Only reclaimed and recycled HCFCs may be used. From 1st January 2015, it was illegal to use any HCFCs to service RAC equipment *i.e.* recycled or reclaimed HCFC may no longer be used. There are four small air conditioning units located at the rear of the property (***Photograph 2-5***).

Photograph 2-5: *Air conditioning units*

2.4.10 Polychlorinated Biphenyls (PCBs)

Any capacitor or transformer manufactured before 1976 may contain PCBs unless information is held to the contrary. It is also possible that there may be PCBs present in capacitors and transformers manufactured between 1976 and 1986. Even if the PCBs have been replaced by another liquid, significant amounts of PCBs may still be present. PCBs may occur as contaminants in the oil used in oil-filled electrical equipment. Hydraulic fluids in lifts, hoists, heavy machinery from the same era are also known to contain PCBs.

No potential PCB containing equipment was observed on-site.

2.4.11 Asbestos Containing Materials (ACMs)

Asbestos Containing Materials (ACMs) can be found in many parts of a building as sprayed asbestos (fire protection in ducts and to structural steel work, fire breaks in ceiling voids etc.), lagging (Thermal insulation of pipes and boilers), asbestos insulating boards (AIB) (fire

protection, thermal insulation, wall partitions, ducts, soffits, ceiling and wall panels), asbestos cement products, flat or corrugated sheets (roofing and wall cladding, gutters, rainwater pipes, water tanks), certain textured coatings (decorative plasters, paints) and bitumen or vinyl materials (roofing felt, floor and ceiling tiles).

According to the Health and Safety Executive (HSE) any buildings built or refurbished before the year 2000 may contain asbestos. The *Asbestos (Prohibitions) (Amendment) Regulations 1999* prohibited the import, supply and use of all asbestos containing products (except for minor exclusions).

Although no Potential Asbestos Containing Materials (PACMs) were identified the Phase I Contaminated Land Assessment does not constitute an approved Health and Safety Executive (HSE) Refurbishment/Demolition Survey in-line with the requirements *The Control of Asbestos Regulations 2012*.

2.4.12 Invasive Non-native Plant Species

Common invasive non-native plants, listed within Schedule 9 of *The Wildlife and Countryside Act 1981*, include such species as Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*) and Japanese Knotweed (*Fallopia japonica*).

Figure 2-3: *Selected Invasive Species (within 250-metres)*

The National Biological Network (NBN) has not recorded Giant Hogweed, Himalayan Balsam or Japanese Knotweed on-site. Giant Hogweed, Himalayan Balsam and Japanese Knotweed has been identified within 250 metres of the Site i.e. at the edge of Eastcote Lawn Tennis Club and the River Pinn (***Figure 2-3***).

No suspected invasive plants were observed during the Site visit. It is important to note that this does not constitute a Preliminary Ecological Appraisal (PEA).

2.4.13 Evidence of Uncontrolled Releases to Ground

No visual evidence of uncontrolled releases to ground were observed. This included the gravelled car park at the rear of the property (***Photograph 2-6*** and ***Photograph 2-7***).

Photograph 2-6: *Rear of site (gravelled car parking area)*

Photograph 2-7: *Rear of site (gravelled car parking area)*

2.4.14 Evidence of Previous Intrusive Investigations

No evidence of previous intrusive investigations (e.g. monitoring well covers) were observed on-site.

2.5 Site History

Historical maps were obtained and reviewed by EAME to determine the historical development of the Site. These are presented in *Annex B*. This enabled an assessment to be made of the potential for contamination associated with former activities, both on-site and in the surrounding areas (**Table *2-1***).

Table 2-1: *Site History*

Date/Scale	Features On-site	Features Off-site
1864-1879 1:2,500	Fields	**North** – Fields. **East** – Road beyond which are formal gardens, a large residential property, and open grassland with trees. **South** – Field boundary beyond which are fields and Laurel Cottage. **West** – Fields.
1896 1:2,500	Fields and a 'structure/building' near to the road. The building/structure is irregular in shape.	**North** – Fields. **East** – Road beyond which are formal gardens, a large residential property (Haydon Hall), smaller buildings (including glass houses), and open grassland with trees. **South** – Field boundary beyond which is a building, beyond which is a residential type building. **West** – Fields.
1913 1:2,500	Building/Structure no longer shown.	No significant changes.
1932-1935 1:2,500	No significant changes.	**North** – No significant changes. **East** – No significant changes. **South** – Field boundary beyond which is are two buildings (St Michael's School), beyond which is a residential type building, pavilion, and tennis courts. **West** – No significant changes.

Date/Scale	Features On-site	Features Off-site
1960-1972 1:2,500	Structure/building near to the road. The building/structure is irregular in shape. There is a smaller rectangular structure close to the northern Site boundary.	**North** – Extensive housing estate. **East** – Joel Street beyond is Haydon Hall and the cricket ground. **South** –St Michael's school beyond which is Laurel Cottage and Eastcote Lawn Tennis Club. **West** – Extensive housing estate.
1969-1983 1:1,250	No significant changes.	**North** – No significant changes. **East** – No significant changes. **South** – St Michael's school beyond which is a new housing estate and Eastcote Lawn Tennis Club. **West** – No significant changes.
1977-1987 1:1,250	Site shown in current layout (single large building).	**North** – No significant changes. **East** – No significant changes. **South** – Extensive housing estate. **West** – No significant changes.

The key stages in the development of the Site are outlined within the following map extracts:

- 1896 (***Figure 2-4***);
- 1959-1965 (***Figure 2-5***); and
- 1991 (***Figure 2-6***).

