



REPORTS 4 PLANNING

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Preliminary Contamination Risk Assessment

PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 6 NORFOLK ROAD,
READING,
RG30 2EE

Consultant:

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Consultant in Contaminated Land

Report Ref: 19CLR4615CW

Report Date: 28th November 2019



Executive Summary

Reports 4 Planning have been commissioned by Mr Manish Parmar to undertake a Preliminary Risk Assessment of a parcel of land located between No.4 and No.8 Norfolk Road, Reading, Berkshire, RG30 2EE.

The site is located within a densely populated area where rows of terraced houses are located nearby. Schools are present to the east a short distance away and there is little retail or industrial land use nearby. Located to the west of the city, Reading West Railway Station is located 500m to the north east with the centre of Reading located 1.5km to the east.

The plot has since the area was first developed in the early 1900's formed part of the adjacent site located directly adjacent. Hardstanding provides some off-street parking and there is a single garage building located to the rear. It is proposed that a single two-storey dwelling is built on the site in a similar design to those already present nearby.

Planning Permission has already been provided with a number of conditions. One of these conditions relates to the assessment of potential contaminative risk. The process of assessing any risk from potential contamination is begun with the preparation of a Phase I Deskstudy and Preliminary Risk Assessment. This report aims to fulfil this purpose by identifying and assessing any potential contamination affecting the site in accordance with DEFRA's and the Environment Agency's 'Model Procedures for the Management of Land Contamination (CLR 11)' and NPPF (particularly paragraphs 109 (fourth and fifth bullet points) and 120 of this document).

The purpose of the Preliminary Risk Assessment is to develop an initial conceptual model of the site and establish whether or not there are potentially unacceptable risks posed by contaminative sources from either historical or current, and either on-site or off-site previous land uses which may be affected by the proposed development. Using recognised national guidance, a Desktop Study has been undertaken on the site utilising many different information sources to gain an understanding of any historical or current risks to the site.

Following a site walkover conducted on 13th November 2019 a conceptual model of the site was developed which demonstrates that there may be some potentially significant pollutant linkages and through the risk assessment it has not been possible to prove that the site is uncontaminated for the proposed end use. This relates to the presence of an inspection pit within the garage building upon where there is some minor staining to the brickwork. The full bottom of the pit could not be inspected and so the risk that some oils or fuels may have entered the base of the pit cannot be discounted. Therefore further work is required in order to confirm and characterize the presence or otherwise of contamination on site. This will take the form of an intrusive investigation and further generic or detailed risk assessment. It is envisaged that a watching brief (and potentially sampling of soils) is required during the removal of the concrete slab and brickwork of inspection pit. If the pollutant linkages are confirmed as unacceptable then some form of remediation will be required. Should this be required, we believe that the level of remediation should be viable, being relatively simple and low key.

The report is based on the assumption by the author that the Local Planning Authority will follow guidance detailed in the NPPF where for all development involving disturbance to land, the LPA would impose a Condition requiring the reporting of all other instances of contamination currently unreported found during the course of development. Should instances of previously unreported contamination be found then the submission for approval of an assessment of the risks and proposed remediation scheme will be submitted to the Local Planning Authority.

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1.0 INTRODUCTION

Reports 4 Planning have been commissioned by Mr Manish Parmar to undertake a Preliminary Risk Assessment of a parcel of land located between No.4 and No.8 Norfolk Road, Reading, Berkshire, RG30 2EE.

The site is located within a densely populated area where rows of terraced houses are located nearby. Schools are present to the east a short distance away and there is little retail or industrial land use nearby. Located to the west of the city, Reading West Railway Station is located 500m to the north east with the centre of Reading located 1.5km to the east. The plot has since the area was first developed in the early 1900's and formed part of the adjacent site. Hardstanding provides some off-street parking and there is a single garage building located to the rear. It is proposed that a single two-storey dwelling is built on the site in a similar design to those already present nearby.

Planning approval has been provided with a number of conditions including the request for an assessment of potential contamination. This report aims to fulfil this purpose. The purpose of this Phase I Deskstudy and Preliminary Risk Assessment report is to gather information on the site to develop an initial conceptual site model (CSM) and establish whether or not there are any potentially unacceptable risks posed by either current or historical use of the land or the surrounding area which may affect the proposed development. The consultant who has prepared this report is a Contaminated Land Consultant with over fifteen years' experience in Brownfield Development, Contaminated Land, Risk Assessment, and Land Condition Surveys. He is a member of the Institute of Environmental Management and Assessment. The Preliminary Risk Assessment report was undertaken based on Desk Study findings utilising publically available data, along with data sourced directly and indirectly from various providers including the Environment Agency, the Local Authority, the British Geological Survey, The Coal Authority and Ordnance Survey. This has allowed characterization of the site with respect to its Geology, Hydrology, Hydrogeology, History and Environmental Setting. The Site Characterisation has been undertaken in general accordance with the procedures identified within CLR11 – Model Procedures for the Management of Land Contamination (Environment Agency – but now officially withdrawn), R & D Publication 66:2008, *BS10175 Investigation of potentially contaminated sites: Code of Practice* and the Environment Agency's *Guiding Principles for Contaminated Land (GPLC 1 & 2) 2010*.

Predominantly these procedures relate to 'past' contamination, and assume that legislative controls such as Pollution Prevention and Control authorisations control current potentially polluting activities. Emphasis is therefore upon historic site use and how this may affect potential future users of the site should the proposed development plans be realised. In accordance with CLR11 a Preliminary Environmental Risk Assessment contained in this report has considered all the relevant Receptors, potential Pathways, and Sources of contamination and assessed these for the level of risk posed to the site and future site users. In accordance with current guidance the information has been used to develop a Conceptual Site Model (CSM) for the site. All Pollutant Linkages must be present and the consequent linkage must be established in order to determine the requirement and scope of any future geo-environmental investigation.

Reasonable skill and care has been exercised in preparation of this report in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking this contamination assessment, it is possible that ground conditions other than that potentially indicated by this report may exist at the site.

2.0 SOURCES OF INFORMATION

This report draws upon many different information sources in order to gain a full understanding of the environmental setting of the site. These are summarized below:

2.1 Internet Sources

- British Geological Survey Borehole Database
- Environment Agency Pollution Inventory Database
- Multi-Agency Geographic Information for the Countryside Database
- 1:50,000 British Geological Survey Digital Map of Great Britain
- www.old-maps.co.uk

2.2 Reports

- Groundsure Dataset Report, GS-6461637
- Groundsure Historical Maps, GS-6461638;

2.3 Site Observations

- Site observations have been made during 13th November 2019 and photographic evidence is provided in Appendix B.

