



Your Environment

STAGE 1: DESKTOP STUDY AND WALKOVER SURVEY REPORT AT 36-38 NORTH STREET, EMSWORTH, PO10 7DG

for Chris Flint Associates Ltd

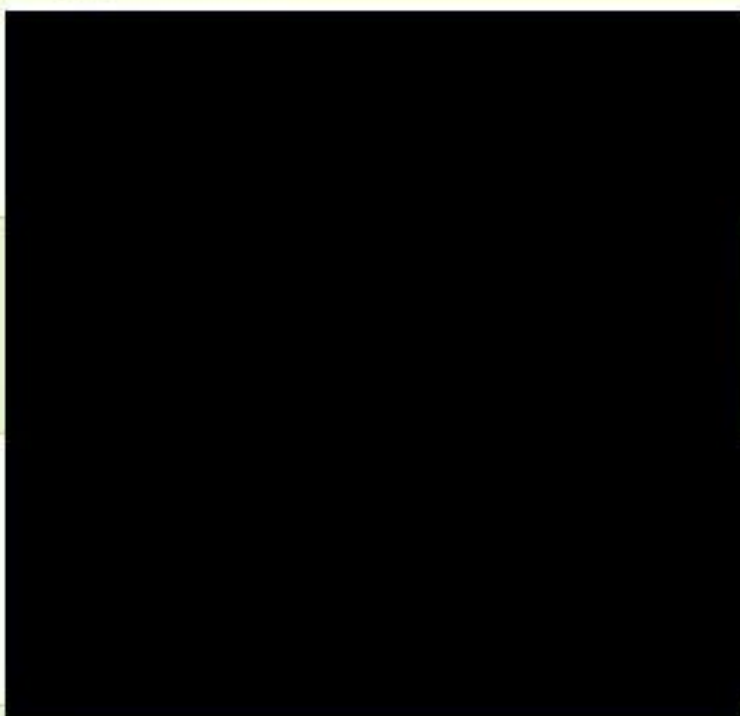
Your Environment

Head Office, Chilgrove Business Centre, Chilgrove Park Road, Chilgrove, Nr
Chichester, PO18 9HU
Tel: 01243 787150

Report Number: YE2585 (Revision 1), September 2016

Kevin Brown

kevin@yourenvironment.org

	Name	Position	Signature	Date
Prepared by:	Sophia Foschini	Junior Geo-Environmental Engineer		September 2016
Reviewed by:	Kevin Brown	Environmental Scientist		September 2016
Approved:	Colin Hiscock	Director		September 2016
For and on behalf of <i>YourEnvironment</i>				

Issue	Date	Description	Prepared	Reviewed	Approved
00	01.09.16	Final Report	SF	KB	CH
01	05.09.16	Client comments	KB	KB	CH

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1.0 Introduction

YourEnvironment (YE) was instructed by Chris Flint Associates Ltd (Quote No: Q1589, Dated: August 12th 2016) to produce a Stage 1: Desktop Study and Walkover Report for a site which is located at 36-38 North Street, Emsworth, PO10 7DG.

We understand current plans for the redevelopment of the site include;

- Erection of two storey detached building for commercial use with associated soft landscaping.

The purpose of this report is to satisfy planning conditions which have been attached to the redevelopment of the site by Havant Borough Council under planning reference APP/15/00829.

The existing and proposed redevelopment plans for the site can be reviewed within [Appendix A](#).

Objectives

The objectives of this Stage 1 report are to:

- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater and ecological receptors;
- Review historical and recent uses to assess the potential for contamination to be present from past and current land-use;
- Assess by qualitative means the potential nature and extent of contamination from those uses and the environmental risk which may affect the site redevelopment;
- Identify the prevalent source-pathway-receptor linkages present on site by means of a Tier 1 contamination risk assessment which incorporates the formulation of a Conceptual Site Model.

Information Sources

During the production of this report the following information sources have been utilised:

- A review of Historical Ordnance Survey Maps, Envirolnsight and Geolnsight information obtained from Groundsure (4C Group Ltd).

2.0 Site Location

The following table outlines the details of the site:

Site address	36-38 North Street, Emsworth, Hampshire PO10 7DG
Grid reference	47881, 106031
Total area	0.02ha
Topography	The site is generally flat and situated at approximately 6mAOD
Site Layout	The site is a regular shaped plot of land

Table 1: Site Details

3.0 Site Geology & Geological Hazards

Superficial Geology

The superficial geology consists of the River Terrace Deposits (Sand, Silt and Clay).

