

# GROUND ENGINEERING

Newark Road, Peterborough PE1 5UA

**REPORT ON A CONTAMINATION  
ASSESSMENT  
COMMON SIDE ROAD  
LEAKE COMMONSIDE  
OLD LEAKE  
BOSTON**

**Report Reference C15568**

**On behalf of:**

**W. J. Gresham & Son**  
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*March 2022*

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**W. J. GRESHAM & SON**

**OGLESBY & LIMB LIMITED**  
**ARCHITECTS**

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**INTRODUCTION**

Ground Engineering Limited was instructed by the client, W. J. Gresham & Son, through Oglesby and Limb Architects, to carry out an intrusive soil contamination assessment beneath their commercial premises on Common Side Road, Leake Commonside, Old Leake. The work is in preparation for the construction of five, two-storey dwellings, which will replace the existing commercial buildings.

The scope of the contamination assessment comprised five window sample boreholes, with chemical laboratory testing on recovered samples to determine the nature of the underlying soil. Reference has been given to a Phase 1 desk study carried out by Ground Investigation Associates (dated July 2021).

This report provides the findings of the investigation and comments on the risk of soil contamination being present.

## **LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE**

The site is located about 10km to the north-east of Boston in the village of Leake Commonside as shown in Figure 1. The site lies within the north-eastern part of the village and the approximate National Grid Reference at the centre of the site is TF 3980 5261.

The site, which is situated within a residential area, comprised a 60m long by 40m wide rectangular plot, bounded by Common Side Road to the north and dwellings directly to the south and west. The eastern part of the site comprised a 15m wide by 30m long yard, partly covered by concrete hardstanding and stone, which provided access to Caleb Hill Road to the east.

The site was occupied by a disused workshop building formerly used by the client, W. J. Gresham & Son, for the manufacture of kitchen cabinets. The building occupied the south-western half of the site and comprised brick constructed offices and showroom. The eastern half of the building comprising a joinery workshop and storage areas, which had cement bonded asbestos corrugated roof. A relatively modern steel-clad, portal framed extension was located at the eastern end of the workshop.

An above ground plastic internally banded diesel tank, previously used for fuelling vehicles, was present within a concrete surfaced compound on the north-eastern corner of the building. No staining of the surfacing was present in the immediate area of the tank.

The site was flat and level and the ground surface stood at about 3mOD.

The geological map at 1:50,000 scale, Sheet 128, and the BGS Geology of Britain viewer indicates the site to be covered by superficial Tidal Flat Deposits, which pass at depth into Glacial Deposits and then the underlying solid geology of the Kimmeridge Clay Formation.

## **SITE HISTORY**

Reference has been made to a desk study report, provided by the client, and produced by Ground Investigation Associates (Project No. 21027-1, dated July 2021).

The site appears to have been developed prior to 1888 with a possible dwelling and outbuildings possibly including stables running through the centre of the site. By the 1950s the stable buildings have been connected to the buildings in the south-west corner. Whilst the site layout remained the same, a 1970s map denotes the site as a Builder's Yard. By the 1990s the original buildings appear to have been incorporated into a single larger building, which was further extended within the south-eastern corner between about 2000 and 2020.

It is understood that W. J. Gresham & Son were established on the site in 1918 with a carpentry/joinery/cabinet makers workshop, which over the past 25 years is understood to have specialised in kitchen design.

The findings of the desk study indicate the following:

- Any contaminated soil present beneath the site would be expected within a surface layer of made ground/topsoil across the site.
- There is the possibility of petroleum impacted soil being present due to spillage or leakage of the surface mounted diesel tank located by the north-eastern corner of the building.
- Whilst there are no landfills or waste sites identified within 250m of the site, the Tidal Flat Deposits could contain pockets or bands of organic soil/peat, which could have the potential to generate methane and carbon dioxide.
- It is unlikely that soils outside the site could detrimentally affect future development of the site.

## **SITE WORK**

The site work was carried out on 7 February 2022 and comprised five 3.00m deep window sample boreholes (WS1 to WS5) at locations shown in Figure 2. Service plans were consulted, and a cable avoidance tool (CAT) was used to check for the absence of buried services prior to boring.

The exploratory hole records have been produced in accordance with British Standard BS5930:2015+A1:2020 'Code of Practice for Site Investigations' and are given in Appendix 1. The records provide the descriptions and depths of the various strata encountered, samples taken, and the groundwater conditions observed during excavation, boring and on completion.

### **Window Sample Boreholes (WS1 to WS5)**

The window sample boreholes were commenced initially by the excavation, using hand tools, of a service inspection pit to a depth of 1.20m in order to ensure the absence of buried services. Representative small disturbed samples of soil were taken from the starter pits.

Each window sample borehole was formed by a standard window sampling and super heavy dynamic probing rig and taken to a depth of 3.00m. The window sampling equipment consisted of drive-in sample tubes of specially constructed and strengthened steel, lined with a plastic core-liner. The barrels were initially of 87mm internal diameter and were reduced in diameter with successive barrels with increasing depth. Upon extraction, a continuous 'undisturbed' profile of the soil was obtained within the plastic liners.

On completion a soil gas/water monitoring standpipe was fitted into WS1, WS3 and WS5 to 3.00m depth. The installations comprised a 50mm diameter perforated plastic pipe where the annulus between the pipe and the borehole was backfilled with silica gravel to a depth of 1.00m. A bentonite seal was inserted between 0.50m and 1.00m depth, above which the tube was sealed by a gas valve and a surface protective cover was fixed in concrete.

### **Return Visits to Site**

Return visits to site were undertaken on 8, 15 and 22 March 2022 to monitor the standpipe installations (WS1, WS3 and WS5) for depth to groundwater and the concentrations of methane, carbon dioxide and oxygen. Measurement was carried out using a Gasdata GFM430, which also recorded the atmospheric pressure and flow rate. The monitoring results are presented on and following the borehole records in Appendix 1. Water samples were also recovered for future chemical analysis.

## **CHEMICAL LABORATORY TESTING**

Selected soil and water samples were submitted to a UKAS Accredited Laboratory who carried out a suite of tests which encompassed a wide range of potential contaminants outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66; 2008 -Guidance for the Safe Development of Housing on Land Affected by Contaminationø

Tests were carried out to screen the samples for the following potential contaminants: total arsenic, total cadmium, total chromium, hexavalent chromium, total lead, total mercury, total selenium, water soluble boron, total copper, total nickel, total zinc, total cyanides, free cyanides, soluble sulphate, sulphides and pH-value, phenols and polyaromatic hydrocarbons (PAH), including benzo[a]pyrene, and petroleum hydrocarbons (TPH). Selected soil samples were also screened for the presence of asbestos.

The results of chemical testing are presented in Appendix 2.

## **GROUND CONDITIONS**

The boreholes encountered made ground covering superficial Tidal Flat Deposits which, were present to at least the base of the boreholes at 3.00m depth.

### **Made Ground**

The made ground was present with a thickness of between 0.50m and 0.80m in WS1, WS2, WS3 and WS5. A greater thickness of made ground was encountered to 1.50m depth in WS4. The made ground in WS1 to WS3 comprised an upper 0.20m to 0.30m thick pavement layer associated with the hardstanding areas. Boreholes WS4 and WS5 were located within a lawn and encountered made ground/topsoil at the surface.

Borehole WS1, which was located adjacent the surface mounted fuel tank, encountered a 0.15m thick surface layer of concrete. This rested on brown and dark brown, slightly gravelly, clayey silt made ground, which was present to 0.80m depth. The gravel comprised angular brick and ash fragments.

