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**Site Investigation Report**

**For The Proposed Development on land to the**

**Rear of former School**

**Northfield Road, Messingham**

**Version 2**

Client Walkers Homes

Date: March 2018  
Report: 1057/4348/P

**SITE INVESTIGATION REPORT**  
**FOR THE PROPOSED DEVELOPMENT ON LAND TO**  
**REAR OF FORMER SCHOOL NORTHFIELD ROAD,**  
**MESSINGHAM**

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## **1.0 Introduction**

At the request of the Walker Homes, Humberside Materials Laboratory Limited (HML) were engaged to undertake a contaminated land ground investigation for the proposed development on land to the rear of the former school on Northfield Road in Messingham, North Lincolnshire.

The aim of the investigation is to assess potential contamination at the site with respect to proposed development works. The scope of the investigation includes excavation of four number trial pits, soil sampling and laboratory testing with an assessment of the findings. This follows the principals approved by the environmental health officer of North Lincs Council.

This report is produced solely for Walker Homes and should only be copied in full. When transmitted electronically, the definitive copy of the report is held by Humberside Materials Laboratory Ltd.

The comments given in this report and the opinions expressed assume that ground conditions do not vary beyond the range revealed by the investigation.

## **2.0 Desk Study Information**

A phase 1 desktop study, dated September 2017, Reference 1057/4348 has been completed for the site. The conclusion of which proposed a sampling strategy for an intrusive investigation. This has been approved by the local authority.

For further details, reference should be made directly to the report and the relevant source data.

## 2.1 Site description and topography

The site is L-shaped with access from Temperance Avenue, on the northern outskirts of Messingham. To the east is the former school now a farm shop and tea room. On the other boundaries are gardens to the surrounding houses.

The site occupies land to the rear of the former school and is roughly centred around national grid reference (NGR) 489200 404740. Local maps indicate the site elevation is about 110m above Ordnance Datum (AOD).

A walkover survey was undertaken on the 14<sup>th</sup> September 2017 and site features noted. The site is relatively flat with some undulations and measures about 47m long by about 53m wide at the maximum, totalling about 0.26Ha in area. The access road into the site has been excavated and sub-base laid. Construction on plot 3 has started. Various trial pits have been excavated for an archaeological investigation. This has indicated the geology to be predominantly topsoil over clayey sand. Some vegetation strip has been undertaken within the site which was grass. There is no evidence of surface staining or potential sources of contamination present.

To the east is the former school, the playground from which is now a car park. A brick wall has been constructed at the site boundary. The former school is now a farm shop and Tea room. The remaining site boundaries are domestic gardens to the surrounding houses.

## 2.2 Proposed works

It is proposed to develop the site with five detached low-rise houses and one pair of semi-detached. Currently, the land is grass, being the former playing field to the school. A site location plan and proposed layout are included in appendix A.

A new access road will also be installed. This is expected to run through to the middle of the site from Temperance Avenue.

A proposed layout plan is included in Appendix A.

### 2.3 Site History

The site history is fully detailed in the phase 1 report. In summary the site was initially a field and domestic garden until circa 1950 when it became a school playing field.

### 2.4 Site Geology

Local British Geological Survey (BGS) maps indicate the site is underlain by blown sands and Scunthorpe mudstone of the lias group.

An archaeological investigation has indicated the geology to be predominantly topsoil over clayey sand.

Estimated soil chemistry data from the BGS indicate the following element concentrations for rural soil around the site: -

- Arsenic <15-25mg/kg
- Cadmium <1.8mg/kg
- Chromium 40-90mg/kg
- Lead <100mg/kg
- Nickel <15-30mg/kg.

No BGS recorded mineral sites are recorded within 700m.

The site is in an area where coal mining might not affect the site. No hazard is given for non-coal mining activity.

Geological hazards are recorded as follows.

Table 1: Geological hazards	
Collapsible ground stability	No hazard
Compressible ground stability	No hazard
Ground dissolution	No hazard
Landslide ground stability	Very low
Running sand	low
Shrinking & swelling clay	None to low

The site is in a low probability area with less than 1% of homes above the action level. No radon protection measures are therefore necessary for new homes.

## 2.5 Hydrology

The site is not within an area considered to be at risk from flooding from rivers or seas without defences.

The nearest surface water feature is 92m northwest.

## 2.6 Hydrogeology

Groundwater vulnerability at the location of the site is classified as high leaching potential. The bedrock is designated as secondary B. The superficial aquifer designation is secondary A.

The site is not within a source protection zone.

## 2.7 Environmental setting

No record has been found of any significant pollution incident near the site. There have been no reported pollution incidents to Controlled Waters within 500m of the site.

There are no reported sites containing especially hazardous substances near the site. There are no reported Registered Radioactive Substances, Control of Major Accident Hazards Sites (COMAH) or Explosive Sites within a kilometre.

There is generally no reported evidence of potential contamination near the site. Within 500m, there are no recorded IPC Registered Waste Sites, Licensed Waste Management Facilities, (Registered, Historical, BGS Recorded or LA Recorded) Landfill Sites, Potentially Infilled Land or Registered Waste (Transfer or Treatment and Disposal) Sites. Similarly, there are no nearby fuel stations.

