HINCKLEY AND BOSWORTH BOROUGH COUNCIL
GEO-ENVIRONMENTAL DESK STUDY
SITE AT LANGDALE ROAD, HINCKLEY

AUGUST 2009

OPUS JOYNES PIKE

Hinckley and Bosworth Borough Council
Geo-Environmental Desk Study
Site at Langdale Road, Hinckley

August 2009

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A. FACTUAL INFORMATION

1.0 INTRODUCTION

1.1 This report describes a Geo-Environmental Desk Study undertaken on behalf of Hinckley and Bosworth Borough Council on a site at Langdale Road. Hinckley proposed for residential development.

1.2 The objectives of this desk study are as follows:

- Identify any potentially significant constraints to redevelopment of the site due to the likely ground conditions;
- Identify any potentially significant contaminative current and/or historical uses at the site or in the surrounding area;
- Identify the required scope of ground investigation works.

1.3 This report is based upon archival research including the analysis of historical maps, geological and hydrological data and other relevant environmental information. In addition, a site inspection was undertaken on 3rd August 2009.

1.4 This report has been prepared by Opus Joynes Pike (OJP) with all reasonable skill, care and diligence within the terms of the Contract with The Client (Hinckley and Bosworth Borough Council), and taking account of the information made available by The Client, as well as the manpower and resources devoted to it by agreement with The Client. Opus Joynes Pike disclaims any responsibility to The Client and others in respect of any matters outside the scope of the above Contract.

1.5 This report has been produced on behalf of The Client, Hinckley and Bosworth Borough Council, and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Opus Joynes Pike. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.6 The findings and opinions conveyed via this report are based on information obtained from a variety of sources, as detailed, which Opus Joynes Pike believes are reliable. Nevertheless, Opus Joynes Pike cannot and does not guarantee the authenticity or reliability of the information it has relied upon from these sources. The findings of this report should be regarded as preliminary at this stage, and should be confirmed by intrusive ground investigation works.

1.7 It is advised that the site plans enclosed in this report should not be used for scaling purposes.

2.0 THE SITE

2.1 Location & Access

2.1.1 The site is approximately 0.18 hectares in area and located off Langdale Road, Hinckley at approximate National Grid Reference 440910, 293490. The site lies approximately 1.5km to the south-west of Hinckley Town Centre, as shown on the appended Drawing No. J-B0070/501.

2.1.2 Access to the site can be gained directly off Langdale Road which lies to the east of the site.

2.2 Site Description

2.2.1 A site inspection was carried out on 3rd August 2009 with the purpose of identification and examination of current site usage and adjacent site activities. Photographs of the site were taken and are included in Appendix 'A'.

2.2.2 At the time of the site inspection, the site comprised generally open flat lying land occupied by several small car garages and associated paved areas and surrounding overgrown scrubland.

2.2.3 The access off Langdale Road is marked by a steel height restriction barrier (See Image 1) which provides access on to a central area paved with bituminous surfacing which mirrors the approximate rectangular shape of the site.

2.2.4 Six garages of varying construction were set back from the paved areas on the surrounding overgrown areas and evidence of concrete bases, presumably former garage bases, was also noted. The car garages were a mixture of sheet metal, wood and concrete construction with some asbestos sheet roofing. Several garages were noted to be secured and in use by the public (See Images 3 and 4).

2.2.5 Fly tipping was evident at the surface locally including wires and cables on the south side of the bituminous paving and scattered demolition type waste elsewhere.

2.2.6 Two service inspection boxes and several CATV underground service inspection chamber covers were located along the frontage of the site with Langdale Road adjacent to the access point (See Image 2).

2.2.7 No obvious signs of surface contamination were noted during the site inspection.

2.2.8 The site is bordered to the north, south and east by residential areas and to the west by commercial units and associated pavement areas. The commercial units were occupied by Kaleidoparts and Power Train projects who provide engine tuning and vehicle spare parts services (See Image 6).

2.2.9 The north, south and east boundaries of the site are formed by a mixture of low iron and wooden fencing and traditional post and panel garden fencing. The western boundary with the commercial area is formed by a more substantial close steel fencing.

2.2.10 Several semi-mature Ash trees were noted near the site frontage. Numerous mature trees were also present along the southern boundary and within the gardens beyond, including Cypress, Maple and Ash (See Image 5).

2.2.11 The identified site area includes a narrow strip of land which extends from the north-west corner in a north-westerly direction. This area was not accessible at the time of the site inspection due to dense semi-mature vegetation including Hawthorn and Maple (See Image 6).

