

Steve O'Halloran
Reside Holding Ltd
The Dutch House
32-134 High Street
Dorking
RH4 1BG



21st April 2022

Our ref. SH/22/LP2910-Issue 2

Re: LP2910 Woodfords, Shipley Road- Additional Chemical Testing
Issue 2: Amendment to proposed layout

Dear Steve

1 Introduction

Leap Environmental Ltd (hereafter referred to as **LEAP**) has been appointed by Reside Holdings Ltd to undertake additional investigation of the potential contamination hotspots at a site known as Woodfords, Shipley Road, Southwater RH13 9BQ [Figure 1, Appendix B] to provide information on the geochemical composition of the soils. The proposed development comprises 73 No. residential properties along with associated access roads and garages. A central section of the site will be green space occupied by large trees. Several attenuation basins/ponds are proposed along the sites south-eastern boundary as illustrated in [Drawing Ref: 102108-BEL-SL-01, Appendix B].

The subject area is c.3.8Ha and comprises a central residential property with outbuildings, swimming pool and stable. The northern field contains a riding school, and the southern field is used as a paddock.

The site has been the subject of previous investigations by **LEAP**, and the reader is referred to these earlier reports which should be read in conjunction with this report.

- Phase I Desk Study at Woodfords, Shipley Road, Southwater RH13 9BQ ref: LP2354 Issue 3 dated 20th September 2021 (Original Issue 10th November 2020) by **LEAP**

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- Phase II Site Investigation at Woodfords, Shipley Road, Southwater RH13 9BQ ref LP2826 issued on 8th March 2022 by LEAP

1.1 Objectives

Several potential sources of localised contamination were identified during previous Phase I and Phase II investigations by LEAP:

- Oil tank behind main residence
- Mounded material under trees along central drainage ditch
- Area used for the burning of mixed wastes
- Abandoned old oil tank
- Yard area
- Construction wastes [concrete, blacktop etc] north-west corner of site

There are also 2 areas of banded materials, one along the western boundary and one along the eastern boundary of sand school. These were investigated as part of LP2826. The areas listed above could not be investigated during the Phase II investigation due to restricted access to the centre of the site.

The locations of the above sources are illustrated in Figure 3, Appendix B.

The objective of this investigation was to screen these areas for contamination by excavating shallow hand dug pits up to 1mbgl with soils collected for laboratory testing for LEAPs standard soil suite (metals, PAH and asbestos) and Total Petroleum Hydrocarbons.

2 Fieldwork

2.1 Methodology

LEAP has carried out an intrusive investigation and laboratory analysis to fulfil the objectives of this investigation. The intrusive investigations were carried out on 07th April 2022 and included the following tasks:

- 6 No. Hand dug pits up to 1.2 mbgl, excavated using hand tools
- Chemical Laboratory tests on soil including 6 No. LEAP standard soil suite tests and 4 No. Petroleum Hydrocarbon tests.
- 1 No. fragment of suspected ACM was sent for Laboratory Determination
- 1 No. piece of Blacktop recovered for coal tar screening with PAK spray by LEAP

The weather during the visit was predominantly cool and sunny.

A site plan for the location of each excavation is presented in Figure 4 of Appendix B and photographs in Appendix C.

2.2 Investigation Rationale

Table 1 Rationale and Scope for Investigation Locations as illustrated on Figure 4 and 5, Appendix B:

Trial Hole Location	Rationale	Proposed Depth (m bgl)	Achieved Depth (m bgl)	Additional Comments
HP1	To screen for potential heating oil contamination to soils underlying the residential oil tank	1	0.2	Access was very restricted, digging by hand trowel was the only available method. Shallow sample adequate for investigative aims.
HP2	Mounded material along tree line, appeared to be the dugout products of burning area due north (LP2354).	1	1.1	Site occupier advised mounds are the remains of the old tennis court.
HP3	Southern end of the bund along sand school, used as a burning area for mixed wastes	1	0.2	Within 10m of underground HV cable, deep excavation prohibited. Terminated at 0.2 after possible ACM (AIB) found. Shallow sample adequate for investigative aims.
HP4	Old single skinned unbunded oil tank, lying on its side.	1	1.1	Site occupier advised tank was bought to heat swimming pool but never installed.
HP5-planned	The yard area not covered by hard standing which has been used to store small plant and construction materials	1	0	No excavation of area was possible due to proximity of underground high voltage cable.
HP5 - undertaken	Southern end of the northern field's western bund	1	1.2	
HP6	Old, abandoned access gate piled up with construction wastes noted LP2354. Far less waste was noted on this visit, but concrete blocks remain and small (c.1m mound) of made ground, which was targeted for investigation.	1	0.6	Terminated at 0.6m due to hitting a concrete obstruction.