### **3.0 Initial Contaminated Land Assessment**

#### **3.1 Assessment principles**

Current legislation and best practice, such as Part IIA of the Environmental Protection Act and CLR 11 (EA/Defra, 2004), recommend that potentially contaminated land is best managed using a risk-based approach. Model procedures to assess the risks from contaminated land involve the development of a conceptual site model (CSM) and the identification of relevant contamination linkages (RCLs).

A relevant contamination linkage (RCL) comprises a *source* (i.e. a contaminant capable of causing pollution or harm), a *receptor* and a viable *pathway* by which one can be transmitted to the other. If one of these three elements are missing, there is no significant risk.

Any risk from potential contamination can be assessed as a product of the severity of the consequences of the hazard from the contamination and the probability of the hazard occurring, as outlined in CIRIA C552 written by Rudland and co-workers (2001). The definitions used to perform the risk assessment for the subject site are shown below (in Tables 2 and 3).

Table 2: Severity of hazard being realised				
Classification	Category/Definition			
	Human	Controlled waters	Property	Eco system
Severe	Short term acute risk	Short term risk	Catastrophic damage	Short term risk
Medium	Chronic damage	Pollution to sensitive water resources		Significant change
Mild		Pollution to non-sensitive water resources	Significant damage	Significant damage
Minor	Non-permanent health effects		Repairable damage	

Table 3: Probability of hazard being realised	
Classification	Definition
Highly likely	There is a pollution linkage and an event that appears very likely in the short term and or almost inevitable over a long term, or evidence at the receptor of harm or pollution
Likely	There is a pollution linkage and all elements are present which means that it is probable that an event will occur.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event will occur. However, it is not certain that even over a long period such an event would occur and is less likely in the short term.
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the long term.

The largest risks are where the severity of the contaminant is great and the probability of the contaminant linkage occurring is highly likely. A matrix can be used to determine a suitable risk classification, as shown below (in Table 4). The definitions of the different classifications used in this assessment based on CIRIA C552 (Rudland *et al.*, 2001) are also shown below (in Table 5).

Table 4: Risk classification matrix					
		Consequence			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Medium	Medium/low
	Likely	High	Medium	Medium/low	Low
	Low likelihood	Medium	Medium/low	Low	Very low
	Unlikely	Medium/low	Low	Very low	Very low

Table 5: Risk classification definition	
Classification	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm to a designated receptor is currently occurring. This risk if realised is likely to result in a substantial liability. Investigation and or remediation is required.
High	Harm is likely to a designated receptor from an identified hazard or there is evidence that severe harm to a designated receptor is currently occurring. This risk if realised is likely to result in a substantial liability. Investigation and or remediation may be necessary in the short term and likely over the long term.
Medium	It is possible that harm could arise to a designated receptor from the identified hazard. However, it is relatively unlikely that such a hazard would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation is normally required to clarify and determine the potential risk. Some remedial works may be required in the long term.
Low	It is possible that harm could arise to a designated receptor from the hazard identified, but is likely that this hazard if realised would at worst normally be mild.
Very low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe

## 3.2 Potential contamination linkages

### 3.2.1 *Sources of contamination*

The *sources* of contamination at the site can be put into one of two groups, as shown below (in Table 6). The first group includes pollutants from unknown sources as the site is categorised by the local authority as a brown field site. The second group comprises of the potential for madeground within the site.

BGS data does not indicate elevated levels of naturally occurring arsenic in the area.

The following initial conceptual site model, table 6, taken from the phase 1 report is applicable.

Table 6 - Conceptual Site Model									
Source		Pathway		Receptor					
Source type/area	Contaminant – likelihood	Route	Sub-route		Risk				
Unknown  Madeground if present	Metals, PAH, petroleum hydrocarbons - low  Metals, PAH and asbestos - low	Ingestion	Soils and soils attached and absorbed by home grown produce, Indoor dust Outdoor dust	Human health	Low				
						Absorption	Dermal contact	Human health	Low
						Inhalation	Indoor dust Outdoor dust Indoor vapour Outdoor vapour	Human health	Low
				Building materials & services	Very Low				
Not applicable									
Item		Rational							

### 3.2.2 Pathways

There are many potential pathways to receptors. These may include:

- Inhalation (i.e. indoor or outdoor dust or vapour)
- Ingestion (i.e. swallowing soil, dust or homegrown produce)
- Absorption (i.e. dermal contact with soil)
- Migration (i.e. vertical/lateral movement through soil, groundwater, voids and along services)

### 3.2.3 Receptors

Receptors comprise those things or beings that may be impacted by contaminants. These include:

- human site users (i.e. future occupants and construction workers),
- controlled waters (i.e. groundwater and surface water features),

- building materials and services (e.g. clean water pipework and buried concrete) and
- ecological systems (e.g. local wildlife).