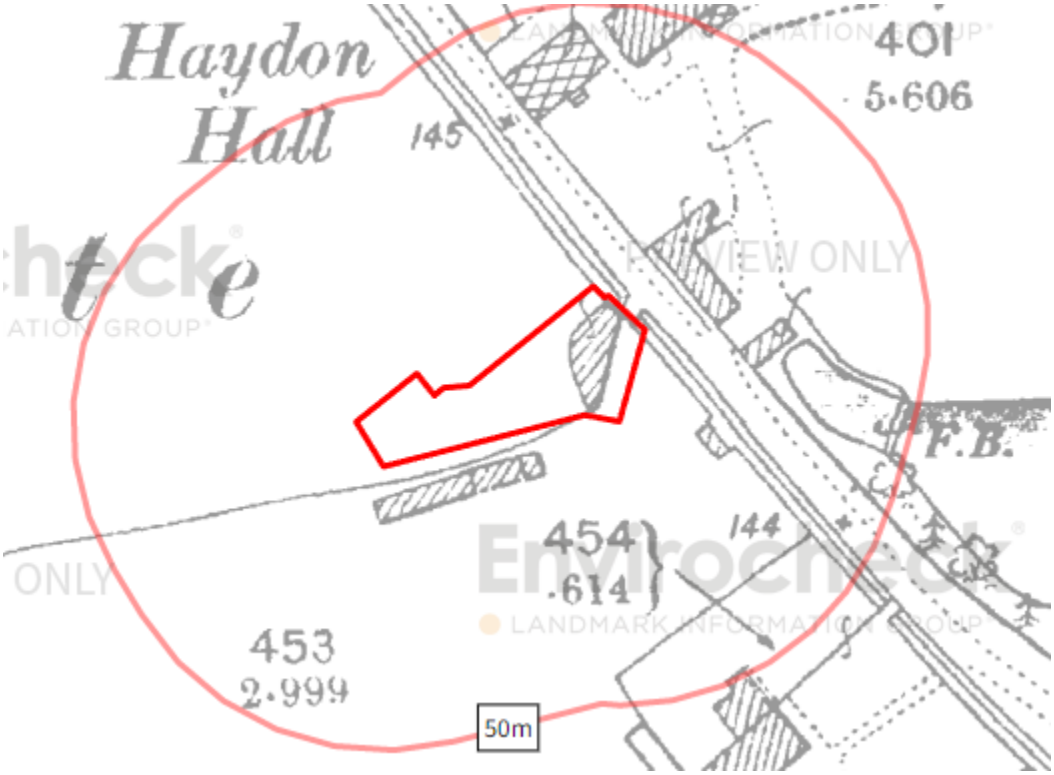


Figure 2-4: *1896 map (1:2,500)*

Figure 2-5: *1959-1965 map (1:1,250)*

Figure 2-6: *1991 map (1:1,250)*

2.6 Regulatory Authority Information

2.6.1 Local Authority Planning Department

A web-based search of the Council planning records was undertaken on April 22, 2022. No historic planning records for the Site were located using the on-line system.

2.6.2 Local Authority Environmental Health Department

Records and information held by local authority has been obtained from their website and from the Landmark Envirocheck which is provided in **Annex C**.

2.6.3 Environment Agency (EA)

Records and information held by EA has been obtained from their website and from the Landmark Envirocheck which is provided in **Annex C**.

2.6.4 Petroleum Enforcement Authority (PEA)

During the Site inspection, no evidence of current or historic USTs (*i.e.* fill points, unexplained manhole covers, vent pipes, *etc.*) were observed. A written request for information has not been submitted to the London Fire Brigade.

2.7 Environmental Database

A commercial database search (provided by Landmark Envirocheck) was obtained to provide further information regarding the Site and the surrounding area (Ref. 294392468_1_1).

2.7.1 Sites Determined as Contaminated Land

The Site has not been determined as contaminated land under Section 78R of the *Environmental Protection Act 1990*. There are no designated site within a 1-km search radius of the Site.

2.7.2 Part A(1) Environmental Permits

The Site is not listed as holding an active Part A(1) environmental permit. There are no identified permitted Part A(1) installations within 1-k m of the Site.

2.7.3 Part A(2) and Part B Environmental Permits

The Site is not listed as holding an active Part A(2) or Part B environmental permit. There are no Part A(2) permits within 1-km of the Site. The closest permitted Part B site is the Q8 Eastcote petrol filing station (327 metres south).

2.7.4 Radioactive Substances Authorisations

There are no records of Radioactive Substance Authorisations (RSAs) relating to the Site or any other site within 1-km.

2.7.5 Hazardous Substances

There are no Planning Hazardous Substance Consents or records of Control of Major Accident Hazards (COMAH) and/or Notification of Installations Handling Hazardous Substances (NIHHS) related to the Site or any other site within 1-km.

2.7.6 Recorded Pollution Incidents

There are no recorded pollution incidents associated with the Site. There are 16 Pollution Incidents to Controlled Waters within 500 metres of the Site. The closest is recorded as 24 metres southeast (July, 1994, minor incident).

2.7.7 Historic Landfill Sites

There are no British Geological Survey (BGS) or Local Authority records of any on-site historic landfills. There are no records of any historic landfill areas within 250 metres (the planning

consultation distance). The closest site is 2.3 km south southeast (Field End Road, household and commercial waste, Ref. EAHLD34558).

2.7.8 Registered Waste Treatment or Disposal Sites

There are no active waste treatment activities associated with the Site or any other site within 1-km.

2.7.9 Petrol and Fuel Sites

There are no active petrol filling stations (PFSs) associated with the Site. The closest operational PFS is Esso MFG Pinner (300 metre south).

2.7.10 Underground Pipelines and Transmission Assets

A search of the Linesearch database was undertaken (April 22, 2022) which lists pipelines owned and/or operated by various pipeline and transmission operators.

According to the initial search Cadent Gas and UK Power Networks may have assets in the area. Further information received from Cadent does not show low pressure (LP) gas mains entering or crossing the Site. Further information should be requested from UK Power Networks if any form of excavation works is planned.

2.8 Historical Contamination Potential

2.8.1 Site

No potentially contaminative activities have been identified as having taken place on-site. The only minor items of note are:

- **Building/Structure** – An irregular (unusual) shaped building or structure was located on-site from c. 1896 until the Site was redeveloped into its current form and layout (Haydon House). There is no documentary evidence to suggest that this structure represents a source of ground contamination; and

- **Car Parking** – Since the Site was redeveloped into its current form (Haydon House) the gravelled rear of the Site has been used for car parking. No evidence of surface staining was observed during the Site tour.

Based on the above information the potential for significant contamination to have arisen at the Site because of the historic use is **VERY LOW**.

2.8.2 Off-site

No potentially significant contaminative activities have been identified as having taken place off-site (within at least 250 metres).

Where activities represent potential off-site sources of contamination that (if present) could potentially migrate beneath the Site this would largely be governed by the underlying geological and hydrogeological conditions. Based upon the above information the potential for contamination to have arisen in the immediate areas surrounding the Site, because of historic and/or current use, and impacting the Site is **VERY LOW**.

