Land Contamination Solutions

Environmental Consultants

Midlands

Proposed Residential Development

Groby Garage
Markfield Road
Groby
LEICESTERSHIRE
LE6 0FL

Supplementary Environmental Investigation

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Status: Final Report

Reference: LCS/GG/PIIA

Date: 16/01/10

EXECUTIVE SUMMARY

Site Address	Groby Garage, Markfield Road, Groby
Client	Mr. K Burrows.
Current Use	Commercial Garage Unit.
Proposed Use	Development to provide one private house, inclusive of private garden.
Date of Investigation	21st December 2009.

Significant Observations

The ground investigation comprised an extension of a previous ground investigation to consider conditions beneath the concrete floor slab of the existing structure. Two trial pits were excavated across the site. Representative soil samples were collected and scheduled for chemical analysis.

The investigation typically revealed around 0.5m of made ground comprising concrete hardcover and gravely clay, overlying natural clay deposits of unproven depth. Two decommissioned underground fuel storage tanks were present beneath the floor slab. Minor groundwater seepage was observed.

Elevated TPH concentrations, were recorded in the near surface made ground at the rear of the site.

Risk Assessment

Current Use - The site is not considered to present any significant potential of significant contamination risks to current users or underlying groundwater.

Proposed Residential Use - There is potential risk to human health from TPH if the existing made ground remains exposed at the surface/near surface or retained beneath the proposed development.

There is always a risk that construction or maintenance workers working in excavations may be exposed to contaminated soils.

Recommendations

In order to minimise the risks posed to future site users from TPH contamination, the proposed rear garden should be provided with a minimum, clean topsoil/subsoil capping layer of 600mm. Any other soft landscaped areas should be provided with sufficient cover for aesthetic purposes and to support growth. A minimum, clean topsoil/subsoil capping layer of 300mm is recommended.

The sub-floor of the proposed property should be provided with a proprietary hydrocarbon vapour membrane, suitably sealed at the walls and around service entry points. In addition to addressing recorded TPH contamination, this provision will safeguard against any residual TPH contamination which may result from the anticipated removal of the underground fuel storage tanks.

Environmental Liability Assessment

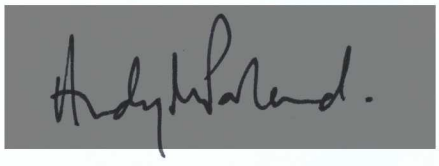
Under the assessment requirements outlined in Part IIA Environmental Protection Act 1990; it is considered that the site is unlikely to be classified as being 'contaminated land'.

It is likely that the local planning authority will require verification of: the proposed soil capping; vapour membrane provision and underground fuel tank removal.

QUALITY ASSURANCE.

LCS Midlands confirm that all reasonable efforts have been made to ensure that information contained within this report is accurate. LCS Midlands would further confirm that due care; attention and technical skill were used in the creation of this report.

Signed for and on behalf of LCS Midlands:



Andy McParland
Dip EH, MCIEH, MSc (Con. Land Mgt.) and Partner.



Kevin Castledine
Partner

1. INTRODUCTION

Land Contamination Solutions Midlands (LCS) has been appointed by the Client, Mr. K Burrows to undertake an additional Environmental Investigation at Groby Garage, Markfield Road, Groby, Leicestershire. LE6 0FL.

This report should be read in conjunction with the Ian Farmer Associates (IFA) Environmental Investigation Ref: PB/2547, dated 5th September 2003, and follow up correspondence between IFA and Hinckley and Bosworth Borough Council in 2009.

The objective of the investigation was to extend the previous IFA investigation beneath the concrete floor slab of the remaining commercial structure and confirm the presence or otherwise, of any significant contamination in this area.

This Report presents the results of the additional Environmental Investigation and assesses the environmental risks in terms of both the existing use and the proposed residential use.

2. SCOPE

The Environmental Investigation comprised the following elements:

- Breaking out and excavation of 2 trial pits to a maximum depth of 2m bgl;
- Logging of soils and strata encountered at each location;
- Recovery of representative disturbed soil samples from each location;
- Chemical analysis of selected soil samples;
- Factual and interpretative reporting.

Reasonable skill, care and diligence have been used in the design of this site investigation. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes. Beyond these intermediate locations, conditions can only be inferred.

3. LIMITATIONS

LCS has prepared this report for the sole use and reliance of the Client Mr. K Burrows and his appointees, in partial fulfilment of the Hinckley and Bosworth Borough Council Planning requirements. No reliance should be made by third parties as to its adequacy or completion in relation to future developments in the area under consideration.

The conclusions and recommendations made in this report are limited to those based on the findings of this investigation. Where comments are made based on information obtained from third parties, LCS assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties.