#### **4.0 Site Investigation Works**

Four trial pits (TP1 to TP4) were carried out under the supervision of an HML engineer on 16<sup>th</sup> November 2017 to explore the ground conditions at site and take suitable soil samples for testing analysis. This was undertaken using a mini 360 excavator.

The procedures adopted for this site investigation were based on BS 5930 (2015) *Code of Practice for Site Investigations* and BS 10175 (2013) *Investigation of potentially contaminated sites, code of practice*. The soils and rocks encountered have been described in accordance with BS5930 (2015), BS EN ISO 14688-1 (2002) and BS EN ISO 14689-1 (2003).

Trial pit locations were agreed between the local authority and the HML engineer and were positioned to encompass the different areas of the site. Positions of exploratory holes were established relative to existing site features and the grid reference of each hole was measured and recorded. The approximate locations of all four trial pits are shown in the plan in Appendix A.

The four trial pits were excavated down to a depth of 1.5m below ground level (bgl) via a tracked mini-excavator with 300mm wide bucket. Samples were taken of each of the encountered strata as indicated on the trial pit logs (in Appendix B). These were collected from the trial pit in amber-coloured glass jars. Precautions were taken to eliminate any cross contamination.

No ground levels were measured during site works. However, since the site is flat, the ground level at all trial pit locations is assumed to be similar.

A further site visit was undertaken on the 12<sup>th</sup> December 2017. This was to facilitate further testing in the region of trial pit 1 for metals, particularly arsenic which was identified as being elevated in the area of trial pit 1. Two trial pits were excavated 3m away from trial pit 1, both within proposed garden areas.

Following additional comments from North Lincs Council a further site visit was undertaken on the 22<sup>nd</sup> February 2018. This included additional testing around trial pit 1 for arsenic with further areas of the site tested for TPH and asbestos.

## **5.0 Laboratory Testing**

The scope of the laboratory testing reflected the findings of the initial CSM and the results of the site work (i.e. the trial pit logs). PAH (i.e. polyaromatic hydrocarbon), metals and TPH (i.e. petroleum hydrocarbon) analyses were carried out. Tests did not include asbestos identification since no cement or concrete rubble or fibrous material was noted. However further samples at a later date has included asbestos testing. The additional testing also included TPH analysis from samples at depth.

Following the results of the first batch of samples, there were concerns over the level of arsenic in Tp1. Therefore, the site was revisited on the 12<sup>th</sup> December 2017 when two further trial pits were excavated. Tp 5 was 3m west of Tp1 and Tp6 was the nearest garden area south of Tp1. Samples were submitted for metals analysis only.

Tests were carried out on a total of fourteen soil samples, as shown below (in Table 7). Four samples were tested for suites of metals and PAHs, with a further six tested for metals only. Six samples were tested for TPH, four shallow and two from depth.

Table 7: Schedule of Laboratory Testing							
<i>Sample ref.</i>	<i>Sample location</i>	<i>Depth (m bgl)</i>	<i>Soil</i>	<i>Metals</i>	<i>Asbestos</i>	<i>PAH</i>	<i>TPH</i>
S/47083	Tp1	0.1-0.35	Natural ground	ü		ü	ü
S/47084	Tp2	0.1-0.4	Natural ground	ü		ü	ü
S/47085	Tp3	0.1-0.4	Natural ground	ü		ü	ü
S/47086	Tp4	0.1-0.4	Natural ground	ü		ü	ü
S/47314	Tp5	0.1-0.4	Natural ground	ü			
S/47315	Tp6	0.1-0.4	Natural ground	ü			
S/47922	TpA	0.1-0.5	Natural ground		ü		
S/47923		1.1-1.2	Natural ground				ü
S/47924	TpB	1.1-1.3	Natural ground				ü
S/47925	Tp1 north	0.1-0.4	Natural ground	ü	ü		
S/47926	Tp1 East	0.1-0.4	Natural ground	ü			
S/47927	Tp1 South	0.1-0.4	Natural ground	ü			
S/47928	Tp1 West	0.1-0.4	Natural ground	ü			
S/47929	Asbestos 1	0.1-0.4	Natural ground		ü		
S/47930	Asbestos 2	0.1-0.4	Natural ground		ü		

All the laboratory testing was undertaken by an MCERTS and UKAS accredited laboratory. Samples were stored and transported in sealed amber-coloured glass jars.

Results for all the testing undertaken are included in Appendix C.

## 6.0 Encountered Ground Conditions

The encountered ground conditions agreed with the anticipated geology based on the archaeological excavations.

Exploratory hole log records (in Appendix B) indicate the following general sequence of sub-strata at the site (in descending order).

- Topsoil (0.38m to 0.5m in thickness)
- Sandy clay (proven to at least 1.5m bgl)

#### 6.1 Topsoil

Topsoil was present across the site as a brown sandy soil. The investigation revealed the depth of topsoil varied between 0.38m and 0.5m.

#### 6.2 Sandy clay

Below the topsoil a grey brown sandy clay with occasional coarse to fine gravels was encountered to 1.5m bgl. It was noted that there were slight variations in the amount of grey and brown components.

