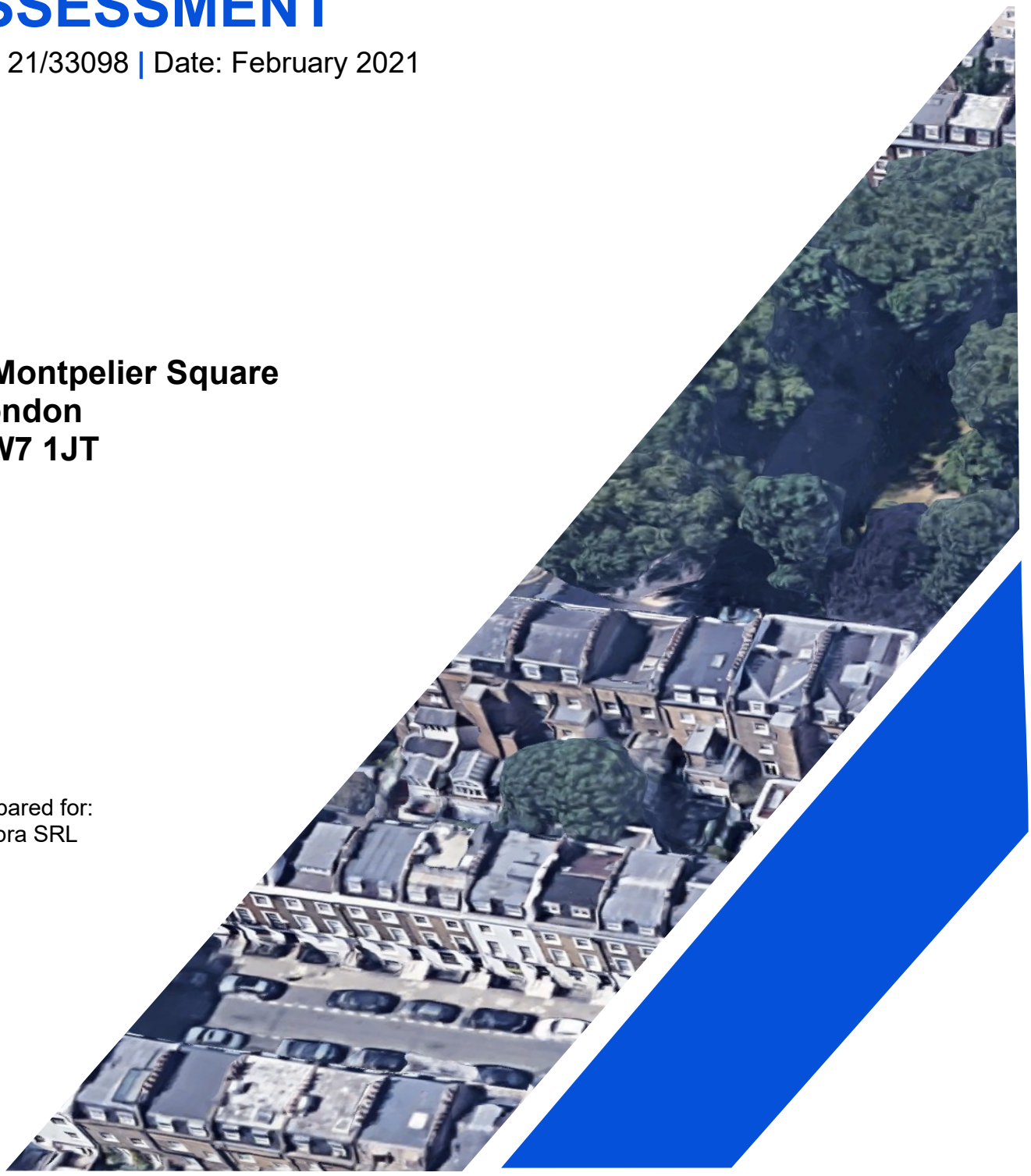
Report on a

PHASE 1 PRELIMINARY RISK ASSESSMENT

Ref: 21/33098 | Date: February 2021



4 Montpelier Square
London
SW7 1JT

Prepared for:
Ambra SRL

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	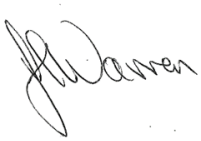	
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1.0 EXECUTIVE SUMMARY

Site Location	4 Montpelier Square, London, SW7 1JT
Proposed Development	House Refurbishment.
Historic and Current Activities	Currently residential use. First built on prior to 1869, and has been residential since then. Garages have been present within 250m of the site.
Environmental Setting	Superficial geology: Kempton Park Gravel Member (Secondary A Aquifer). Bedrock geology: London Clay (Unproductive). Zone II (Outer Protection Zone) located on site. Zone I (Inner Protection Zone) located 87m to the south-east of the site. No significant surface water features within 250m. No landfill sites within 250m. No sensitive land uses within 250m.
Potential Contamination Sources	On Site: No Sources Off Site: Garages, Car Breakers & Dismantlers, Photographic Processors, Dry Cleaners, Printers
Potential Risks	• Human Health: Future Users + Workforce Inhalation of contaminated dust and vapours Direct Contact with contaminated soil • Human Health: Future Users + Workforce + Neighbours Inhalation of asbestos fibres • Buildings/Service Materials • Secondary A Aquifer • Site Flora/Ecosystems
Recommendation	Provide further characterisation of the site in relation to potential pollution from local industry and Made Ground on-site. Provide information for further characterisation of the site in relation to potential ground gas.