A revised plan of the location is presented in Figure 5, Appendix B to take account of the repositioned hand pits.

2.3 Additional Observations

During the site investigation it was noted there were tiles in the yard area that potentially may contain asbestos. As these are not within the soils, they are outside the scope of this investigation. A photo has been included in Appendix C for reference.

3 Geology

The excavated hand pits were logged, and samples were collected. The logs created for each hand auger pit are presented in Appendix D.

LP2826 identified the site was underlain by topsoil over orangish brown to brown mottled grey to light grey slightly silty CLAY [Weald Clay]. The areas of investigation were mainly made ground, with only HP4 digging directly into the natural soils and HP2 penetrating potential natural soils at its base.

Table 2 Key observations from excavation logs

Trial Hole/Test Location	Geology	Key observations/Anthropogenic inclusions
HP1	Silty Clayey TOPSOIL	Brick, glass, ceramic tile
HP2	Sandy silty gravelly MADE GROUND natural encountered 0.9mbgl	Blacktop, charcoal, clinker, scrap metal, geotextile, cemented sand
HP3	Clayey MADE GROUND	Burnt wood, consolidated ash, ceramic tile, scrap metal, manufactured wooden board, cemented sand. Possible ACM (AIB?) recovered.
HP4	Silty clayey TOPSOIL over sandy silty CLAY over clayey silty SAND.	Appeared natural, no anthropogenic inclusions or indicators of hydrocarbon contamination.
HP5	Clayey MADE GROUND	Occasional clinker and brick fragments
HP6	MADE GROUND	Ceramic tile, metal wire, blacktop. 1 sample of blacktop recovered for PAK testing.

4 Soil Risk Assessment

4.1 Conceptual Site Model

The initial Conceptual Site Model (CSM) is described in LP2354 and a revised CSM was formed following LP2826 Phase II site investigations.

Areas of the CSM requiring further investigation, as identified in LP2826, were the inaccessible areas in the centre of the site as listed in section 1.1 (2 oil tanks, mounded material, yard area, burning area and north-western corner of the site).

The site is underlain by the Weald Clay an unproductive non-aquifer, furthermore groundwater was not encountered during the Phase II investigation, as such on site contamination was not considered to pose a risk to groundwater. No significant contamination was noted during LP2826 and therefore surface water was not considered at risk. However, the report did note that this assessment would require revision if significant contamination were discovered in association with the oil tank (HP4).

4.2 Laboratory Testing

Selected samples of soil were subjected to laboratory testing.

The suite of soil contaminant analysis considered the potential contaminants of concern identified in the CSM (heavy metals, PAHs, Petroleum Hydrocarbons). Soil samples were also analysed for pH and total organic carbon (TOC) to support the selection of assessment criteria in the subsequent quantitative risk assessment (QRA) for human health.

Sampling techniques and storage have been undertaken as per BS 10175:2011+A1:2013 Code of Practice for Investigation of Potentially Contaminated Sites. The laboratory testing was carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex. Where available, the tests for soils procedures were UKAS and MCERTS accredited.

The following analyses were completed on selected soil samples to target the areas of potential contamination identified:

- 6 No. metals (As, Cd, Cr, CrVI, Cu, Pb, Hg, Ni, Se, Zn)
- 6 No. USEPA 16 PAHs
- 7 No. Asbestos identification [6 No soil samples and 1 No. board fragment]
- 4 No. Petroleum Hydrocarbons
- 6 No. pH

- 6 No. TOC

The laboratory test results are summarised below and have been compared to Tier 1 Site Assessment Criteria based on published Soil Guideline Values (SGVs), Category 4 Screening Levels (C4SLs), or LQM/CIEH Generic Assessment Criteria (GAC) in Appendix E. The laboratory analytical certificates are provided in Appendix E.

The results are summarised in table 3 below.

Table 3: Summary of Soil Contamination Test Results for the shallow soils

Determinand	Number of samples	Number >LOD	Maximum Conc. (mg/kg unless otherwise stated)	Generic Assessment Criteria (mg/kg)	Number of Exceedances
METALS					
Arsenic	6	6	38.6	37	1
Cadmium	6	2	0.9	22	0
Chromium	6	6	49.3	910	0
Hexavalent Chromium	6	0	Blod	21	0
Copper	6	0	Blod	2,400	0
Lead	6	0	Blod	200	0
Mercury ¹	6	0	Blod	40	0
Nickel	6	0	Blod	130	0
Selenium	6	0	Blod	250	0
Zinc	6	0	blod	3,700	0
ASBESTOS					
Asbestos	7	0	None detected	Presence	0
HYDROCARBONS					
Benzo(a)pyrene ²	6	1	9	5.0	1
Naphthalene ³	6	5	0.3	2.3	0
Total PAHs	6	5	96.4	n.v.	-
Total (>C5-C40) Ali/Aro	4	4	221	n.v.	-