The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

This survey has not included asbestos within existing structures, invasive plant species or any elements unconnected with potential ground contamination at the site. If required, such surveys should be undertaken by suitably accredited organisations.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

Geotechnical considerations are also beyond the scope of this investigation.

4. FIELDWORKS

The ground investigation took place on 21st December 2009 and comprised the excavation of two trial pits to a maximum depth of 0.7m bgl, to allow ground conditions to be assessed, both laterally and vertically, and to allow soil samples to be taken for chemical assessment.

The approximate trial pit locations, trial pit logs and photographs are presented in Appendices1, 2 and 3 respectively.

Soils for inorganic analysis were sealed in air-tight polythene tubs. Soils for organic analysis were sealed in amber glass jars with the minimal practicable headspace. Samples were retained in cool storage conditions and delivered for laboratory analysis within 2 hours.

5. PHYSICAL GROUND CONDITIONS ENCOUNTERED

The ground conditions as proven during the current works were in accordance with previous reporting. Two disused, underground fuel storage tanks were noted as present beneath the floor slab. Whilst apparently empty, details of the decommissioning of these tanks were not available.

5.1 Artificial Deposits

The investigated area comprised a complete concrete floor slab to a depth of 0.2m.

The floor slab was underlain to a depth of approximately 0.5m blg. by red, gravely clay with cobbles and brick fragments.

Slight fuel odour was present within one trial pit (GG-2). No textural evidence of obvious contamination was noted.

5.3 Superficial Deposits

Moderately soft, red clay with sand, pebbles, cobbles was found to underlie the artificial deposits. This unit was devoid of any malodour or textural evidence of obvious contamination. The extent of the unit strata was not determined. Trial pitting was terminated at a maximum depth of 0.7m bgl.

5.4 Groundwater

Minor water seepage was encountered at 0.6m blg. This appeared to be perched water associated with a fractured local drain. No malodour or textural evidence of obvious contamination was noted.

6. CHEMICAL INVESTIGATION

Sampling and analyses were selected with consideration to the findings of the Previous IFA Investigation and the range of strata encountered during the fieldworks. Collected samples were analysed for a basic suite of common contaminants, which can be collated into three sets, each specific to a general type of contamination.

- Heavy Metal Analysis
- Petroleum Hydrocarbon Analysis (TPH)
- Polycyclic Aromatic Hydrocarbons (PAH)

The samples from the excavations were retained for chemical analysis and dispatched Nicholls Colton Analytical Ltd for MCERTs/UKAS accredited laboratory testing.

The following tests were performed on samples of soil:

- Heavy Metal suites comprising: Arsenic, Cadmium, Chromium, Nickel, Mercury, Copper and Zinc
- Banded TPH
- Speciated PAH.
- Soil Organic Matter and pH.

During the site investigation, no samples suspected of containing asbestos materials were visually identified and therefore no testing for asbestos was undertaken.

Full copies of the laboratory reports are contained within Appendix 4.

7. SUMMARY OF CHEMICAL ANALYTICAL RESULTS

Contaminant	No. of Tests	Units	Trial Pit GG-1	Trial Pit GG-2
Metals and Inorganics				
Arsenic	2	mg/kg	10.7	17.0
Cadmium	2	mg/kg	<0.7	<0.7
Chromium (total)	2	mg/kg	27.7	19.7
Copper	2	mg/kg	22.0	21.2
Mercury	2	mg/kg	<0.7	<0.7
Nickel	2	mg/kg	34.4	23.6
Zinc	2	mg/kg	95.6	53.3
Petroleum Hydrocarbons				
C8 – C10	2	mg/kg	<6.5	244
C10 – C12	2	mg/kg	<6.5	2021
C12 – C16	2	mg/kg	14.0	2701
C16 - C21	2	mg/kg	20.6	67.8
C21 – C35	2	mg/kg	204	276
C35 – C40	2	mg/kg	37.2	35.2
PAHs				
Acenaphthene	2	mg/kg	<0.1	<0.1
Ancenaphthylene	2	mg/kg	<0.1	<0.1
Anthracene	2	mg/kg	<0.1	<0.1
Benzo(a)anthracene	2	mg/kg	<0.1	<0.1
Benzo(a)pyrene	2	mg/kg	<0.1	<0.1
Benzo(b)flouanthene	2	mg/kg	<0.1	<0.1
Benzo(ghi)perylene	2	mg/kg	<0.1	<0.1
Benzo(k)flouranthene	2	mg/kg	<0.1	<0.1
Chrysene	2	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	2	mg/kg	<0.1	<0.1
Fluorancene	2	mg/kg	<0.1	<0.1
Fluorene	2	mg/kg	<0.1	<0.1
Indeno(1,2,3,cd)pyrene	2	mg/kg	<0.1	<0.1
Naphthalene	2	mg/kg	<0.1	<0.1
Phenanthrene	2	mg/kg	<0.1	<0.1
Pyrene	2	mg/kg	<0.1	0.1
Other				
Organic Matter		%	5.9	4.1
pH			10.6	10.9