Borehole WS2, which was located in the gravel yard in the eastern part of the site, encountered a 0.15m thick surface layer of gravel, over sand and gravel, of brick and quartz, to 0.30m depth. This rested on dark brown, gravelly silt made ground, which was present to 0.60m depth. The gravel comprised angular brick fragments.

Borehole WS3, which was located within the macadam surface driveway along the western site margin, encountered 0.10m thickness of macadam over sand/gravel of hardcore to 0.20m depth. This rested on brown and dark brown, slightly gravelly, clayey silt made ground that was present to 0.80m depth. The gravel comprised angular brick fragments.

Borehole WS4, which was located within north-western corner of the site at the edge of the lawn adjacent driveway, encountered a 0.70m thickness of soft, dark brown, clayey silt topsoil which contained occasional fragments of pottery. This layer rested on soft, dark brown, slightly gravelly, clayey silt made ground, which was proved to 1.50m depth. This layer contained

occasional fragments of brick, pottery and glass.

Borehole WS5 was located at the eastern end of the site within the lawned area to the north of the building. This borehole encountered soft, dark brown, clayey silt topsoil to 0.40m, which rested on soft, brown and grey, slightly gravelly, clayey silt made ground to a depth of 0.80m. The gravel comprised angular brick fragments.

### **Tidal Flat Deposits**

The Tidal Flat Deposits, which were encountered underlying the made ground at depths between 0.50m and 1.50m, comprised an interbedded sequence of soft (locally initially firm), brown, orange brown and grey brown, locally organic, silty clay; clayey silt; fine sandy silt; and silty fine sand. The boreholes were completed in these Tidal Flat Deposits at the scheduled depth of 3.00m.

### **Groundwater**

On completion of the boreholes water was standing at depths between 1.70m and 2.00m.

Subsequent return visits on 8, 15 and 22 March 2022, recorded standpipe water levels of between 1.09 and 1.55m depth in WS1, WS3 and WS5.

## **COMMENTS ON SOIL CHEMICAL TESTING**

The results of the laboratory chemical testing on near surface soil samples have primarily been compared to soil screening values (SSVs) produced by Land Quality Management Limited (LQM) and the Chartered Institute for Environmental Health (CIEH) presented in their document -The LQM/CIEH S4ULs for Human Health Risk Assessment: 2015 (Publication Number S4UL3608)ø The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and are transparently-derived and cautious -trigger valuesøabove which further assessment of the risks or remedial action may be needed. The S4ULs (Suitable for Use Levels) have been derived, in accordance with UK legislation and Environment Agency policy, using a modified version of the Environment Agency CLEA 1.06 software.

Reference has also been given to ATRISKsoil soil screening values produced by Atkins Limited and provided under licence to Ground Engineering Limited. Atkins SSVs have been derived in line with the Environment Agency 2009 guidance using the CLEA 1.071 software. With the absence of a S4UL for cyanide the ATRISKsoil SSV has been used as the soil screening criteria within this report.

In 2014 the Department for Environment Food and Rural Affairs (DEFRA) published, in their document SP1010, Category 4 Screening Levels (C4SL) for several contaminants including lead. The C4SL represent screening levels below which the land could be considered suitable for a specified use and definitely not contaminated land in respect of those determinands. With the absence of S4UL for lead the C4SL has been used as the soil screening criteria within this report.

For each contaminant the adopted soil screening criteria have been calculated for the following land uses:

- Residential use with home grown produce
- Residential use without home grown produce
- Public Open Spaces Near Residential Housing

The intended purpose of the SSVs are as 'intervention values' in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Tables 1 & 2 compare the test results for the made ground with the SSVs in relation to the specified uses. The number of test results, which exceed these values, are also provided.

Residential use with home grown produce values are considered appropriately conservative screening values for the proposed housing development.

**Table 1: Made Ground - Comparison of Chemical Test Results for Near Surface Soil with Soil Screening Values (SSV)**

Determinand	Number of Samples	Min Value (mg/kg)	Max Value (mg/kg)	Number of Samples Exceeding SSV for:			Measured 95 <sup>th</sup> Percentile (mg/kg)	Soil Screening Values (SSV) (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Public Open Spaces Near Residential Housing		Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Public Open Spaces Near Residential Housing (mg/kg)
Organic matter	5	2.1%	9.0%	-	-	-	-	-	-	-	-
Arsenic	5	7.0	22	0	0	0	20.73	S4UL	37	40	79
Cadmium	5	<0.10	0.39	0	0	0	0.29	S4UL	11	85	120
Total Chromium	5	11	19	0	0	0	18.01	S4UL	910	910	1500
Hexavalent Chromium	5	<0.50	<0.50	0	0	0	0.50	S4UL	6	6	7.7
Lead	5	28	430	1	1	0	236.27	C4SL	200	310	630
Mercury	5	<0.10	0.60	0	0	0	0.43	S4UL	11	15	40
Selenium	5	<0.20	0.26	0	0	0	0.24	S4UL	250	430	1100
Nickel	5	12	18	0	0	0	17.69	S4UL	130	180	230
Phenols	5	<0.10	<0.10	0	0	0	<0.10	S4UL	120	440	1300
Copper	5	14	35	0	0	0	33.37	S4UL	2400	7100	12,000
Zinc	5	25	160	0	0	0	117.42	S4UL	3700	40,000	81,000
Free Cyanide	5	<0.50	<0.50	0	0	0	<0.50	ATRISK	34	34	34

Notes

S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM

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ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited

**Table 2: Made Ground - Comparison of PAH Chemical Test Results for Near Surface Soil with Soil Screening Values (SSV)**

Determinand	Number of Samples	Min Value (mg/kg)	Max Value (mg/kg)	Number of Samples Exceeding SSV for:			Measured 95 <sup>th</sup> Percentile (mg/kg)	Soil Screening Values (SSV) (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Public Open Spaces Near Residential Housing		Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Public Open Spaces Near Residential Housing (mg/kg)
Acenaphthene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	210	3000	15,000
Acenaphthylene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	170	2900	15,000
Anthracene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	2400	3100	74,000
Benzo[a]anthracene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	7.2	11	29
Benzo[a]pyrene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	2.2	3.2	5.7
Benzo[b]fluoranthene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	2.6	3.9	7.1
Benzo[g,h,i]perylene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	320	360	640
Benzo[k]fluoranthene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	77	110	190
Chrysene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	15	30	57
Dibenzo[a,h]anthracene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	0.24	0.31	0.57
Fluoranthene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	280	1500	3100
Fluorene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	170	2800	9900
Indeno[1,2,3-cd]pyrene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	27	45	82
Naphthalene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	2.3	2.3	4900
Phenanthrene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	95	1300	3100
Pyrene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	620	3700	7400

Notes  
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ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited

**Table 3: Summary of Petroleum Hydrocarbon Test Results in Soil**

Depth m	Concentration of Total Petroleum Hydrocarbons (TPH) in soil mg/kg (s) and water µg/l (w)				
	WS1	WS2	WS3	WS4	WS5
0.30	<10s		1400s		
0.50		<10s			
0.60	<10s		<10s	<10s	<10s
0.90	<10s				
1.09					<10w
1.20	<10s	<10s			
1.30	<10w				
1.40			<10w		
2.00	<10s			<10s	<10s
3.00	<10s	<10s			

**Discussion of Results**

With the exception of lead (WS1 at 0.30m depth) none of the determinand concentrations, from the made ground, exceeded the respective SSV for residential with home grown produce; residential without home grown produce end use; or public open spaces near residential housing.