Bedrock Geology

The bedrock geology consists of the London Clay Formation (Clay, Silt and Sand).

Natural Hazards

On site there is a low risk from shrink-swell hazards, collapsible rocks and running sand hazards with a very low risk from landslides. In addition, there is a negligible risk from soluble rocks and compressible ground hazards.

Coal Mining

There are no coal mining areas within 75m of the study site.

Non-Coal Mining

There are no non-coal mining areas within 50m of the study site.

Artificial/Made Ground

There are no records of artificial/Made Ground within 500m.

Landslips

There are no records of landslips within 500m.

Faults

There is one record of a fault within 500m, which is located on site described as an axial plane fold.

Radon

The study site is located within a Radon Affected Area, as between 3% and 5% of properties are above the Action Level. Therefore, basic radon protective measures are necessary for new properties or extension to existing ones as described in BR211 by the Building Research Establishment.

Borehole Records

There is one record of boreholes within 250m, which is 171m southeast drilled to a depth of 5.9m.

4.0 Site Hydrogeology and Hydrology

Aquifer within Superficial Deposits

As a result of the superficial geology on site the aquifer is designated as being a Secondary (A) Aquifer. These are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers. These are generally Aquifers formerly classified as Minor Aquifers.

Permeability of Superficial Ground

The minimum permeability is recorded as being low with the maximum permeability recorded as being high.

Aquifer within Bedrock Deposits

As a result of the bedrock geology on site the Aquifer is designated as being an Unproductive Aquifer. These are described as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Permeability of Bedrock Ground

The minimum permeability is recorded as being very low with the maximum permeability also recorded as being moderate.

Groundwater Abstraction Licences

There are no active groundwater abstraction licences within 2000m.

Surface Water Abstraction Licences

There are no active surface abstraction licences within 2000m.

Potable Water Abstraction Licences

There is one active potable water license within 2000m, which is 1907m east for water bottling.

Source Protection Zones

The study site is not located within a Source Protection Zone.

Groundwater Vulnerability and Soil Leaching Potential

On site the soil vulnerability category is listed as being 'HU', this is described as soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

Detailed River Network

There are a number of network entries within 500m, the closest of which is 133m east known as the River Ems.

Surface Water Features

There are four surface water features within 250m, the nearest of which is 131m east.

Records of Licensed Discharge Consents

There are two active licensed discharges within 500m, the nearest of which is 128m northeast for drainage. The other record is located over 300m away.

5.0 Site Flood Information

The study site is situated 113m west of an Environment Agency Zone 2 floodplain and 120m west of an Environment Agency Zone 3 floodplain. The risk from flooding from rivers and sea (RoFRaS) is recorded as being very low. There is one record of flood defences within 250m, which is 184m northeast and no areas benefiting from flood defences or flood storage in 250m.

There are British Geological Survey (BGS) groundwater flooding susceptibility areas within 50m of the boundary of the study site which relate to superficial deposits flooding based on the underlying rock type. However, this is recorded as being of limited potential.

The BGS confidence rating in respect of this result is considered to be moderate.

6.0 Site Environmental and Industrial Setting

Environmental Permits, Incidents and Registers

Sites Determined as Contaminated Land under Part IIA EPA 1990

There are no records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 within 500m.

Records of Part A (2) and Part B Activities

There are four current permits within 500m, the nearest of which is located 87m east for a Part B activity associated with the respraying of road vehicles. Enforcements were noted. Other Part B activities associated with dry cleaning, oil burning and vapour recovery are 200m south, 252m north and 252m southwest. No enforcements are noted.

Record of Planning Hazardous Substance Consents and Enforcements

There is one record of planning hazardous substance consents and enforcements within 500m, which is 123m northeast for storage of natural gas.

Record of COMAH and NIHHS Sites

There is one record of a COMAH and NIHHS site within 500m, which is 94m northeast by British gas.

Records of National Incidents Recording System List 2

There are sixteen records of incidents occurring within 500m, the nearest of which is 147m west and took place in August 2001. This incident had no impact (category 4) on air, water or land. Three of these records are within 250m, 203m southwest and 204m southwest and took place in September 2001. The incidents had a minor impact (category 3) on water and air and no impact (category 4) on land.