3 Environmental Setting

3.1 Introduction

Desk-based research of the local geology, hydrogeology, hydrology and ecology was carried out to establish the potential for migration of contamination onto or away from the Site, and to assess the surface water and groundwater sensitivity of the surrounding area. Information was obtained from several sources, namely:

- inspection of the British Geological Survey (BGS) information *i.e.* Onshore GeoIndex, Lexicon of Named Rock Units and borehole logs for the area[1];
- examination of the EA's on-line aquifer designation mapping[2];
- examination of EA's flood map for planning[3];
- a review of MAGIC geographic information about the natural environment from across UK government[2]; and
- a review of online web-based information sources.

3.2 Geology

The relevant British Geological Survey (BGS) 1:50,000 map of the area (Sheet 255, Beaconsfield, solid and drift 1:50,000, 2002) and the BGS Onshore GeoIndex, outline that the Site is directly underlain by:

- **Artificial ground** – Not indicated.
- **Superficial deposits** – Alluvium - Clay, Silt, Sand and Gravel.
- **Bedrock deposits** – Lambeth Group - Clay, Silt and Sand (***Figure 3-1***). According to the BGS Lexicon of rock units the Lambeth Group is composed of vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate. The Lambeth Group was deposited in fluvial, estuarine, lagoonal, or proximal marine environments.

[1] http://mapapps2.bgs.ac.uk/geoindex/home.html
[2] https://magic.defra.gov.uk/
[3] https://flood-map-for-planning.service.gov.uk/

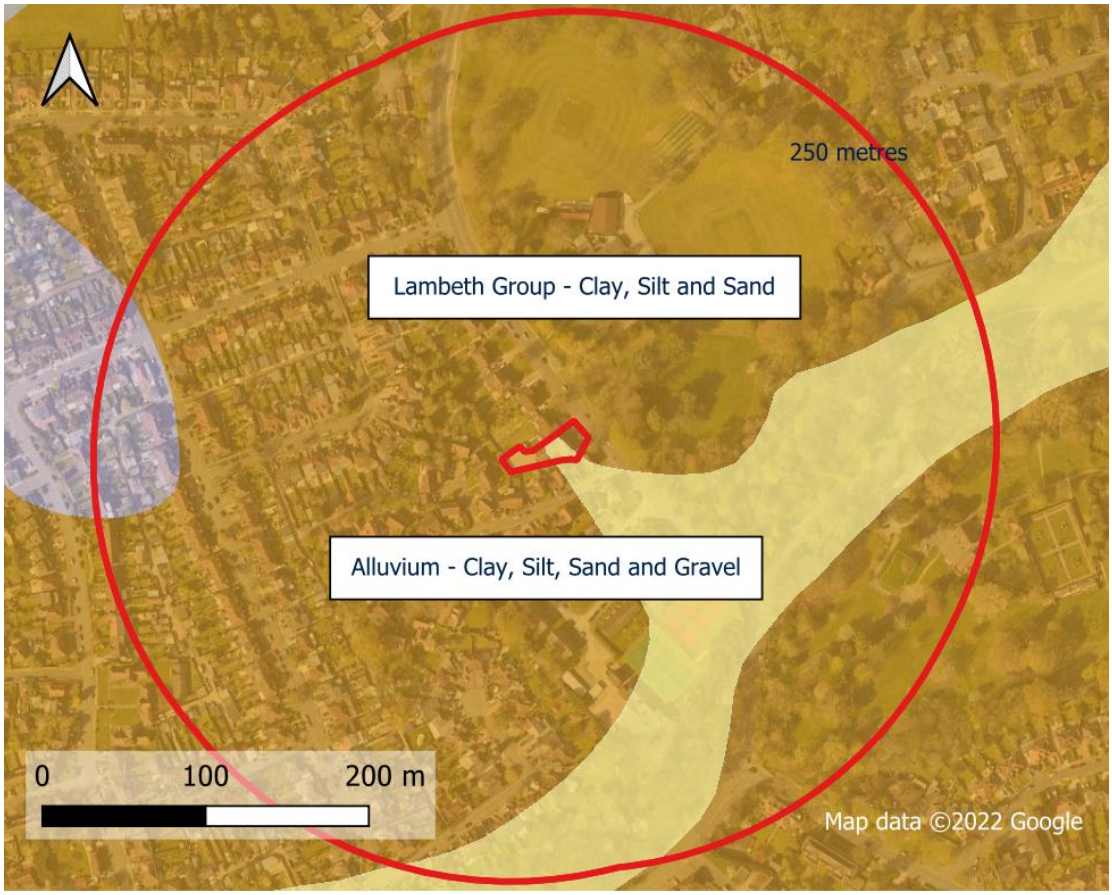


Figure 3-1: *Superficial and Bedrock Geology (1:50,000)*

The closest BGS registered borehole is TQ18NW2 (HAYDON HALL), RUISLIPBHO_581673, TQ18NW2/A-F HAYDON HALL RUISLIP 1-6 (BHO_581673) 145 metres north of the Site. The borehole log (from 1939) shows superficial deposits (clay) underlain by Reading Beds (sand, stiff clays). According to the BGS Lexicon of Rocks Units the term 'Woolwich and Reading Beds' was the previous name for the Lambeth Group. Rest water levels were recorded at around 5 metres below ground level.

3.2.1 Coal Mining and Man-Made Cavities

The environmental database defines the area as a 'Coal Mining Affected Area' *i.e.* in an area which may be affected by coal mining activity. In these areas it is recommended that a coal mining report is obtained from the Coal Authority. The Site is not within a coal mining affected area.

The Landmark environmental database identifies man-made mining cavities within 1-km of the Site. There is a Shaft Entry in relation to Sand/Clay mining approximately 542 metres west of the Site.

3.3 Hydrogeology

The aquifer classification system was last updated on 1st April 2010 which provided new aquifer designations to replace the old system of aquifer classifications, such as Major, Minor and Non-Aquifer. This revised system is in line with the EA's Groundwater Protection Policy (GP3) and the Water Framework Directive (WFD) and is based on BGS mapping. From a review of the BGS on-line maps (Magic.defra.gov.uk) the Site is located on the following:

- **Superficial Deposits** – The superficial deposits have been designated by the EA as a Secondary A Aquifer. Secondary A are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

- **Bedrock Deposits** – The bedrock deposits have been designated by the EA as a Secondary A Aquifer.