3.0 SITE RECONNAISSANCE

3.1 Site Location

The proposed development site is located at No.6 Norfolk Road in Reading.

The site is located in a densely populated residential area with rows of terraced housing located in close proximity. Located to the west of the city, Reading West Railway Station is located 500m to the north east with the centre of Reading located 1.5km to the east.

The site is located at Grid Reference 469620, 173175.

Figure 1 Site Location Plan and Figure 2 Aerial Photograph shows the location of the site in relation to its surrounding land uses.

3.2 Site Access

The site can be accessed directly from Norfolk Road passing the site to the north.

3.3 Site Description

The proposed development site is rectangular in shape and measures 0.0121ha in size. The plot is located between two end terraces but as far as is known has never been developed. The site can be accessed easily from Norfolk Road and is surfaced with hardstanding. The occupier of the adjacent dwelling utilises the site for the parking of one vehicle.

Located to the rear of the site is a single garage block which is no longer actively used. The building has a main door to the front with single access door to the side. The building has a sloping corrugated cement roof. The building has an inspection pit inside which is partially filled with discarded items.

There are no other notable features.

An aerial photograph showing the site is provided as Figure 2 with photographs taken during the site reconnaissance visit provided in Appendix A.

3.3.1 Site Topography

The site relatively flat with no discernible changes in topography.

3.3.2 Structures

The building on site is a traditional garage block made from brick with a sloping corrugated cement roof typical of these structures. The building appears to be in a good structural condition with no apparent structural failings caused by ground movement.

3.3.3 Surfacing

All internal and external areas of the site have been inspected and in general this is observed to be in a good condition. There is some minor staining down the inside brick walls to the inspection pit which appears to come from ground surface (liquids brushed from garage floor into the pit?)

3.3.4 Vegetation

There is no notable vegetation located on site.

3.3.5 Underground and Aboveground Storage Tanks

It is understood that there are no above or underground storage tanks present on the site.

3.3.6 Raw Material and Chemical Use and Storage

The site contains a single parked car although no staining was observed associated with this.

3.3.7 Solid Wastes

No potentially hazardous solid wastes are present at time of survey.

3.3.8 Hazardous and Industrial Waste

No potentially hazardous industrial wastes have been observed at the time of survey.

3.3.9 Air Emissions

No evidence of significant air emission sources was observed.

3.3.10 Wastewater / Sewers

There are drains of an unknown nature beneath the site.

3.3.11 Stormwater

Stormwater of adjacent building appears to enter the ground but its destination is unknown.

3.3.12 Asbestos Containing Materials (ACM)

No certified asbestos survey was undertaken as part of this assessment. As garage building contains a corrugated cement bonded roof which is likely to contain bonded asbestos.

3.3.13 Polychlorinated Biphenyls (PCBs)

PCBs were historically used as a dielectric filler liquid in some types of large scale transformers, switchgear, capacitors and the starter units in some fluorescent lights and fractional horsepower motors. Typically these are large pieces of electrical equipment commonly found on power lines. They were used because of their good electrical insulation properties, fire resistance and chemical stability. An international agreement in 1986 (EU Directive 96/59/EC) banned most of these uses and agreement was also reached to phase out remaining uses and safely dispose of PCBs by the end of 2010. It should be assumed that any large scale capacitor or transformer made before 1976 contains PCBs unless it is known otherwise. PCBs are known to harm the environment and can damage health.

3.3.14 Ionising Radiation

No evidence of Ionising Radiation sources were made at the site.

3.3.15 Spills and Releases

No evidence of any staining was seen in the external areas of the site. Minor staining observed on the walls of the inspection pit, the bottom of which was inaccessible.

3.4 Surrounding Land Use

3.4.1 North

The site is bordered to the north by Norfolk Road.

3.4.2 East

The site is bordered to the east by dwelling of 4 Norfolk Road.

3.4.3 South

The site is bordered to the south by garden of residential property.

3.4.4 West

The site is bordered to the west by dwelling of 8 Norfolk Road.

A selection of photographs showing the property is provided in Appendix A.

4.0 CURRENT LAND USES

4.1 Current Site Use

The proposed development site is currently assigned to the adjacent dwelling and used for parking. A small garage located at the rear of the site is generally unused, but may have been used for light car repair in the past.

4.2 Potentially Contaminative Current Surrounding Land Use

The following records of potentially contaminative sites are made within 250m of the site:

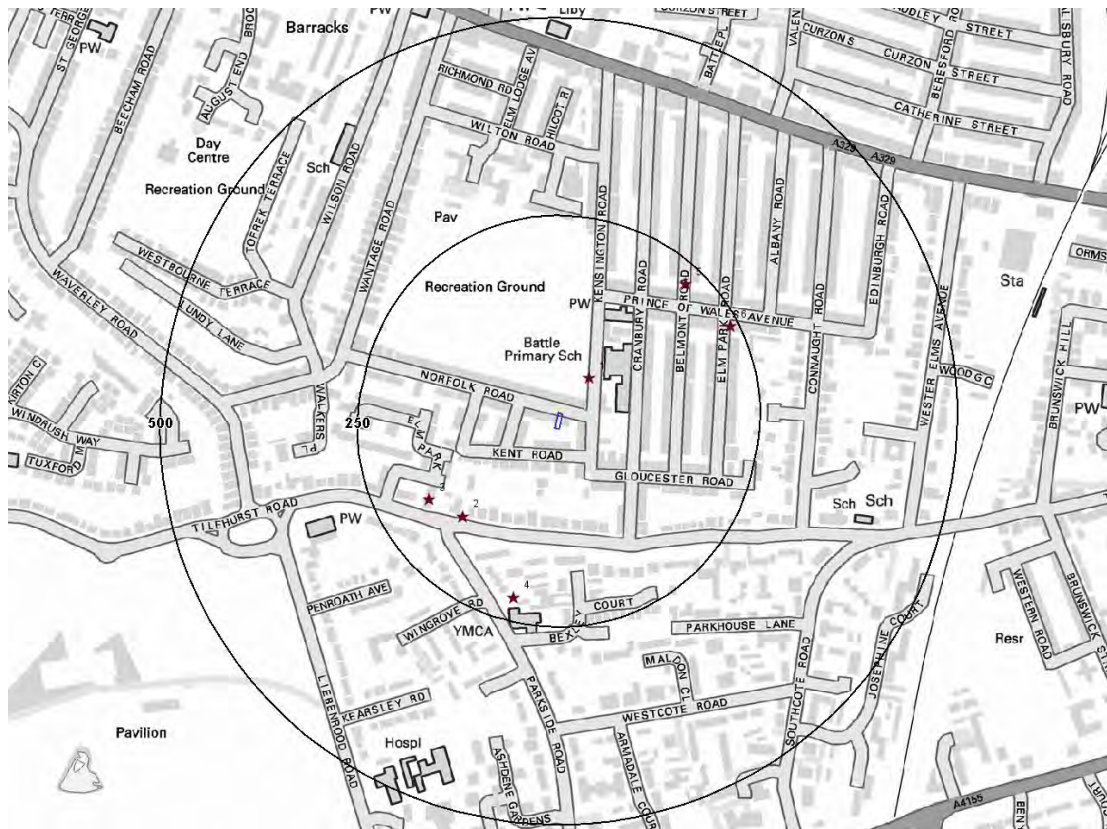


Table 1: Potentially Contaminative Current Sites

Distance (m)	Direction	Company	Activity
57	NE	Electricity Sub Station	Electrical Feature
161	SW	Electricity Sub Station	Electrical Feature
183	SW	Electricity Sub Station	Electrical Feature
220	S	Electricity Sub Station	Electrical Feature
227	NE	Electricity Sub Station	Electrical Feature
239	NE	TSD Motors	Vehicle Repair

4.3 Petrol and Fuel Sites

There are no records of any petrol and/or fuel sites within 500m of the site.

4.4 Underground High Voltage Electricity Cables and High Pressure Gas Transmission Pipelines

There are no records of any such feature within 500m of the site.

5.0 HISTORICAL LAND USES

5.1 Site and Surrounding Area Historical Land Use

5.1.1 Site Observational Evidence

There is no current visual evidence available at the site to suggest any other site use other than residential.

5.1.2 Historical Maps Assessment

A number of historical maps have been reviewed for the site and reviewed for potential evidence which may indicate potentially contaminative land uses for either the site or surrounding land within 250m of the site. Copies of the historical maps are provided in Appendix B and are discussed below:

Table 2: Historical Land Use

Map Year (Scale)	Site Use	Surrounding Land Use
1881 (1:2,500)	The site is undeveloped and consists of open farmland.	The following notable features / changes are observed: South: Three large houses located around 230m south and south east of the site.
1899 (1:500)	No changes to the site observed. Housing development in progress on other side of road to the north.	The following notable features / changes are observed: West: Brick Works with slight depression located 80m west. East: Vineyard located 250m east.
1911 (1:2,500)	No changes to the site observed. Although housing located adjacent to site as seen today. Appears to show small building (garage) shown at back of site.	The following notable features / changes are observed: South: Small excavation 245m south. Brickworks appears to be closed.
1932 (1:2,500)	No changes to the site observed.	The following notable features / changes are observed: General: Some increase in housing generally.
1960 (1:2,500)	No changes to the site observed.	The following notable features / changes are observed: East: Schools shown 50m east
1962 (1:2,500)	No changes to the site observed.	The following notable features / changes are observed: North: Laundry shown 260m north.

		West: Printing Works shown 245m west
1989 (1:1,250)	No significant changes shown to site.	The following notable features / changes are observed: South: Small Builders Yard shown 70m south.
1993 (1:1,250)	No significant changes shown to site.	No significant changes shown
2003 (1:1,250)	No significant changes shown to site.	The following notable features / changes are observed: South: Small Builders Yard shown 75m south.

Historical mapping shows that the site was developed as part of a wider housing scheme between 1899 and 1911 when a small building (garage) was shown. The site has not changed since this time.

The surrounding area is predominantly residential in nature although a number of school are located to the east. A small buildings yard is present to the south with printing works building shown 250m to the north west.

5.1.3 Potentially Contaminative Historical Uses

The following records of potentially contaminative historical land uses within 250m of the site are shown:



The following records are made of potentially contaminative historical industrial sites within 250m of the property.

Table 3: Potentially Contaminative Historical Sites

Distance (m)	Direction	Activity	Date
44	S	Brick Works	1898
49	S	Brick Works	1898
82 - 87	SW	Unspecified Pit	1932
219	S	Unspecified Pit	1932
228	E	Vine Yard	1960
239	NW	Unspecified Works	1974

5.1.4 Historical Tank Database

The following records are made of historical tanks within 250m of the property.

Table 4: Historical Tanks

Distance (m)	Direction	Activity	Date
183	S	Unspecified Tanks	1899

5.1.5 Historical Energy Features Database

The following records of sites with historical energy features are known within 250m of the property.

Table 5: Historical Energy Features

Distance	Direction	Activity	Date
57	NE	Electricity Substation	1989
157	SW	Electricity Substation	1985
220	S	Electricity Substation	1989
226	NE	Electricity Substation	1973

5.1.6 Historical Petrol and Fuel Sites

There are no records of any historical petrol and/or fuel sites within 500m of the property.

5.1.7 Historical Garage and Motor Vehicle Sites

The following records of sites with historical garage and motor vehicle sites within 500m of the property.

Table 6: Historical Garage and Motor Vehicle Sites

Distance	Direction	Activity	Date
289	W	Garage	1973

5.1.8 Historical Potentially Infilled Land

The following records of potentially infilled land are made for sites located within 250m of the site:

Table 7: Potentially Infilled Land

Distance	Direction	Activity	Date
44	S	Brick Works	1898
82	SW	Unspecified Pit	1932
219	S	Unspecified Pit	1932

5.1.9 Department of Environment (DEFRA) Industry Profiles

The old Department of Environment (now DEFRA) Profiles provide information on the processes, materials and waste associated with individual industries with regard to land contamination. DOE Industry Profiles provide information on the processes, materials and wastes associated with individuals industries. They are not definitive studies but they introduce some of the technical considerations that need to be borne in mind at the start of an investigation for possible contamination.

6.0 GEOLOGY

6.1 Artificial and Made Ground

BGS records show that there are no potential deposits of artificial or made ground at or within 50m of the site.

6.2 Superficial and Drift Geology

The British Geological Survey 1:50,000 Geological Map of Great Britain shows that there are no recorded deposits of superficial and/or drift deposits within 50m of the site.

6.3 Solid Geology

The British Geological Survey 1:50,000 Geological Map of Great Britain shows that the solid geology beneath, or within 50m, of the site is recorded as being of the Seaford Chalk Formation consisting of Chalk, and Lambeth Group consisting of clay, silt and sand.

6.4 Mining

Information provided by the Coal Authority indicates that the site is not located within 75m of a coal mining area.

6.5 Non-coal Mining

The site is located in an area where chalk is present which may have localised small scale underground mining may have occurred.

6.6 Brine Affected Areas

There are no brine affected areas within 75m of the site.