#### 6.3 Groundwater observations

Groundwater was not encountered in any of the trial pits.

#### 6.4 Contamination tests

The results of all chemical analyses are contained in Appendix C.

## 7.0 Contamination Assessment

### 7.1 Assessment principles

The proposed works outlined (see Section 2) are for a residential, which will include scope for garden-grown vegetables. Therefore, the risk assessment to human health (presented herein) is considered in the context of a development that is *residential with homegrown produce land-use*. This context is intended to reflect the proposed site use and tends to produce reasonably onerous assessment criteria.

The assessment criteria (in mg/kg) are presented below (in Tables 8 to 13). These have been taken from the *generic assessment criteria* (GAC) published in the *Land Quality Management Ltd/Chartered Institute of Environmental Health suitable for use levels* (LQM/CIEH S4ULs) report (LQM/CIEH, 2015), which are based on tolerable/minimal risk from contaminants. The exception to this is for lead which is taken from the provisional Category 4 Screening Level (C4SL) data published in a report by Defra (2014). This value is representative of 'low' risk and is pending review.

It is acknowledged that lead is a non-threshold chemical and so should be *as low as reasonably practicable* (ALARP).

The GAC for organic contaminants takes into account the soil organic matter (SOM) content. 1% SOM has been assumed as this gives the most conservative GAC values.

### 7.2 Metals

Table 8 (below) gives the GAC for metal contaminants considered for the assessment of the site.

Table 8: GAC for metals	
element	mg/kg
Arsenic	37
Boron	290
Cadmium	11
chromium III	910
chromium VI	6
lead pC4SL	82-210
Mercury element	1.2
mercury inorganic	40
mercury methyl	11
selenium	250
copper	2400
nickel	130
zinc	3700
vanadium	410

The samples of soil tested for metals are from natural shallow soils. The complete results are presented later (in Appendix C).

The analysis in the first instance has included *total chromium*, which can exist in nine oxidation states. Typically, in natural soils, the most common is chromium III. Chromium VI (hexavalent chromium) is typically only present in soils in the vicinity of industrial processes and waste deposition, which is not the case on this site.

The highest measured *total chromium* concentration (of 19mg/kg) is far below the GAC threshold value for Chromium III (of 910mg/kg). The GAC for Chromium VI is only 6mg/kg, but it is considered implausible that Chromium VI as a percentage of total chromium could be as high as 30%. Moreover, the measured concentrations of total chromium are below the normal background levels (of 40-90mg/kg) as shown above, (in Table 2). Therefore, it is considered that there is minimal risk on site from chromium pollution.

For the samples from Tp2 to Tp6 the levels are similar for all metals and well below the assessment criteria. In Tp1 all metals except for arsenic were well below the assessment criteria. Arsenic in this sample was recorded at 74mg/kg, which is considered either an erroneous result or a hotspot, all other metals in this sample were similar to the other samples. Further assessment was therefore required.

Trial pits 5 and 6 were sighted close to the location of trial pit 1 for further testing. Trial pit 5 was 3m west of Tp1, being the closest possible to the initial trial pit and trial pit 6 being in the nearest garden area south of Tp1. The results are commensurate with the remainder of the site at 11mg/kg and 9 mg/kg.

From time to time any analysis may give rise to erroneous results often unexplained. Statistical analysis indicates that Tp1 was an outlier, not conforming with the population for the remainder of the site. Once a trial pit has been backfilled subsequent sampling cannot be undertaken. Therefore, the only option was to excavate as close as practically possible, i.e. 1m away at the cardinal point. These four samples, tested for arsenic only, revealed levels of 13mg/kg to 14mg/kg, again commensurate with the remainder of the site. For Tp1 to be a hotspot, the area would only be less than 2m<sup>2</sup>. Furthermore, the level would have to reduce from 74mg/kg to 14mg/kg without any smearing instantly, which is highly unlikely. This would therefore confirm the option that the original result was erroneous.

Accordingly, the risk of contamination from metals is considered very low with the exception of Tp1 arsenic levels. However, the subsequent testing in the zone of trial pit 1 would suggest that the test is erroneous and should be discounted.

## 7.3

Polyaromatic hydrocarbons (PAHs)

Table 9: GAC for PAH			
element	mg/kg		
	1% SOM	2.5% SOM	6% SOM
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Anthracene	2400	5400	11000
benzo a anthracene	7.2	11	13
benzo pyrene	2.2	2.7	3
benzo b fluoranthene	2.6	3.3	3.7
benzo k fluoranthene	77	93	100
benzo perylene	320	340	350
chrysene	15	22	27
dibenzo anthracene	0.24	0.28	0.3
fluoranthene	280	560	890
fluorene	170	400	860
indeno pyrene	27	36	41
Naphthalene	2.3	5.6	13
phenanthrene	95	220	440
pyrene	620	1200	2000
BaP as Surrogate marker	0.79	0.98	1.1

Table 9 (above) gives the GAC (from LQM/CIEH, 2015) for speciated PAH contaminants considered for an initial assessment of the site, based on a soil organic matter (SOM) content of 1%, which is the most onerous categorisation.