Notes to table

1. Assessment criterion based on inorganic mercury
2. As a surrogate marker for genotoxic PAH

3. As a marker compound for threshold PAH
n.v. – no appropriate value blod- Below limit of detection

For heavy metals one sample (HP2) of the six samples tested recorded Arsenic at concentrations in excess of the Generic Assessment Criteria (GAC) values for a residential development with private gardens. However, it is noted that the area of the tree line (the area around HP2) is earmarked for Public Open Space. The arsenic concentration recorded is significantly below the GAC value of 79mg/kg for residential public open space (POSResi). No other metal concentrations were recorded above GAC values.

Benzo(a)pyrene concentrations in excess of the GAC value were recorded in HP6 in the far northwest of the site. No other PAH exceedance were reported. Given that no PAH exceedances have been encountered across the wider site PAH impacted soils are considered localised to the area around HP6. The area around HP6 is proposed for an electrical substation and access road. As such, it is assumed the area will be hard landscaped and an active contaminant migration pathway will not be present.

No petroleum hydrocarbon concentrations were recorded above the GAC values therefore hydrocarbon contamination is not considered to pose a significant threat to Human Health at any of the sample locations.

No asbestos was detected within any of the samples tested.

4.2.1 PAK testing

The sample of blacktop collected from HP6 was tested by LEAP with PAK spray for the presence of coal tar. The field test did not indicate the presence of coal tar, although this should not be taken as absolute proof of its absence, noting that slightly elevated Benzo(a)pyrene was recorded in the soil sample taken from this location.

5 Soil Content

The hand pits encountered anthropogenic inclusions including glass, clinker, tile, metal and brick fragments. Where the soils are found to contain glass and metal fragments (HP2 in the mounded material between the trees and HP3 near the burning area) they will be unsuitable to be retained at surface in gardens or areas of soft landscaping. Given the small volumes in these areas, it may be considered more appropriate to remove these soils as part of the redevelopment to be disposed of offsite. Initial chemical results indicate these soils would be suitable for re-use beneath structures or areas of hardstanding.

6 Conclusions and Recommendations

This additional investigation targeted at areas of potential concern highlighted within LEAP's previous investigations Refs. LP2354 and LP2826. These comprised:

- Oil tank behind the main residence
- Mounded soils along the tree line
- Burning area
- Disused Single Skinned oil tank
- Area of construction waste
- Construction waste in former access gate

Chemical testing of the soils recovered generally recorded contaminant concentrations below the assessment criteria values for a residential development with private gardens. Two exceedances were recorded, these comprised an elevated arsenic concentration recorded in HP2 and an elevated benzo(a)pyrene concentrations recorded in HP6. However, it is noted that in the case of the HP2 arsenic exceedance this area is earmarked for proposed public open space. The arsenic concentration recorded is significantly below the assessment criteria value for public open space (POSres). Furthermore, the HP6 excavation recorded fragments of blacktop within the made ground and it is considered likely that this represents the source of the elevated benzo(a)pyrene concentration. No asbestos was identified in the samples tested.

Anthropogenic material including glass and metal were recorded within the made ground in some of the hand pits. This material would make the soils unsuitable should they be retained at surface in gardens or areas of soft landscaping. Given the limited extent of the made ground in these areas excavation and disposal off site may be preferable. Alternatively, initial chemical testing indicates these soils could be retained beneath structures or areas of hardstanding.

Investigation has not been possible beneath the footprint of the existing properties and stables and as with any development there remains the potential for as yet unidentified contamination for which a careful watch should be kept during construction. Should such material be encountered during the construction phase a suitable qualified environmental consultant should be contacted.

Please do not hesitate to contact the undersigned if you require any further information.

Yours faithfully,



Susan Haynes
Graduate/Technical Assistant
BSc

Enc.

Appendix A – Limitations

Appendix B- Figures

Appendix C – Photos

Appendix D – Logs

Appendix E – Chemical Test Results

APPENDIX A - LIMITATIONS

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode¹, although this is subject to