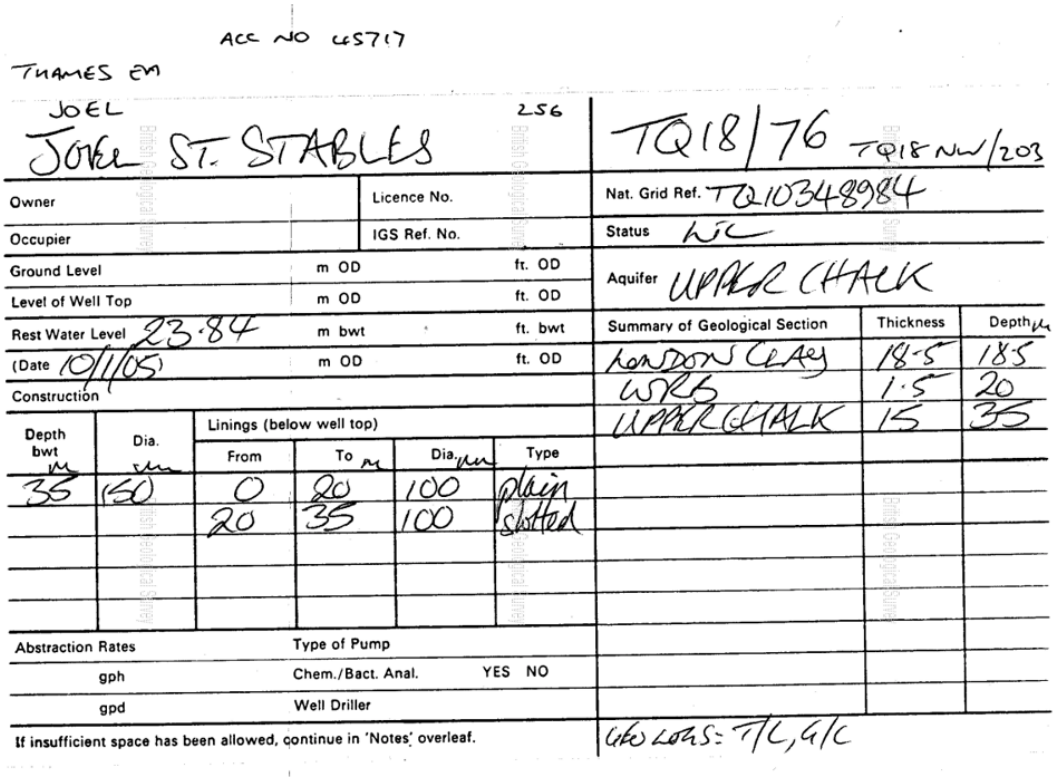
The groundwater vulnerability is based on the likelihood of a pollutant reaching the groundwater (i.e. the vulnerability), the types of aquifer present and the potential impact (i.e. the aquifer designation status). The EA/BGS has classified the Site as Medium Vulnerability.

Figure 3-2: *Groundwater Source Protection Zones*

The EA have defined groundwater Source Protection Zones (SPZs) for 2,000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones are designated to protect the location from the risk of contamination from any activities that might cause pollution in the area, *i.e.* the closer the activity, the greater the risk. The maps show three main zones; an inner, an outer and the total catchment with a fourth zone of special interest, which the EA occasionally apply, to a groundwater source. The Site is not located within an SPZ. The Site is located within 50 metres of a Zone III (***Figure 3-2***).

There are no groundwater abstraction licences associated with the Site.

The BGS borehole mapping outlines a water well Ref. BHO_15640142, Water Well TQ18NW203 JOEL STREET STABLES (BHO_15640142) approximately 1025 metres north (Easting: 510340, Northing: 189840) of the Site. The 35-metre-deep borehole (Chalk Group) has a rest water level of 23.84 m.



ACC NO 65717

THAMES EM

JOEL

JOEL ST. STABLES 256

TQ18/76 TQ18NW/203

Owner | Licence No.

Occupier | IGS Ref. No.

Nat. Grid Ref. TQ10348984

Status WL

Ground Level m OD ft. OD

Level of Well Top m OD ft. OD

Aquifer UPPER CHALK

Rest Water Level 23.84 m bwt ft. bwt

(Date 10/1/05) m OD ft. OD

Construction

Summary of Geological Section	Thickness	Depth
LONDON CLAY	18.5	18.5
WRG	1.5	20
UPPER CHALK	15	35

Depth bwt m	Dia. mm	Linings (below well top) From	To m	Dia. mm	Type
35	150	0	20	100	plain
		20	35	100	slotted

Abstraction Rates

gph

gpd

Type of Pump

Chem./Bact. Anal. YES NO

Well Driller

If insufficient space has been allowed, continue in 'Notes' overleaf.

GEOLOGY: T/C, G/C

Figure 3-3: *Off-site Borehole abstraction record*

http://scans.bgs.ac.uk/sobi_scans/boreholes/15640142/images/17580795.html

The EA's draft river basin management plan outlines the quantitative status of the groundwater as poor (***Figure 3-4***).

Figure 3-4: *River basin management plan – Groundwater*

The closest water abstraction listed within the environmental database is 1886 metres northwest and is operated by Affinity Water Limited (potable abstraction).

3.4 Hydrology

There are no on-site water features.

The Landmark database, which utilises the Ordnance Survey water network mapping, outlines the following surface water features (within 250 metres):

- River Pinn (120 metres east); and
- Unspecified drain (47 metres east) that connects with a culverted drain connecting to an area of unsurfaced ground approximately 650 metres west of the Site.