The four samples of soil tested for PAH are again from the shallow soils. The complete results are presented later (in Appendix C).

PAH contaminants are all well below the assessment criteria. Accordingly, the risk of contamination from PAH on site is considered very low

## 7.4

Petroleum hydrocarbons

Hydrocarbon analyses were carried out on four samples again from a shallow depth in each trial pit. These included tests for fractions of volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) in aromatic and aliphatic equivalent carbon (EC) chain banding. The generic assessment criteria based on LQM/CIEH (2015) values are shown below (in Table 10 to 13). Assessment is based on a 1% soil organic matter content (SOM), being the most onerous category.

Table 10: GAC for aliphatic TPH			
element	1% SOM	2.5% SOM	6% SOM
<b>TPH aliphatic</b>			
C5-6	<b>42</b>	78	160
C6-8	<b>100</b>	230	530
C8-10	<b>27</b>	65	150
C10-12	<b>130(48)</b>	330 (118)	760 (283)
C12-16	<b>1100(24)</b>	2400 (59)	4300 (142)
C16-35	<b>65000(8.5)</b>	92000 (21)	110000
Values in () are either vapour or solubility			

Table 11: GAC for aromatic TPH			
element	1% SOM	2.5% SOM	6% SOM
<b>TPH aromatic</b>			
C5-7	<b>70</b>	140	300
C7-8	<b>130</b>	290	660
C8-10	<b>34</b>	83	190
C10-12	<b>74</b>	180	380
C12-16	<b>140</b>	330	660
C16-21	<b>260</b>	540	930
C21-35	<b>1100</b>	1500	1700

Table 12: GAC for BTE compounds			
element	1% SOM	2.5% SOM	6% SOM
Benzene	<b>0.087</b>	0.17	0.37
toluene	<b>130</b>	290	660
ethylbenzene	<b>47</b>	110	260

Table 13: GAC for xylene			
element	1% SOM	2.5% SOM	6% SOM
o-xylene	60	140	330
m-xylene	59	140	320
p-xylene	56	130	310

With all results being less than the detection limits and well below the assessment criteria, testing has indicated TPH contamination is not present on the site.

Comments from the local authority suggest that the natural geology is blown sand. Evidence from the site investigation, archaeological excavations on site and the BGS data base, all indicate clay (being very weathered mudstone over Scunthorpe mudstone). Therefore, migration will be limited. Furthermore, the evidence provided in the phase 1 report a photograph from 2008 shows the buildings within the site to be timber framed temporary classrooms (footprint dates back to 1972) and therefore most unlikely to house above ground fuel tanks for heating. The area would be limited to the eastern section of the site.

Nevertheless, two additional samples have been taken at depth to assess potential TPH migration. These additional samples are well below the assessment criteria and confirm that TPH contamination has not migrated through the clay.

## 7.5 Asbestos

Four samples have been subject to asbestos assessment. No asbestos fibres were detected.

## 7.6 Revised risk assessment

A revised risk assessment of potential contamination linkages that incorporates the findings of the investigation is presented below (in Table 14).

Madeground has not been identified within the site. Therefore, the potential for asbestos is not present.

<b>Table 14: Revised risk assessment (of potential contamination linkages)</b>						
Potential source	Potential pathway	Potential receptor	Probability	Severity	Risk rating	Comments
Metals	inhalation, ingestion, absorption	Future occupants	Low likelihood	Minor	Very low	Not present above the assessment criteria
	Inhalation, ingestion, absorption	Construction workers	Unlikely	Minor	Very low	
	Aggressive attack	Building materials & services	Unlikely	Minor	Very low	
	Migration	Aquifer	Unlikely	Minor	Very low	
	Migration	Surface waters	Unlikely	Minor	Very low	
PAH and TPH	Inhalation, ingestion, absorption	Future occupants	Unlikely	Minor	Very low	
	Inhalation, ingestion, absorption	Construction workers	Unlikely	Minor	Very low	
	Aggressive attack	Building materials & services	Unlikely	Minor	Very low	
	Migration	Aquifer	Unlikely	Minor	Very low	
	Migration	Surface waters	Unlikely	Minor	Very low	
Asbestos	Inhalation, ingestion, absorption	Future occupants	Unlikely	Minor	Very low	
	Inhalation, ingestion, absorption	Construction workers	Unlikely	Minor	Very low	

## 7.7 Revised Conceptual Site Model

A revised list of potential contamination linkages is presented below (in Table 18) based on the findings of the investigation and the results of the above revised risk assessment.

Table 15 - Conceptual Site Model					
Source		Pathway		Receptor	
Source type/area	Contaminant – likelihood	Route	Sub-route		Risk
Unknown	Metals, PAH, petroleum hydrocarbons and asbestos – Not present above assessment criteria	Ingestion	Soils and soils attached and absorbed by home grown produce, Indoor dust Outdoor dust	Human health	Very low
		Absorption	Dermal contact	Human health	Very low
		Inhalation	Indoor dust Outdoor dust Indoor vapour Outdoor vapour	Human health	Very low
		Migration		Groundwater Surface water	Very Low
				Building materials & services	Very Low
Not applicable					
Item Madeground		Rational Not present			

## 7.8 Remediation proposals

As shown in the revised conceptual model above, there are no relevant contamination linkages (RCLs) that have the potential to cause significant harm to receptors relating to the proposed works.