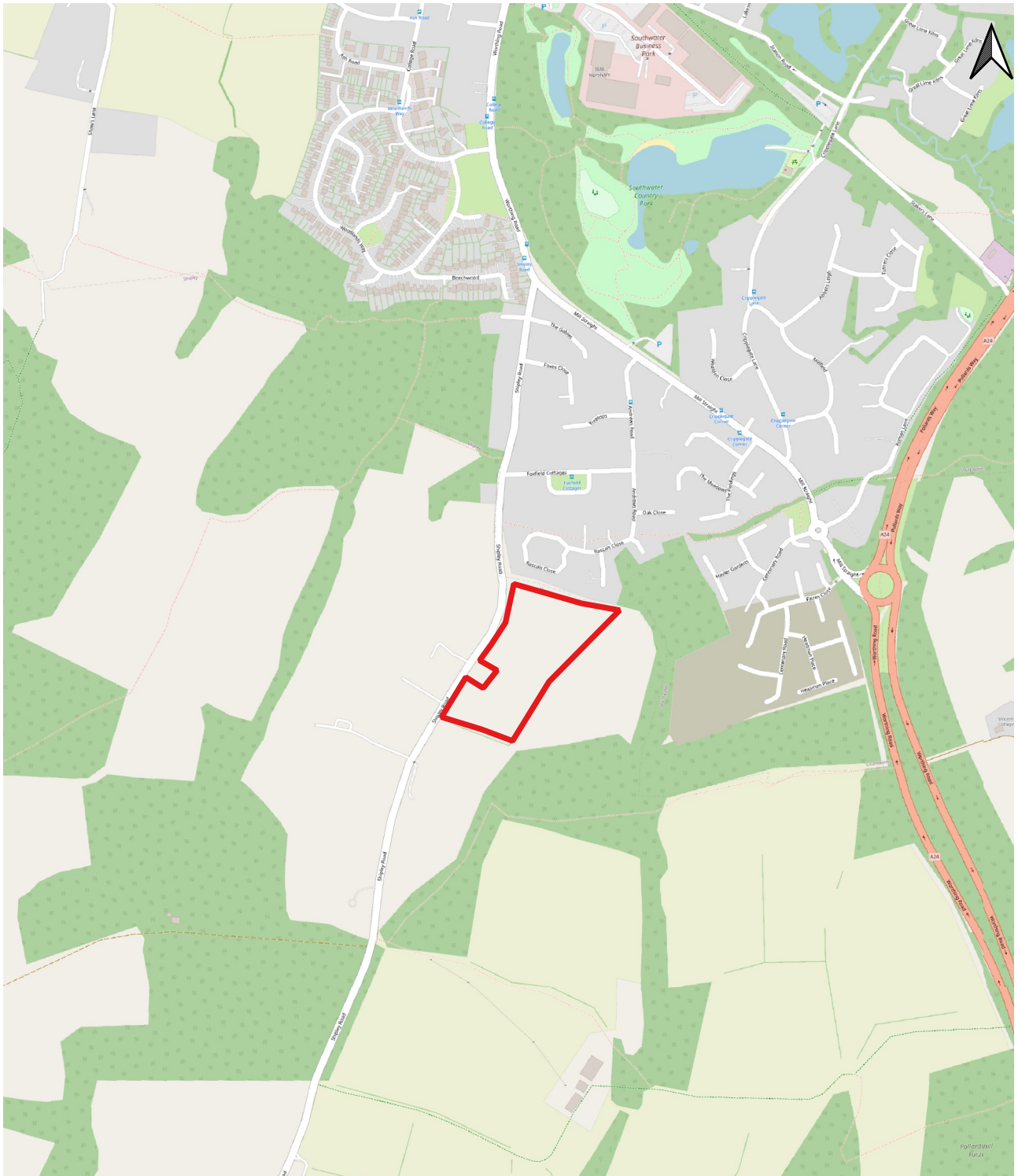
¹ BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

