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**PHASE 1 DESK TOP STUDY AT
SITE AT ELDON GROVE
LIVERPOOL
MERSEYSIDE**

FOR

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**PHASE 1 DESK STUDY FOR CONVERSION OF EXSITNG APARTMENT BLOCKS AND NEW
DWELLINGS AT ELEDON GROVE, LIVERPOOL**

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1.0 INTRODUCTION

ADS Structural Ltd is providing consultancy services for the 136 proposed residential apartments at the site of an existing derelict apartment site.

A Phase 1 Environmental Audit/Desk Study Report is required to identify any potential sources of harm to human health and/or the environment arising from previous sites uses, which may warrant intrusive investigation and/or remediation, taking account of the specific form of development proposed for the site.

The Phase 1 Report is a compilation of data available in the public domain, and data obtained in the course of consultations and site inspections, and is being undertaken with the specific aims of obtaining information pertaining to:

- Current, historical and proposed land uses, both on site and on surrounding land.
- The environmental sensitivity of the site location, with particular respect to its geology, hydrogeology, proximity to surface watercourses, neighbouring land uses etc.
- Records held by environmental regulators.

The primary objectives of the Phase 1 study are:

- To assess whether the site is likely to be affected by chemical and/or radiochemical and/or gas contamination, which would impose remedial requirements and/or building design requirements, taking account of the specific form of development proposed for the site.
- To provide guidance on the design of any Phase 2 intrusive site investigation considered appropriate, based on the foregoing assessment.

The Phase 1 assessment was undertaken with due regard to Contaminated Land Guidance issued by the Department of the Environment, Food and Rural Affairs (DEFRA) and its predecessors, the Royal Institution of Chartered Surveyors (RICS), and the American Standard for Testing and Materials (ASTM) E 1527-97. The methodology follows a risk-based approach, based on the source-pathway-target concept outlined in the Environmental Protection Act 1990.

This report should be read in conjunction with the Notes on Limitations, given in Appendix D.

2.0 SITE DATA

2.1 Proposed Development

The proposed development comprises of the conversion of three existing tenement blocks along with five number apartment blocks within the existing site curtilage.

2.2 Site Description and Walkover Survey

The site is rectangular in shape and is currently occupied by three number existing derelict tenement blocks. The tenement blocks are noted as being of three storey height.

There is an existing hardstanding area to the east of the blocks which is predominantly hard paved with tarmacadam although as the site has remained derelict for what appears to be a number of years there has been significant plant and vegetation growth around the site.

The existing structures are noted as three storey dwellings of a traditional construction i.e. masonry and stone walls with timber floors and roof structure.

There is also evidence of concrete infill balconies to the front elevation.

Give the condition of the building it was deemed too dangerous to carry out an internal investigation to assess the potential for the presence of asbestos although given the age of the structure and the fact that works will have undoubtedly been carried out throughout its life span we must assume that asbestos will be present and this would need to be fully assessed within the phase 2 element.

To the west of the site further areas of tarmac hard stand was noted and again this was subject to a significant amount of weed and vegetation growth.

Further investigation revealed that significant fly tipping had been carried out within and around the site which upon inspection of the material revealed a mixture of general building waste, bricks rubble, broken bathroom sinks etc. along with general household waste.

There was some evidence of empty paint tins and but no note of asbestos sheets etc. however this would need to be confirmed within the phase 2 report element.

The National Grid Reference for the approximate site centre is. 3345990 3916650

The site falls within the administrative jurisdiction of Liverpool City Council.

2.3 Historical Setting

The history of the site has been reviewed by reference to Historical Ordnance Survey maps. The Historical O.S. maps are presented in Appendix C and are summarised as thus-

1893 Residential development noted on site with varies residential and industrial developments surrounding the site

1973-1975 Further residential development noted with a school development noted to the south west.

2.5 Published Geology

The superficial Glacial Till deposits underlying the site are classified by the Environment Agency as an Unproductive Aquifer: "drift deposits with low permeability that have negligible significance for water supply or river base flow".

The underlying Wilmslow Sandstone Formation is classified by the Environment Agency as a Principal Aquifer: “geology of 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”.

2.6 Coal Mining

The site lies in an area where coal is not believed to exist and as such a coal mining report is not considered necessary on this development.

2.7 Radon

Using the methodology in BR211 it is deduced that the site is in an area where the risk from radon is minimal, as only between “1% and 3% of the homes” in the surrounding area are above the action level. It is proposed that “no radon protection measures are necessary” in the construction of any new buildings / dwellings on the site.

2.8 Hydrology and Hydrogeology

There are 7no. Groundwater abstraction licences within 250m of the site and a further 4no. Within 1km of the site. The closest groundwater abstraction licence is located 111m south of the site for process washing.