No visual or olfactory evidence of petroleum fuel pollution was observed in the boreholes and the TPH laboratory results reflected this with concentrations of less than 10mg/kg. An exception was a made ground sample, taken from WS3 at 0.30m, which had a TPH concentration of 1400mg/kg. This is thought to be due to the presence of ash or macadam within the sample rather than petroleum.

None of the five samples screened for asbestos contained asbestos.

## GROUNDWATER QUALITY ASSESSMENT

Water samples were recovered from the standpipes, in WS1, WS3 and WS5, and tested for a wide range of potential contaminants including metals, phenols, PAHs and TPH. The primary assessment tool employed for the generic screening of samples for the protection of Controlled Waters comprised the Statutory Instrument 2016 No.614 which supersedes Statutory Instrument 2000 No.3184 The Water Supply (Water Quality) Regulations 2000. The latter document amends the 1991 version, which provides a standard of 10µg/l for dissolved or emulsified hydrocarbons represented by total petroleum hydrocarbons (TPH) in the chemical analysis. There is no amendment indicated in Statutory Instrument 2000 No.3184 and consequently with the absence of an amendment or update we refer to the 1991 standard, which is generally accepted within the industry. In summary Table 4 compares the chemical test results on water samples with the adopted water screening criteria (WSC). No evidence of petroleum pollution was detected, and all the results were below the WSC.

**Table 4: Comparison of Chemical Test Results, on water recovered from boreholes WS1, WS3 & WS5 with Water Supply Regulations**

Determinand	No of Samples	Min. Value	Max. Value	No of Samples Exceeding WSC	WSC The Water Supply (Water Quality) Regulations 1989-2016 Maximum Concentration/Value for Consumers Taps
pH value	1		8.2	0/1	6.5 minimum 9 maximum
Arsenic (total) µg/l	1		2.9	0/1	10 µg/l
Boron (Water Soluble) µg/l	1		17	0/1	1000 µg/l
Cadmium (total) µg/l,	1		<0.11	0/1	5.0 µg/l
Chromium (total) µg/l	1		8.8	0/1	50 µg/l
Copper (total) µg/l	1		2.4	0/1	2000 µg/l
Cyanide (total) mg/l	1		<0.050	0/1	0.05 mg/l
Lead (total) µg/l	1		<0.50	0/1	10 µg/l
Mercury (total) µg/l	1		<0.05	0/1	1.0 µg/l
Selenium (total) µg/l	1		0.56	0/1	10 µg/l
Nickel (total) µg/l	1		1.0	0/1	20 µg/l
Zinc (total) µg/l	1		5.1	0/1	5000 µg/l
Sulphate (soluble) mg/l	1		11	0/1	250 mg/l
Phenols mg/l	1		<0.030	-/1	0.0005 mg/l
PAHs µg/l	1		<0.20	-/1	0.10 µg/l
TPH µg/l	3	<10	<10	0/3	10 µg/l

## **SOIL GAS**

Soil gas and water monitoring of the standpipes WS1, WS3 and WS5 was conducted on 8, 15, and 22 March 2022.

Concentrations of less than 0.1% by volume methane were encountered with carbon dioxide concentrations between 0.4% and 4.3% by volume. Near atmospheric oxygen levels of between 14.4% and 19.3% were measured in the standpipes.

The results indicate a Gas Screening Value (GSV) of 0.00011/hr for methane and 0.00431/hr for carbon dioxide.

The results fall into Characteristic Situation 1 as defined by BS8485:2015+A1:2019 -Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildingsø

## UPDATED CONCEPTUAL MODEL

A generalised conceptual model, updated following the intrusive works, monitoring and testing, is presented below in Table 5 and follows the comparison of consequence against probability presented in CIRIA 552.

**Table 5: Updated Conceptual Model & Risk Assessment Relative to Construction and Future Development**

Source	Pathway	Receptor	Probability of risk being realised	Consequence of risk being realised	Risk Classification
<b>Asbestos in Buildings</b>	Inhalation of Dust	Human Health Demolition/Construction Workers	High	Severe	Very High Risk
<b>Contamination from Oil/Fuel stored in tank or Containers within Buildings; and Damaged Drainage</b>	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Demolition/Construction Workers	High Likelihood	Medium	High Risk
	Migration through ground into surface water or groundwater	Water Environment	High Likelihood	Medium	High Risk
<b>Soil Beneath Site</b>	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Groundworkers	Likely Likelihood	Mild	Moderate/Low Risk
		Human Health Site Users if exposed at surface within residential gardens	Likely Likelihood	Medium	Moderate Risk
		Human Health Site Users if present beneath buildings	Low Likelihood	Medium	Moderate/Low Risk
		Human Health Site Users if present beneath permanent hardstanding/roads	Unlikely	Mild	Very Low Risk
	Migration through ground into surface water or groundwater	Water Environment	Unlikely	Minor	Very Low Risk

Source	Pathway	Receptor	Probability of risk being realised	Consequence of risk being realised	Risk Classification
<b>Soil Gas</b>	Inhalation of Soil Gas	Human Health Groundworkers	Unlikely	Mild	Very Low Risk
		Human Health Site Users	Unlikely	Mild	Very Low Risk
<b>Ground Contamination Outside Site boundary</b>	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Groundworkers	Unlikely	Mild	Very Low Risk
		Human Health Site Users	Unlikely	Mild	Very Low Risk
	Migration through ground into surface water or groundwater	Water Environment	Unlikely	Mild	Very Low Risk

<b>Key to Table 5 Risk</b>	<b>Definition</b>
<b>Very High risk</b>	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 happening. The risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
<b>High risk</b>	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) and remedial works may be necessary in the short term and likely over the long term.
<b>Moderate risk</b>	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
<b>Low risk</b>	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
<b>Very Low risk</b>	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.

**COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED  
RESIDENTIAL DEVELOPMENT**

The ground investigation works have been carried out in advance of proposed development scheduled to comprise the demolition and removal of the existing buildings and replacement with five dwellings.

This investigation may not have revealed the full depth or extent of made ground or contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

Anticipated exposure scenarios relating to the site and future use, in the context of the conceptual model, are discussed as follows.

**Asbestos in Existing Buildings**

It would be recommended that an asbestos survey is conducted prior to any demolition or building works. Asbestos presents a very high risk and consequently suitable precautions, in line with current best practice, should be put in place to protect workers from the effects of asbestos material, during demolition or building works. Care should be taken to during demolition to ensure that asbestos fragments or fibres are not spread onto other areas of the site including neighbouring sites, or get mixed into the soil.

**Drainage**

Redundant foul drain runs and oil interceptors, if present, should be removed from beneath the site and precautions should ensure that any remaining effluent is directly disposed of off-site. The integrity of existing drainage should be checked, and damaged sections replaced prior to re-use within the development. The latter measures should reduce the future likelihood of contaminants affecting human health and water environment from low to very low.

### **Contamination from Fuel Tank or Oil/Chemicals Stored within Buildings**

Whilst there was no evidence of pollution in WS1, which was located adjacent the surface mounted fuel tank, the presence of the fuel tank, and any other chemicals oil/chemicals if present, means that there must be a high risk that a pathway could develop linking the contained oil/chemicals with potential receptors. Consequently in order to eliminate this risk the careful removal of all such oil/chemicals and any impacted soil (if present) is recommended. All oil/chemicals/soil removed from site should be disposed using licensed carriers and taken to appropriately licensed disposal facilities.