SITE CONCEPTUAL MODEL

Potential Contaminants / Source	Pathway	Receptor	Site specific settings	Action Required
On Site: No Sources Off Site: Garages, Car Breakers & Dismantlers, Photographic Processors, Dry Cleaners, Printers Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels	Dust and soil Inhalation, ingestion and dermal contact.	Human Health Residential use	Residential use with gardens.	Further investigation required – Soils
	Inhalation, ingestion and dermal contact	Human Health Workers	Follow health and safety during development (HSE, 1991).	Further investigation required – Soils
	Inhalation of vapours	Human Health	Volatile contamination could potentially be present within soils or groundwater.	Further investigation required – Vapour monitoring
	Chemical attack on water supply pipe	Human Health	Potential for small amount of Made Ground	Further investigation required – Soils
	Leaching (direct precipitation, overland flow and through flow)	Shallow groundwater Surface Water contamination via groundwater flow	Secondary A Aquifer underlying the site.	Further investigation required – Groundwater sampling
	Negligible groundwater flow	Deep groundwater	Unproductive Strata underlying the site.	No further investigation required.
	Uptake (root and stomata), ingestion, inhalation and dermal absorption by animal)	Environmentally Sensitive Land use	There are no significant sensitive land uses within 1 km of the site.	No further investigation required.
	Through high permeability strata, fissures and shafts, and by Inhalation by humans	Human Health Inhalation of Gases Gas accumulation in buildings	There are sources of ground gas found within 250m of the site.	Further investigation required – Ground gas monitoring

2.0 INTRODUCTION

2.1 Project Objectives

At the request of Ambra SRL, a preliminary risk assessment was carried out to develop an outline conceptual model and to establish whether or not there are a not potentially unacceptable risks arising from potential contamination at the above site in reference to the proposed development with potential impact on sensitive receptors, such as human health, controlled waters, ecological features, building structures and services.

The information was required for a qualitative risk assessment of the potential for contamination at the site and to evaluate whether any remediation may be required for the protection of the end-user and other sensitive receptors from the presence of potential contamination.

The investigation is required by the City of Westminster under planning regulations.

The project objectives include the following aims:

- To assess the presence, extent and nature of potential risk of pollution to end-users of the site, controlled waters and other potentially sensitive receptors.
- To undertake a qualitative environmental risk assessment of the site and surroundings.
- To identify further works, if any, needed to further assess, manage or mitigate any potential risks.
- To provide information relevant for planning approval.

This report comprises a Phase 1 - Preliminary Risk Assessment to assess the potential for the presence of potential contamination on site and to identify potential receptors.

Planning permission granted by councils for development of Brownfield often have conditions attached which require the following site investigation to be undertaken and submitted to the local authority for approval:

1. Phase 1 - Preliminary Risk Assessment
2. Phase 2 - Intrusive Investigation
3. Phase 3 - Remediation Strategy
4. Phase 4 - Validation Report

This Phase 1 - Preliminary Risk Assessment is to be submitted to planning for approval.

2.2 Scope of Works

A preliminary risk assessment comprising a Phase 1 Land Quality Assessment (a desk study and site survey) has been undertaken and is summarised as follows:

1. A review of current activities and conditions at the site based on information from the Client, regulatory data and the results of a site walkover survey.
2. A review of the history of the site and surrounding area from historical maps and available anecdotal information.
3. An assessment of geological, hydrological and hydrogeological information pertaining to the site.
4. The development of a site conceptual model identifying potential sources, pathways, receptors and linkages, a preliminary qualitative risk assessment and identification of unacceptable risks.
5. Recommendations for further works, if necessary.

The site works were performed in accordance with the methods given in BS 5930+A2:2010 and BS EN ISO 22476-2&3:2005. The work was carried out in accordance with the methodologies detailed in CLR11: Model Procedures for the Management of Land Contamination.

The recommendations and comments given in this report are based on the information contained from the sources cited and may include information provided by the Client and other parties including anecdotal information. It must be noted that there may be special conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report. No liability can be accepted should such conditions alter the recommendations made in this report.

2.3 Details of Research Undertaken

A number of database searches have been undertaken, soliciting information of the current and historical uses of the site and surrounding area in order to complete a qualitative risk assessment associated with the development of the site. These include:

- Environmental Data Search 1:10000
- Environmental Data Search 1:2500
- Site Sensitivity Maps and Data Sheets
- Historical Maps
- Local Council consultation
- Consultation with the Client / Architect / Site representatives
- Google Search

2.4 Report Limitations

This report is prepared for Ambra SRL (herein called the 'Client'), for purposes agreed and in accordance with the terms and conditions set out in the Agreement between Site Analytical Services Limited and the client.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports and most importantly CLR Report 11.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on-site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

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

This report does not include specific investigation for the presence of Japanese Knotweed at the subject site however, if obvious evidence of this is observed during the site walkover, details will be provided in this report. Specialist contractors should be commissioned to make detailed assessments and recommendations if these materials are suspected.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Site Analytical Services Limited. The report has been prepared in relation to the proposed end-use and should another end-use been intended a further re-assessment may be required.

2.5 Confidentiality, Copyright and Reproduction

This document has been prepared by Site Analytical Services Limited in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract.

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3.0 SITE DETAILS

3.1 Site Location

The site is located on the eastern side and upper section of Montpelier Square, in Knightsbridge, Central London at approximate postcode SW7 1JT. The site is located opposite to a residential garden square (Montpelier Square) and is immediately bound by residential properties to the north, east and south.

The site is rectangular in shape and covers an approximate area of 0.02 Hectares with the general area being under the authority of the City of Westminster.

The site is at National Grid Reference: TQ 274 795.