There are no surface water or potable abstraction licences within 2km of the site and the site does not lie within 500m of a Source Protection Zone.

There is 1no. Detailed River Network record within 500m of the site, located 228m north associated with the Leeds and Liverpool Canal. The River Mersey is located approximately 1km to the west of the site.

3.0 HAZARD ASSESSMENT

3.1 Introduction

Current approaches to risk assessment of land suggest the construction of a **Preliminary Conceptual Model** at the Phase 1 desk study stage. The purpose of this model is to define **all** possible complete pollution linkages, where the requisite **source – pathway – target** elements may present, these elements being defined as:

- A contaminant (**source**) is a hazardous substance or agent that has the potential to cause harm or damage a receptor.
- A **pathway** is the means through which a contaminant comes into contact with, or otherwise affects, the receptor.

- A receptor (**target**) is an entity (human being, aquatic environment, flora and fauna etc) that is vulnerable to the adverse effects of the contaminant.

From the DETR document “Contaminated Land: Implementation of Part 11a of the Environmental Protection Act 1990”. This relationship is termed a “**pollution linkage**”. It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, i.e.:

- If there is no contaminant, there can be no adverse effect on a receptor.
- If there is nothing that can be adversely affected by the contaminant, no harm or damage can arise.
- Even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which contact between the two can be established.

The information collated in this desk study has assessed as discussed hereunder, to determine the likelihood of pollution linkage(s) existing on that part of the site proposed for development.

3.2 Identification of Contamination sources

The following sources of contamination have been identified from the Risk Identification:

Table 4
Sources of Contamination

On site potential sources of contamination	Off site sources of contamination
From asbestos used within the existing building fabric	Adjacent historic tanneries, gas works, paint works and metal works
Potential for the use of ash on site for preparation of car parking, drainage bedding and backfill.	
Seepage of petroleum hydrocarbons into sub-soil from vehicles within and around the car park area.	
From potential fly tipping.	
Migration of landfill gases from filled ground	

3.3 Identification of Potential Receptors and Pathways

3.3.1 Human Receptors

It is proposed that a Residential Housing Development is to be built on the site, hence the most appropriate model on which to base risk assessment, is the 'Residential' land use as defined in CLEA

The pathways that may be relevant to the proposed development in terms of human health are as follows:

- Ingestion of soil
- Ingestion of building dust
- Dermal contact with soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive building dust
- Inhalation of soil vapours outdoors
- Inhalation of soil vapours indoor
- Inhalation of asphyxiant landfill gases

Depending on the depth to perched groundwater, inhalation of groundwater vapours may also be significant.

3.3.2 Environmental/Ecological Receptors

The desk studies have established that the adjacent Leeds Liverpool Canal is the nearest environmental receptors.

The superficial Glacial Till deposits underlying the site are classified by the Environment Agency as an Unproductive Aquifer: "drift deposits with low permeability that have negligible significance for water supply or river base flow".

The underlying Wilmslow Sandstone Formation is classified by the Environment Agency as a Principal Aquifer: "geology of 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".

3.4 Built Environment Receptors

The proposed buildings on the site and adjacent properties may be at risk if aggressive ground conditions were present on the site.

Water mains and other utilities may also be affected by contamination, if present in the soils and/or groundwater, and may require special considerations of specification.

Utility installation and maintenance works may be exposed to contaminated soils and/or groundwater.

3.5 Preliminary Conceptual Model

Taking account of the proposed form of the site development and the site history, credible pollution linkages may be present, as illustrated in tubular form hereunder.

Table 5
Preliminary Conceptual Model

Potential Source/Contaminants	Pathway	Receptor
Heavy Metals SVOC's	Ingestion of soil Dermal contact with soil Inhalation of fugitive soil dust Ingestion of household dust Dermal contact with household dust Inhalation of fugitive household dust Ingestion of vegetables Dissolution and migration to water table	Human Workers Underlying groundwater (controlled waters)
TPH's Chlorinated Aliphatic Hydrocarbons, Aromatic Hydrocarbons (asbestos)	Ingestion of soil Dermal contact with soil Inhalation of fugitive soil dust Inhalation of soil vapours indoors Inhalation of soil vapours outdoors Acute exposure via ingestion of soil Acute exposure via inhalation of soil vapours outdoors Dissolution and migration to water table	Human Workers Construction Workers Underlying groundwater (controlled waters)
Sulphates And Organic Chemicals in Soil and Groundwater (asbestos)	Direct contact with building fabric	Fabric of Buildings & Services on and offsite

To assess the potential pollution linkages that may be present on the site a Phase 2 site investigation is required.