8. REVISED CONCEPTUAL SITE MODEL

In order to assess the risks posed by potential on-site contamination sources, a conceptual site model (CSM) is developed based on the intended end use of the site, which is a simplification of the environmental setting of the site. The CSM is used to identify any potential pollutant linkages, which may exist when the three key elements described below are present:

A source – a substance which is in, on or under the land and has the potential to cause harm when exposed to a receptor.

A receptor – something which could be adversely affected when exposed to a contamination source such as humans, controlled waters or an ecological system

A pathway – a mechanism by which a receptor is exposed to a contamination source

Each element can exist in isolation without posing a significant risk, and it is only when the three elements are linked that a potential risk can exist and a potential pollutant linkage be created, whereby contamination can travel from a source, via an identifiable pathway, to a receptor. The objective of the ground investigation was to confirm the presence, or otherwise, of the potential pollutant linkages identified by the previous IFA investigation. In light of the investigation data, the presence of a number of pollutant linkages has been established or inferred.

9 CHEMICAL ASSESSMENT CRITERIA

On establishing the presence of pollutant linkages, it is then necessary to assess whether or not any of the linkages are significant, whereby significant harm is being caused or there is significant possibility of significant harm being caused to human health or the environment. In the absence of any evidence of 'significant harm', the risks will be assessed on the basis of a 'significant possibility of significant harm' being caused. In order to initially assess the risks, appropriate Tier 1 assessment criteria are derived which represent benchmark contamination concentrations with respect to relevant receptors. Concentrations recorded in excess of these levels may represent a significant risk to a specific receptor when considered as part of a pollutant linkage.

9.1 Human Health

The Environment Agency, through its Contaminated Land Exposure Assessment (CLEA) framework, published toxicological reports (TOX) and soil guideline values (SGVs) for eleven substances.

SGVs are science-based generic assessment criteria that indicate human health risks from long-term exposure to soil contaminants. They are set at levels where there are 'no appreciable' or 'minimal' risks to human health. For each substance, different SGVs are applicable according to land use, for example, whether residential, allotment or commercial. They have been widely seen as over precautionary and offering councils a very weak indication of whether sites represent a "significant possibility of significant harm" (SPOSH) requiring determination under the contaminated land regime.

Where published SGVs are not available, the results have been compared to ATRISKsoil Soil Screening Values (SSVs).

Atkins Ltd has derived ATRISKsoil Soil Screening Values SSVs using the 2009 guidance (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report)) for commercial/industrial, residential without homegrown produce, residential with homegrown produce and allotment land uses. These are based these on the default assumptions provided in the CLEA framework. Atkins SSVs for 6% soil organic matter (SOM) have been derived in line with the new guidance using the CLEA model.

For the purposed of this investigation, the 6% SOM assumption is considered to derive appropriate outputs for the investigation site.

The pathways considered in deriving the Atkins SSVs for the standard land uses include:

- Ingestion of soils;
- Ingestion of household dust;
- Ingestion of contaminated vegetables (residential with plant uptake only);
- Ingestion of soil attached to vegetables (residential with plant uptake only);
- Dermal contact with soils;
- Dermal contact with household dust;
- Inhalation of fugitive dusts from soils;
- Inhalation of fugitive household dust;
- Inhalation of vapours in outdoor air; and
- Inhalation of vapours in buildings.

These exposure routes have been evaluated independently of one another to identify the most sensitive exposure route. The SSV adopted for a given land use scenario is the most stringent screening value of all those relevant to the site.

The current proposals are to redevelop the site for a residential use with gardens. It is considered appropriate to compare the chemical testing results to those SGVs/SSVs with the appropriate 'residential with plant uptake' settings. Selected Tier 1 Human Health Assessment Criteria Values are detailed in the following table.