The site location map is presented below in Figure 1:

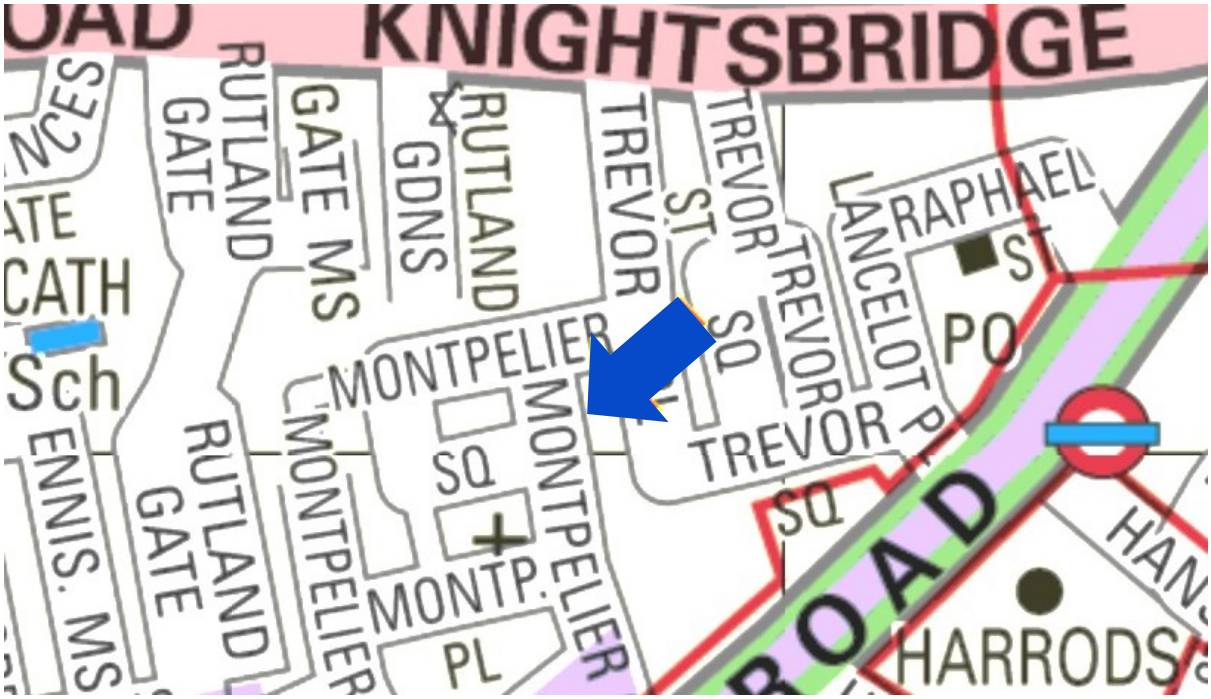

Figure 1 - Site Location Map

3.2 Current Use of the Site and Surrounding Land Uses

The site in use as a residential property. The site comprises a 3-storey Victorian terrace house, including a basement level.

The nearby surrounding areas to the site are mainly residential in all directions. Commercial properties are located nearby to the south-east, within 250m.

An existing site plan (ground floor) is presented below in Figure 2:

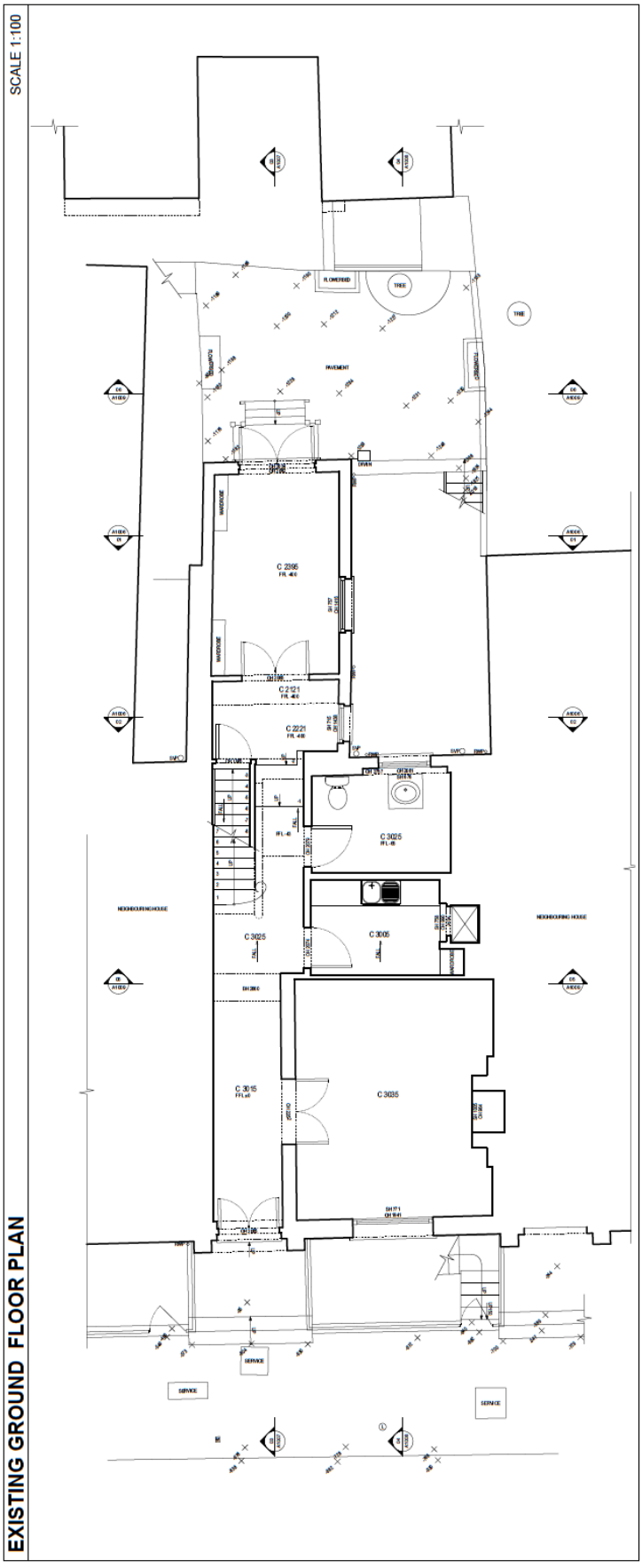

Figure 2 - Existing Site Plan

3.3 Site Walkover

The site was attended on 21st January 2021 for the sake of undertaking a site walkover survey.