3.0 DESK STUDY

3.1 Sources of Information

3.1.1 The following sources of information have been consulted as part of the desk study:

(a) OJP Archives
(b) Landmark Information Group Ltd 'Envirocheck' database report
(c) Selected County Series and Ordnance Survey plans
(d) British Geological Survey 1:50,000 Map, Coventry (Sheet 169)
(e) Environment Agency, Groundwater Vulnerability 1:100,000 Map, 'Leicestershire' (Sheet 23)
(f) BR 211 Radon; Guidance on Protective Measures for New Dwellings, 2007 Edition
(g) DEFRA Contaminated Land Report (CLR) 8: Potential Contaminants for the Assessment of Land (Now withdrawn)
(h) Observations made during site walkover

3.2 Site History

3.2.1 A review of the site history has been undertaken in order to identify any potentially significant historical contaminative activities located either on or within significant distance of the site.

3.2.2 Potential on-site contamination sources may present a risk to future site users and underlying and/or adjacent 'controlled waters'.

3.2.3 Neighbouring potential off-site contamination sources may also present a risk to soils and, if present, groundwater underlying the site through cross boundary migration or deposition of waste materials.

3.2.4 The history of the site is recorded over selected periods by inspected maps, copies of which are presented in Appendix 'B'. The account presented in this report is restricted by specific time periods represented by these maps only.

3.2.5 The earliest inspected plans of the site dated **1887-1888** indicate that the site comprised open, undeveloped land at this time. The northern and eastern boundaries were undefined. The southern and western boundaries were defined by field boundaries. Several limekilns were located approximately 100m to the south-west of the site. Ashby De La Zouch Canal was located approximately 150m to the west of the site, running north - south. Moira Coal Wharf was shown approximately 180m south-west of the site boundary. A road, running east-west, north - south, was located approximately 190m to the south of the site boundary. A branch of the South Leicestershire Railway was situated approximately 650m to the south of the site boundary.

3.2.6 No significant changes to the site and surrounding area were recorded on the **1903** and **1924** plans although the Lime Kilns previously shown to the south-west were no longer recorded. A small pond was recorded just off the eastern corner of the site at this time.

3.2.7 By **1959-1963**, seventeen small structures, presumably vehicle garages, had been established around the perimeter of the site with access provided off Langdale Road which had been established to the east. Residential

properties had been developed immediately beyond the northern boundary and a works was present approximately 5m to the south beyond a residential property and associated gardens. Allotment gardens were located approximately 250m to the north-west of the site boundary and Wharf Farm was shown approximately 190m to the south-west. The small pond to the east was no longer recorded by this time.

3.2.8 The **1973-1978** plans indicate that the layout and number of vehicle garages on the site had changed by this time. Further residential developments had been established approximately 100m to the east of the site and a pumping station had been developed approximately 120m to the north-west. The residential property formerly shown to the south was no longer present and open ground was present between the site and the works.

3.2.9 No significant changes to the site and surrounding area were recorded by the **1987 and 1988** plans other than further slight changes to the layout of vehicle garages.

3.2.10 By **1992**, Wharf Farm and Moira Coal Wharf to the south-west had been replaced by a garage and the residential plot and works immediately to the south had been developed as a residential area off Rydal Close. Commercial premises had been established to the west.

3.2.11 No significant changes to the site and surrounding areas are recorded on more recent plans other than variations to and notably a reduction in the number of vehicle garages.

3.3 Geology, Hydrogeology and Hydrology

Geology

3.3.1 According to the British Geological Survey map of Coventry (Sheet 169), the site is recorded as being underlain by drift deposits of the Wolston Clay which comprises grey stoneless clay and silt which in turn overlies the Mercia Mudstone of Triassic age.

Hydrogeology

3.3.2 According to the Environment Agency Groundwater Vulnerability map of Leicestershire (sheet 23), the site is recorded as being underlain by a **Non Aquifer**.

3.3.3 Non aquifers are formations which are generally regarded as containing insignificant quantities of groundwater however groundwater flow through such strata does take place and needs to be considered in assessing the risk associated with persistent pollutants.

3.3.4 The site does not lie in a Groundwater Source Protection Zone.

3.3.5 There are no Water Abstractions associated with the site. The nearest recorded Water Abstraction relates to a surface water abstraction for dust suppression at a greyhound track located approximately 229m to the south-west of the site.