Imported topsoil is not anticipated to be required as sufficient soils will be generated from within the development to make up and increased levels (which will be minimal) on site.

Any unforeseen contamination encountered during the development of the site should be reported to the local authority. Work should be halted in that area and the contamination investigated/assessed to the satisfaction of the local authority.

## **8.0 Conclusion**

### **8.1 Encountered ground conditions**

The encountered ground conditions agreed with the anticipated geology based on the archaeological excavations. Exploratory hole log records (in Appendix B) indicate the following general sequence of sub-strata at the site (in descending order).

- Topsoil (0.38m to 0.5m in thickness)
- Sandy clay (proven to at least 1.5m bgl)

### **8.2 Groundwater and excavations**

Groundwater was not encountered in any of the trial pits.

The sides of trial pits were stable to 1.5m bgl.

### **8.3 Contamination**

The results of all chemical analyses are contained in Appendix C.

Metals, TPH, PAH and asbestos analysis indicate levels below the assessment criteria. Accordingly, the risk of contamination from metals, asbestos, TPH and PAH on site is considered very low

Remediation is not required.

Any unforeseen contamination encountered during the development of the site should be reported to the local authority. Work should be halted in that area and the contamination investigated/assessed to the satisfaction of the local authority.

This report is prepared on the assumption that all facts have been disclosed. The comments given in this report and the opinions expressed assume that conditions do not vary beyond the range revealed by this study and the information provided in the production of this report is complete and reliable.

**M.J. Green I.Eng. F.I.H.I.E**

## 9.0

### References

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***APPENDIX A***



## SITE PLAN - BOREHOLE / TRIAL PIT LOCATIONS



Humberside Materials Laboratory Ltd  
 Atherton Way, Brigg  
 North Lincs, DN20 8AR  
 Tel Fax 01652 652753

CLIENT :- Walker Homes

SITE :- Northfield Road Messingham

***APPENDIX B***



## HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

### TRIAL PIT LOG

Trial pit  
No  
1

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 16-Nov-17

Coordinates E: 89319 N: 4728

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2		0.38	1	D	
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(1.12)			
0.6			2	D	
0.8					
1					
1.2					
1.4		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green

Page :- 1 of 1



**HUMBERSIDE MATERIALS LABATORY Ltd.**

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

**TRIAL PIT LOG**

**Trial pit  
No  
1 East**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2		0.38	1		
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(0.62)			
0.6					
0.8					
1		1			
1.2					
1.4					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver



### HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

### TRIAL PIT LOG

Trial pit  
No  
1 North

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2		0.38	1	D	
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(0.62)			
0.6					
0.8					
1		1			
1.2					
1.4					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver

Page :- 1 of 1



### HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

### TRIAL PIT LOG

Trial pit  
No  
1 South

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2		0.38	1		
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(0.62)			
0.6					
0.8					
1		1			
1.2					
1.4					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver



### HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

Trial pit  
No  
1 West

### TRIAL PIT LOG

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2		0.38	1		
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(0.62)			
0.6					
0.8					
1		1			
1.2					
1.4					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver



**HUMBERSIDE MATERIALS LABATORY Ltd.**

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

**TRIAL PIT LOG**

**Trial pit  
No  
2**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 16-Nov-17

Coordinates E: 89280 N: 4711

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.45)			
0.2			1	D	
0.4		0.45			
0.45	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(1.05)			
0.6			2	D	
0.8					
1					
1.2					
1.4		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green



**HUMBERSIDE MATERIALS LABATORY Ltd.**

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

**TRIAL PIT LOG**

**Trial pit  
No  
3**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 16-Nov-17

Coordinates E: 89314 N: 4693

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.48)			
0.2			1	D	
0.4		0.48			
0.6	Firm brown grey sandy CLAY with very occasional coarse to fine gravels	(1.02)			
0.8			2	D	
1					
1.2					
1.4		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green



**HUMBERSIDE MATERIALS LABATORY Ltd.**

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

**TRIAL PIT LOG**

**Trial pit  
No  
4**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 16-Nov-17

Coordinates E: 89330 N: 4706

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.5)			
0.2			1	D	
0.4					
0.5	Firm brown grey sandy CLAY with very occasional coarse to fine gravels	(1)			
0.6			2	D	
0.8					
1					
1.2					
1.4					
1.5					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green



**HUMBERSIDE MATERIALS LABATORY Ltd.**

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email info@humbersidematerialslab.co.uk

**TRIAL PIT LOG**

**Trial pit  
No  
5**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 12-Dec-17

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.4)			
0.2			1		D
0.4	Firm brown grey sandy CLAY with very occasional coarse to fine gravels	0.4 (1.1)			
0.6					
0.8					
1					
1.2					
1.4					
1.5		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green