APPENDIX B - FIGURES

Figures



Basemap: © OpenStreetMapcontributors
 Note 1: Elevations not shown



Client: Reside

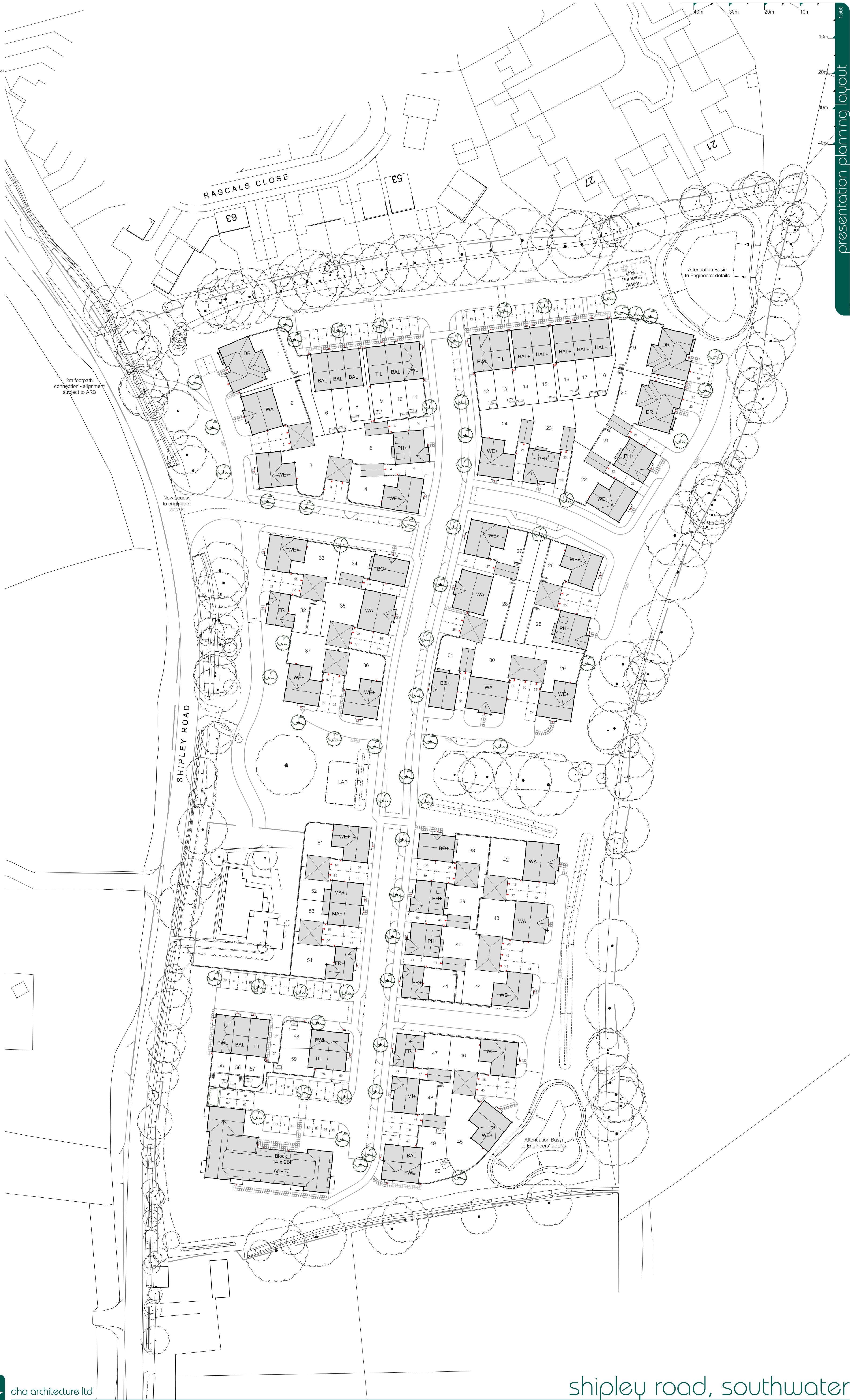
Title: Site Location

Project ID: LP2910

Project: Woodfords, Shipley Road, Southwater

Date: 23/02/22

Figure No. 1





Basemap: © gridreferencefinder.com



Client:	Reside Developments	Date:	02 nd October 2020	Project ID:	LP2910
Project:	Woodfords, Shipley Road, Southwater RH13 9BQ	Title:	Site Walkover notes and current site usage	Fig. No.	3



Basemap: Supplied by the client
 Note 1: Exploratory holes have been positioned by 3rd party surveyors and should therefore only be taken as approximate
 Note 2: Exploratory holes shown are not to scale
 Note 3: Elevations not shown

	Client:	Reside Developments	Title:	Site Investigation Locations	Project ID:	LP2910
	Project:	Woodfords, Shipley Road, Southwater	Date:	17/03/2022	Figure No.	4



Basemap: © Google

	Client:	Reside	Date:	08 th April 2022	Project ID:	LP2910
	Project:	Shipley Road, Southwater	Title:	Hand Pit locations	Fig. No.	5

APPENDIX C – PHOTOGRAPHS

Photographs



Photo 1 – Access path to HP1, oil tank to left and main residence to the right.



Photo 2:
Oil tank on Plinth



Photo 3:
HP1 location



Photo 4:
HP2 location marked by white spray and
green flag (centre of photo)



Photo 5:
Mid-excavation of HP2



Photo 6:
HP2 arisings



Photo 7:
HP2 reinstated



Photo 8- HP3 general location [wooden post within burning area approximately locates High Voltage cable]



Photo 9:
HP3 location



Photo 10:
HP3 possible ACM (AIB?)



Photo 11:
Old oil tank



Photo 12:
HP4 arisings



Photo 13:
HP5 rear of year, southern extremity of western bund in northern field



Photo 14 - HP5 arisings



Photo 15- HP6 general location



Photo 16- Possible ACM in yard area.