Selected Tier 1 Human Health Assessment Criteria Values

Parameter	Assessment Criteria (mg/kg)	Source
Arsenic	3.2E+01	**SGV**
Cadmium	1.0E+01	**SGV**
Chromium	1.47E+01	**SSV**
Mercury	1.00E+01	**SGV**
Nickel	1.33E+02	**SGV**
Copper	4.02E+03	**SSV**
Zinc	1.72E+04	**SSV**
Acenaphthene*	9.37E+02	**SSV**
Anthracene*	2.09E+01	**SSV**
Benzo(a)anthrancene*	1.03E+01	**SSV**
Benzo(a)pyrene	2.43E+00	**SSV**
Benzo(b)flouranthene*	7.29E+00	**SSV**
Benzo(g,h,i)perylene*	1.12E-02	**SSV**
Benzo(k)flouranthene*	4.12E+00	**SSV**
Chrysene*	2.64E+00	**SSV**
Dibenzo(a,h)anthracene*	1.81E+01	**SSV**
Fluoranthene*	1.13E+02	**SSV**
Flourene*	7.46E+02	**SSV**
Indeno(1,2,3-cd)pyrene*	3.68E-01	**SSV**
Pyrene*	1.32E+01	**SSV**
Napthalene*	8.71E+00	**SSV**

*The value presented is the lower of the aqueous or vapour saturation limits. The inhalation of vapour pathway contributes less than ten percent of total exposure which is unlikely to significantly affect the combined assessment criterion. In the absence of free product Atkins directs users towards using the combined assessment criterion given by CLEA.

Selected Tier 1 Human Health Assessment Criteria Values (continued)

Parameter	Assessment Criteria (mg/kg)	Source
TPH Aromatic C8-10	2.37E+01	**SSV**
TPH Aliphatic C8-10	1.45E+01	**SSV**
TPH Aromatic C10-12	1.32E+02	**SSV**
TPH Aliphatic C12-16*	4.52E+02	**SSV**
TPH Aliphatic C10-12	8.77E+01	**SSV**
TPH Aliphatic C12-16	1.26E+02	**SSV**
TPH Aromatic C16-21	8.04E+02	**SSV**
TPH Aromatic C21-35	1.22E+03	**SSV**
TPH Aliphatic C16-35	8.82E+04	**SSV**

10. ASSESSMENT OF POTENTIAL CONTAMINANTS

10.1 Heavy Metals

Near surface made ground characterised by the samples recorded levels for Heavy Metals which were below selected Human Health Assessment Criteria Values for a residential with plant uptake end use.

It is therefore considered reasonable to discount the existence of any plausible heavy metal linkage.

10.2 Petroleum Hydrocarbons

Two samples were submitted for TPH analysis speciated along carbon chain lines. In the absence of any obvious source of specific contaminant, the recorded levels were compared against the most conservative of the Human Health Assessment Criteria Values for the appropriate banding.

Made Ground present across the site characterised by the samples recorded levels for C8-10, C10-12 and C12-16, which were above the selected Human Health Assessment Criteria Value for a residential use with plant uptake end use.

Near surface retention in garden areas of material characterised by the samples would present a plausible linkage with the relevant exposure pathways being: indoor and outdoor dermal contact; ingestion of soil: inhalation of indoor vapour and consumption of homegrown vegetables.

10.3 Polycyclic Aromatic Hydrocarbons

PAHs are a family of chemicals that can be toxic to humans; some are carcinogenic and toxic at any level of exposure whilst others can be tolerated by the human body until a threshold concentration limit is reached.

All levels were below the Selected Human Health Assessment Criteria Values for a residential use with plant uptake end use.

It is therefore considered reasonable to discount the existence of any plausible PAH linkage.

10.4 Acidity/Organic Carbon.

Testing for pH indicated generally alkaline conditions of pH 10.6 and pH10.9.

Organic matter content ranged from 4.1% to 5.9%.

11. RISK ASSESSMENT

11.1 Human Health

Of the potential linkages referred to in the Conceptual Model, Petroleum Range Organics (C8-10) and Diesel Range Organics (C10-21) present in the made ground, may be considered plausible in relation to any proposed external soft landscaping and indoor use.

It is evident however that this material would provide unsuitable external topcover and is unlikely to be retained at the near surface for aesthetic reasons. The replacement/capping of this material with clean cover would remove any plausible external pollutant linkage.

With regards to indoor door use, the relevant linkage is inhalation of vapour. The installation of a proprietary hydrocarbon vapour membrane within the sub-floor of the proposal would afford suitable protection.

11.2 Surrounding Properties

On the basis of the ground conditions encountered and the results of analytical testing, the risk of off site migration of contaminants presenting a risk to nearby residents/property is not considered to be significant.

11.3 Underground Water Services.

Underground services can be affected by the presence of a range of contaminants in the soil. Reference has been made to the Water Regulations Advisory Services information and guidance note 'The Selection of Materials for Water Pipes to be Laid in Contaminated Land' (Ref. No 9-04-03) dated October 2002. Whilst only a limited number of the potential contaminants that could affect water supply pipes have been reviewed as part of this assessment, it has been established that the made ground contained levels of TPH, which may represent a hazard to certain types of water supply pipes.