4.0 PROPOSALS FOR PHASE 2 SITE INVESTIGATION

The aims and proposed scope of works for the Phase 2 Site Investigation are presented below:

Table 7
Phase II Site Investigation Proposals

Aim	Required Site work to Assess Aim
<p>Are the superficial soils on the site affected by contamination that may be harmful to human health?</p> <p>Is groundwater underlying the site impacted by contamination arising from the site and does this pose a risk to the wider aquatic environment?</p> <p>Is the site affected by migratory landfill gases from undisclosed site filling or from the nearest noted landfill site</p> <p>Does these existing building fabric contain asbestos</p>	<p>Excavate 12No window sampling boreholes down to a depth of 6m below ground level.</p> <p>6 samples to be taken within the fill material and 3 from the natural drift materials.</p> <p>Water samples to be extracted from 2No bore holes and assessed against previously noted contaminants* (item above subject to water strikes being available)</p> <p>Gas testing to be carried out on three of the boreholes on 6 separate occasions and during three different barometric pressures</p> <p>Full asbestos survey to be carried out prior to demolition of existing structures.</p>
<p>To assess the ground conditions in relation to their suitability for the proposed housing development. Specifically in relation to the potential for shallow mine workings</p>	<p>Excavate 12No trial holes down to a depth of 6m below ground level.</p>

4.1 Analysis Suites

Samples source and key contaminants to be analysed are presented below:

Table 8
Sample Type and Contaminant Analysis Suites

Matrix to be analysed	Key Contaminants in Analysis Suite
Made Ground	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Boron, Nitrates, Sulphate, Sulphur, Asbestos, Boron, pH, Sulphide, Phenol, Propane, Chlorophenols, TPH, PAHs, Full asbestos suite Full suite of hydrocarbon and diesel range organics.
Natural Drift Soils	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Boron, Nitrates, Sulphate, Sulphur, Asbestos, Boron, pH, Sulphide, Phenol, Propane, Chlorophenols, TPH, PAHs, Full asbestos suite Full suite of hydrocarbon and diesel range organics.

4.2 Proposed Sampling Strategy.

We have based our sampling strategy on areas which would present most risk to potential end users i.e. private garden areas.

We have appended a proposed borehole location plan within the appendices to this report

4.2 Proposed Assessment Criteria – SGV's/SSAC's

For assessment of contamination data obtained in investigations at this site, the SSAC's/SGV's will be based on the "Residential" land use scenario. Derivation worksheets and input parameters will be included in the Phase 2 Report.

5.0 HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

The results of the analysis obtained in the investigations, will be assessed in accordance with the Human Health Risk Assessment Methodology as included in Appendix C.

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**Standard
Terms and Conditions of Engagement
Notes on Limitations
For
ADS Structural Ltd**

General

ADS Structural LTD has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from ADS Structural LTD, and a charge may be levied against such approval.

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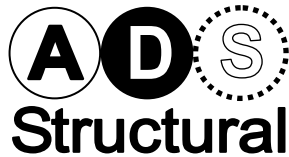
Phase 1 Environmental Audits/Desk Studies

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by finite data on which they are based, and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, ADS Structural LTD reserves the right to review such information and, if warranted, to modify 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.

Phase II Environmental/Geoenvironmental/Geotechnical Investigations

In relation to contamination, the investigation of the site has been carried out with the objective of providing sufficient information concerning the type and degree of soil and/or groundwater contamination, and other relevant soil and groundwater conditions, to allow a credible risk assessment to be made. The



objectives of the investigation have been limited to establishing the risks associated with human health, building materials, the environment (including adjacent land), and surface and groundwater

The locations of exploratory holes may have been restricted by the existence of building(s), other obstructions, or by buried services on the site, and therefore the investigation may not have fully covered the site, in such circumstances, further investigation may be required when hitherto inaccessible areas become accessible.

If estimated costs have been included in relation to proposed site remediation, then these must be considered as tentative only, and must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” of contamination where concentrations may be significantly higher than those encountered in the investigation.

The risk assessments and opinions provided in relation to soil and/or groundwater contamination, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

With regard to geotechnical engineering investigation, the exploratory holes investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which has not been disclosed by this investigation, and which has therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

CONTAMINATION RISK ASSESSMENT METHODOLOGY

INTRODUCTION

ADS Structural LTD utilises the Clea method to assess soil and/or groundwater contamination, as discussed below. The toxicological data collated by **ADS Structural LTD** is presented within an appendix in the Report. The data gathered is generally in accordance with the hierarchy in the contaminated land exposure assessment model (CLEA) R&D Publication CLR 11

Supplied by the Department for Environment, food and rural affairs along with the environment agency.