Logs



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Trial Pit Log

Trialpit No

HP1

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords: -
Level:

Date
07/04/2022

Location: Southwater

Dimensions
(m):

Depth
0.20



Scale
1:25

Logged
SH

Client: Reside Holdings Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.20			Dark brown clayey silt MADEGROUND with fragments of brick, glass, ceramic tile and frequent roots and rootlets. ----- End of pit at 0.20 m	1
								2
								3
								4
								5

Remarks: hand dug pit to 0.2m restricted access (limited space in between house wall, tank and hedge)- dug with hand trowel, through hedge roots. Dry. All arisings were sampled, therefore not backfilled.

Stability: STABLE

AGS



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Trial Pit Log

Trialpit No

HP2

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords: -
Level:

Date
07/04/2022

Location: Southwater

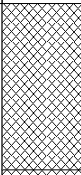
Dimensions
(m):

Depth
1.10

Scale
1:25

Logged
SH

Client: Reside Holdings Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.35	ES		0.55			Dark brown sandy silty gravelly MADE GROUND with occasional pockets of yellow medium course sand. Gravels of flint, blacktop and charcoal. Rare fragments of scrap metal. <i>Rare pockets of light reddish brown clayey sand to 0.1m</i> <i>Fabric Membrane noted at 0.3m</i> <i>Clinker and fragments of cemented sand (screed?) below 0.3m</i>	
	0.80	ES		0.90			Mid brown slightly sandy reworked clay - MADE GROUND. Occasional fragments of brick, clinker and glass, cobbles of flint and brick.	
				1.10			Light brown / grey brown, mottled orange silty CLAY with rare fine gravel of ironstone.	1
							End of pit at 1.10 m	
								2
								3
								4
								5

Remarks: Hand dug pit to 1.1m, dry and backfilled with arisings.

Stability: STABLE

AGS

Trial Pit Log

Trialpit No

HP3

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords:	-
Level:	

Date
07/04/2022

Location: Southwater

Dimensions
(m):

Scale
1:25

Client: Reside Holdings Ltd

Depth
0.20

Logged
SH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.20			Sandy gravelly clayey dark brown / greyish brown MADE GROUND. Gravels of flint, burnt wood, consolidated ash. Large fragments of manufactured board (wood), ceramic tiles, scrap metal and cemented sand. Possible ACM recovered.	End of pit at 0.20 m
	0.20	ES						

Remarks:	Hand dug pit to 0.2m into burning area, sufficient depth achieved to enable sampling. Dry and backfilled with arisings.
----------	---

Stability: STABLE

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Trial Pit Log

Trialpit No

HP4

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords: -
Level:

Date
07/04/2022

Location: Southwater

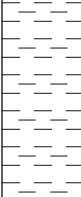
Dimensions
(m):

Depth
1.10

Scale
1:25

Logged
SH

Client: Reside Holdings Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.05	ES		0.10			Mid brown slightly silty clay TOPSOIL with frequent rootlets	
	0.50	ES					Light brown / grey brown occasionally mottled orange slightly silty CLAY with rare coarse sand.	
				0.80			Orange brown clayey silty SAND.	1
				1.10			End of pit at 1.10 m	
								2
								3
								4
								5

Remarks: Hand dug pit to 1.1m, dry and backfilled with arisings.

Stability: STABLE

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Trial Pit Log

Trialpit No

HP5

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords: -
Level:

Date
07/04/2022

Location: Southwater

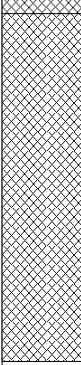
Dimensions
(m):

Depth
1.20

Scale
1:25

Logged
SH

Client: Reside Holdings Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.05			Mid brown silty sandy clayey MADE GROUND with occasional gravels of clinker Grey mottled orange brown reworked silty clay MADE GROUND with occasional brick fragments and fine gravel of ironstone.	
	1.00	ES		1.20				1
							End of pit at 1.20 m	2
								3
								4
								5

Remarks: Hand dug pit to 1.2m, dry and backfilled with arisings.

Stability: STABLE

AGS



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Trial Pit Log

Trialpit No

HP6

Sheet 1 of 1

Project Name: Woodfords Shipley Lane

Project No.
LP2910

Co-ords: -
Level:

Date
07/04/2022

Location: Southwater

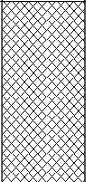
Dimensions
(m):

Depth
0.60

Scale
1:25

Logged
SH

Client: Reside Holdings Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.01	ES					Dark brown gravelly silty sandy MADE GROUND. Gravels of flint and rare ceramic tile, metal wire and blacktop.	
	0.40	ES		0.60				
							End of pit at 0.60 m	
								1
								2
								3
								4
								5

Remarks: Hand dug pit to 0.6, terminated due to hitting concrete fragment. Dry and backfilled with arisings.