Landfill and Other Waste Sites

Records of Environment Agency Historical Landfill Sites

There are two records of sites within 1500m, the nearest of which is located 849m southeast with the other 1280m northeast.

Records of Waste Treatment, Transfer or Disposal Sites

There is one record of waste treatment, transfer or disposal sites within 500m, which is 432m south as a recycling centre.

Potentially Infilled Land

There are seventy-four records of potentially infilled land within 500m, the closest of which is 5m west for a grave yard. Other notable features within 200m include unspecified ground workings 69m west, pond 176m southeast and numerous mill ponds 188-198m southwest.

Workings/ Tunnels and Railway Features

Historical Railways

There are a number of features within 250m, the closest of which is 245-249m north for railway sidings.

Historical Surface Ground Working Features

There are a number of features recorded as being within 250m, the closest of which is 5m west for a grave yard. Other notable features include unspecified ground workings 69m west, pond 176m southeast and mill ponds 192-198m southwest.

Current Ground Working Features

There is one record of current ground workings within 1000m, which is 696m south as a brick field.

Historical/Current Land Uses

Records of Potentially Contaminative Uses

There are one hundred and seventy-three records of sites with a potentially contaminative past land use within 500m, the nearest of which is 5m west for a grave yard with a gas works 58m north. Other notable features within 200m include a hospital 74-82m south, unspecified tank 96-100m northeast, gas works 103-116m north, gasometer 146-154m northeast and mill pond 188-198m southwest.

Historical Tanks

There are twenty-seven records of historical tanks located within 500m, the closest of which is 79m northeast for a gas works. Other notable features within 150m include an unspecified tank 84m east and 133-146m northeast, gasholder 98-99m northeast, gas works 101-115m north, gasometer 120-131m north and 146-147m northeast.

Historical Energy Features

There are eighty-three records within 500m, the closest of which is 79m northeast for gas works. Twenty-six of these records are within 150m and relate to electrical substations, gasholders and gasometers.

Historical Garage and Motor Vehicles Repairs

There are twenty-three records within 500m, the closest of which is 81m northeast as a coach works. Other noted features are over 200m away.

Records of Potentially Contaminative Industrial Sites

There are thirty-four records of sites with a potentially contaminative industrial usage within 250m, the closest of which is a vehicle cleaning service 23m northwest. Other notable features within 150m include vehicle parts 43m north, 87m east, 88m northeast and 52m east, unspecified works 52m northeast, fire station 64m southeast and an industrial estate 93m east.

Petrol and Fuel Sites

There are two records within 500m, which are 290m southwest and 374m southeast, both are recorded as being open.

Designated Environmentally Sensitive Sites

The study site is located upon a Nitrate Vulnerable Zone.

Information on the environmental and geological setting of the site is presented in a Groundsure EnvironInsight and GeolInsight Report prepared for the site, a copy of this report is reproduced in **Appendix B**.

7.0 Historical Mapping Information

The object of this search was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Groundsure.

Maps only represent a “snap shot” of the site and its environs at the date of the survey. Changes that had occurred either to the site and/or the environs may well not have been recorded on the maps and could represent a hazard to the site.

The information reported might not represent all pertinent information that could be obtained.

The interpretation of the maps and/or other data commented on in this report is subjective.

Year	Information
1866	The site is undeveloped forming part of a larger arable field to the northeast. The surrounding environs are largely arable with residential dwellings to the south and west of the site. A railway line is 300m north, running in an east to west orientation. A mill pond is 300m southwest, quay mill 500m south, brick field 700m south, oyster beds 600m southeast, timber yard 450 east, saw mill 500m east, brewery 550m northeast and factory 650m northeast. Furthermore, a grave yard is approximately 50m east and gas works 150m north.
1869	The site now contains numerous structures of unknown usage. Off site, no discernible change is noted.
1874	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1877	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1896	The site has no discernible changes. Off site, a corn mill is 450m northeast, mill pond 300m southeast and 450 southeast, brewery 350m south and Malthouse 500m southeast.
1898	There have been no discernible changes to the site and immediate surrounds.
1907	There have been no discernible changes to the site and immediate surrounds.
1908	The site remains unchanged; buildings of unknown usage extend directly east. A fire station is 50m south and a hospital 100m south.
1912	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1914	The site remains unchanged. Off site, a smithy is 400m southeast and a shipbuilder's yard is 700m southeast.
1931	The site remains unchanged. Off site, a nursery is 600m north.
1932	There have been no discernible changes to the site and immediate surrounds.
1942	There have been no discernible changes to the site and immediate surrounds.
1952	There have been no discernible changes to the site. Off-site a nursery is 200m northwest.
1961	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1962	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1963	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1966	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1968	There have been no discernible changes to the site. Off site, a coachworks depot and