6.7 Shrink Swell

The maximum Shrink Swell Hazard for the site has been rated by the BGS as Moderate. Ground conditions are predominantly of a high plasticity. Do not plant or remove trees or shrubs near to the building without expert advice.

6.8 Landslides

The maximum Landslide Hazard for the site has been rated by the BGS as Very Low. There is a possibility of slope instability problems after major changes in ground conditions.

6.9 Soluble Rocks

The maximum Soluble Rocks Hazard for the site has been rated by the BGS as Moderate. Very significant soluble rocks are present with a moderate possibility of local natural subsidence due to high surface or subsurface water flow.

6.10 Compressible Ground

The maximum Compressible Ground Hazard for the site has been rated by the BGS as Negligible. No special actions are required.

6.11 Collapsible Rocks

The maximum Collapsible Rocks Hazard for the site has been rated by the BGS as Very Low.

6.12 Running Sand

There is a very low potential for running sand problems if the water table rises or if sandy strata is exposed to water. No special actions are required.

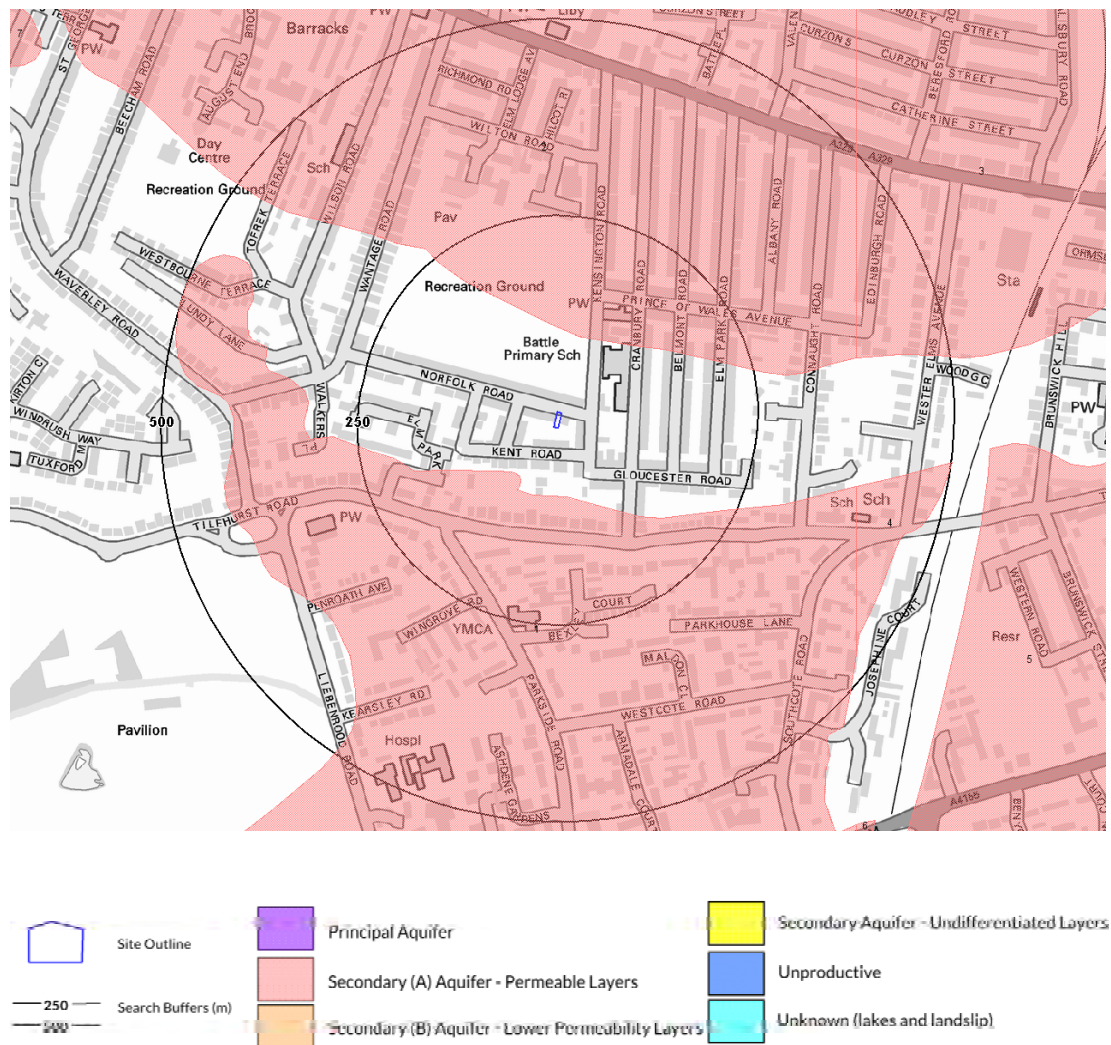
6.13 Radon

The Indicative Atlas of Radon in England and Wales as prepared by both the Health Protection Agency and the British Geological Survey shows that the site is not located in a radon area as less than 1% of properties are above the Action Level. No radon protection measures are necessary.