If water services are to be installed in made ground Statutory Authorities may require provision of specific water supply pipes to prevent the tainting of water. A copy of this report should be supplied to the relevant authority such that a decision may be made.

12 RECOMMENDATIONS

12.1 Remedial Actions.

As a result of this investigation, the following remedial actions are recommended as part of the proposed construction of a house on this plot.

- In order to minimise the risks posed to future site users from TPH contamination, the rear garden should be provided with a minimum, clean topsoil/subsoil capping layer of 600mm. Any other landscaped areas should be provided with sufficient cover for aesthetic purposes and to support growth. A minimum, clean topsoil/subsoil capping layer of 300mm is recommended.

- The sub-floor of the property should be provided with a proprietary hydrocarbon vapour/damp proof membrane, suitably sealed at the walls and around service entry points. In addition to addressing recorded TPH contamination this provision will afford protection against any residual TPH contamination which may result from the anticipated removal of the underground fuel storage tanks.

It is likely that the local planning authority will require confirmation of: the suitable removal of the underground fuel storage tanks; verification of the vapour protection provision and the chemical quality of replacement topsoil.

12.2 Disposal of Materials

If off-site disposal is required, analytical results relevant to the materials being disposed of should be provided to landfill operators to confirm whether it meets their license agreements and to confirm disposal costs.

The waste producer is responsible for ensuring that basic characterisation of the waste has taken place to establish its key characteristics. All waste materials should be handled in accordance with the Duty of Care for waste relevant to Waste Management Licensing. Materials should be classified and disposed of according to the Landfill Directive. Correct testing (e.g. Waste Acceptance Criteria testing) may need to be undertaken prior to disposal.

12.3 Construction workers

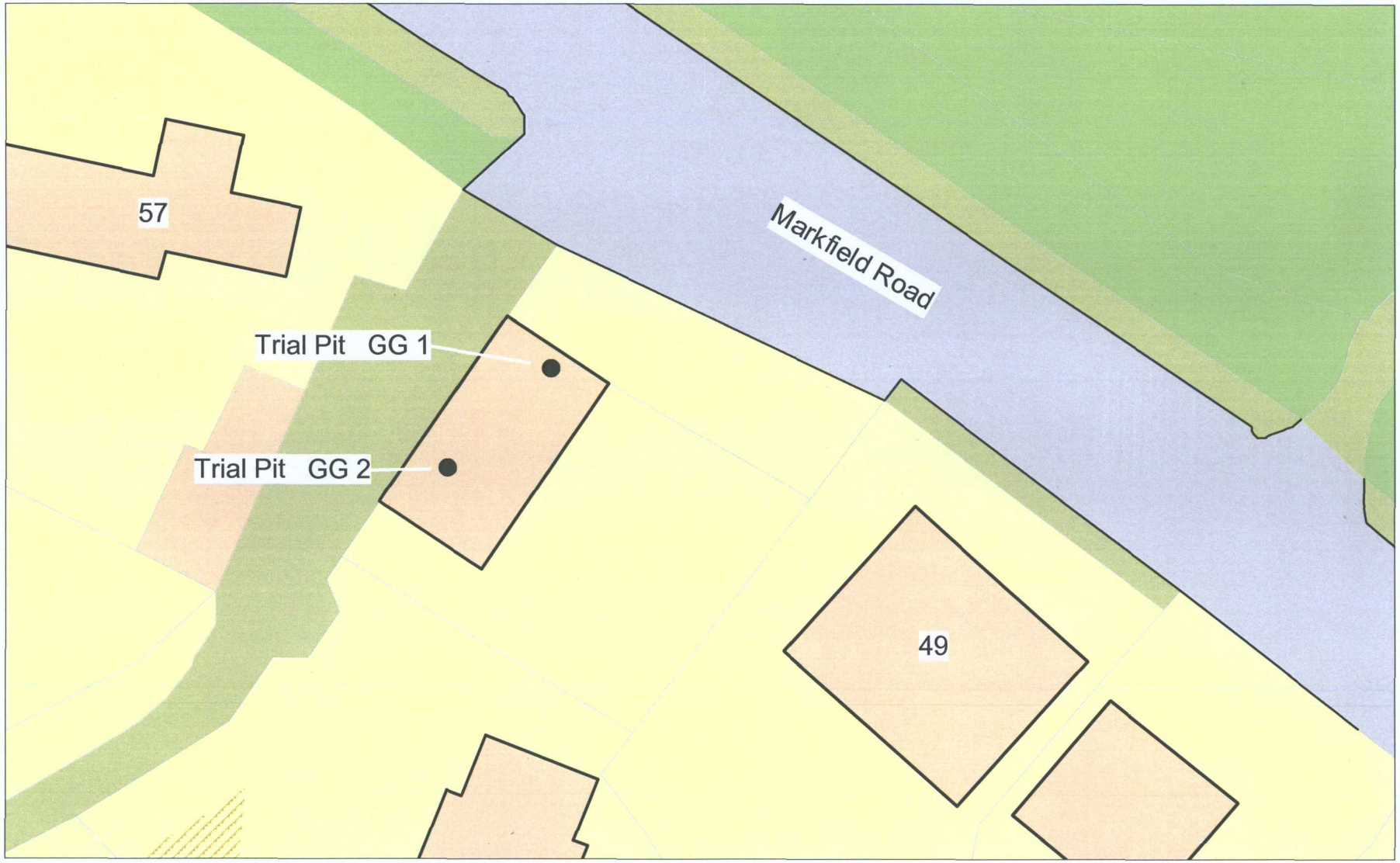
The potential health hazard imposed on construction workers engaged in site works by the Made Ground deposits encountered over the majority of the site area is considered to be low on the basis of the chemical analyses carried out. Standard health and safety measures are considered adequate and as such, high standards of personal hygiene should always be maintained amongst site personnel and ground workers in particular should be encouraged to use gloves and dust masks. Washing facilities should also be provided and used prior to eating/smoking to prevent any hand to mouth transfer. In dry conditions, it may be necessary to dampen down exposed materials to prevent dust generation and operatives should be encouraged to wear dust masks.