	tank is 100m east, gasholder 100m northeast and engineering works 150m north.
1975	There have been no discernible changes to the site and immediate surrounds.
1978	The mapping is incomplete and therefore it is not possible to ascertain if any changes have occurred on or off site, to the immediate surrounds.
1980	The site remains unchanged. Off site, works are 50m north and a bus depot 100m northeast.
1989	There have been no discernible changes to the site. Off site, a builder's yard is 150m northeast.
1991	There have been no discernible changes to the site and immediate surrounds.
1993	There have been no discernible changes to the site and immediate surrounds.
1995	There have been no discernible changes to the site and immediate surrounds.
2002	There have been no discernible changes to the site and immediate surrounds.
2010	There have been no discernible changes to the site and immediate surrounds.

Table 2: *Historical Mapping Review*

Therefore, from the historical maps we can consider the following:

On site sources of possible contamination;

- Various structures (of unknown usage).

Off-site sources of possible contamination;

- Railway line (300m north);
- Mill Pond (300m southwest, 300m southeast and 450m southeast);
- Quay Mill (500m south);
- Brick field (700m south);
- Timber yard (450m east);
- Grave yard (50m east);
- Gas works (150m north);
- Brewery (550m northeast and 350m south);
- Corn mill (450m northeast);
- Malthouse (500m southeast);
- Fire station (50m south);
- Hospital (100m south);
- Smithy (400m southeast);
- Shipbuilders yard (700m southeast);
- Nursery (600m north and 200m northwest);
- Coachworks depot and tank (100m east);
- Gas holder (100m northeast);
- Engineering works (150m north);
- Builders yard (150m northeast).

The Historical Ordnance Survey Maps were obtained from Groundsure and are available for review within [Appendix C](#).

8.0 Walkover Survey

The site was visited on August 30th 2016. The weather was dry and sunny at the time of the visit.

The site is devoid of any structures, following demolition. The site is bounded by high wooden fencing, therefore limited access was available.

Other Services

The site has all services.

Surrounds

The site neighbours an Italian restaurant to the southwest, a residential property to the north, with further residential and commercial properties east across North Street.

Direction	Description of Site boundary
North	The boundary is a brick wall to number 40 North Street.
East	The boundary is North Street road.
South	The boundary is the walls to a commercial building.
West	The boundary is a rear wall separating a residential house and garden.

Table 3: Summary of site boundaries

Direction	Description of Surrounding Land Use
North	Residential houses and a church with a small corresponding graveyard.
East	North Street, numerous commercial shops and kitchens.
South	A restaurant immediately to the south, with residential property southwest of the site.
West	Residential gardens and houses

Table 4: Summary of Surrounding Land Uses

Potentially Contaminative Land Uses

On site sources:

- None identified.

Off site sources:

- None identified.

Photographs taken during the walkover of the site and surrounds can be reviewed within **Appendix D**.

9.0 Summary of Possible Contamination Sources

The earliest mapping (c.1866) indicates the site to be undeveloped forming part of a larger arable field to the northeast, this remains the case until 1869 when the site contains numerous structures of unknown usage, which remains the case throughout the proximity of time.

The surrounding environs are largely arable in nature, with residential and industrial development occurring throughout the proximity of time, with residential dwellings noted south and west of the site in 1866.

Observations could not be made directly on site during the walkover survey due to the site being bound by fencing. However, it was noted that at distance the site is devoid of any structures. The surrounding environs were noted to be a mixture of commercial and residential.