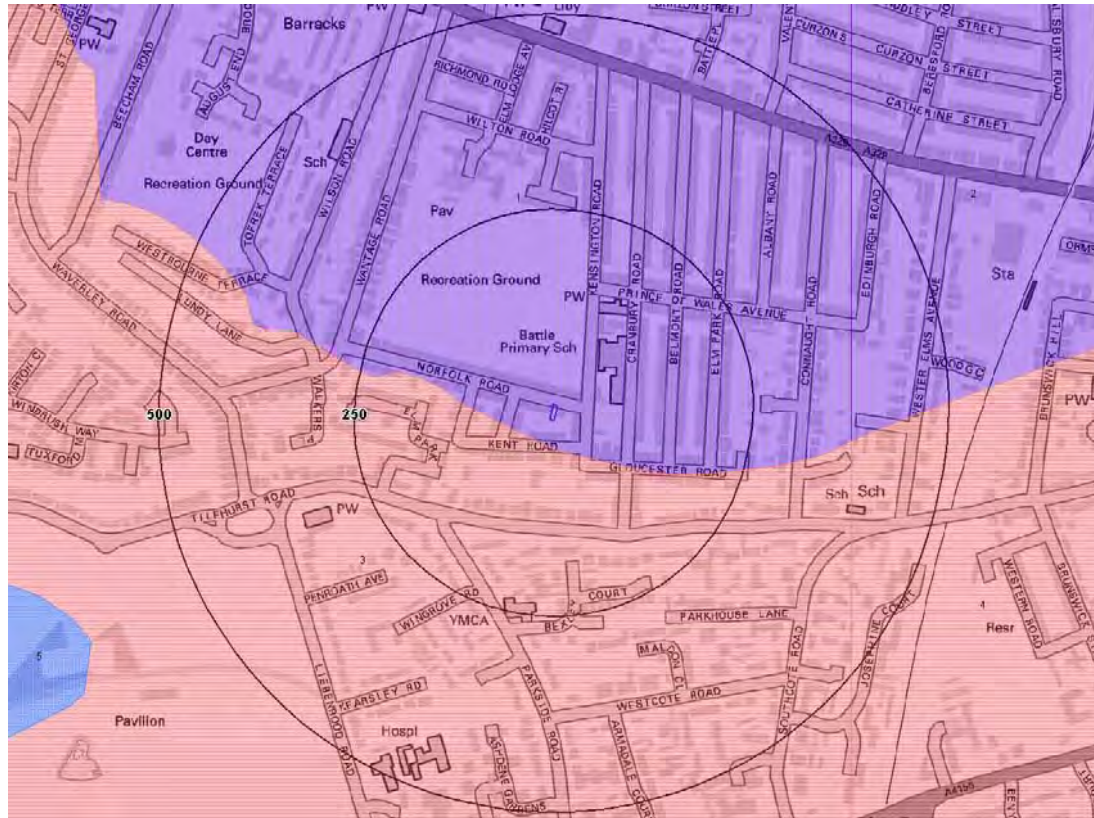
7.0 HYDROGEOLOGY

7.1 Groundwater Vulnerability and Soil Classification

The site is located on ground where a Secondary aquifer is present within the superficial deposits. This is a geology with permeable layers capable of supporting water supplies at a local rather than a strategic scale, and in some cases, form an important source of base flow to rivers. The principal aquifer soils have a high leaching potential which are soils readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock.



The aquifer within the bedrock at the site is classed as a principal aquifer which is a geology of a high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. The major aquifer has a high leaching potential which is often assumed for sites located in urban areas.



7.2 Groundwater Abstraction Licences

There are no active groundwater abstraction licences issued for sites located within 1,000 of the site. The nearest active permit is operated by Little Johns Farm 1,021m north of the site used for general farming.

7.3 Discharge Consents

There are no Red List Discharge Consents recorded in the Groundsure Report within 250m of the site.

There are no site with licensed discharge consents within 250m of the property.

7.4 Source Protection Zones

The site is not located within a SPZ.

8.0 HYDROLOGY

8.1 Surface Waters

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

8.1.1 Main Rivers

There are no main rivers located within 500m of the site.

8.1.2 River Quality

There is no river quality information available.

8.2 Surface Water Abstraction Licenses

There are no active surface water abstraction licenses is located within 1,500m of the site. The nearest active licence is located 1965m east of the site at Oracle Shopping Centre.

8.3 Potable Water Abstraction Licenses

The nearest active potable water abstraction license applies to a site located 1,570m north east of the site at Manrose Manufacturing.

8.4 Flooding

8.4.1 Environment Agency Flood Protection Zones

The Environment Agency Flood map (from rivers and the sea) shows that the site is not located within a Zone 2 or Zone 3 flood risk zone for fluvial (rivers).

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as less than 1 in 1000 (0.1%).

Environment Agency/Natural Resources Wales Zone 3 floodplains estimate the annual probability of flooding as less than 1 in 100 (1%).

There is a Very Low (less than 1 in 1000) risk of flooding on site.

8.4.2 Flood Defences

There are no Flood Defences protecting the site.

There are no areas shown as benefiting from flood defences within 250m of the site.

There are no areas which are shown to benefit from flood storage within 250m of the site.

8.4.3 Groundwater Flooding Susceptibility Areas

British Geological Survey shows that the site may be affected by Clearwater flooding which is associated with unconfined aquifers.

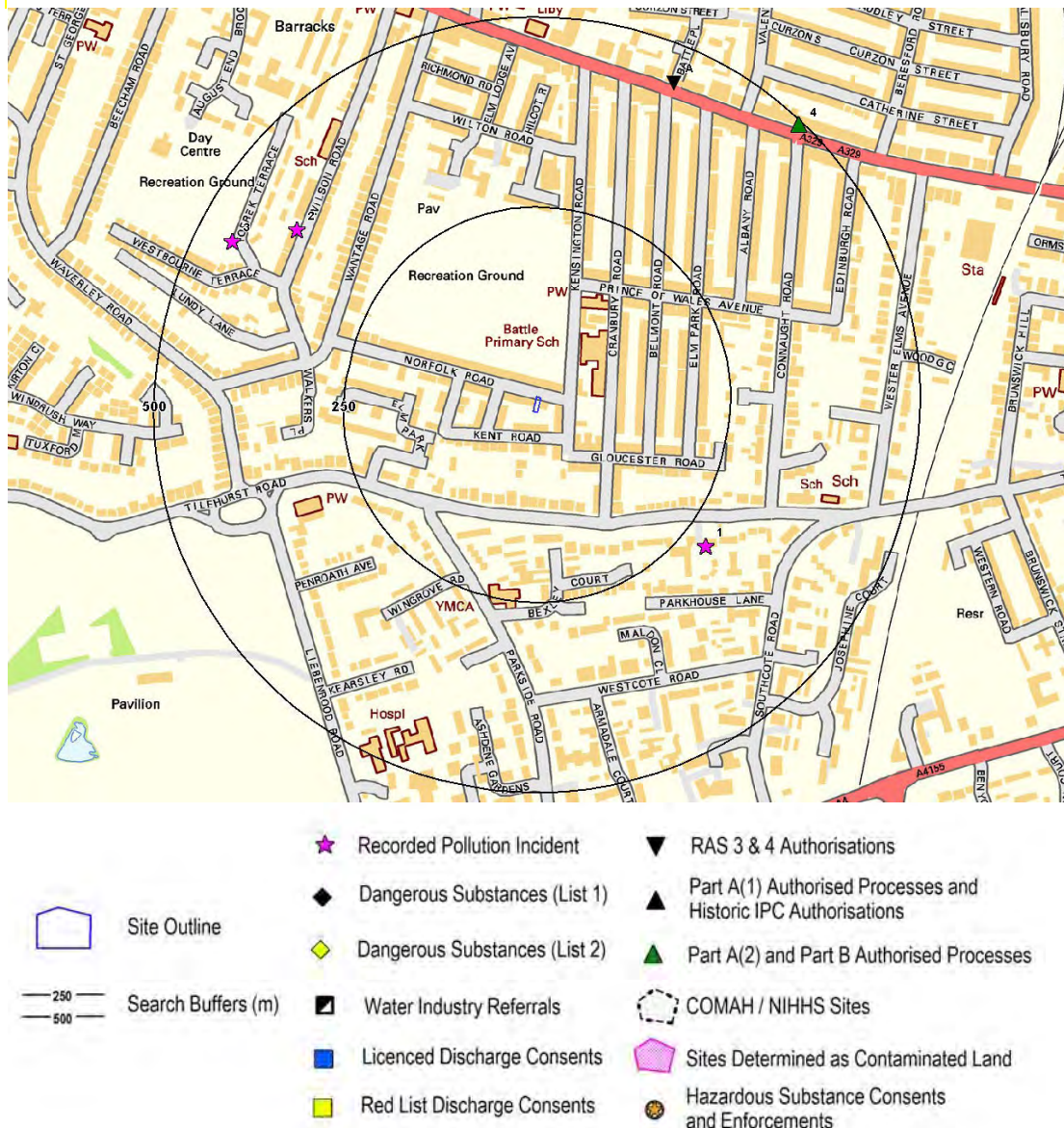
There is some potential of flooding from below the surface Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous

flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard.