Hydrology

3.3.6 The nearest significant surface watercourse to the site is the Ashby De La Zouch Canal, located approximately 150m to the west of the site at its closet point. The Harrow Brook is located approximately 280m to the north of the site boundary

3.3.7 The site is not recorded as being located within an area which is considered to be at risk from extreme flooding although this report should not be taken as a detailed flood risk assessment.

3.4 Environmental Considerations

3.4.1 The 'Envirocheck' report comprises a summary of statutory data held on public registers and identifies potential sources of contamination on the site and within a search radius of 1000m surrounding the site. In addition, the report also identifies potential receptors of contamination on the site and within 1000m.

3.4.2 Specific details relating to the environmental setting of the site are provided within the 'Envirocheck' report, which is presented in Appendix 'C'.

- There are four discharge consents located within 250m of the site boundary. The nearest is located approximately 135m to the north-west of the site and relates to a sewage discharge to a tributary of the River Anker.
- No registered landfills are located within 500m of the site boundary.
- There are three Local Authority Pollution Prevention and Controls sites located within 250m of the site boundary. The nearest is located approximately 119m to the south of the site boundary and relates to a petrol filling station.
- Two Pollution Incidents to Controlled Waters have been recorded within 250m of the site boundary, the nearest being located approximately 184m to the south-west of the site. This involved an unknown natural contaminant into the canal in a category 3 – minor incident.
- No Control of Major Accident Hazards (COMAH) or Notification of Installation Handling Hazardous Substances (NIHHS) sites are recorded within 1000m of the site boundary.
- Four Contemporary Trade Directory Entries are located within 250m of the site boundary. The nearest is located approximately 119m to the south of the site and relates to an 'active' car dealers.
- The nearest Fuel Station Entry is located approximately 156m to the south of the site and relates to an open petrol station.

3.5 Radon

3.5.1 Reference to the 'Envirocheck' report and BR211 indicates that the site lies in an area where no Radon protection measures are required in new buildings.

4.0 PRELIMINARY CONCEPTUAL SITE MODEL

4.1 Potential Sources of Contamination

4.1.1 The following potential **on site** sources of ground contamination have been identified:

- Potential leakage of petrol and/or diesel from parked cars within car parking and garage areas. Contaminants may include TPH (Total Petroleum Hydrocarbons), BTEX (Benzene, Toluene, Ethyl benzene and Xylene) and PAH (Polycyclic Aromatic Hydrocarbons).

- Potentially contaminated sub-base materials beneath floor slabs of garages and hardstanding surfaces derived from local industries. Contaminants may include heavy metals, PAH, phenols, asbestos and sulphur compounds.

- Potential ground gas generation from organic matter within Made Ground materials. Typical ground gases include methane and carbon dioxide.

4.1.2 The following potential **off-site** sources of contamination have been identified:

- Former works located to the south of the site (Former activities on this site are unknown at this time).

- Existing commercial premises located to the west of the site which include servicing and tuning of engines and sale of spare parts.

- Old pond backfilled prior to the 1950's adjacent to the eastern corner of the site may represent a source of gas migration to the site.

4.2 Receptors of Contamination and Migration Pathways

4.2.1 Receptors are defined as human or non-human organisms that have the potential to experience adverse effects from direct or indirect exposure to contaminated material.

4.2.2 Migration pathways are defined as the courses chemicals take from a source to an exposed organism or receptor. The exposure pathway can be direct (i.e. stays within the same exposure media) or indirect, where transport from one medium to another takes place.

4.2.3 The following potential human health and environmental receptors have been identified:

- Future site residents
- Demolition, construction and maintenance workers
- Buried concrete and plastics (e.g. water supply pipes)
- Neighbouring occupants
- Ashby De La Zouch Canal

4.2.4 The following potential migration pathways have been identified:

- **Inhalation**
  Breathing dust and vapours from contaminated soil in outdoor air. Vapours can also migrate into buildings resulting in inhalation by the occupants.

- **Ingestion**
  Indirect eating and swallowing of contaminated soil and/or groundwater by eating or smoking with dirty hands or by ingestion of fugitive dust.

- **Dermal Contact**
  Direct contact with contaminated soil and groundwater can cause skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts or abrasions

- **Leaching**
  Infiltration of water through soil can leach out soluble contaminants resulting in groundwater pollution.

- **Migration of Contaminated Water**
  Contaminated groundwater can migrate laterally or vertically dependent on permeability, preferential pathways, man-made voids etc and impact on the adjacent river.