The potential sources of contamination identified from the historical mapping include; a railway line (300m north), mill pond (300m southwest, 300m southeast and 450m southeast), quay mill (500m south), brick field (700m south), timber yard (450m east), grave yard (50m east), gas works (150m north), brewery (500m northeast and 350m south), corn mill (450m northeast), Malthouse (500m southeast), fire station (50m south), hospital (100m south), smithy (400m southeast), shipbuilders yard (700m southeast), nursery (600m north and 200m northwest), coachworks depot and tank (100m east), gas holder (100m northeast), engineering works (150m north) and builders yard (150m northeast). In respect of the aforementioned historical and current land uses these are located at distances which would negate their potential impact to the study site.

The site is underlain by superficial geology of River Terrace Deposits which are underlain by Bedrock consisting of the London Clay Formation. There are records of historic landfills such as 849m southeast, with no records of artificial/made ground identified within 1000m. In respect historical/current ground workings a brick field 696m south, grave yard 5m west, unspecified ground workings (69m west), pond (176m southeast) and mill ponds (192-198m southwest).

The hydrogeological and hydrological setting of the site is considered to be relatively low given the presence of a Secondary (A) Aquifer in the superficial and an Unproductive Aquifer in the bedrock. There are no groundwater or surface water abstraction points within 1000m, the closest potable point is approximately 1907m east. In addition, the nearest surface water feature is located 133m east which is the River Ems.

The proposed redevelopment is to incorporate soft landscaping, with the erection of a two storey detached building, therefore it would be prudent to ensure that in areas of proposed soft landscaping that it is fit for purpose given the increased risks that this would pose, particularly from historical development which has occurred on site.

10.0 Framework for Assessment of Contamination

Environmental risks are assessed within the risk management framework established in Part IIA of the Environmental Protection Act (EPA) 1990 introduced by Section 57 of the Environment Act 1995 which provides a statutory definition of contaminated land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- (a) *Significant harm is being caused or there is a significant possibility of such harm being caused;*
- or
- (b) *Pollution of controlled water is being, or is likely to be caused.*

Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential receptors, which could be harmed or polluted.

The key aspect of the framework is the development of a Conceptual Site Model (CSM) which illustrates the spatial interaction between the potential sources and receptors on site.

The information presented in this report was collated and evaluated to develop an initial CSM to assess ground contamination issues at the site.

For a risk of pollution or environmental harm to occur as a result of ground contamination, **all** of the following elements must be present:

- A source, i.e., a substance that is capable of causing pollution or harm;
- A receptor, i.e., something which could be adversely affected by the contaminant;
- A pathway, i.e., a route by which the contaminant can reach the receptor.

If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

Potential sources, pathways and receptors are identified in the sections below and the risks associated with possible pollutant linkages outlined.

11.0 Source / Pathway / Receptor

Sources

The **main sources** of potential contamination that have been identified at the site or in the vicinity of the site are summarised above and below:

Source	Location	Description
Made Ground	On site/ off site	Made Ground as a result of historical development on site.

Table 3: Sources

Receptors

The site specific **receptors** that could be potentially affected by the contamination hazards identified during this preliminary appraisal are summarised below:

Category	Receptor	Properties
Humans	Future end users and visitors	Potential contact with impacted soils in proposed soft landscaping areas.
	Construction workers	Reworking of potentially impacted materials in soils during construction works can expose workers to contamination.
Property	Materials and site structures	Foundations and site services may be damaged by potentially aggressive compounds present in soils and as a result of soil gas production.
Controlled Waters	Surface Water and underlying bedrock aquifer	The site is recorded as having a Secondary (A) Aquifer within the superficial and an Unproductive Aquifer within the bedrock geology. There are no groundwater or surface water abstraction points within 2000m, with a potable abstraction point located 1907m away and a surface water feature 131m east.
Plant (species and uptake) and Wildlife	Various	Attributes will be influenced by factors such as relative quality, scale, rarity and substitutability.

Table 4: Receptors

Pathways

In order for contaminants to reach potential receptors, there has to be a viable **pathway** for the contaminant. Potential pathways that may affect the migration of contaminants are listed below:

Pathway	Medium	Properties
Direct soil and dust ingestion, Dermal contact with soil (indoor and outdoor). Inhalation or indoor and outdoor soil dust	Dust, solid and liquid phase	There may be direct contact with potentially contaminated soils underlying the site. There is a possibility of dust fumes being produced during earthworks in the redevelopment phase, with a latent risk from dermal contact and ingestion of potentially contaminated soils during construction or operational phase of the site.
Migration of Ground Gas	Gaseous flow	Made Ground is known to be highly variable in composition. Migration through granular material and alongside buried utility pipes / cables or along preferential flow paths.
Leaching of contaminants through soils and/or via surface off.	Saturated flow	Potential for leaching and migration through superficial/bedrock geology from off site current land use in proximity to the site.