Current Use of the Site	The site in use as a residential property.
Structures or Past Structures	The site comprises a 3-storey Victorian terrace house, including a basement level.
Site Covering	The entirety of the site covering is in the form of hardstanding (buildings, footpaths, concrete and tarmac).
On-Site Vegetation	A tree is evident in the rear hard-landscaped garden area alongside a couple of potted plants.
Site Topography	The site is generally flat with no apparent sloping.
Potential Contamination Sources	There are no signs of potential contamination sources noted on-site.
Visual or Olfactory Signs of Contamination	There are no visual or olfactory signs of contamination noted on-site.
Drainage/Services or Past Services	There are no drainage features which are visibly evident. Any drainage in the future is likely to be located around the footprint of the concrete footing. There is not considered to be a significant potential from on-site drainage / services to cause contamination on-site. There are not any obvious preferential pathways resulting from the presence of services that may connect possible contamination on-site with receptors on and / off site.
Water Courses	There were no obvious water courses on site or adjacent to the site.

From the walkover, the site appears to be a well-maintained residential property. There are no potential sources of contamination noted on-site.

3.4 Details of Intended Future Uses of the Site

At the time of reporting (February 2021), it is proposed to refurbish the house.

A proposed site plan (ground floor) is presented below in Figure 3:

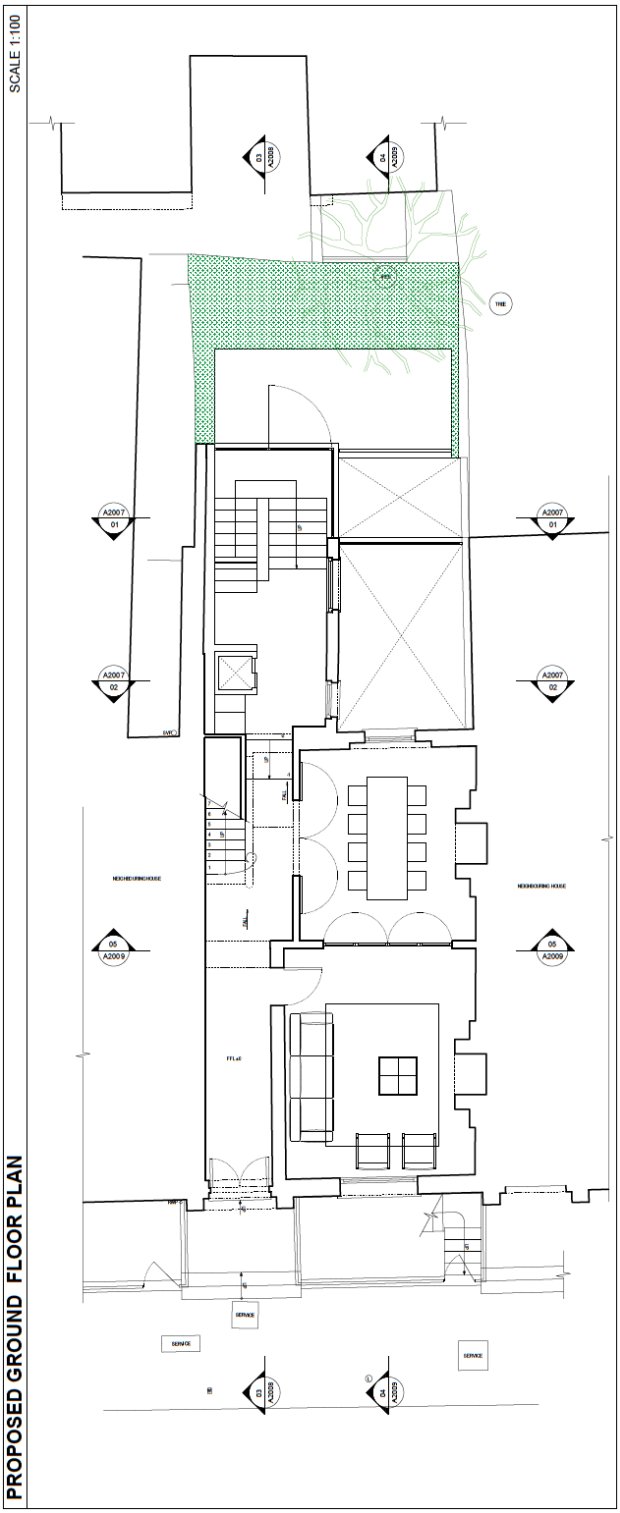

Figure 3 - Proposed Site Plan

3.5 References of Planning Applications

There are no recent and relevant planning applications for the site registered on the City of Westminster planning portal.

4.0 ENVIRONMENTAL SETTING

4.1 Anticipated Geology

The Geological Survey of Great Britain (England and Wales) covering the area indicates the site to be underlain by the Kempton Park Gravel Member over the London Clay Formation at depth.

4.1.1 Kempton Park Gravel Member

The Kempton Park Gravel Member comprises sand and gravel, locally with lenses of silt, clay or peat.

4.1.2 London Clay Formation

The London Clay mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occur in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels.

4.1.3 Artificial Made Ground

According to the BGS map, Made Ground deposits are not present on site, however, it is still anticipated that localised areas of Made Ground may be present on the site.

4.1.4 Historical Boreholes

The British Geological Survey maintains an archive of historical exploratory borehole logs throughout the UK. SAS Limited has searched the database and have found multiple boreholes located within 250m of the site. The closest is located 90m to the north-west of the site at 'South Lodge BH8' and shows 1.70m of Made Ground over 0.90m of sand and gravel in a matrix of brown and grey mottled sandy clay (Kempton Park Gravel Member) over stiff brown fissured clay, blue on fissures (London Clay Formation) to 12.00m.