There is potential for flooding at the surface and there is a High confidence rating in this result.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

9.0 AUTHORISATIONS, INCIDENTS AND REGISTERS



9.1 Industrial Sites Holding Licenses / Authorisations

There are no sites located within 250m of the site where records of historic IPC authorisations have been made.

There are no sites located within 250m of the site where records of Part A(1) and IPPC authorisations have been made.

Bobbys 2hr Dry Cleaning located 493m north east of the site holds a current permit Part B for a Dry Cleaning process.

There are no sites located within 500m of the site where records of List 1 Dangerous Substances Inventory Sites have been made.

There are no sites located within 500m of the site where records of List 2 Dangerous Substances Inventory Sites have been made.

Royal Berkshire NHS Trust located 451m north east of the site has a cancelled licence for the keeping and use of radioactive materials.

9.2 Dangerous or Hazardous Sites

There are no COMAH or NIHHS sites within 500m of the subject property.

9.3 Environment Agency Recorded Pollution Incidents

There are no records of any List 1 Environment Agency Recorded Pollution Incidents within 250m of the site.

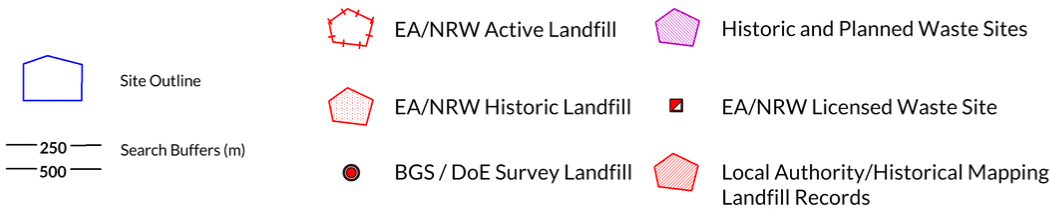
On the 16th May 2002 a category 3 minor land impact was caused by release of oils and fuel.

9.4 Sites Determined as Contaminated Under Part IIa EPA 1990

No sites have been determined as Contaminated Land under Part IIa EPA 1990 within 500m of the site.

10.0 WASTE

10.1 Landfill Sites



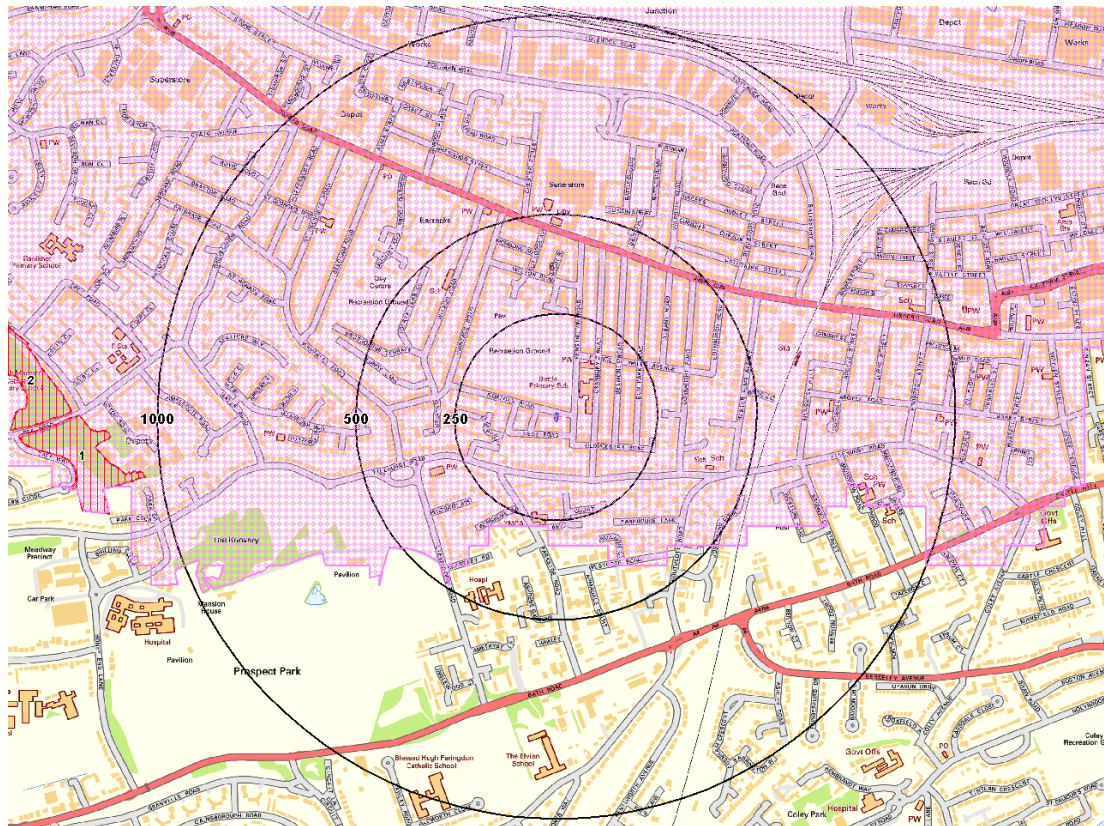
Historical inert landfill feature located 944m NE of the site. Commercial, Household and Liquid Sludge site located 1,384 NE of the site.

10.2 Other Waste Sites

The Environment Agency and others hold various records of metal recycling and waste transfer stations located within 1,000m of the site. The nearest being 842m north east of the site.

11.0 DESIGNATED ENVIRONMENTALLY SENSITIVE SITES

The following designated environmentally sensitive sites are located within 250m of the sites:



11.1 Nitrate Vulnerable Zone

The site is located on ground which is susceptible to the application of nitrates.