13 ENVIRONMENTAL LIABILITY ASSESSMENT

Under the assessment requirements outlined in Part IIA Environmental Protection Act 1990; it is considered that the site is unlikely to be classified as being 'contaminated land'.

APPENDIX 1 TRIAL PIT LOCATIONS

APPENDIX 1 TRIAL PIT LOCATIONS



APPENDIX 2 TRIAL PIT LOGS

Project. Groby Garage, Markfield Road, Groby				Trial Pit No. GG-1		
Client. **Mr K Burrows**				21/12/2009.		
Method. By Hand		Pit Dimensions. (m) **0.5 x 0.5**		Project Reference. LCS/GG/PIIA		
Groundwater	**Depth (m)**	**Description of Strata**	**Legend**	**Samples**		
				Type	**Depth (m) From**	**To**
	0.2	**Made Ground** Concrete Hardcover.				
	0.6	**Made Ground** Red, gravely clay with cobbles and brick fragments. . Sewage odour.		B, A	0.4	0.5
0.6	0.7	Moderately soft, red clay with sand, pebbles and cobbles. Strata extent not proven				
Remarks Water seepage encountered at 0.6 No visible contamination. Slight sewage odour noted.		Key Sample Identification B – Bulk container reference: GG-1 A – Amber glass reference: GG1-1A		**LCS Mids.**		
		Logged By AM	Scale Not to Scale	Sheet 1 of 1		

Project. Groby Garage, Markfield Road, Groby				Trial Pit No. GG-2		
Client. **Mr K Burrows**				21/12/2009.		
Method. By Hand		Pit Dimensions. (m) **0.5 x 0.5**		Project Reference. LCS/GG/PIIA		
Groundwater	**Depth (m)**	**Description of Strata**	**Legend**	**Samples**		
				Type	**Depth (m) From**	**To**
	0.2	**Made Ground** Concrete Hardcover.				
0.4	0.5	**Made Ground** Red, gravely clay with cobbles and brick fragments. . Slight fuel odour.		B, A	0.4	0.5
	0.6	Moderately soft, red clay with sand, pebbles and cobbles and boulders. Strata extent not proven				
Remarks Water seepage encountered at 0.4 No visible contamination noted.		Key Sample Identification B – Bulk container reference: GG-2 A – Amber glass reference: GG-2A		**LCS Mids.**		
		Logged By AM	Scale Not to Scale	Sheet 1 of 1		

APPENDIX 3 PHOTOGRAPHS



Trial Pit 1



Trial Pit 2

APPENDIX 4 LABORATORY REPORTS

Nicholls Colton & Partners Limited
7-11 Harding Street, Leicester, LE1 4DH
Tel: 0116253 6333. Fax: 0116251 4709
e-mail: testing@nicholl s-colton.co.uk
website : www.nicholls-c olton.co.uk

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Nicholls Colton ANALYTICAL

LCS Suite 1 Soil Analysis

Groby Garage , Markfield Road

Report no. E09/LCS/002/001		
Order reference: Andy McParland	Date of issue: 14.01.10	
Date & time of sampling: Not provided	Date of receipt: 22.12.09	Date of testing: 23.12.09 to 13.01.10