The records of the British Geological Survey indicate the following:

Ground Stability Hazard	Risk Assessment
Collapsible Ground	Very Low
Compressible Ground	No Hazard
Ground Dissolution	No Hazard
Landslide	Very Low
Running Sand	Very Low
Shrinking or Swelling Clay	Moderate
Coal Mining	Not Affected

4.1.5 Natural Ground Gases

Natural strata can present a source of ground gases, such as methane and carbon dioxide. The natural geological strata identified above are not considered to pose a ground gas risk.

The site is not in a Radon Affected Area (as defined by the Health Protection Agency), as less than 1% of properties are above the action level set by the Health Protection Agency. According to BR211 (by the Building Research Establishment), Radon Protection Measures are not required for new properties in these areas.

4.2 Hydrogeology

4.2.1 Groundwater

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

The Superficial geology underlying the site has been classified as Secondary A Aquifer; 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.

The Bedrock geology underlying the site has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

An Unproductive Strata designation was noted on-site and therefore controlled water is not considered to be vulnerable to potential contaminants that may be present on-site.

Considering the thickness of London Clay, it is considered that the potential for pollutants, if present, to interact with the underlying Chalk aquifer would be minimal.

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

4.2.2 Water Abstractions

There are 2 Groundwater Source Protection Zones located within 1 kilometre of the site. A Zone II (Outer Protection Zone) is located on site and a Zone I (Inner Protection Zone) is located 87m to the south-east of the site.

There are 33 water abstraction licences within 1 kilometre of the site, including 8 located within 250m:

Distance	Abstraction Type	Source	Permit Start Date
82m E	Household Water Supply: Drinking; Cooking; Sanitary; Washing; (Small Garden)	Groundwater	27th May 1992
107m E	Household Water Supply: Drinking; Cooking; Sanitary; Washing; (Small Garden)	Groundwater	25th December 2003
231m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	12th November 2004
231m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	10th February 1999
240m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	8th March 2013
240m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	12th November 2004
240m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	10th February 1999
241m SE	Retail: Drinking, Cooking, Sanitary, Washing, (Small Garden)	Groundwater	8th March 2013

Due to there being 2 potable water abstraction licences within 250m of the site, they are considered to be at risk.

4.2.3 Hydrology and Drainage

The closest surface water feature is a small swimming pool located 161m to the north-east of the site. Due to the nature of the surface water feature from the site, it is not considered to be a vulnerable receptor to potential contaminants that may be present on-site.

The site is currently not located within 1km of an area at risk from extreme flooding from rivers or sea without defences (Zone 2) or an area at risk from rivers or sea without defences (Zone 3).

Modelling of surface water flooding has been undertaken by the Environment Agency and was published on its website in January 2014; an extract from their model is presented within the Envirocheck Site Sensitivity maps. Whilst this map identifies three levels of risk (high, medium and low) it is understood that it is based at least in part on depths of flooding. The modelling shows low risk of flooding in the east of the site.

4.3 Sensitive Land Use

There are no sensitive land issues within 1 kilometre of the site.

4.4 Summary of Potential Environmental Receptors

Receptor Type	Receptor(s)	Sensitivity	Comments
Groundwater/ Water Abstractions	Secondary A Aquifer/ 2 Potable Water Abstraction Licences	High	Due to the presence of a Secondary A Aquifer beneath the site, the risk is high.
Surface Water	Swimming Pool, 161m NE	Low	Due to the nature of the surface water feature, the risk is deemed low.
Sensitive Land	N/A	Very Low	Due to there being no sensitive land uses within 250m, the risk can be deemed very low.

5.0 INFORMATION ON SITE HISTORY AND LOCAL INDUSTRY

5.1 Present Use and Activities

There are no entries in the contemporary trade directories on-site, there are 31 within 250m of the site, 78 within 500m and 180 within one kilometre of the site.

5.1.1 Industrial Data

Trade	On-Site	Within 250m
Current Industrial Data Entries	0	31

5.1.2 Entries Within 250m

Trade	Distance (m)
Marine Engineers	106m E
Oil Companies	From 111m SE
Oil Fuel Distributors	From 115m SE
Chemicals & Allied Products	121m S
Car Breakers & Dismantlers	131m S
Freight Forwarders	131m S
Waste Disposal Services	From 133m N
Photographic Processors	140m S
Dry Cleaners	From 132m S
Glass Products - Manufacturers	167m S
Chemicals – Distributors & Wholesalers	177m NE
Pharmaceutical Manufacturers & Distributors	177m NE
Printers	210m S
Metals - Miners	232m E

Note: Only trades likely to impact the underlying soil and/or groundwater and /or activities which are described in R&D Publication CLR8 – Potential Contaminants for the Assessment of Land have been selected. Dates not supplied, multiple entries of similar trades are not listed, and references considered to be office premises only are not listed.

5.1.3 Fuel Station Entries

There is one fuel station recorded within 1 kilometre of the site. It is located 869m to the south of the site at 'Sloane Avenue, Chelsea, London, SW3 3DL'and its status is currently described as 'Open'. Due to the distance of the fuel station from the site, it is not considered to be a potential risk to the site.

There are no Control of Major Accident Hazard Sites (COMAH), Explosive sites, Notification of Installations Handling Hazardous Substances (NIHHS), Planning Hazardous Substance Consents or Planning Hazardous Substance Enforcements within 1 kilometre of the site.

There are 6 local authority pollution prevention and controls found within 1 kilometre of the site. The closest is located 464m to the north-east of the site with the description for 'PG6/46 Dry Cleaning' and its status is described as 'Permitted'. Due to the distances of the local authority pollution prevention and controls from the site, they are not considered to be a potential risk to the site.

5.2 Landfill Sites and Waste

There are no BGS recorded landfill sites located within 1 kilometre of the site.

There are no recorded historical landfill sites located within 1 kilometre of the site.

There are no local authority recorded landfill sites located within 1 kilometre of the site.