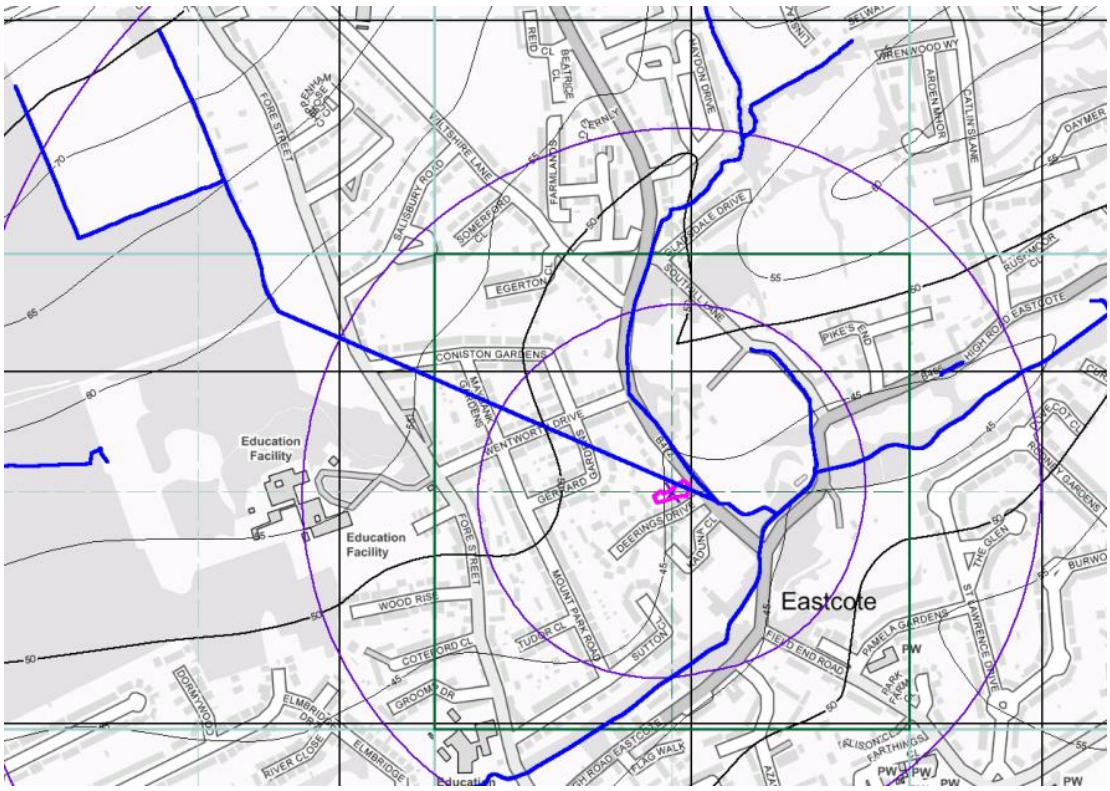


Figure 3-5: *Surface water features*

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According to the EA Catchment Data Explorer[4] the Site is located within the Thames (River Basin District), Colne (Management Catchment), Colne (Operational Catchment), Pinn (Water Body). The Cycle 2 water quality for the Pinn is classified by the EA as moderate ecological quality and fail chemical quality (for priority hazardous substances Benzo(ghi) perylene and Polybrominated diphenyl ethers (PBDE).

There are no surface water abstractions associated with the Site or any other site within 1-km.

3.4.1 Flood Risk

According to the UK government flood mapping service the Site is in the following flood zone areas:

- **Planning** – Flood Zone 3. These locations have a high probability of flooding and will need a flood risk assessment (***Figure 3-6***). A flood risk assessment (as part of a planning

4 https://environment.data.gov.uk/catchment-planning/WaterBody/GB106039023070

application) is required if your development is bigger than 1 ha, in an area with critical drainage problems (as notified by the Environment Agency) or there is a change of use in development type to a more vulnerable category (for example from commercial to residential) and in an area that could be affected by sources of flooding other than rivers and the sea (such as surface water or reservoirs).

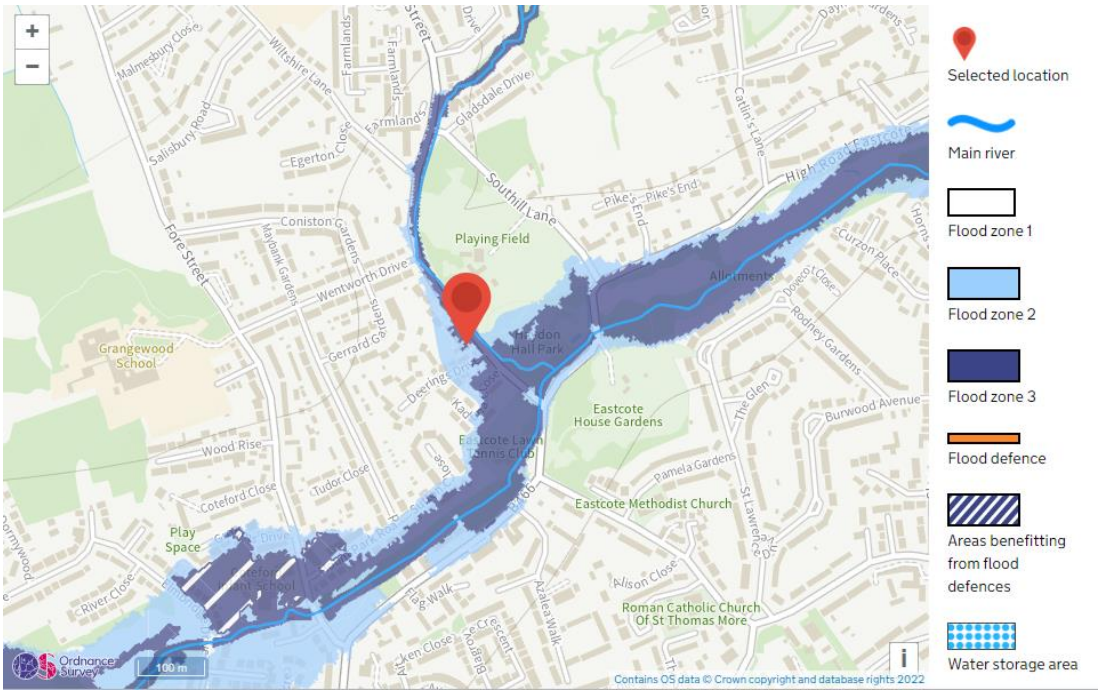

Figure 3-6: *Flood risk (for planning)*

- **Rivers and seas** – **HIGH RISK**. This flood risk summary is not property specific. High risk means that each year this area has a chance of flooding of greater than 3.3%. This information is suitable for identifying which parts of towns or streets are at risk or have the most risk the approximate extent and depth of flooding. It's likely to be reliable for a local area but not for identifying individual properties at risk. This information considers any flood defences.

- **Surface water** – **HIGH RISK**. This flood risk summary reports the highest risk from surface water within a 20m radius of this property. High risk means that each year this area has a chance of flooding of greater than 3.3%. This information is suitable for identifying which parts of counties or towns are at risk or have the most risk the approximate extent and depth of flooding. It's unlikely to be reliable for a local area and very unlikely to be reliable for identifying individual properties at risk. Surface water flooding, sometimes known as flash flooding happens when heavy rain cannot drain away, it is difficult to predict as it depends on rainfall volume and location, can happen up hills and away from rivers and other bodies of water and is more widespread in areas with harder surfaces like concrete.

Lead local flood authorities (LLFA) are responsible for managing the flood risk from surface water and may hold more detailed information. The LLFA for this area is Hillingdon Council.

- **Reservoirs** – There is a risk of flooding from reservoirs in this area (George V FSA, grid reference TQ1280090400). The LLFA for this asset is Harrow. It is important to note that flooding from reservoirs is extremely unlikely.