Stability: STABLE

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APPENDIX E – CHEMICAL TEST RESULTS

Chemical Test Results

LP2910 Woodfords Additional Testing
Table G1: Soil Analytical Results and Human Health QRA

					Sample Location: HPIHP2HP3HP4HP5HP6HP3							
					Depth (m): 0.00 - 0.200.350.00 - 0.200.500.200.400.2							
					Matrix: MGMGMGSOILMGMGACM?							
					Date Sampled: 07/04/202207/04/202207/04/202207/04/202207/04/202207/04/202207/04/2022							
Determinand	Units	LOD	Assessment Criteria Value*	Source	Maximum Detected							
Miscellaneous												
pH	pH units	0.1	n.v.	n.a.	8.1	8.1	8.1	7.5	7.9	8	7.8	-
Total Organic Carbon	%	0.1	n.v.	n.a.	7.2	5.4	7.2	3.8	0.38	3.4	5.4	-
Soil Organic Matter (calculated)**	%	-	n.v.	n.a.	0							-
Metals												
Arsenic	mg/kg	2	37	C4SL	38.6	22.2	38.6	19.2	13.7	13.3	14.2	-
Cadmium	mg/kg	0.1	22	C4SL	0.9	0.8	0.9	< 0.5	< 0.5	< 0.5	< 0.5	-
Chromium	mg/kg	0.5	910	S4UL	49.3	39.8	49.3	40.3	40.5	34.1	39	-
Chromium VI	mg/kg	1	21	C4SL	<0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Copper	mg/kg	2	2,400	S4UL	0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Lead	mg/kg	2	200	C4SL	0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Mercury	mg/kg	1	40	S4UL	<0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Nickel	mg/kg	0.5	130	S4UL	0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Selenium	mg/kg	3	250	S4UL	<1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Zinc	mg/kg	2	3,700	S4UL	0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	-
Asbestos												
Asbestos Identification	-	-	Presence	n.a.	n.a.	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Quantification	%	0.001	Presence	n.a.	0	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)												
Benzo(a)pyrene	mg/kg	0.1	5.0	C4SL	9	1.6	0.6	0.24	< 0.1	0.7	9	-
Naphthalene	mg/kg	0.1	5.6	S4UL	0.3	0.1	0.3	0.07	< 0.1	< 0.1	0.1	-
Acenaphthylene	mg/kg	0.1	n.v.	n.a.	0.4	0.2	< 0.1	0.03	< 0.1	< 0.1	0.4	-
Acenaphthene	mg/kg	0.1	n.v.	n.a.	0.8	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	0.8	-
Fluorene	mg/kg	0.1	n.v.	n.a.	0.7	< 0.1	< 0.1	0.03	< 0.1	< 0.1	0.7	-
Phenanthrene	mg/kg	0.1	n.v.	n.a.	7	1	0.4	0.06	< 0.1	< 0.1	7	-
Anthracene	mg/kg	0.1	n.v.	n.a.	1.9	0.2	0.2	0.02	< 0.1	< 0.1	1.9	-
Fluoranthene	mg/kg	0.1	n.v.	n.a.	15.1	2.7	0.5	0.13	< 0.1	0.4	15.1	-
Pyrene	mg/kg	0.1	n.v.	n.a.	13	1.9	0.6	0.15	< 0.1	0.4	13	-
Benzo(a)anthracene	mg/kg	0.1	n.v.	n.a.	6.9	1.5	0.3	0.11	< 0.1	0.1	6.9	-
Chrysene	mg/kg	0.1	n.v.	n.a.	8.1	2	0.3	0.16	< 0.1	0.1	8.1	-
Benzo(b)fluoranthene	mg/kg	0.1	n.v.	n.a.	8.3	1.6	0.6	0.23	< 0.1	0.8	8.3	-
Benzo(k)fluoranthene	mg/kg	0.1	n.v.	n.a.	11.6	1.7	0.6	0.21	< 0.1	0.7	11.6	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	n.v.	n.a.	6.9	1.1	0.2	0.27	< 0.1	0.2	6.9	-
Dibenzo(ah)anthracene	mg/kg	0.1	n.v.	n.a.	1.1	0.2	< 0.1	0.07	< 0.1	< 0.1	1.1	-
Benzo(ghi)perylene	mg/kg	0.1	n.v.	n.a.	5.6	1	0.2	0.37	< 0.1	0.3	5.6	-
Total PAH (16)	mg/kg	0.1	n.v.	n.a.	96.4	17	5	2.15	< 0.4	3.9	96.4	-
Petroleum Hydrocarbons												
Benzene	µg/kg	0.01	410	C4SL	0	-	-	-	-	-	-	-
Toluene	µg/kg	0.01	290,000	S4UL	0	-	-	-	-	-	-	-
Ethylbenzene	µg/kg	0.01	110,000	S4UL	0	-	-	-	-	-	-	-
Xylenes	µg/kg	0.01	130,000	S4UL	0	-	-	-	-	-	-	-
Methyl tert-Butyl Ether	µg/kg	0.01	n.v.	n.a.	0	-	-	-	-	-	-	-
>C5-C6 Aliphatic	mg/kg	0.01	78	S4UL	0	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-
>C6-C8 Aliphatic	mg/kg	0.01	230	S4UL	0	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-
>C8-C10 Aliphatic	mg/kg	1	65	S4UL	0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-
>C10-C12 Aliphatic	mg/kg	1	330	S4UL	0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-
>C12-C16 Aliphatic	mg/kg	1	2,400	S4UL	2.1	< 1.0	< 1.0	2.1	< 1.0	-	-	-
>C16-C21 Aliphatic	mg/kg	1	92,000	S4UL	7.6	< 1.0	< 1.0	7.6	< 1.0	-	-	-
>C21-C35 Aliphatic	mg/kg	1	92,000	S4UL	68.5	7.3	24.5	68.5	< 1.0	-	-	-
>C35-C40 Aliphatic	mg/kg	1	92,000	S4UL	32.4	1.5	18	32.4	1.9	-	-	-
>C5-C7 Aromatic	mg/kg	0.01	140	S4UL	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-
>C7-C8 Aromatic	mg/kg	0.01	290	S4UL	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-
>C8-C10 Aromatic	mg/kg	1	83	S4UL	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-
>C10-C12 Aromatic	mg/kg	1	180	S4UL	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-
>C12-C16 Aromatic	mg/kg	1	330	S4UL	1.3	< 1.0	< 1.0	1.3	< 1.0	-	-	-
>C16-C21 Aromatic	mg/kg	1	540	S4UL	8	< 1.0	< 1.0	8	< 1.0	-	-	-
>C21-C35 Aromatic	mg/kg	1	1,500	S4UL	77.4	22.2	58.3	77.4	3.9	-	-	-
>C35-C40 Aromatic	mg/kg	1	1,500	S4UL	34.2	7.9	34.2	23.5	4	-	-	-
Total (>C5-C40) Ali/Aro	mg/kg	1	n.v.	-	221	38.9	135	221	9.7	-	-	-