NCA sample reference :		09-16663	Client sample reference :		GG-1
Sample Matrix:		Clay	Sample Location:		GG-1
Moisture Content:	(%)	26	Sample Depth:		0.5m
Stone Content:	(%)	30	Visual description :		Red/brown sandy gravelly clay with rare organic matter

Acenaphthene	(mg/kg)	< 0.1	Arsenic	(mg/kg)	10.7
Acenaphthylene	(mg/kg)	< 0.1	Cadmium	(mg/kg)	< 0.7
Anthracene	(mg/kg)	< 0.1	Chromium (Total)	(mg/kg)	27.7
Benzo (a) anthracene	(mg/kg)	< 0.1	Copper	(mg/kg)	22.0
Benzo (a) pyrene	(mg/kg)	< 0.1	Mercury	(mg/kg)	< 0.7
Benzo (b) fluoranthene	(mg/kg)	< 0.1	Nickel	(mg/kg)	34.4
Benzo (g, h, i) perylene	(mg/kg)	< 0.1	Zinc	(mg/kg)	95.6
Benzo (k) fluoranthene	(mg/kg)	< 0.1			
Chrysene	(mg/kg)	< 0.1	PH Value		10.6
Dibenzo (a,h) anthracene	(mg/kg)	< 0.1			
Fluoranthene	(mg/kg)	< 0.1	SOM		5.9
Fluorene	(mg/kg)	< 0.1			
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	< 0.1			
Naphthalene	(mg/kg)	< 0.1			
Phenanthrene	(mg/kg)	< 0.1			
Pyrene	(mg/kg)	< 0.1			
Total PAH Content	(mg/kg)	< 1.6			

NOTES:
1. Analysis was carried out in accordance with NCA method statements: MS - CL - PAH, MS - CL - ICP Metals, MS-CL-TOC (SOM) and BS 1377: Parts 1 and 3 : 1990.
2. Testing was carried out on an air dried sample for all tests with the exception of phenols that were determined on an as received sample.
3. Concentration s are reported as a percentage mass of the dry soil passing the 10mm BS test sieve, where appropria te these results have been corrected for moisture content but not stone content.
4. Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep, oven dried at <30ºC.
5. Stone Content was determined in accordance with NCA method statement MS - CL - *Sample Prep and refers to the percentage* of stones retained on the 10mm test sieve.
6. Sample was supplied by customer.
7. MCERTS accreditation does not cover mercury, PAH's, SOM and pH value. All testing is UKAS accredited with the exception of PAH.

J. Gane
Environmental Laboratory Manager
Nicholls Colton Analytical

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website : www.nicholls-colton.co.uk

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Nicholls Colton ANALYTICAL

LCS Suite 1 Soil Analysis

Groby Garage , Markfield Road

Report no. E09/LCS/002/002		
Order reference: Andy McParland	Date of issue: 14.01.10	
Date & time of sampling: Not provided	Date of receipt: 22.12.09	Date of testing: 23.12.09 to 13.01.10

NCA sample reference :		09-16664	Client sample reference :		GG-2
Sample Matrix:		Sand	Sample Location:		GG-2
Moisture Content:	(%)	11	Sample Depth:		0.5m
Stone Content:	(%)	30	Visual description :		Brown gravelly sand (aromatic odour)

Acenaphthene	(mg/kg)	< 0.1	Arsenic	(mg/kg)	17.0
Acenaphthylene	(mg/kg)	< 0.1	Cadmium	(mg/kg)	< 0.7
Anthracene	(mg/kg)	< 0.1	Chromium (Total)	(mg/kg)	19.7
Benzo (a) anthracene	(mg/kg)	< 0.1	Copper	(mg/kg)	21.2
Benzo (a) pyrene	(mg/kg)	< 0.1	Mercury	(mg/kg)	< 0.7
Benzo (b) fluoranthene	(mg/kg)	< 0.1	Nickel	(mg/kg)	23.6
Benzo (g, h, i) perylene	(mg/kg)	< 0.1	Zinc	(mg/kg)	53.3
Benzo (k) fluoranthene	(mg/kg)	< 0.1			
Chrysene	(mg/kg)	< 0.1	pH Value		10.9
Dibenzo (a,h) anthracene	(mg/kg)	< 0.1			
Fluoranthene	(mg/kg)	< 0.1	SOM		4.1
Fluorene	(mg/kg)	< 0.1			
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	< 0.1			
Naphthalene	(mg/kg)	< 0.1			
Phenanthrene	(mg/kg)	< 0.1			
Pyrene	(mg/kg)	0.1			
Total PAH Content	(mg/kg)	1.6			

NOTES:
1. Analysis was carried out in accordance with NCA method statements: MS - CL - PAH, MS - CL - ICP Metals, MS-CL-TOC (SOM) and BS 1377: Parts 1 and 3 : 1990.
2. Testing was carried out on an air dried sample for all tests with the exception of phenols that were determined on an as received sample.
3. Concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve, where appropriate these results have been corrected for moisture content but not stone content.
4. Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep, oven dried at <30ºC.
5. Stone Content was determined in accordance with NCA method statement MS - CL - Sample Prep and refers to the percentage of stones retained on the 10mm test sieve.
6. Sample was supplied by customer.
7. MCERTS accreditation does not cover mercury, PAH's, SOM and pH value. All testing is UKAS accredited with the exception of PAH.