3.5 Sensitive Land Uses and Receptors

3.5.1 Ecological Receptors

The MAGIC website which is managed by the Department for Environment, Food and Rural Affairs (Defra), was queried to locate Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, National Nature Reserves (NNR), Areas of Outstanding Natural Beauty (AONB), National Parks and Local Nature Reserves (LNR), ancient woodlands, green belt within 1-km of the site (***Figure 3-7***).

Figure 3-7: *Ecological and Land Use Designations*

The closest designated areas are:

- Ancient woodland – Park Wood, 192 metres northwest;
- Adopted Greenbelt – 222 metres northeast; and
- Local Nature Reserve – Ruislip 583 metres south.

3.5.2 Protected Buildings

The MAGIC, English Heritage and Historic England websites were queried to locate Scheduled Monuments, World Heritage sites, battlefield sites park and gardens and Listed Buildings within 1-km metres of the Site (***Figure 3-8***).

Figure 3-8: *Heritage assets*

- **Scheduled Monument (Park Pale, Ruislip)** – The monument (345 metres west) includes a continuous section of park pale and ditch which form the surviving northern side of Ruislip Park. The section is roughly 1.5km long and at the eastern end runs into a section of later

medieval earthwork. Ruislip Park was mentioned in the Domesday Survey of 1086 as a 'Park for Woodland Beasts' and is one of only two such Parks in Middlesex.

- **Listed Buildings** – The closest is the Grade II Wall and Gate Piers To West of Haydon Lodge (Reference1358378) located 194 metres east of the Site.

The Eastcote Village Conservation Area boundary is located 10 metres east of the Site.

3.5.3 Residential Receptors

The closest residential properties surround the Site to the north, south and west.

3.5.4 Recreational Land Use

There are no public rights of way on to or around the Site.

3.6 Significance of Environmental Setting

The significance of the environmental setting is considered by EAME to be as follows:

- **Groundwater [MODERATE SENSITIVITY]** – The Site is located on superficial deposits classified as a secondary A aquifer and bedrock deposits classified as a secondary A aquifer. The Site is not located within a SPZ.
- **Surface Water [HIGH SENSITIVITY]** – The nearest surface watercourse is the River Pinn (120 metres east) and an unspecified drain (47 metres east).
- **Ecological Sensitive Areas [LOW SENSITIVITY]** – The closest designation is an area of ancient woodland – Park Wood, 192 metres northwest, an area of adopted greenbelt – 222 metres northeast and a Local Nature Reserve (Ruislip) 583 metres south.
- **Protected Buildings and Structures [LOW SENSITIVITY]** – The closest designation is the Grade II Wall and Gate Piers To West of Haydon Lodge (Reference1358378) located 194 metres east of the Site. There is a scheduled monument 345 metres west of the Site.
- **Residential Areas [HIGH SENSITIVITY]** – The closest residential properties surround the Site to the north, south and west.
- **Recreational Areas [LOW SENSITIVITY]** – There are no public rights of way on to or around the Site.

4 Qualitative Risk Assessment

4.1 Introduction

Part 2A of the *Environmental Protection Act 1990* ("Part 2A") provides the legislative framework for the contaminated land regime in England, Wales and Scotland. It provides for contaminated land to be identified and dealt with in a risk-based manner. *The Contaminated Land (England) Regulations 2006* set out provisions for procedural matters under Part 2A. The 2006 regulations have recently been modified with the introduction of *The Contaminated Land (England) (Amendment) Regulations 2012*, which came into force on 6th April 2012. This includes an amendment to Regulation 3(c) to take account of the updated definition of "controlled waters" in Section 78A(9) of the *Environmental Protection Act 1990*.

Section 78A(2) of Part 2A of the EPA 1990 defines contaminated land as "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:

- significant harm is being caused or there is a significant possibility of harm (SPOSH) being caused; or
- pollution of controlled waters is being or is likely to be caused".

The revised Statutory Guidance introduced a new four-category system for classifying land under Part 2A for cases of a Significant Harm or Significant Possibility of Significant Harm (SPOSH) to human health which would both give rise to unacceptable risk, where supported by robust science-based evidence, and the determination of the site as Contaminated Land under Part 2A.

Category 1 includes land where the level of risk is clearly unacceptable (significant harm) and Category 4 includes land where the level of risk posed is acceptably low. The Category 2/3 border defines the point at which land is determined as contaminated land under the legislation. The following definitions are outlined within the Department for Environment, Food & Rural Affairs (Defra) Guidance:

- **Category 1** – a) The authority is aware that similar land or situations are known, or are strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere; or b) the authority is aware that similar degrees of exposure (via any medium) to the contaminant(s) in question are known, or strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere.

- **Category 2** – a) There is a strong case for considering that the risks from the land are of sufficient concern, that the land poses a significant possibility of significant harm; b) land where there is little or no direct evidence that similar land/situations/exposure have caused harm before, but the authority considers on the basis of the available evidence, including expert opinion, that there is a strong case for taking action under Part 2A on a precautionary basis c) the authority considers that significant harm may already have been caused by contaminants in, on or under the land, and that there is an unacceptable risk that it might continue or occur again if no action is taken.

- **Category 3** – (Not designated as Contaminated Land) a) A strong case does not exist, and therefore the legal test for significant possibility of significant harm is not met. b) Land where the risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted. (This recognises that placing land in Category 3 would not stop others, such as the owner or occupier of the land, from taking action to reduce risks outside of the Part 2A regime if they choose).

- **Category 4** – (Not designated as Contaminated Land) a) There is no risk, or the level of risk posed is low. b) Land where no relevant contaminant linkage has been established. c) Where there are only normal levels of contaminants in soil.

Significant harm is defined in the Guidance on risk-based criteria and must be the result of a significant pollutant linkage. The presence of a pollutant linkage relies on the Source-Pathway-Receptor concept, where all three factors must be present and potentially or linked for a potential risk to exist. An initial assessment of pollutant linkage can be made qualitatively (*i.e.* through identifying these factors) and may be assessed using qualitative risk assessment models.

A conceptual model is an essential element of any site-specific environmental risk assessment. In this context, they are often simple representations of the hypothesised relationships between sources, pathways and receptors. For this report, a basic conceptual model has been developed based on the principles of LCRM and interpretation of information gathered during the Phase I Contaminated Land Assessment. Thus, this allows the identification of potential pollutant linkages and whether these linkages have the potential to comprise significant harm and/or pollution of controlled waters in relation to the Site. Based on this interpretation, the implications for potential liability associated with soil or water contamination at the site can be evaluated.