11.2 Local Nature Reserves

Lousehill Copse located 1039m west of the site is designated as a LNR.

12.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

12.1 Introduction

The current contaminated land regime is explained in Part IIA of the Environmental Protection Act 1990 and was introduced on the 1st April 2000 in England. Also, this assessment has been completed taking into account the advice and guidance contained in the NPPF and particularly paragraphs 109 (fourth and fifth bullet points) and 120 of this document. In general, the purpose of these aspects of the legislation is to achieve the identification of contaminated land and the remediation of contaminated land to ensure the such land poses no significant risk to human health and/or the environment.

Contaminated Land is defined as:

‘any land which appear to the local authority in whose area it is situated, to be in such a condition, by reason or substances in, on, or under the land, that: significant harm is being caused or there is a significant possibility of such harm being caused; or pollution of controlled water is being or is likely to be caused.’

For land to be classified as contaminated land a relevant Pollutant Linkage must be identified. A Pollutant Linkage will only be present where the Source-Pathway-Receptor factors are all present and where they are not all present, no risk assessment is possible. This is common with the Model Procedures as described in CLR-11.

Statutory Definitions	
Contaminant Source (Hazard)	A substance which is in, on or under the land and which has the potential to cause harm or cause pollution of controlled waters
Receptor (Target)	A living organism or group of organisms, an ecological system or property, controlled waters which are or could be polluted by a contaminant
Pathway (Route)	One or more routes or means which either allows the contaminant to cause significant harm to that receptor, or that there is a significant possibility of such harm being caused to the receptor, or that pollution of controlled waters is being or likely to be caused.

A Preliminary Environmental Risk Assessment involves assessing the likely probability and consequence of a Pollutant Linkage and determining a consequent level of risk.

The term ‘risk’ is widely used in different contexts and situation but a prescriptive definition is provided by the Guidelines for Environmental Risk Assessment and Management (DEFRA et al, 2000):

Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequence of the occurrence’.

A hazard is defined as *‘a property or situation that in particular circumstance could lead to harm’.*

The risk category for a particular scenario can be assessed in terms of the consequences and probability of an occurrence which can be defined as follows:

Classification of a Consequence

Classification	Definition
Severe	1 – short term (acute) risk to human health likely to result in significant harm 2 – short term risk to controlled waters 3 – catastrophic damage to buildings / structures 4 – short term risk to an ecosystem or organism within the particular ecosystem.
Medium	1 – chronic damage to human health (long term risk) 2 – pollution of a sensitive water resource 3 – a significant change in an ecosystem or organism within the ecosystem
Mild	1 – pollution of non-sensitive water resources 2 – significant damage to buildings / structures
Negligible	1 – harm (not necessarily significant) which may result in financial loss; 2 – non permanent health effects to humans (easily prevented by PPE for example) 3 – easily repairable effects of structural (building damage).

Classification of a Probability

Classification	Definition
High	1 – there is a complete pollution linkage and an event appears very likely to occur in the short term and is inevitable in the long term 2 – evidence of harm to the receptor
Medium	1 – there is a complete pollution linkage which means that it is probable that an event will occur 2 – the event is not inevitable but possible in the short term and likely in the long term
Low	1 – there is a complete pollution linkage and circumstance are possible under which an event could occur 2 – it is not certain that an event will occur in the long term, and it is less likely to occur in the short term
Negligible	1 – there is a complete pollution linkage but circumstance are such that is improbable that an event would occur even in the long term.

The consequences of a risk and the probability of an event taking place can be assessed and the likely risk category can be determined as follows:

Probability	Consequence				
		<i>Severe</i>	<i>Medium</i>	<i>Mild</i>	<i>Negligible</i>
	High	High	High	Medium / Low	Negligible
	Medium	High	Medium	Low	Negligible
	Low	High / Medium	Medium	Low	Negligible
	Negligible	Medium / Low	Medium / Low	Low	Negligible

High Risk – there is a high probability that severe harm could risk a receptor, or there is evidence that a receptor is being harmed. The risk is realised is likely to result in liability and/or significant harm, and urgent investigation or remediation will be required.

Medium Risk - it is probable that harm will arise to a receptor. However it is relatively unlikely that such harm would be severe, or if harm does occur then the harm is likely to be relatively mild. Investigation will be required to determine the liability, and some remedial works may be required in the long term.

Low Risk – it is possible that harm may arise to a receptor, but it is likely that the harm would be mild.

Near Zero Risk – There is a very low risk of harm to the receptor. In the event of harm being realised the harm is not likely to be severe.

12.2 Potential Sources

The current and historical use of the site has been carefully assessed. All potential risks have been determined and assessed as part of this study.

A number of off-site sources are also recorded in the vicinity of the site and are discussed below.

12.3 Potential Pathways

Exposure pathways link any contamination to the receptor. All or any of the following potential pathways may apply:

Future Site Workers, including Construction Workers

<i>Oral Pathway (W-O)</i>	Indoor /outdoor ingestion of dust Indoor/outdoor ingestion of soil Indoor/outdoor ingestion of Flora/Fauna Ingestion of tainted mains water
<i>Inhalation Pathway (W-I)</i>	Indoor/outdoor inhalation of fugitive dust Indoor/outdoor inhalation of soil vapour
<i>Dermal Pathway (W-D)</i>	Indoor/Outdoor exposure to soil through dermal contact

Future Site Users, Occasional Visitors and Neighbouring Residents including Children

<i>Oral Pathway (O-O)</i>	Indoor ingestion of dust (post construction) Outdoor ingestion of soil (post construction) Indoor/outdoor ingestion of Flora/Fauna
<i>Inhalation Pathway (O-I)</i>	Outdoor inhalation of fugitive dust Indoor inhalation of fugitive dust (post construction) Outdoor inhalation of soil vapour Indoor inhalation of soil vapour (post construction)
<i>Dermal Pathway (O-D)</i>	Outdoor exposure to soil through dermal contact

Indoor exposure to soil dust through dermal contact

Flora (potential new on-site or off-site flora affected by potential contamination on the site, or migrating onto or from the site).

Plant Uptake (Fl-PU) General uptake of contaminants by plants growing in the vicinity of, or on, the site

Fauna (on-site or off-site affected by potential contamination on the site, or migrating from the site)

Oral Pathway (Fa-OP) Consumption of contaminated Flora located on site

Water Resources

Surface Water Mobilisation (SWM) Surface water run-off from site, migrating off site
Also infiltration into the site from site.

Groundwater Mobilisation (Leaching Potential) (GWM)

Percolation and mobilisation of contaminants within the soil into waters held locally within pore space beneath the site.