The latter measures should reduce the future risk to human health and water environment to low.

### **Contamination Risk - Near Surface Soil**

The site, which was covered by buildings, hardstanding and lawn, was underlain by made ground thickness of between 0.50m and 1.50m. The made ground in WS1 to WS3, which comprised an upper 0.20m to 0.30m thick construction layer, associated with the hardstanding areas, is considered unsuitable for re-use within garden areas. However, the underlying made ground which comprised brown and dark brown, clayey silt and made ground/topsoil (WS4 & WS5) would appear to be suitable for reuse.

It should be noted that this investigation may not have revealed the full depth or extent of made ground or contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

### **Human Health - Construction Workers**

No special precautions would be required during the development of the site by workers who may come into contact with the soil during groundworks, providing standard precautions are adopted, which should generally include the procedures given by the Health and Safety Executive (The Blue Book).

For the protection of these workers during groundworks the following is recommended:

a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.

b) Washing facilities should be made available to groundworkers, so as to minimise the potential for inadvertent ingestion of soil.

c) If any soils are revealed, which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

d) Suitable precautions should be implemented if asbestos containing materials are encountered in the ground.

### **Human Health – Residential Usage**

The made ground in WS1 to WS3, which comprised an upper 0.20m to 0.30m thick construction layer, associated with the hardstanding areas, is considered unsuitable for reuse within residential garden areas.

Subject to verification testing, the made ground/topsoil (WS4 & WS5) and the underlying dark brown, clayey silt made ground would appear to be suitable for re-use.

Unsuitable soil at the surface within gardens or landscaped areas should be replaced with a suitably thick, clean capping layer.

- For permanent communal landscape areas it would be recommended that the underlying natural ground be exposed, or in deeper areas the unsuitable made ground should be removed to a minimum depth of 0.30m and replaced with an equivalent thickness of clean inert soil.
- For residential garden areas it would be recommended that the underlying natural ground be exposed, or in deeper areas the unsuitable made ground should be removed to a minimum depth of 0.60m and replaced with an equivalent thickness of clean inert soil.

All garden and landscaped areas should be inspected prior to final capping to ensure that unsuitable materials have not been inadvertently placed in the garden or landscaped areas during the preceding stages of redevelopment works.

All imported soils will be certified 'clean' fill and should be suitable for use in accordance with UK legislation and Environment Agency policy. The made ground contained elevated concentrations of lead, which were present with concentrations exceeding residential SSVs. Whilst no visual or olfactory evidence or petroleum pollution was observed within the boreholes appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

### **Methane and Carbon Dioxide Soil Gas**

According to database information, there are no landfills within 250m of the site and the composition of the underlying natural soil would suggest a very low hazard potential.

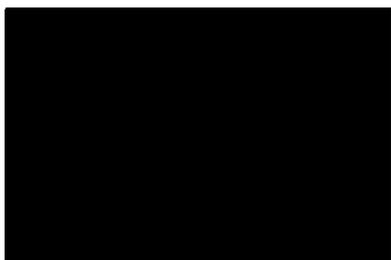
The soil gas monitoring results fall into Characteristic Situation 1 (very low risk) as defined by BS8485:2015+A1:2019. 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' Characteristic Situation 1 indicates that gas protection measures would not normally be considered necessary.

### Off-Site Disposal of Soil Arisings

The results of chemical analysis are provided in Appendix 2 and can be used within the suite of information necessary for basic characterisation of the soil destined for landfill. Excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act, 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. Basic characterisation is the responsibility of the waste producer and compliance checking and on-site verification are generally the responsibility of the landfill operator. The landfill operator will need to liaise with the waste producer as the approach relies on the information from basic characterisation.

The clean arisings from the underlying natural soils, excluding peat and topsoil, across this site should fall under the EWC code 17 05 04 inert category.

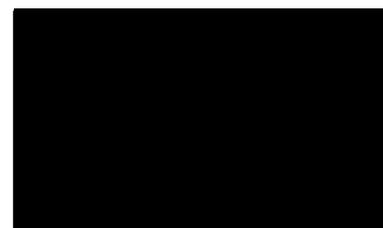
### GROUND ENGINEERING LIMITED



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Director

# Figures

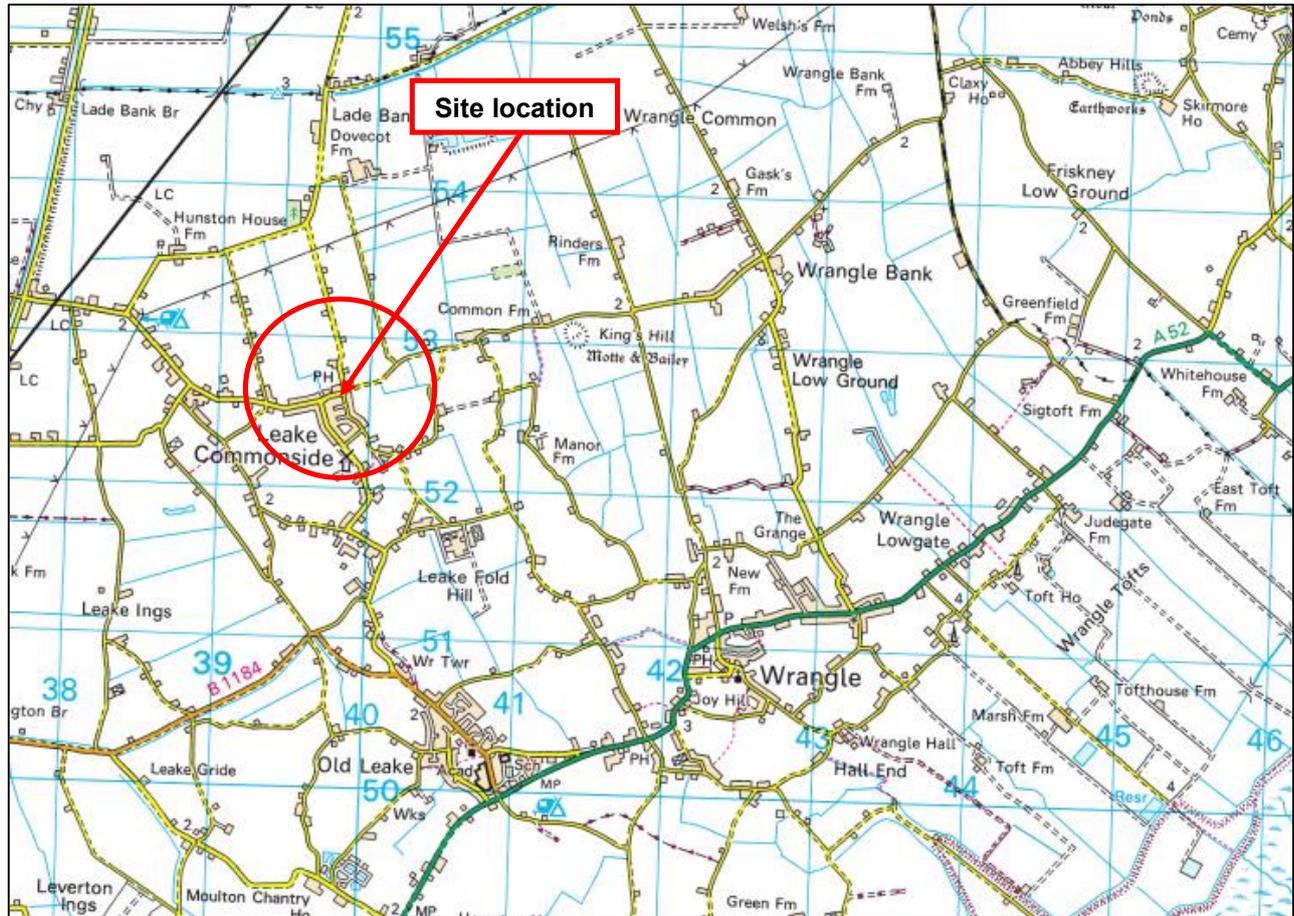
**Figure 1: Site Location Plan**

**Figure 2: Exploratory Hole Location Plan**

# Site Location Plan

Figure 1

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**Project : W. J. Gresham & Son, Common Side Road,  
Leake Commons, Old Leake**