There are 19 registered radioactive substances within 1 kilometre of the site. The closest is located at Imperial College London, 603m west of the site. The last reported status is described as 'Authorisation superseded by a substantial or non-substantial variation', dated 20th February 2003. Due to the distances of the registered radioactive substances from the site, they are not considered to be a potential risk to the site.

There are no licenced waste management facilities (locations) within 1 kilometre of the site.

There are no licenced waste management facilities (landfill boundaries) located within 1 kilometre of the site.

There are no integrated pollution control registered waste sites within 1 kilometre of the site.

There are no registered waste transfer sites located within 1 kilometre of the site.

5.3 Land Raising or Land Filling

There are no infilled features located within 250m of the site.

There are no obvious burial sites within 250m of the site.

5.4 Pollution Incidents and Discharge Consents

There have been 2 pollution incidents to controlled waters within 1 kilometre of the site. The closest is located 799m to the north of the site, with the pollutant described as 'Miscellaneous - Natural', incident severity described as 'Category 3 – Minor Incident' and incident dated 25th August 1998. Due to the ages of the incidents and their distances from the site, they are not considered to be a risk on-site.

There have been 5 discharge consents to controlled waters within 1 kilometre of the site. The closest is located 304m to the north-east of the site and relates to 'Trade Discharge - Process Water' into 'Underground Water'. The status of this consent is described as 'New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)', dated 7th August 2009. Due to the distances from the site, they are not considered to be a risk on-site.

There are no integrated pollution controls within 1 kilometre of the site.

5.5 Historical Maps

The site history was compiled from information available from a Landmark Envirocheck Report consisting of a series of past Ordnance Survey maps (scale 1:1,250 and 1:2,500 which are presented in Appendix B). Information was also sourced from Envirocheck Analysis (online database) containing a series of more recent Ordnance Survey maps and satellite images (scale 1:10,000).

Date	Description of Site Use	Surrounding Site Use
1869-1878	The site comprises a building in the west.	The surrounding areas to the site are mostly residential in all directions.
1896	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1916	The site remains essentially unchanged.	A **Garage** is evident 122m to the south-east of the site.
1946-1947 *Aerial Photography*	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1952	The site remains essentially unchanged.	**Garages** are evident 32m to the north and 140m and 175m to the north-east of the site.
1953	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.
1960-1968	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.

1973	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
1974-1976	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
1985	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
1991	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
1992-1993	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
1999 *Aerial Photograph*	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
2003 *Envirocheck Analysis*	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
2009 *Envirocheck Analysis*	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
2013 *Envirocheck Analysis*	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.
2021 *Envirocheck Analysis*	The site remains essentially unchanged.		The surrounding area remains essentially unchanged.

5.5.1 Historical Summary of Site

Date	Site Development
1869 - Present	The site comprises a building in the west.

From historical map evidence, it would appear that the site was first built on prior to 1869, with no changes taking place to the property since its construction. Garages have been present within 250m of the site.

5.6 WW2 Unexploded Ordnance Potential

The 'Bomb Sight' archive has identified areas within 250m of the site that have previously been targeted by WW2 bombings. A high-explosive bomb located 125m to the north-west of the site has been recorded close to: Rutland Gardens, Knightsbridge, City of Westminster, London, SW3 1JJ, dated from 1940-1941.

6.0 SITE DRAINAGE AND MAN-MADE POTENTIAL POLLUTANT PATHWAYS

The site is in use as a residential property and as such drainage may be present under and surrounding the site buildings, which may potentially lead to lateral or vertical migration of potential pollutants on-site.

7.0 CONSULTATION WITH THE LOCAL AUTHORITY, THE ENVIRONMENT AGENCY, ETC.

Consultation with the Local Authority was undertaken via the council's online planning portal and archives.

Consultation with the Environment Agency has not been undertaken; however, the Environment Agency have been cited within the information of the Envirocheck report with reference to groundwater, surface water, authorised processes and licenced waste management issues.

There was no additional consultation with other bodies/sources undertaken.

The Canal & River Trust were not consulted regarding navigable rivers and canals and English Nature were not consulted regarding ecological systems; however, their databases have been cited within the information of the Envirocheck report.

8.0 REVIEW AND SUMMARY OF PREVIOUS REPORTS

There have not been any previous reports available to us at the time of writing.

9.0 OUTLINE CONCEPTUAL MODEL

In accordance with current UK guidance on land contamination risk assessment (CLR 11, Science Report – SC050021/SR3 and BS10175), the following conceptual site model has been generated for the subject site.

The purpose of the conceptual model is to identify:

- All potential source(s) of contamination at and / or within the immediate vicinity of the site.
- Any potentially sensitive receptor(s) which may be at risk from the above source(s).
- Any potential migration and / or exposure pathways which link the source(s) to the receptor(s).

Only if all three of the above elements are present i.e. a source-pathway-receptor, is a potential risk present. Such a relationship is termed a 'pollutant linkage'. The SCM describes in detail any potentially significant pollutant linkages present and justifies the exclusion of any potential pollutant linkages considered to be non-significant.

9.1 Contamination Sources

A review of the current and historical land uses indicated the potential contaminative land uses that may impact the site are similar to the following industries highlighted in DoE industry profiles for potential contaminants of concern.