12.4 Potential Receptors

The following potential receptors have been identified for the site:

Human Receptors (H)	Site workers, adults. Child/Adult future site users.
Flora and Fauna (FL, FA)	Future, on and off-site Fauna and Flora
Water Resources (SW, GW)	principal bedrock aquifer;
Site Infrastructure (SI)	Existing and future foundations and drainage services
Environmental	N/A

Under the proposals the site is to be developed for residential purposes. Although it is assumed that the building will be used to house vulnerable adults in time it is possible that children may reside at the site and so this has been assumed as the **Critical Receptor**.

12.5 Qualitative Risk Assessment

A qualitative risk assessment has been undertaken to provide an initial assessment of the potential risks caused by contaminant sources identified during this assessment to potential future users of the site, building structures, and the aquatic environment. **The assessment has been made on the understanding that the site is used for long term residential use.** This is detailed in the table below:

Table 8 Risk Assessment

Hazard Identification			Hazard Assessment		Risk Estimation			Risk Evaluation
Sources	Location	Potential Contaminants	Pathway	Receptor	Magnitude of Consequence	Probability of Occurrence	Risk Appraisal	Rationale
Current / Historical use of the site, Parking, garage Residential	On site	Made Ground Oil spills in garage Oil spills from parked cars Asbestos	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Medium	Medium	Medium	- Possible risk from oils, fuels released historically into inspection pit some minor staining observed; - Likely asbestos on roof of garage. - Further site assessment required in this regard.
Brick Works	80m west	Potential for infilled ground	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Negligible	Low	Negligible	- No record of infilling; - Sites now developed - Long time since operations - No further site assessment required in this regard.
Printers	245m west	Inks, made ground	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Negligible	Low	Negligible	- Located significant distance from site - No recorded pollution incidents - No further site assessment required in this regard.
Laundry	260m north	Solvents, detergents	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Negligible	Low	Negligible	- Located significant distance from site - No recorded pollution incidents - No further site assessment required in this regard.

Builders Yard	75m south	Inerts, made ground	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Mild	Medium	Low	- General low risk from site given location and distance - No likely hazardous materials - Negligible risk of ground gas - No further site assessment required in this regard.
TSD Motors	239m NE	Oils, Fuels,	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Negligible	Low to Medium	Negligible	- General low risk given distance from site and possible pathways; - Low risk of bulk fuel storage - No further site assessment required in this regard.
Electrical Sub Stations	Various	Oils, PCBs	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Mild	Low to Medium	Low	- No likely impact - No impact observed – no viable pathway - Low volume source materials - No further site assessment required in this regard.
Landfill Sites	1384m NE	Organic or inorganic	W-O, W-I, W-D, O-O, O-I, O-D, FLPU, FaOP SWM, GWM	H, SW, GW, FL, FA	Negligible	Low to Medium	Low	- No features reported; - Located significant distance from site - No superficial aquifer - No further site assessment required in this regard.

13.0 CONCEPTUAL SITE MODEL

The model assessment has been made on the understanding that the site is used for **Residential Purposes**. Those potential pathways which may give rise to unacceptable contaminative risk under this scheme have been brought forward and form part of the Model as discussed below.

Table 10: Conceptual Site Model

Conceptual Site Model			
Receptor	Linkage	Source	Risk
Demolition / Ground workers	Inhalation	Organic vapours arising from on-site sources Asbestos	Low – general low risk of acute impact providing expected PPE is worn Asbestos on garage roof to be dealt with to best practice Site best working methods to remove asbestos.
	Ingestion and dermal contact	Organic or inorganic contaminants	Possible risk should soils beneath garage be impacted. Further assessment required.
Future site users	Inhalation	Organic vapours arising from on-site sources and off-site sources	Possible risk should soils beneath garage be impacted. Further assessment required.
	Ingestion and dermal contact	Shallow soil contamination from potential on-site and/or migratory off-site.	Possible risk should soils beneath garage be impacted. Further assessment required.
	Direct	Radon	No risk.
Neighbouring Residents	Inhalation	Disturbed vapours arising from on-site development	Negligible – general low risk of acute impact. No further assessment required.
	Ingestion and dermal contact	Shallow soil contamination from on-site sources	No potentially hazardous made ground expected. No significant generation

		being disturbed through development and transposed off-site through air.	of dusts, no residential use nearby, No viable linkages from other off-site sources No further assessment required.
Groundwater resources	Infiltration and leaching of potential wastes from spillages	Downward and lateral migration of mobile contaminants and possible disturbance and creation of new fractures result of development adversely affecting flow to other receptors	No superficial aquifer. Principal bedrock aquifer But no large scale significant source expected to impact deeper aquifer No further assessment required.
Surface waters	Possible mobilisation of shallow soil contaminants from site to east	Shallow soil contamination from off site and on site sources being mobilised through surface waters off site.	No nearby features to be impacted by development No further assessment require.
Local flora and fauna	Uptake from soil and Ingestion	Shallow soil contamination from off site and on site sources	No further assessment required.

The Conceptual Site Model shows that the site is viewed generally as low risk from off-site sources, however possible presence of hydrocarbons beneath the garage possible concern. .

13.0 CONCLUSIONS AND RECOMMENDATIONS

Following a site walkover conducted on 13th November 2019 a conceptual model of the site was developed which demonstrates significant potential pollutant linkages and through the risk assessment it has not been possible to prove at this time that the site is uncontaminated for the proposed end use. This relates to the presence of an inspection pit in the garage of the existing building showing some evidence of minor staining on the brickwork. It is possible that oily materials have entered the pit directly or been swept from the floor of the garage leaving unknown risks.

Therefore further work is required in order to confirm and characterize the presence or otherwise of contamination on site. This will take the form of an intrusive investigation and further generic or detailed risk assessment. If the pollutant linkages are confirmed as unacceptable then some form of remediation will be required. Should this be required we believe that the level of remediation required should be viable, being relatively simple and low key.

Any remediation will need to be undertaken to the satisfaction of the Local Authority and any other Regulatory Body involved in the development. This is normally undertaken by the formulation of an Options Appraisal (including Remediation Strategy), Implementation Plan, Verification Plan, Monitoring and Maintenance Plan, and Verification Report.

The report is based on the assumption by the author that the Local Planning Authority will follow guidance detailed in the NPPF where for all development involving disturbance to land, the LPA would impose a Condition requiring the reporting of all instances of contamination found during the course of development, including removal of concrete floor slab. Should instances of previously unreported contamination be found then the submission for approval of an assessment of the risks and proposed remediation scheme will be submitted to the Local Planning Authority.

The report is supplied subject to our standard terms and conditions and these should be read alongside the report.