**Client : W. J. Gresham & Son**

**GROUND  
ENGINEERING  
LIMITED**

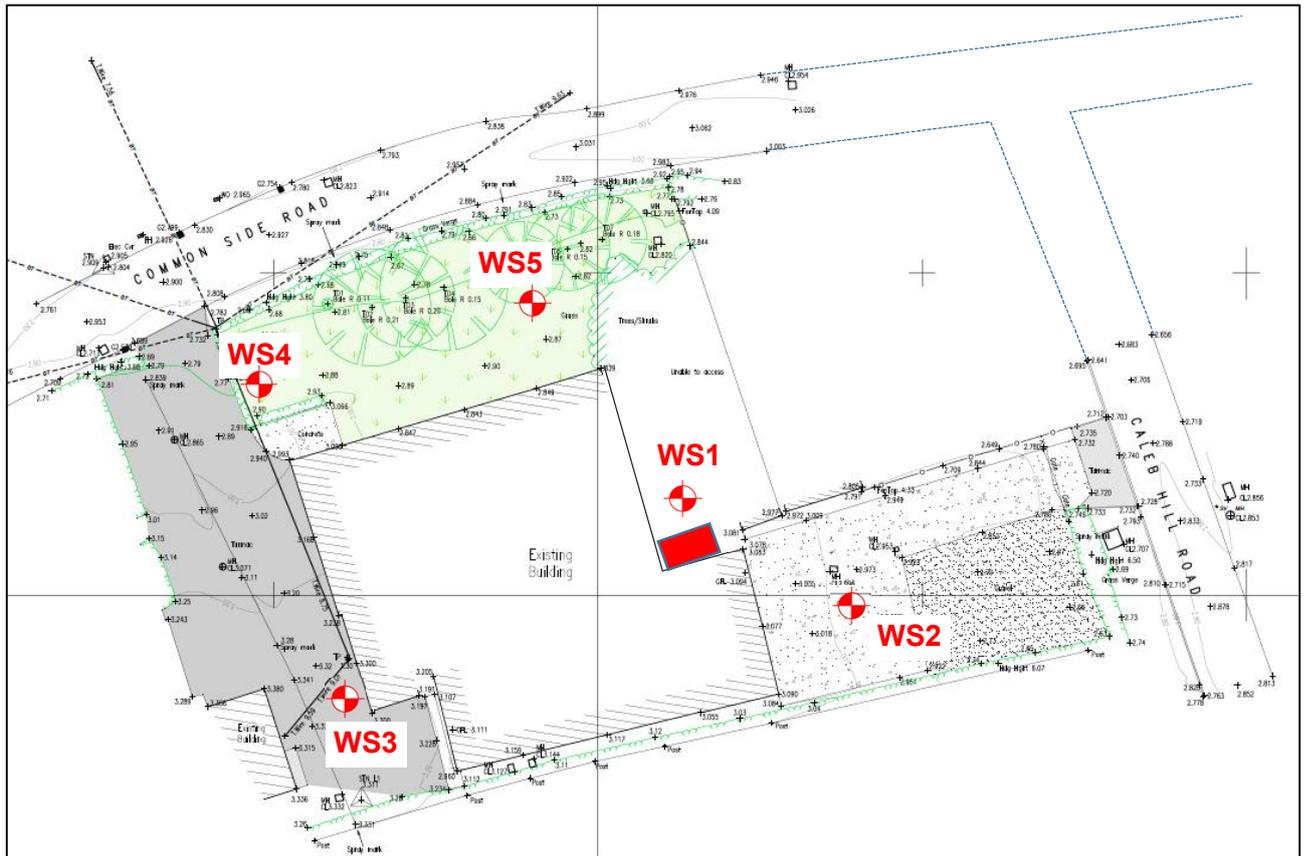
Peterborough Tel : 01733 566566

**Project No.**

**C15568**

# Exploratory Hole Location Plan

Figure 2



**KEY**

-  Boreholes WS1 to WS5
-  Oil Tank

Project : W. J. Gresham & Son, Common Side Road,  
Leake Commons, Old Leake

Client : W. J. Gresham & Son

**GROUND  
ENGINEERING  
LIMITED**

Peterborough Tel : 01733 566566

Project No.

**C15568**

# **Appendix 1**

## **Records of Boreholes WS1 to WS5 Groundwater/Gas Monitoring Record**

<b>GROUND ENGINEERING</b> LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: COMMON SIDE ROAD/LEAKE COMMONSIDE, OLD LEAKE				WINDOW SAMPLE WS1		
			Date: 07/02/22		Hole Size: 87mm dia to 2.00m 77mm dia to 3.00m		Ground Level:		
Samples and in-situ Tests			(Date)	Inst.	Description of Strata		Legend	Depth m	O. D. Level m
Depth m	Type	Result	Water						
0.30	D1				MADE GROUND - CONCRETE.			0.15	
0.60	D2				MADE GROUND - Soft, brown and dark brown, slightly gravelly, clayey SILT. Gravel of angular brick and ash.			0.80	
0.90	D3				Soft, brown, clayey SILT.				
1.20 1.20-2.00	D4 U1				(TIDAL FLAT DEPOSIT)			1.80	
2.00 2.00-3.00	D5 U2				Brown, very silty, fine SAND.  (TIDAL FLAT DEPOSIT)				
3.00	D6				Hole completed at 3.00m depth			3.00	

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. Gas monitoring standpipe installed to 3.00m depth	Project No 15568	
	Scale 1:25	Page 1/1

<b>KEY</b> D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample W - Water Sample ∇ Water Strike ∇c Depth to Water on completion J - Jar Sample MP - Mackintosh Probe V - Vane Shear Test Cohesion ( ) kPa P( ) - Hand Penetrometer Cohesion ( ) kPa ∇s Standpipe Level	Groundwater Strikes					Groundwater Observations				
	Depth m						Depth m			
	No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
							07/02/22	3.00		1.90
						08/02/22	3.00		1.30	
						15/03/22	3.00		1.43	
						22/03/22	3.00		1.33	

# GROUND ENGINEERING

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www.groundengineering.co.uk

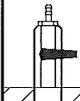
Site: COMMON SIDE ROAD/LEAKE COMMONSIDE, OLD LEAKE