9.1.1 On-Site Sources

Date	Feature	Distance and Direction from Site	Potential Contaminants	Potential Impact on the Site?
1869 - Present	No Sources	On-Site	N/A	No

9.1.2 Off-Site Sources

Date	Feature	Distance and Direction from Site	Potential Contaminants	Potential Impact on the Site?
1916	Garages	From 32m N	**Road vehicle servicing and repair: garages and filling stations:** Chromium, Copper, Lead, Zinc, Asbestos, pH, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Organo-lead compound's.	Yes
Present	Marine Engineers	106m E	**Engineering works: Shipbuilding repair and shipbreaking (including naval shipyards):**	No – Due to being registered at residential address
Present	Oil Companies	From 111m SE	**Oil refineries and bulk storage of crude oil and petroleum products:** Copper, Lead, Nickel, Cyanide, Sulphide, Asbestos pH, Phenol, Acetone, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PCB's.	No - Due to being registered at office location
Present	Oil Fuel Distributors	From 115m SE	**Oil refineries and bulk storage of crude oil and petroleum products:** Copper, Lead, Nickel, Cyanide, Sulphide, Asbestos pH, Phenol, Acetone, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PCB's.	No - Due to being registered at supermarket address which does not distribute fuel/registered at office location
Present	Chemicals & Allied Products	121m S	**Chemical works: pharmaceuticals manufacturing works:** Chromium, Copper, Mercury, Zinc, Arsenic, Asbestos, pH, Oil/fuel hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Chlorinated Aromatic Hydrocarbons, PCB's.	No – Due to not being manufacturers

1941	Ruins	125m NW	**Potential Made Ground / infilled material**	Yes
Present	Car Breakers & Dismantlers	131m S	**Road vehicle servicing and repair: garages and filling stations:** Chromium, Copper, Lead, Zinc, Asbestos, pH, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Organo-lead compound's.	Yes
Present	Freight Forwarders	131m S	**Road vehicle servicing and repair: transport and haulage centres:** Chromium, Copper, Lead, Vanadium, Zinc, Sulphur, Asbestos, pH, Acetone, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Organo-lead compound's.	No – Due to being registered at an office location/service provider only
Present	Waste Disposal Services	From 133m N	**Waste recycling, treatment and disposal sites: landfills and other waste treatment or disposal sites:** Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Arsenic, Sulphide, Asbestos, pH, Oil/Fuel Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, PCB's, Chlorinated Aromatic Hydrocarbons, Dioxins and furans.	No – Due to being registered at an office
Present	Photographic Processors	140m S	**Photographic processing industry:** Cadmium, Chromium, Copper, Lead, Mercury, Zinc, Arsenic, Selenium, Cyanide, Nitrate, Sulphate, Asbestos pH, Acetone, Aromatic Hydrocarbons, Chlorinated Aliphatic Hydrocarbons, PCB's.	Yes
Present	Dry Cleaners	From 132m S	**Dry cleaners:** Cadmium, Chromium, Copper, Lead, Mercury, Zinc, Arsenic, Selenium, Free Cyanide, Nitrate, Sulphate, Asbestos, pH, Aromatic Hydrocarbons, Chlorinated Aliphatic Hydrocarbons, PCB's.	Yes

Present	Glass Products - Manufacturers	167m S	**Glass manufacturing works:** Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, Arsenic, Boron, Free Cyanide, Nitrate, Sulphate, Asbestos, pH, Acetone, Aromatic Hydrocarbons, Chlorinated Aliphatic Hydrocarbons, PCB's.	No - Due to not being manufacturers/retail only
Present	Chemicals – Distributors & Wholesalers	177m NE	**Chemical works: pharmaceuticals manufacturing works:** Chromium, Copper, Mercury, Zinc, Arsenic, Asbestos, pH, Oil/fuel hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Chlorinated Aromatic Hydrocarbons, PCB's.	No – Due to being registered at an office
Present	Pharmaceutical Manufacturers & Distributors	177m NE	**Chemical works: pharmaceuticals manufacturing works:** Chromium, Copper, Mercury, Zinc, Arsenic, Asbestos, pH, Oil/fuel hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, Chlorinated Aromatic Hydrocarbons, PCB's.	No – Due to being registered at an office
Present	Printers	210m S	**Printing and bookbinding works:** Cadmium, Chromium, Copper, Lead, Mercury, Zinc, Arsenic, Selenium, Cyanide, Nitrate, Sulphate, Asbestos pH, Acetone, Aromatic Hydrocarbons, Chlorinated Aliphatic Hydrocarbons, PCB's.	Yes
Present	Metals - Miners	232m E	**Metal manufacturing, refining, and finishing works: precious metal recovery works:** Cadmium, Chromium, Copper, Lead, Mercury, Zinc, Arsenic, Nitrate, Sulphate, Sulphide, Asbestos, pH, Oil/Fuel Hydrocarbons, Chlorinated Aliphatic Hydrocarbons, PCB's.	No – Due to being registered at an office

9.2 Contaminants of Concern

It is considered that a number of the contamination sources are similar to those highlighted in "DoE industry profiles for potential contaminants of concern" and those likely to be of concern can be summarised as follows:

- Metals and metalloids: Cadmium, Chromium, Copper, Lead, Selenium, Nickel, Vanadium, Zinc, Arsenic, Mercury, Boron
- Inorganic Compounds: Nitrate, Sulphate, Sulphide, Complex and Free Cyanide
- Organic compounds: Acetone, Oil/Fuel Hydrocarbons, Aromatic Hydrocarbons, PAH's, Chlorinated Aliphatic Hydrocarbons, PCB's, Organo-lead compounds.
- Other: Asbestos, pH, Ground gas, Hydrocarbon / Solvent Vapours

9.3 Receptors

The receptors / resources considered to be affected by identified contamination during the assessment included the following:

- Construction workers
- Future users
- Building materials and services
- Secondary A Aquifer
- Site flora / ecosystems
- Off-site receptors / neighbouring residents and property

9.4 Pollutant Linkages

The following tables illustrate the hypothesised Source - Pathway - Receptor linkages for exposure to possible contaminants associated with industrial activity in the area, the current site conditions and the proposed development.

The Conceptual Site Model summarises all the potential sources/pathways/receptors at this site.

Contaminated Land Risk Assessment Table

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

9.4.1 Risk Classification Definitions

Very High - There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe 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 - 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 - It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more 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.

Moderate/Low or Low - 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 - 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.