Table 5: Pathways

12.0 Qualitative Risk Assessment

Potential pollutant linkages are identified using the source-pathway-receptor framework detailed above. An assessment of the potential significance of each linkage is then made by consideration of the likely magnitude and mobility of the source, the sensitivity of the receptor and nature of the migration/exposure pathways.

This qualitative risk assessment has been undertaken in accordance with CIRIA C552: Contaminated Land Risk Assessment, A Guide to Good Practice (Rudland et al., 2001)

An assessment of the likelihood of the risk being realised and the magnitude of potential risk is presented below to give an estimation of the significance of each potential pollutant linkage Identified.

The assessment is undertaken based on the current proposals for the site, at the time of issuing this report and therefore would be classed as been a generic proposed end land use of 'commercial'.

13.0 Preliminary Conceptual Site Model

Hazard / Pollutant	Pathways	Receptor	Potential Severity	Probability of Risk	Level of Risk	Justification
Hydrocarbons (TPH, PAH), Heavy metals and asbestos.	Ingestion, dermal contact, inhalation	Future end users and site visitors	Medium	Likely	Moderate	A moderate risk is considered given the historic/current setting of the site, particularly as there are areas of soft landscaping to be incorporated within the proposed redevelopment.
		Construction Workers	Medium	Likely	Moderate	A moderate risk is considered given the historic/current setting of the site and surrounding environs. Construction workers will come into direct contact with soils during groundworks therefore the use of appropriate PPE should be adopted to mitigate against any potential risks.
	Leaching through soils and migration via groundwater or soil pore moisture	Controlled Waters	Medium	Low Likelihood	Low	A low risk is considered given the historic/current setting of the site and surrounding environs. The aquifer within the superficial is a Secondary (A) Aquifer and an Unproductive Aquifer in the bedrock. The nearest potable water abstraction is 1907m from the site and the nearest surface water feature is 131m east.
	Uptake	Plant and Wildlife	Mild	Low Likelihood	Moderate	A moderate risk is considered given that the proposed development will incorporate limited areas of discrete soft landscaping.
Ground Gases.	Gas generation, migration and build up within properties	Future end users, site workers and proposed site structure.	Medium	Low Likelihood	Low	A low risk is considered given the absence of recorded landfill sites in proximity to the study site. It is likely there will be Made Ground underlying the site as a result of historical development. However, it is likely to be limited in depth and therefore will pose a minimal risk.

Table 6: Preliminary Conceptual Site Model

The risk posed to future end users & site visitors, construction workers, plant and wildlife has been estimated as **MODERATE** with the risks to controlled waters and ground gases (to proposed structures) estimated as being **LOW**.

14.0 Proposed Site Investigation

Based on the information gained for formation of this report, we would recommend that an intrusive contaminated land investigation is undertaken to determine the actual pollution linkages and to quantify the risk to the receptors as outlined within the Preliminary Conceptual Site Model.

The 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 site model.

14.1 Testing Regime

The testing regime has been devised in accordance with BS10175:2011 Guidelines for the Code of Practice for Contaminated Land and CLR Report No. 4 Sampling Strategies. The objective at this stage of the report is to attempt to delineate the extent of any possible contamination that may exist at the site by using intrusive soil sampling and testing techniques.

14.2 Sampling Strategy

A service search should be completed prior to any subsequent investigation to determine the service locations by lifting up any manhole/drain covers, therefore locations may be subject to change depending upon these results.

The SI should incorporate 3no. hand excavated trial pits in order to gain a suitable spread of the site and enable adequate analysis of the soil conditions, particularly focussing on proposed soft landscaping areas. These exploratory holes will be completed to a maximum depth of 1.0 metres below ground level (mbgl), positions logged and samples removed in accordance with current protocol, with any visual/olfactory observations noted.