WINDOW SAMPLE  
WS3

Date: 07/02/22

Hole Size: 87mm dia to 2.00m  
67mm dia to 3.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Inst.	Description of Strata	Legend	Depth m	O. D. Level m
Depth m	Type	Result						
0.30	D1				MADE GROUND - MACADAM.		0.10	
					MADE GROUND - Black SAND AND GRAVEL of hardcore.		0.20	
0.60	D2				MADE GROUND - Firm, brown and dark brown, slightly gravelly, sandy SILT. Gravel of angular brick, macadam and ash.		0.50	
					Firm, brown, silty CLAY. (TIDAL FLAT DEPOSIT)		0.80	
0.90	D3				Soft, brown, silty CLAY.			
					(TIDAL FLAT DEPOSIT)			
1.20 1.20-2.00	D4 U1				(TIDAL FLAT DEPOSIT)			
								
2.00-3.00	U2				Soft, brown, locally mottled black, clayey SILT. (TIDAL FLAT DEPOSIT)		1.90	
					Soft, brown and orange brown, sandy (fine) SILT. (TIDAL FLAT DEPOSIT)		2.20	
							3.00	
Hole completed at 3.00m depth								

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth  
2. Gas monitoring standpipe installed to 3.00m depth

Project No  
15568

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KEY	
D - Disturbed Sample	J - Jar Sample
B - Bulk Sample	MP - Mackintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion ( ) kPa
 Water Strike	P( ) - Hand Penetrometer
 Depth to Water on completion	Cohesion ( ) kPa
	 Standpipe Level

Groundwater Strikes						Groundwater Observations			
Depth m						Depth m			
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						07/02/22	3.00		1.70
						08/03/22	3.00		1.40
						15/03/22	3.00		1.55
						22/03/22	3.00		1.44

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Site: COMMON SIDE ROAD/LEAKE COMMONSIDE, OLD LEAKE

WINDOW SAMPLE  
WS5

Date: 07/02/22

Hole Size: 87mm dia to 2.00m  
67mm dia to 3.00m

Ground Level:

Samples and in-situ Tests			(Date)	Inst.	Description of Strata	Legend	Depth m	O. D. Level m
Depth m	Type	Result	Water					
0.30	D1				MADE GROUND - Soft, dark brown, clayey SILT. (TOPSOIL)		0.40	
0.60	D2				MADE GROUND - Soft, brown and grey, slightly gravelly, clayey SILT. Gravel of angular brick.		0.80	
0.90	D3				Firm, grey brown, clayey SILT. (TIDAL FLAT DEPOSIT)		1.00	
1.20	D4				Brown and orange brown, silty, fine SAND. (TIDAL FLAT DEPOSIT)		1.60	
1.20-2.00	U1				Soft, grey brown, organic CLAY with occasional peaty matter. (TIDAL FLAT DEPOSIT)		2.00	
2.00	D5				Soft, brown, sandy (fine) SILT. (TIDAL FLAT DEPOSIT)		3.00	
2.00-3.00	U2							
3.00	D6				Hole completed at 3.00m depth			

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth  
2. Gas monitoring standpipe installed to 3.00m depth

Project No  
15568

Scale 1:25 Page 1/1

KEY	
D - Disturbed Sample	J - Jar Sample
B - Bulk Sample	MP - Mackintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion ( ) kPa
▽ Water Strike	P( ) - Hand Penetrometer
▽c Depth to Water on completion	Cohesion ( ) kPa
	▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
Depth m						Depth m			
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						07/02/22	3.00		1.90
						08/03/22	3.00		1.09
						15/03/22	3.00		1.25
						22/03/22	3.00		1.14

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Site: COMMON SIDE ROAD/LEAKE COMMONSIDE, OLD LEAKE

WINDOW SAMPLE  
WS2

Date: 07/02/22

Hole Size: 77mm dia to 2.00m  
57mm dia to 3.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O. D. Level m
Depth m	Type	Result					
0.30	D1			MADE GROUND - Brown SAND AND GRAVEL.		0.15	
				MADE GROUND - Brown, clayey, silty SAND AND GRAVEL of angular brick rubble and rounded quartz.		0.30	
0.60	D2			MADE GROUND - Dark brown, gravelly SILT. Gravel of angular brick.		0.60	
0.90	D3			Soft, brown, slightly sandy (fine), silty CLAY.			
1.20 1.20-2.00	D4 U1			(TIDAL FLAT DEPOSIT)			
2.00 2.00-3.00	D5 U2		▼c	Soft, brown, clayey SILT.		2.00	
				(TIDAL FLAT DEPOSIT)			
3.00	D6			Hole completed at 3.00m depth		3.00	

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth

Project No  
15568

Scale  
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KEY

D - Disturbed Sample  
B - Bulk Sample  
U - Undisturbed Sample  
W - Water Sample  
▼ Water Strike  
▼c Depth to Water on completion

J - Jar Sample  
MP - Mackintosh Probe  
V - Vane Shear Test  
Cohesion ( ) kPa  
P( ) - Hand Penetrometer  
Cohesion ( ) kPa  
▼s Standpipe Level

Groundwater Strikes

Depth m						
No	Struck	Rose to	Rate	Cased	Sealed	

Groundwater Observations

Date				Depth m		
Date	Hole	Casing	Water			
07/02/22	3.00		2.00			

# GROUND ENGINEERING

L I M I T E D  
Tel: 01733-566566  
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Site: COMMON SIDE ROAD/LEAKE COMMONSIDE, OLD LEAKE

WINDOW SAMPLE  
WS4

Date: 07/02/22

Hole Size: 87mm dia to 2.00m  
57mm dia to 3.00m

Ground Level:

Samples and in-situ Tests			(Date)	Description of Strata	Legend	Depth m	O. D. Level m
Depth m	Type	Result	Water				
0.30	D1			MADE GROUND - Soft, dark brown, clayey SILT with occasional fragments of pottery. (TOPSOIL)		0.70	
0.60	D2						
0.90	D3			MADE GROUND - Soft, dark brown, slightly gravelly, clayey SILT. Gravel of angular brick, pottery and glass.			
1.20	D4					1.50	
2.00	D5		▼c	Soft, brown and orange brown mottled, silty CLAY with silt partings. (TIDAL FLAT DEPOSIT)		2.00	
				Soft, brown and orange brown, sandy (fine) SILT. (TIDAL FLAT DEPOSIT)			
3.00	D6			Hole completed at 3.00m depth		3.00	

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth

Project No  
15568

Scale  
1:25

Page  
1/1

KEY	
D - Disturbed Sample	J - Jar Sample
B - Bulk Sample	MP - Mackintosh Probe
U - Undisturbed Sample	V - Vane Shear Test
W - Water Sample	Cohesion ( ) kPa
▼ Water Strike	P( ) - Hand Penetrometer
▼c Depth to Water on completion	Cohesion ( ) kPa
	▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
Depth m						Depth m			
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						07/02/22	3.00		2.00