J. Gane
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BANDED TOTAL PETROLEUM HYDROCARBON CONTENT - SUITE 2

GROBY GARAGE , MARKFIELD ROAD

REPORT NO. E09/LCS/002/003		
ORDER REFERENCE: ANDY MCPARLAND	DATE OF ISSUE: 13.01.10	
DATE & TIME OF SAMPLING: NOT PROVIDED	DATE OF RECEIPT: 22.12.09	DATE OF TESTING: 23.12.09 TO 14.01.10

NCA SAMPLE REFERENCE :		09-16665
SAMPLE MATRIX:		Clay
MOISTURE CONTENT:	(%)	29
STONE CONTENT:	(%)	18

CLIENT SAMPLE REFERENCE :	GG-1A
SAMPLE LOCATION:	GG-1A
SAMPLE DEPTH:	0.5m
VISUAL DESCRIPTION :	Brown sandy gravelly day

Band 1 (>C_8-C_{10})	(mg/kg)	<6.5
Band 2 (>C_{10}-C_{12})	(mg/kg)	<6.5
Band 3 (>C_{12}-C_{16})	(mg/kg)	14.0
Band 4 (>C_{16}-C_{21})	(mg/kg)	20.6
Band 5 (>C_{21}-C_{35})	(mg/kg)	204
Band 6 (>C_{35}-C_{40})	(mg/kg)	37.2
Gasoline Range Organics (> C_8 to C_{10})	(mg/kg)	<6.5
Diesel Range Organics (> C_{10} to C_{21})	(mg/kg)	36.8
Mineral Range Organics (> C_{21} to C_{40})	(mg/kg)	241

NOTES:
1. Analysis was carried out in accordance with NCA method statement: MS - CL - TPH.
2. Testing was carried out on an as received sample.
3. Concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve, these results have been corrected for moisture content but not for stone content.
4. Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep.
5. Stone Content was determined in accordance with NCA method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.
6. Sample was supplied by client.
7. MCERTS does not cover Band 1, Band 6 and GRO.

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BANDED TOTAL PETROLEUM HYDROCARBON CONTENT - SUITE 2

GROBY GARAGE , MARKFIELD ROAD

REPORT NO. E09/LCS/002/004		
ORDER REFERENCE: ANDY MCPARLAND	DATE OF ISSUE: 14.01.10	
DATE & TIME OF SAMPLING: NOT PROVIDED	DATE OF RECEIPT: 22.12.09	DATE OF TESTING: 23.12.09 TO 14.01.10

NCA SAMPLE REFERENCE :		09-16666	CLIENT SAMPLE REFERENCE :		GG-2A
SAMPLE MATRIX:		Sand	SAMPLE LOCATION:		GG-2A
MOISTURE CONTENT:	(%)	12	SAMPLE DEPTH:		0.5m
STONE CONTENT:	(%)	29	VISUAL DESCRIPTION :		Brown gravelly sand

Band 1 ($>C_8$-C_{10})	(mg/kg)	244
Band 2 ($>C_{10}$-C_{12})	(mg/kg)	2021
Band 3 ($>C_{12}$-C_{16})	(mg/kg)	2701
Band 4 ($>C_{16}$-C_{21})	(mg/kg)	67.8
Band 5 ($>C_{21}$-C_{35})	(mg/kg)	276
Band 6 ($>C_{35}$-C_{40})	(mg/kg)	35.2
Gasoline Range Organics (> C_8 to C_{10})	(mg/kg)	244
Diesel Range Organics (> C_{10} to C_{21})	(mg/kg)	4789
Mineral Range Organics (> C_{21} to C_{40})	(mg/kg)	311

NOTES:
1. Analysis was carried out in accordance with NCA method statement: MS - CL - TPH.
2. Testing was carried out on an as received sample.
3. Concentration s are reported as a percentage mass of the dry soil passing the 10mm BS test sieve, these results have been corrected for moisture content but not for stone content.
4. Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep.
5. Stone Content was determined in accordance with NCA method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.
6. Sample was supplied by client.
7. MCERTS does not cover Band 1, Band 6 and GRO.

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