4.2 Conceptual Site Model

The soil and groundwater conditions on the Site, as identified through the environmental assessment, have been summarised into a Conceptual site Model (CSM), which defines the

key sources, pathways and receptors that have been identified as being relevant to this Site. The CSM concludes with potential pollutant linkages for the Site given the current setting:

- **SOURCES** – the identification of contaminants within the soils and groundwater that represent potential pollution sources;
- **PATHWAYS** – the identification of the potential exposure mechanisms and migration pathways from the potential sources; and
- **RECEPTORS** – the identification of the potential receptors that could be sensitive to harm if exposed to these pollution sources.

Collectively, each of these scenarios would be considered a potential pollutant linkage that may require further assessment.

A summary description of the Proposed Development is as follows:

- *Conversion of an existing structure to form 6 residential flats i.e. Ground floor - Flat 1 (Studio), Flat 2 (IB-2P), Flat 3 (2B-3P) and First Floor - Flat 4 (Studio), Flat 5 (1B-2P) and Flat 6 (2B-3P). The building also includes a bike storage and bin storage area.*

With respect to Site surfacing (**Figure *4-1***) the Proposed Development is predominantly constructed of hardstanding (Sustainable drainage systems (SUDs) compliant parking arrangements) with landscaping (shared greenspaces) around the southern edges of the Site. There are no planned changes to the footprint of the current building. Shallow groundworks will only occur in the current gravelled area (rear of the Site) and on the southern side of the building (landscaped area).

Changes to the above proposals will invalidate the following risk assessment (*i.e.* a more sensitive land use has not been considered). A preliminary conceptual model is presented below in accordance with the current guidance outlined within LCRM.

Figure 4-1: *Proposed site layout (including surfacing)*

Creative Ideas & Architecture Office (2022). Proposed site plan, 21/04/22, DWG. 166-3GA-01

4.2.1 Identification of Potential Sources

Based on the information from the desk study, historical maps, Site inspection and published information, no significant sources either on-site or off-site have been identified. Two minor items of note have been identified (**Table *4-1***).

Table 4-1: *Potential sources*

Source	Dates	Status
S1. Unspecified site use (building/structure) No information available to identify use. However, no potentially significant contamination sources or activities have been identified. This has been discounted as a potential source.	c.1896 – c.1990s	On-site Historic
S2. Car parking (unsurfaced area) Potential for localised spillage of hydrocarbons due to leaks and spills from parked cars. It should be noted that no evidence of historic leaks or spills was observed during the Site visit. This has been discounted as a potential source.	c.1990s - Current	On-site Historic/Current

4.2.2 Identification of Potential Exposure Pathways

Exposure pathways are the potential routes and mechanisms by which on-site sources could be linked to the identified potential receptors and thereby expose them to potential harm. Only plausible pathways need be considered. The following potential exposure pathways have been identified at the Site (note these do not assume a source is present) as outlined within ***Table 4-2***.

Table 4-2: *Potential pathways*

Pathway	Plausible	Comments
P1. Inhalation of dust and/or vapours.	Yes	Viable pathway during the shallow construction phase activities (car park and landscaping).
P2. Dermal contact (direct contact) with soils and/or groundwater.	Yes	Viable pathway during the shallow construction phase activities (car park and landscaping).

Pathway	Plausible	Comments
P3. Ingestion of soils or groundwater.	Yes	Viable pathway during the shallow construction phase activities (car park and landscaping).
P4. Direct contact between buildings and/or services with soils and/or groundwater.	Yes	Viable pathway for current shallow Made Ground.
P5. Migration via on-site drainage systems and service runs.	Yes	Viable pathway for current shallow Made Ground.
P6. Leaching and vertical migration into groundwater.	Yes	Viable pathway for current shallow Made Ground.
P7. Lateral migration within the groundwater.	Yes	Viable pathway, shallow and deeper groundwater bodies are likely to be present.
P7. Capillary rise within vegetated unsurfaced areas.	Yes	Viable pathway for current shallow Made Ground.
P8. Inhalation of ground gases.	Yes	Viable pathway for ground gases.
P9. Vertical/horizontal migration of ground gases.	Yes	Viable pathway for current shallow Made Ground.

4.2.3 Potential Receptors

Based on the Site's environmental setting and the proposed future end use of the Site, the following potential receptors have been identified within ***Table 4-3***.

Table 4-3: *Potential receptors*

Receptor	Status	Comments
Human Health R1. Current site users	On-site	The Site is not currently occupied.
Human Health R2. Construction workers	On-site	Construction workers encountering shallow Made Ground, shallow perched water or confined space in which gases may build up.
Human Health R3. Future site users	On-site	Proposed end users of the Site (residential users).
Property R4. Buildings and structures	On-site	Buildings materials used below ground e.g. foundations.

Receptor	Status	Comments
Property R5. Services	On-site	Buildings materials used below ground e.g. services and potable water supply pipes.
Controlled Waters R6. Alluvial groundwater (Secondary A Aquifer)	On-site Off-site	Shallow groundwater within the superficial deposits.
Controlled Waters R7. Bedrock groundwater (Secondary A Aquifer)	On-site Off-site	Deep groundwater within the bedrock aquifer.
Controlled Waters R8. Surface water (local ditch and River Pinn)	Off-site	Local surface water resources.
Ecology R9. Flora and Fauna	On-site	Landscaped areas located on-site.
Third Party Users R10. Adjacent users and structures	Off-site	Residential properties near the Site (to the north, south and west).

4.2.4 Potential Pollutant Linkages

For there to be a plausible pollutant linkage there must be a source, receptor and pathway and a feasible linkage between them (a so-called pollutant linkage). Consequently, even where a contaminant is identified, if there is no pathway for the contamination to reach a receptor, or no receptor then there can be no significant risk and remedial actions are not required. Furthermore, even if there is a complete pollutant linkage, it is possible that the contaminant concentration that can pass along the linkage does not represent a significant risk to human health or the environment. Central to this risk assessment process is the development of a 'conceptual model'. This is a descriptive and/or pictorial representation of the area of potential contamination, the surrounding environment and the processes acting on the contaminants by which they can move and encounter receptors (*e.g.* by leaching and migration into groundwater).

Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, to assess risk both the likelihood and the consequences of an event must be considered. This report adopts the methodology for risk evaluation presented in the guidance

document CIRIA C552 Contaminated Land Risk Assessment – A Guide to Good Practice (D J Rudland, 2001).