Page :- 1 of 1



**HUMBERSIDE MATERIALS LABATORY Ltd.**

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Tel & Fax 01652 652753

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**TRIAL PIT LOG**

**Trial pit  
No  
6**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 12-Dec-17

Coordinates E: N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples		Water level	Notes
0	Brown sandy TOPSOIL	(0.45)	0			
0.2			0.2	1 D		
0.4	Firm brown grey sandy CLAY with very occasional coarse to fine gravels	0.45 (1.05)	0.4			
0.6			0.6			
0.8			0.8			
1			1			
1.2			1.2			
1.4			1.4			
1.5		1.5	1.5			
1.6			1.6			
1.8			1.8			
2			2			
2.2			2.2			
2.4			2.4			
2.6			2.6			
2.8			2.8			
3			3			
3.2			3.2			
3.4			3.4			
3.6			3.6			
3.8			3.8			

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Green



## HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

### TRIAL PIT LOG

Trial pit  
No  
**A**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E:            N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.45)			
0.2			1	D	
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	(1.05)			
0.6					
0.8					
1					
1.2			1	D	
1.4		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver



**HUMBERSIDE MATERIALS LABATORY Ltd.**

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

**TRIAL PIT LOG**

**Trial pit  
No  
Asb1**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E:            N:

Elevation :-

Excavated by :- hand dig

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples		Water level	Notes
0	Brown sandy TOPSOIL	(0.2)				
0.2			1	D		
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	0.4				
0.4		(0.1)				
0.6		0.6				
0.8		0.8				
1		1				
1.2		1.2				
1.4		1.4				
1.6		1.6				
1.8		1.8				
2		2				
2.2		2.2				
2.4		2.4				
2.6		2.6				
2.8		2.8				
3		3				
3.2		3.2				
3.4		3.4				
3.6		3.6				
3.8		3.8				

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver



### HUMBERSIDE MATERIALS LABATORY Ltd.

Atherton Way, Brigg  
North Lincs DN20 8AR  
Tel & Fax 01652 652753

email info@humbersidematerialslab.co.uk

### TRIAL PIT LOG

Trial pit  
No  
Asb2

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E: N:

Elevation :-

Excavated by :- hand dig

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.45)			
0.2			1	D	
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	0.45 (0.05)			
0.6					
0.8					
1					
1.2					
1.4					
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver

Page :- 1 of 1



**HUMBERSIDE MATERIALS LABATORY Ltd.**

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North Lincs DN20 8AR  
Tel & Fax 01652 652753

email [info@humbersidematerialslab.co.uk](mailto:info@humbersidematerialslab.co.uk)

**TRIAL PIT LOG**

**Trial pit  
No  
B**

Client :- Walker Homes

Site :- Northfield Road Messingham

Project No :- 4348

Location :- see site plan

Date :- 22-Feb-18

Coordinates E:            N:

Elevation :-

Excavated by :- 360 excavator

Depth (m)	Lithology / Description / (thickness) / Depth	Elevation	Samples	Water level	Notes
0	Brown sandy TOPSOIL	(0.38)			
0.2					
0.4	Firm grey brown sandy CLAY with very occasional coarse to fine gravels	0.38 (1.12)			
0.6					
0.8					
1					
1.2			1	D	
1.4		1.5			
1.6					
1.8					
2					
2.2					
2.4					
2.6					
2.8					
3					
3.2					
3.4					
3.6					
3.8					

Sample Key  
B Bulk  
D Disturbed  
W Water  
SS Split spoon  
C Cone

Notes :-

File Ref :- 1057 / 4348

Logged by :- M Driver

***APPENDIX C***

# Concept Life Sciences

## Certificate of Analysis

**Report Number:** 697931-1

**Date of Report:** 05-Dec-2017

**Customer:** Humberside Materials Laboratory Ltd  
Atherton Way  
Brigg  
North Lincolnshire  
DN20 8AR

**Customer Contact:** Mr Mick Green

**Customer Job Reference:** 1057/4348/P

**Customer Purchase Order:** HML/PO/3274

**Customer Site Reference:** Northfield Rd, Messingham

**Date Job Received at Concept:** 20-Nov-2017

**Date Analysis Started:** 21-Nov-2017

**Date Analysis Completed:** 05-Dec-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked  
and authorised by :  
Miajan Miah  
Customer Service Advisor