# GROUND ENGINEERING LIMITED

## Groundwater/Gas Monitoring Record

Site: W. J. Gresham & Son, Common Side Road, Leake  
Commonside, Old Leake

Report Ref: C15568

Date	Borehole No.	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Flow Rate (l/hr)	Atmosph. Pressure (mb)	Depth of Well (m bgl)	Depth to Groundwater (m bgl)
		Peak	Steady	Peak	Steady	Min.	Max.				
08/03/22	WS1	<0.1	<0.1	0.4	0.4	19.2	19.2	<0.1	1013	3.00	1.30
15/03/22	WS1	<0.1	<0.1	0.7	0.7	18.9	18.9	<0.1	1021	3.00	1.43
22/03//22	WS1	<0.1	<0.1	0.7	0.7	18.9	18.9	<0.1	1030	3.00	1.33
08/03/22	WS3	<0.1	<0.1	2.4	2.4	17.6	17.6	<0.1	1013	3.00	1.40
15/03/22	WS3	<0.1	<0.1	3.0	3.0	17.4	17.4	<0.1	1021	3.00	1.55
22/03//22	WS3	<0.1	<0.1	3.2	3.2	17.3	17.3	<0.1	1030	3.00	1.44
08/03/22	WS5	<0.1	<0.1	4.3	4.3	14.4	14.4	<0.1	1013	3.00	1.09
15/03/22	WS5	<0.1	<0.1	2.3	2.3	19.3	19.3	<0.1	1021	3.00	1.25
22/03//22	WS5	<0.1	<0.1	2.2	2.2	19.2	19.2	<0.1	1030	3.00	1.14

# Appendix 2

## Laboratory Chemical Test Results



# Final Report

---

**Report No.:** 22-04951-1  
**Initial Date of Issue:** 18-Feb-2022  
**Client:** Ground Engineering Limited  
**Client Address:** Newark Road  
Peterborough  
Cambridgeshire  
PE1 5UA  
**Contact(s):** John Gibb  
**Project:** C15668 Land off Commons Road,  
Old Leake, Boston

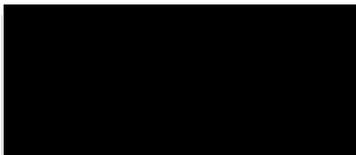
**Quotation No.:** **Date Received:** 10-Feb-2022

**Order No.:** C15568 **Date Instructed:** 10-Feb-2022

**No. of Samples:** 15

**Turnaround (Wkdays):** 5 **Results Due:** 16-Feb-2022

**Date Approved:** 18-Feb-2022



**Details:** Stuart Henderson, Technical  
Manager

---

# Results Soil

**Project: C15668 Land off Commons Road, Old Leake, Boston**

Client: Ground Engineering Limited		Chemtest Job No.:		22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951		
Quotation No.:		Chemtest Sample ID.:		1369654	1369655	1369656	1369657	1369658	1369659	1369660	1369661	
Order No.: C15668		Client Sample Ref.:		D1	D2	D3	D4	D5	D6	D2	D4	
		Sample Location:		WS1	WS1	WS1	WS1	WS1	WS1	WS2	WS2	
		Sample Type:		SOIL								
		Top Depth (m):		0.3	0.6	0.9	1.2	2.0	3.0	0.5	1.2	
		Date Sampled:		07-Feb-2022								
		Asbestos Lab:		DURHAM						DURHAM		
Determinand	Accred.	SOP	Units	LOD								
pH	M	2010		4.0	9.2					8.5		
Moisture	N	2030	%	0.020	19	20	18	14	9.1	25	15	21
Stones and Removed Materials	N	2030	%	0.020	< 0.020						< 0.020	
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.71						< 0.40	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.051						0.040	
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50						< 0.50	
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50						0.60	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	13						4.1	
Arsenic	M	2450	mg/kg	1.0	22						8.9	
Cadmium	M	2450	mg/kg	0.10	0.39						0.13	
Chromium	M	2450	mg/kg	1.0	19						18	
Copper	M	2450	mg/kg	0.50	34						14	
Mercury	M	2450	mg/kg	0.10	0.12						< 0.10	
Nickel	M	2450	mg/kg	0.50	18						18	
Lead	M	2450	mg/kg	0.50	430						34	
Selenium	M	2450	mg/kg	0.20	0.26						< 0.20	
Zinc	M	2450	mg/kg	0.50	160						45	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50						< 0.50	
Organic Matter	M	2625	%	0.40	6.9						2.1	
Acenaphthene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Anthracene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Chrysene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Fluoranthene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Fluorene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Naphthalene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Phenanthrene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Pyrene	M	2700	mg/kg	0.10	< 0.10						< 0.10	
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0						< 2.0	
Total Phenols	M	2920	mg/kg	0.10	< 0.10						< 0.10	

## Results Soil

**Project: C15668 Land off Commons Road, Old Leake, Boston**

<b>Client: Ground Engineering Limited</b>		<b>Chemtest Job No.:</b>		22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951
Quotation No.:	<b>Chemtest Sample ID.:</b>			1369654	1369655	1369656	1369657	1369658	1369659	1369660	1369661	
Order No.: C15568	<b>Client Sample Ref.:</b>			D1	D2	D3	D4	D5	D6	D2	D4	
	<b>Sample Location:</b>			WS1	WS1	WS1	WS1	WS1	WS1	WS2	WS2	
	<b>Sample Type:</b>			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	<b>Top Depth (m):</b>			0.3	0.6	0.9	1.2	2.0	3.0	0.5	1.2	
	<b>Date Sampled:</b>			07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	
	<b>Asbestos Lab:</b>			DURHAM						DURHAM		
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>								
ACM Type	U	2192		N/A	Fibres/Clumps						-	
Asbestos Identification	U	2192		N/A	Chrysotile						No Asbestos Detected	
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay	Sand	Sand	Sand	Clay
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

# Results Soil

**Project: C15668 Land off Commonsie Road, Old Leake, Boston**

Client: Ground Engineering Limited		Chemtest Job No.:		22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951
Quotation No.:		Chemtest Sample ID.:		1369662	1369663	1369664	1369665	1369666	1369667	1369668
Order No.: C15668		Client Sample Ref.:		D6	D1	D2	D2	D5	D2	D5
		Sample Location:		WS2	WS3	WS3	WS4	WS4	WS5	WS5
		Sample Type:		SOIL						
		Top Depth (m):		3.0	0.3	0.6	0.6	2.0	0.6	2.0
		Date Sampled:		07-Feb-2022						
		Asbestos Lab:			DURHAM		DURHAM		DURHAM	
Determinand	Accred.	SOP	Units	LOD						
pH	M	2010		4.0		8.4		8.1		8.5
Moisture	N	2030	%	0.020	25	14	26	20	25	28
Stones and Removed Materials	N	2030	%	0.020		< 0.020		< 0.020		< 0.020
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40		0.49		0.68		1.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		0.041		< 0.010		0.017
Cyanide (Free)	M	2300	mg/kg	0.50		< 0.50		< 0.50		< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50		< 0.50		< 0.50		< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		9.2		2.1		3.0
Arsenic	M	2450	mg/kg	1.0		19		16		7.0
Cadmium	M	2450	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Chromium	M	2450	mg/kg	1.0		12		11		12
Copper	M	2450	mg/kg	0.50		20		17		35
Mercury	M	2450	mg/kg	0.10		0.21		0.60		< 0.10
Nickel	M	2450	mg/kg	0.50		14		12		12
Lead	M	2450	mg/kg	0.50		80		120		28
Selenium	M	2450	mg/kg	0.20		< 0.20		< 0.20		< 0.20
Zinc	M	2450	mg/kg	0.50		25		31		63
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50		< 0.50		< 0.50
Organic Matter	M	2625	%	0.40		9.0		4.8		3.5
Acenaphthene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Acenaphthylene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Anthracene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Chrysene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Fluoranthene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Fluorene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Naphthalene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Phenanthrene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Pyrene	M	2700	mg/kg	0.10		< 0.10		< 0.10		< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0		< 2.0		< 2.0		< 2.0
Total Phenols	M	2920	mg/kg	0.10		< 0.10		< 0.10		< 0.10