Soil samples will be taken through the soil profile at depths of 0.15mbgl, 0.30mbgl, 0.50mbgl, 0.7mbgl and 1.0mbgl, with the deepest sample to be obtained from the natural strata. The proposed sampling strategy is relative to the intended risk assessment.

The intended depths of investigative positions reflect the particular receptor of concern which is driven by the exposure of scenario of concern, namely human health. Surface samples in top 0.15mbgl for direct ingestion and inhalation, with samples to be obtained at greater depths are to ensure any potential contamination has not impacted natural soils at depth.

14.3 Monitoring Regime

Based on the information contained within this report we do not anticipate the need for completing any gas and/or groundwater monitoring for this site. The historical, current and proposed use of the site along with the hydrological setting indicates that there is no significant risk. Furthermore, we do not anticipate the depth of Made Ground to be substantial.

14.4 Laboratory Analysis

An appropriate and consistent analytical suite of contaminants should be applied to any soil samples retrieved from the site.

Based on the findings contained within this report, we would recommend that a comprehensive range of testing should be undertaken to comprise of heavy metals, speciated Total Petroleum Hydrocarbons (TPH CWG Aromatic/aliphatic split) and speciated Polycyclic Aromatic Hydrocarbons (PAH) including the more carcinogenic benzo(a)pyrene (BaP) and naphthalene, phenols, soil organic matter (SOM) content, pH and sulphates.

In addition, selected samples retrieved from the Made Ground, if encountered, will also be submitted for a screen to determine the presence, or otherwise, of asbestos.

It should be noted that not all samples retrieved from the proposed investigative works will be laboratory analysed and a UKAS and MCERTS accredited laboratory testing organisation should carry out all analysis.

14.5 Guidance

The results from the proposed SI shall be compared against standards, such as, against revised LQM/CIEH S4UL criteria¹ where available. These GAC have been designed for use under planning, using Health Criteria Values based on minimal risk, and updated exposure parameters. The S4UL are intended to replace the previous LQM/CIEH GAC. Or alternatively criteria such as, Soil Guideline Values (SGVs) and LQM 'CIEH' Generic Assessment Criteria for the most stringent land use classification appropriate to the proposed end use, namely; 'commercial'.

15.0 Recommendations

15.1 Consultees

We would recommend that this report be forwarded to the relevant Statutory Consultees including the Environment Agency (EA) and the relevant Local Authority Environmental Health and Planning Department prior to the proposed site investigation works commencing to seek their comments and subsequent approval.

15.2 Groundworks Watching Brief

We would recommend that a watching brief be maintained during the course of the development, particularly during the ground works stage.

During construction works visual and olfactory appraisal of the underlying soils should be made. If during construction works any material is noted to show visual and/or olfactory signs of contamination an environmental consultant should be contacted to supervise/guide further works. This material should be stockpiled separately and tested prior to its appropriate removal off site or re-use as necessary.

¹ Nathanail et al. (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, 2015. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3495

If any landscaping materials are to be imported on site, they should be tested to check that they are suitable for the intended use. Clean, uncontaminated rock, subsoil brick rubble, crushed concrete, ceramics and topsoil only should be permitted as infill material.

15.3 Soakaways

Soakaways are for the disposal of clean uncontaminated surface water only and must not be constructed in contaminated land, or land suspected of having contamination present.

15.4 Flood Risk Assessment

This report does not replace a full hydrogeological survey and specialist studies may need to be undertaken to ascertain the risks posed from flooding.

16.0 Limitations and Uncertainties

This report has been prepared by YE with all reasonable skill, care and diligence. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources, together with a site walkover inspection of the site.

The opinions given in this report have been dictated by the finite data on which are they based and are relevant only to the purpose for which the report was commissioned.

Information reviewed should not be considered exhaustive and has accepted in good faith as providing true and representative data with respect to site conditions. Should additional information become available which may influence the opinion expressed in this report, YE reserves the right to review such information and, if warranted, to alter the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

The 'vicinity' of the site for the purposes of the report, is defined as locations situated within an approximate 250m radius of the site, although certain source of contamination and/or sensitive targets further than 250m of site have also been included.

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices at this time and as such are not guarantee that the sites are free of hazardous, or potentially hazardous materials, or conditions.

This report has been prepared solely for the use of the named client, and may not be relied upon by other parties without written consent from YE. YE disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.