Issued by :  
Miajan Miah  
Customer Service Advisor





Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
TPH (C10-C12 aromatic)	T909	AR	2	mg/kg	U	001-004
TPH (C12-C16 aromatic)	T909	AR	1	mg/kg	U	001-004
TPH (C16-C21 aromatic)	T909	AR	1	mg/kg	U	001-004
TPH (C21-C35 aromatic)	T909	AR	1	mg/kg	U	001-004
Arsenic	T6	A40	1	mg/kg	U	001-004
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-004
Cadmium	T6	A40	1	mg/kg	U	001-004
Chromium	T6	A40	1	mg/kg	U	001-004
Copper	T6	A40	1	mg/kg	U	001-004
Lead	T6	A40	1	mg/kg	U	001-004
Mercury	T6	A40	1	mg/kg	U	001-004
Nickel	T6	A40	1	mg/kg	U	001-004
Selenium	T6	A40	3	mg/kg	U	001-004
Zinc	T6	A40	1	mg/kg	U	001-004
Naphthalene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthylene	T149	AR	0.01	mg/kg	U	001-004
Acenaphthene	T149	AR	0.01	mg/kg	U	001-004
Fluorene	T149	AR	0.01	mg/kg	U	001-004
Phenanthrene	T149	AR	0.01	mg/kg	U	001-004
Anthracene	T149	AR	0.01	mg/kg	U	001-004
Fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Pyrene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Chrysene	T149	AR	0.01	mg/kg	U	001-004
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	U	001-004
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	U	001-004
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	U	001-004
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	U	001-004
PAH(total)	T149	AR	0.01	mg/kg	U	001-004



# Concept Life Sciences

## Certificate of Analysis

**Report Number:** 704006-1

**Date of Report:** 29-Dec-2017

**Customer:** Humberside Materials Laboratory Ltd  
Atherton Way  
Brigg  
North Lincolnshire  
DN20 8AR

**Customer Contact:** Mr Mick Green

**Customer Job Reference:** 1057/4348

**Customer Purchase Order:** HML/PO/3292

**Customer Site Reference:** Messingham

**Date Job Received at Concept:** 14-Dec-2017

**Date Analysis Started:** 15-Dec-2017

**Date Analysis Completed:** 29-Dec-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked  
and authorised by :  
Aleksandra Pacula  
Customer Service Advisor

Issued by :  
Aleksandra Pacula  
Customer Service Advisor







## ANALYTICAL TEST REPORT

**Contract no:** 70315  
**Contract name:** Messingham  
**Client reference:** 1057/4348  
**Clients name:** Humberside Materials Laboratory  
**Clients address:** Atherton Way  
Brigg  
North Lincolnshire  
DN20 8AR  
**Samples received:** 26 February 2018  
**Analysis started:** 26 February 2018  
**Analysis completed** 05 March 2018  
**Report issued:** 05 March 2018

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**



Dave Bowerbank  
Customer Services Co-ordinator

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## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.  
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
70315-2	S/47923 TPA	1.10-1.20	Clay	-	-	18.9
70315-3	S/47924 TPB	1.10-1.30	Clay	-	-	22.3
70315-4	S/47925 TP1 1m North	0.10-0.40	Sandy Clay with Gravel	-	-	20.2
70315-5	S/47926 TP1 1m East	0.10-0.40	Sandy Clay with Gravel	-	-	21.2
70315-6	S/47927 TP1 1m South	0.10-0.40	Sandy Clay with Gravel	-	-	21.0
70315-7	S/47928 TP1 1m West	0.10-0.40	Sand	-	-	20.5

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## SOILS

Lab number			70315-1	70315-2	70315-3	70315-4	70315-5	70315-6
Sample id			S/47922 TPA	S/47923 TPA	S/47924 TPB	S/47925 TP1 1m North	S/47926 TP1 1m East	S/47927 TP1 1m South
Depth (m)			0.10-0.50	1.10-1.20	1.10-1.30	0.10-0.40	0.10-0.40	0.10-0.40
Date sampled			22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018	22/02/2018
Test	Method	Units						
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	-	-	-	14	13	13
<b>TPH</b>								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	<0.01	-	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	<0.01	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	<0.01	-	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	<1	<1	-	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	<1	<1	-	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	<1	<1	-	-	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	<1	<1	-	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	<1	<1	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	<0.1	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	<0.1	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	<0.1	-	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	<4	<4	-	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	<4	<4	-	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	16	12	-	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	16	<10	-	-	-
<b>Subcontracted analysis</b>								
Asbestos (qualitative)	\$	-	NAD	-	-	NAD	-	-

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## SOILS

Lab number			70315-7	70315-8	70315-9
Sample id			S/47928 TP1 1m West	S/47929 Asbestos 1	S/47930 Asbestos 2
Depth (m)			0.10-0.40	0.10-0.40	0.10-0.40
Date sampled			22/02/2018	22/02/2018	22/02/2018
Test	Method	Units			
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	14	-	-
<b>TPH</b>					
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-
<b>Subcontracted analysis</b>					
Asbestos (qualitative)	\$	-	-	NAD	NAD

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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	Wet		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	Wet		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	Wet		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	Wet		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	Wet		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	Wet		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	Wet		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
IT	Sample not cooled
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
70315-2	S/47923 TPA	1.10-1.20	N	
70315-3	S/47924 TPB	1.10-1.30	N	
70315-4	S/47925 TP1 1m North	0.10-0.40	N	
70315-5	S/47926 TP1 1m East	0.10-0.40	N	
70315-6	S/47927 TP1 1m South	0.10-0.40	N	
70315-7	S/47928 TP1 1m West	0.10-0.40	N	