Area of Potential Concern (and contaminants of concern)	Potential Receptor	Potential Pathway to Receptor	Hazard (Potential Consequence)	Likelihood of Pollutant Linkage	Risk Assessment	Justification / Comments
On Site: No Sources Off Site: Garages, Car Breakers & Dismantlers, Photographic Processors, Dry Cleaners, Printers, Ruins *Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels, ground gas, solvent*	Construction workers	Direct soil and dust ingestion Dermal contact Inhalation of dust Inhalation of vapours Inhalation of ground gases Fire and explosion	Acute and chronic toxicity, carcinogenic impact	*Low Likelihood*	*Moderate Risk*	Significant reconstruction is planned. As such, significant groundwork would be involved in the construction process. Additional investigation required.
	Future users – open landscaped areas. Off-site receptors/residents	Consumption of home-grown produce Dermal contact Inhalation of dust Inhalation of vapours	Acute and chronic toxicity, carcinogenic impact	*Low Likelihood*	*Low Risk*	The proposed development will have areas of soft landscaping. Additional investigation is required.
	Future users – within building footprint	Inhalation of dust Inhalation of vapours Inhalation of ground gases Fire and explosion	Acute and chronic toxicity, carcinogenic impact	*Unlikely*	*Very Low Risk*	There are no sources of ground gas located within 250m. No Risk.
	Surface water	Surface water run-off Migration via groundwater flows	Water pollution	*Unlikely*	*Very Low Risk*	There are no significant surface water features within 250m. No Risk.
	Superficial Aquifer (Secondary A Aquifer)	Surface water run-off Migration downwards via granular soils Migration downwards via permeable soils and bedrock Migration via groundwater flows	Water pollution	*Low Likelihood*	*Low Risk*	The site is situated in an area of Secondary A Aquifer which may be affected by potential contamination. Additional investigation required.
	Bedrock Aquifer (Unproductive London Clay)	Migration downwards via granular soils Migration downwards via permeable soils and bedrock Migration via groundwater flows	Water pollution	*Unlikely*	*Very Low Risk*	The London clay underlying the gravels on site is unproductive. No Risk
	Built materials and services Off-site buildings	Direct contact of concrete with concrete aggressive soils Direct contact with service supply pipes in contaminated soils	Degradation	*Low Likelihood*	*High Risk*	It is probable that future underground services and structures will come into contact with potentially impacted soils. Additional investigation required.
	Environmentally Sensitive Land use	Plant uptake and Phytotoxicity Plant uptake and ecotoxological effects	Phytotoxicity	*Unlikely*	*Very Low Risk*	There are no significant sensitive land uses within 250m of the site. No Risk.

10.0 SITE CONCEPTUAL MODEL

Following the hypothesised Source - Pathway - Receptor linkages for exposure to possible contaminants as identified in the site conceptual model, the following possible unacceptable risks have been identified.

Potential Contaminants / Source	Pathway	Receptor	Site specific settings	Action Required
On Site: No Sources Off Site: Garages, Car Breakers & Dismantlers, Photographic Processors, Dry Cleaners, Printers Heavy metals, asbestos, PAH, Petroleum hydrocarbons and fuels, solvents	Dust and soil Inhalation, ingestion and dermal contact.	Human Health Residential use	Residential use with gardens.	Further investigation required – Soils
	Inhalation, ingestion and dermal contact	Human Health Workers	Follow health and safety during development (HSE, 1991).	Further investigation required – Soils
	Inhalation of vapours	Human Health	Volatile contamination could potentially be present within soils or groundwater.	Further investigation required – Vapour monitoring
	Chemical attack on water supply pipe	Human Health	Potential for small amount of Made Ground	Further investigation required – Soils
	Leaching (direct precipitation, overland flow and through flow)	Shallow groundwater Surface Water contamination via groundwater flow	Secondary A Aquifer underlying the site.	Further investigation required – Groundwater sampling
	Negligible groundwater flow	Deep groundwater	Unproductive Strata underlying the site.	No further investigation required.
	Uptake (root and stomata), ingestion, inhalation and dermal absorption by animal)	Environmentally Sensitive Land use	There are no significant sensitive land uses within 1 km of the site.	No further investigation required.
	Through high permeability strata, fissures and shafts, and by Inhalation by humans	Human Health Inhalation of Gases Gas accumulation in buildings	There are sources of ground gas found within 250m of the site.	Further investigation required – Ground gas monitoring

11.0 SUGGESTED NEXT STEPS

The information from the preliminary risk assessment and site conceptual model has identified a number of potential unacceptable risks relating to sensitive receptors on-site.

Dependent on the scope of the proposed works on-site, it may be necessary to fully assess the potentially unacceptable risks, for which additional information would be required. We would suggest that the most viable method of assessment would be via a Quantitative Risk Assessment (Site Investigation) and the investigation would have the following objectives:

- Provide information for further characterisation of the site in relation to potential pollution from local industry.
- Provide information for further characterisation of the site in relation to potential ground gases on-site

An intrusive investigation may reveal on-site sources of contamination that were not established by the Phase I Desk Study and Site Walkover, and thus require modification of the conceptual model.

11.1 Proposed Further Site Works

The proposal is a combined environmental and geotechnical Intrusive Site Investigation in order to obtain further information about the site conditions.

Phase II Intrusive Investigation

The Preliminary CSM allows for the identification of the test parameters relevant to the investigation, though this may require modification or addition from the findings of the intrusive investigation. Phase II intrusive site investigation will be carried out in order to investigate and assess pollutant linkages identified in the preliminary Conceptual Site Model presented in Section 10. The works to be undertaken on the site would comprise (a) soil sampling that is appropriate to the potential sources and (b) testing for the potential contaminants given in the CSM or other sources identified during the intrusive investigation.

Geotechnical Site Investigation

The purpose of the geotechnical investigation will be to obtain data regarding engineering properties of the soils to enable the design of foundations, concrete, pavements and drainage. The works to be undertaken on the site would comprise (a) soil sampling, (b) drilling boreholes at selected locations within the site and to establish foundation design parameters.

The scope of any such investigation should be agreed with the Local Authority, Environment Agency and any other Interested Parties prior to commencement.

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