## Results Soil

**Project: C15668 Land off Commons Road, Old Leake, Boston**

<b>Client: Ground Engineering Limited</b>		<b>Chemtest Job No.:</b>		22-04951	22-04951	22-04951	22-04951	22-04951	22-04951	22-04951
Quotation No.:	<b>Chemtest Sample ID.:</b>		1369662	1369663	1369664	1369665	1369666	1369667	1369668	
Order No.: C15568	<b>Client Sample Ref.:</b>		D6	D1	D2	D2	D5	D2	D5	
	<b>Sample Location:</b>		WS2	WS3	WS3	WS4	WS4	WS5	WS5	
	<b>Sample Type:</b>		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	<b>Top Depth (m):</b>		3.0	0.3	0.6	0.6	2.0	0.6	2.0	
	<b>Date Sampled:</b>		07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	07-Feb-2022	
	<b>Asbestos Lab:</b>			DURHAM		DURHAM		DURHAM		
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>						
ACM Type	U	2192		N/A		-		-		-
Asbestos Identification	U	2192		N/A		No Asbestos Detected		No Asbestos Detected		No Asbestos Detected
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Black
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	1400	< 10	< 10	< 10	< 10

## Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

## **Report Information**

### **Key**

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U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



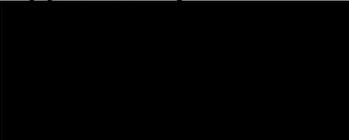
# Final Report

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**Report No.:** 22-08937-1  
**Initial Date of Issue:** 15-Mar-2022  
**Client** Ground Engineering Limited  
**Client Address:** Newark Road  
Peterborough  
Cambridgeshire  
PE1 5UA  
**Contact(s):** John Gibb  
**Project** C15568 Land off Commons Road,  
Old Leake, Boston

<b>Quotation No.:</b>		<b>Date Received:</b>	10-Mar-2022
<b>Order No.:</b>	C15568	<b>Date Instructed:</b>	10-Mar-2022
<b>No. of Samples:</b>	3		
<b>Turnaround (Wkdays):</b>	5	<b>Results Due:</b>	16-Mar-2022
<b>Date Approved:</b>	15-Mar-2022		

**Approved By:**



**Details:** Stuart Henderson, Technical  
Manager

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# Results Water

**Project: C15568 Land off Commons Road, Old Leake, Boston**

Client: Ground Engineering Limited		Chemtest Job No.:		22-08937	22-08937	22-08937
Quotation No.:		Chemtest Sample ID.:		1388043	1388044	1388045
Order No.: C15568		Client Sample Ref.:		W1	W1	W1
		Sample Location:		WS1	WS3	WS5
		Sample Type:		WATER	WATER	WATER
		Top Depth (m):		1.30	1.40	1.09
		Date Sampled:		08-Mar-2022	08-Mar-2022	08-Mar-2022
Determinand	Accred.	SOP	Units	LOD		
pH	U	1010		N/A	8.2	
Boron (Dissolved)	U	1455	µg/l	10.0	17	
Sulphate	U	1220	mg/l	1.0	11	
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	
Sulphide	U	1325	mg/l	0.050	< 0.050	
Arsenic (Dissolved)	U	1455	µg/l	0.20	2.9	
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	
Chromium (Dissolved)	U	1455	µg/l	0.50	8.8	
Copper (Dissolved)	U	1455	µg/l	0.50	2.4	
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	
Nickel (Dissolved)	U	1455	µg/l	0.50	1.0	
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	
Selenium (Dissolved)	U	1455	µg/l	0.50	0.56	
Zinc (Dissolved)	U	1455	µg/l	2.5	5.1	
Acenaphthene	N	1700	µg/l	0.010	< 0.010	
Acenaphthylene	N	1700	µg/l	0.010	< 0.010	
Anthracene	N	1700	µg/l	0.010	< 0.010	
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010	
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010	
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010	
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010	
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010	
Chrysene	N	1700	µg/l	0.010	< 0.010	
Dibenz(a,h)Anthracene	N	1700	µg/l	0.010	< 0.010	
Fluoranthene	N	1700	µg/l	0.010	< 0.010	
Fluorene	N	1700	µg/l	0.010	< 0.010	
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010	
Naphthalene	N	1700	µg/l	0.010	< 0.010	
Phenanthrene	N	1700	µg/l	0.010	< 0.010	
Pyrene	N	1700	µg/l	0.010	< 0.010	
Total Of 16 PAH's	N	1700	µg/l	0.20	< 0.20	
Total Phenols	U	1920	mg/l	0.030	< 0.030	
Total Hardness as CaCO3	U	1270	mg/l	15	110	
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10

# Results Water

**Project: C15568 Land off Commons Road, Old Leake, Boston**

Client: Ground Engineering Limited		Chemtest Job No.:		22-08937	22-08937	22-08937	
Quotation No.:		Chemtest Sample ID.:		1388043	1388044	1388045	
Order No.: C15568		Client Sample Ref.:		W1	W1	W1	
		Sample Location:		WS1	WS3	WS5	
		Sample Type:		WATER	WATER	WATER	
		Top Depth (m):		1.30	1.40	1.09	
		Date Sampled:		08-Mar-2022	08-Mar-2022	08-Mar-2022	
Determinand	Accred.	SOP	Units	LOD			
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Chloromethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Vinyl Chloride	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromomethane	U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Chloroethane	U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromochloromethane	U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Trichloromethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tetrachloromethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Benzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Trichloroethene	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Dibromomethane	U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Bromodichloromethane	U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Toluene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0

# Results Water

**Project: C15568 Land off Commons Road, Old Leake, Boston**

Client: Ground Engineering Limited		Chemtest Job No.:			22-08937	22-08937	22-08937
Quotation No.:		Chemtest Sample ID.:			1388043	1388044	1388045
Order No.: C15568		Client Sample Ref.:			W1	W1	W1
		Sample Location:			WS1	WS3	WS5
		Sample Type:			WATER	WATER	WATER
		Top Depth (m):			1.30	1.40	1.09
		Date Sampled:			08-Mar-2022	08-Mar-2022	08-Mar-2022
Determinand	Accred.	SOP	Units	LOD			
Trans-1,3-Dichloropropene	N	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
1,1,2-Trichloroethane	U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
Tetrachloroethene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Dibromochloromethane	U	1760	µg/l	10	[C] < 10	[C] < 10	[C] < 10
1,2-Dibromoethane	U	1760	µg/l	5	[C] < 5	[C] < 5	[C] < 5
Chlorobenzene	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Ethylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
m & p-Xylene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
o-Xylene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Styrene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tribromomethane	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Isopropylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Bromobenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	[C] < 50	[C] < 50	[C] < 50
N-Propylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
N-Butylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	[C] < 50	[C] < 50	[C] < 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	[C] < 2.0	[C] < 2.0	[C] < 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0	[C] < 1.0

## Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

<b>Sample:</b>	<b>Sample Ref:</b>	<b>Sample ID:</b>	<b>Sample Location:</b>	<b>Sampled Date:</b>	<b>Deviation Code(s):</b>	<b>Containers Received:</b>
1388043	W1		WS1	08-Mar-2022	C	Coloured Winchester 1000ml
1388044	W1		WS3	08-Mar-2022	C	Coloured Winchester 1000ml
1388045	W1		WS5	08-Mar-2022	C	Coloured Winchester 1000ml

## Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8- C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

## **Report Information**

### **Key**

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U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)