- **Migration of Ground Gas**
  Ground gases can migrate laterally or vertically through permeable or voided ground and accumulate within unprotected buildings.

- **Aggressive Attack**
  Building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete and hydrocarbon attack on plastics.

4.3 Source-Pathway-Receptors Relationships

4.3.1 The following potential **Source-Pathway-Receptor** relationships have been identified for the site bearing in mind the development proposals;

Source	Pathway	Receptor
Contaminated Made Ground. Potential contaminants include: **1. Metals** **2. TPH** **3. PAH's** **4. Asbestos**	Ingestion Dermal contact Inhalation (outdoor air) Inhalation (indoor air) Aggressive attack	Construction workers Future occupants Future occupants Building materials
Contaminated groundwater Potential contaminants include: **1. TPH** **2. Metals**	Lateral migration Aggressive attack	Nearby watercourses Building materials
Ground gases (on-site and off-site) and hydrocarbon vapours	Generation, migration, accumulation inside buildings	Construction workers Future occupants

5.0 DISCUSSION AND PRELIMINARY RECOMMENDATIONS

5.1 Introduction

5.1.1 The results of this desk study have been reviewed in the context of the proposed development of the site for residential purposes although specific details of the proposed development are not known at this stage.

5.1.2 It should be noted that any general proposals or issues for consideration presented in this report are preliminary only and subject to detailed review based on the results of an appropriately scoped ground investigation.

5.2 Environmental Issues

5.2.1 The Preliminary Conceptual Site Model has identified several potential Pollutant Linkages associated with the history of the site and surrounding areas which will require investigation and appraisal through appropriate risk assessment before development can proceed.

5.2.2 Based on our experience of similar site including the specific environmental setting of the area, it is considered unlikely that the site will present a risk to the environment and in particular ground and surface water resources.

5.2.3 In terms of development proposals it is also considered unlikely that the site will present a significant risk to future ground workers and occupants although it cannot be discounted that localised spillage of hydrocarbons may be present within the near surface materials. Given the prevailing geology, it is considered likely that any such contamination will be ponded locally above the anticipated natural clays and will be readily dealt with by localised excavation and removal.

5.2.4 Potential migration of contaminants from off-site sources is also considered unlikely although details of historical activities within the former works area to the south are unknown. Given that these 'works' were re-developed with residential properties in the early 1990's, it would not be unreasonable to assume that an appropriate level of remediation will have been carried out prior to development.

5.2.5 In terms of the near surface conditions and the likely presence of Made Ground associated with the vehicle garages which have changed many times over the years and the import of sub base for hard standing, it would not be unreasonable to assume that some remedial works will be required, particularly in proposed garden areas. This is likely to comprise the provision of an appropriate thickness of capping, including topsoil.

5.2.6 It should be noted that the near surface materials may include a percentage of asbestos type sheeting and other construction materials associated with old vehicle garages, as evidenced by the remaining garages at the present day. Asbestos contaminated materials will require removal off site as a hazardous waste and notifiable to the HSE.

5.2.7 The risk of gas migration from the former pond and from Made Ground deposits on site is considered to be low although this requires confirmation through appropriate monitoring.

5.3 Geotechnical Issues

5.3.1 Based on existing geological information and the recorded history of the site, it is anticipated that the near surface ground conditions are likely to comprise a thin mantle of Made Ground overlying Wolston Clay deposits.

5.3.2 Based on our experience of similar sites, it is conjectured at this stage that a traditional strip or trench fill foundation design will be appropriate for traditional housing up to two storeys. It should be noted however that the Wolston Clay can include localised 'soft' clay and silt bands which may require the incorporation of reinforced and wide foundations to reduce the bearing pressure to an acceptable value, dependent on development proposals.

5.3.3 Floor slab design requirements for the development will depend on Made Ground thicknesses and finished levels. Ground bearing slabs will only be appropriate for the proposed development where the required thickness of engineered sub-slab fill is less than 600mm

5.3.4 Given the abundance of trees around the boundaries of the site, it should be noted that foundation and floor slab designs will need to be significantly adjusted to take account of potential clay volume change. This is likely to take the form of deepening of foundations and provision of heave protection.

5.3.5 Given the anticipated presence of cohesive natural soils, it is considered that soakaways are unlikely to provide a suitable drainage solution for the site.

5.3.6 For pavement design, if confirmed at an appropriate level, the Wolston Clay is likely to provide a CBR Design value within the range 2-5% for design purposes.