The method is qualitative and involves the classification of the magnitude of the potential severity or consequence of the risk occurring (**Table 4-4**).

Table 4-4: *Classification of consequence*

Consequence	Definition
Severe	Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short term risk of (significant) pollution of sensitive water resource. Catastrophic damage to building/property. A short-term risk to an ecosystem, or organism forming part of such ecosystem.
Medium	Chronic damage to human health (significant harm). Pollution of sensitive water resources. A significant change in an ecosystem, or an organism forming part of such an ecosystem.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing *etc.*). Easily repairable effects of damage to buildings, structures and services.

The magnitude of the likelihood or probability of the risk occurring is estimated using (**Table 4-5**).

Table 4-5: *Classification of probability*

Likelihood	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.

Likelihood	Definition
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period that such an event would take place and is even less likely in the shorter term.
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned using **Table 4-6**.

Table 4-6: *Risk assessment matrix*

		Consequence			
		Severe	Medium	Mild	Minor
Likelihood of Occurrence	High	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

The description of the classified risks and likely actions required, in accordance with CIRIA C552, are:

- **VERY HIGH RISK** – There is a high probability that severe harm could arise to a designated receptor from an identified hazard OR, there is evidence that sever harm to a designated receptor is currently happening. This risk (if realised) is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.

- **HIGH RISK** – Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.

- **MODERATE RISK** – It is possible that harm could arise to a designated receptor from an identified hazard. However, if it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.

- **LOW RISK** – It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

- **VERY LOW RISK** – There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

4.2.5 Tabular CSM

EAME has devised a conceptual model based on the information obtained to date through the desk-based study and the proposed end use of the Site. This is detailed in tabular format in **Table *4-7*** and pictorially in **Annex A, Figure A4** and **Figure A5**.

It is important to remember that:

- this preliminary risk assessment (based primarily on desk-based information) is based on professional judgement;

- the stated risk assessment only remains valid if the current proposals are implemented; and

- the following risk assessment has been undertaken assuming no mitigation measures are in place (*i.e.* prior to the implementation of appropriate control measures).

Table 4-7: *Tabular Conceptual Site Model*

Source	Pathway	Receptor
S2. Car parking (unsurfaced area) Potential for localised spillage of hydrocarbons due to leaks and spills from parked cars	P1. Inhalation of dust and/or vapours. P2. Dermal contact (direct contact) with soils and/or groundwater. P3. Ingestion of soils or groundwater.	R2. Construction workers
Potential Pollutant Linkage and Significance (PRIOR to mitigation and control)		
Likelihood	**Consequence**	**Risk**
LOW	**MINOR**	**VERY LOW**
Discussion		
Site History An irregular (unusual) shaped building or structure was located on-site from c. 1896 until the Site was redeveloped into its current form and layout (Haydon House). There is no documentary evidence to suggest that this structure represents a source of ground contamination. Since the Site was redeveloped into its current form (Haydon House) the gravelled rear of the Site has been used for car parking. No visible evidence of surface staining was observed during the Site tour. **Proposed Development** The Proposed Development involves the conversion of an existing structure to form 6 residential flats i.e. Ground floor - Flat 1 (Studio), Flat 2 (IB-2P), Flat 3 (2B-3P) and First Floor - Flat 4 (Studio), Flat 5 (1B-2P) and Flat 6 (2B-3P). The building also includes a bike storage and bin storage area. With respect to Site surfacing the Proposed Development is predominantly constructed of hardstanding (SUDs compliant parking arrangements) with landscaping (shared greenspaces) around the southern edges of the Site. There are no planned changes to the footprint of the current building. Shallow groundworks will only occur in the current gravelled area (rear of the Site) and on the southern side of the building (landscaped area). Potential for minor historic hydrocarbon staining due to leaks and spills from parked cars. **Construction Phase Activities** The construction phase will involve site clearance, localised soil disturbance in the current car park. These activities could expose constructions workers to in-ground materials via dermal contact, ingestion, or inhalation risk (if present).		
Mitigation and Management		

Construction activities fall under the control of the *Health and Safety at Work etc. Act 1974* and the *Construction (Design & Management) Regulations (CDM 2015)*. There is a statutory requirement and duty of care for workers to be informed of potential contamination at a site. This should clearly be the case during the construction phase. Employers and employees are required to carry out risk assessments and take all reasonable steps to protect themselves from exposure to potential contamination during any works. Normal operational hygiene requirements and procedures would need to be applied. These would be enough to break any potential pollution linkages with the in-ground materials (if present). If an appropriate safe system or work is developed and implemented the risks to future construction workers would be very low.	
Potential Pollutant Linkage and Significance (AFTER mitigation and control)	**VERY LOW**

5 Conclusions

5.1 Introductions

The Phase I Contaminated Land Assessment centred on the likelihood of contamination being present either in the ground or groundwater on the Site and there being an exposure pathway to receptors such that there is the significant probability of significant harm occurring (SPOSH). Where such conditions exist then there is a need to mitigate that situation (i.e. break the pollutant linkage).

5.2 Site History

No potentially contaminative activities have been identified as having taken place on-site. The only minor items of note are:

- **Building/Structure** – An irregular (unusual) shaped building or structure was located on-site from c. 1896 until the Site was redeveloped into its current form and layout (Haydon House). There is no documentary evidence to suggest that this structure represents a source of ground contamination; and

- **Car Parking** – Since the Site was redeveloped into its current form (Haydon House) the gravelled rear of the Site has been used for car parking. No evidence of surface staining was observed during the Site tour.

Based on the above information the potential for significant contamination to have arisen at the Site because of the historic use is **VERY LOW**.

5.3 Summary

No potentially significant pollutant linkages have been identified. As the development will occur within the footprint of the current building minimal ground works will occur. It is recommended that a watching brief is applied to the excavation and relaying of the existing car park (during the construction phase) in case hydrocarbon impacted ground is uncovered (although there is no visible evidence to suggest that this is the case).

Based on the qualitative risk assessment (using available information), potentially significant pollutant linkages have not been identified with respect to human health and controlled waters. There is no evidence to suggest the identified potential receptors will be exposed to sufficient levels of the contamination source to either cause significant ham or cause SPOSH. This conclusion only remains valid if the current proposals are implemented. Any changes to the proposed scope of works would invalidate the presented assessment.

Annex A: Figures

Annex B: Historical Maps

Annex C: Environmental Database

Annex D: Environmental Site Sensitivity