* Assuming 2.5% SOM for organic compounds
** - Soil Organic Matter = Total Organic Carbon x 1.72

NAD = No asbestos detected
MG = Made Ground
- = not tested
n.a = not applicable
n.v = no published value available
NIV = Netherlands Intervention Value



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 22-39877

Issue: 1

Date of Issue: 19/04/2022

Contact: Susie Haynes

Customer Details: Leap Environmental Ltd
Book House
Glebelands Centre
Dorking
Surrey RH4 3HW

Quotation No: Q22-02626

Order No: LPO-5515

Customer Reference: LP2910

Date Received: 08/04/2022

Date Approved: 19/04/2022

Details: Woodfords, Shipley Rd, Southwater

Approved by:

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 22-39877, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
274498	HP2 0.35	07/04/2022	08/04/2022	Silty loam	
274499	HP1 0.00 - 0.20	07/04/2022	08/04/2022	Silty loam	
274500	HP3 0.00 - 0.20	07/04/2022	08/04/2022	Sandy silty loam	
274501	HP3 ACM?	07/04/2022	08/04/2022		
274502	HP4 0.5	07/04/2022	08/04/2022	Silty clayey loam	
274503	HP5 0.20	07/04/2022	08/04/2022	Silty loam	
274504	HP6 0.40	07/04/2022	08/04/2022	Silty loam	
274505	HP2 0.80	07/04/2022	08/04/2022		
274506	HP4 0.05	07/04/2022	08/04/2022		
274507	HP5 1.00	07/04/2022	08/04/2022		



Results Summary

Report No.: 22-39877, issue number 1

ELAB Reference	274498	274499	274500	274502	274503	274504
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	HP2	HP1	HP3	HP4	HP5	HP6
Sample Depth (m)	0.35	0.00 - 0.20	0.00 - 0.20	0.5	0.20	0.40
Sampling Date	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022

Determinand	Codes	Units	LOD						
Soil sample preparation parameters									
Moisture Content	N	%	0.1	16.4	20.6	25.7	19.6	22.2	51.2
Material removed	N	%	0.1	21.8	16.4	10.9	< 0.1	< 0.1	27.4
Description of Inert material removed	N		0	Stones/Clinker	Stones/Clinker/Brick	Stones/Clinker/Wood	None	None	Stones/Clinker/Brick
Metals									
Arsenic	M	mg/kg	1	38.6	22.2	19.2	13.7	13.3	14.2
Cadmium	M	mg/kg	0.5	0.9	0.8	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	49.3	39.8	40.3	40.5	34.1	39.0
Copper	M	mg/kg	5	88.7	85.7	198	26.5	19.8	33.2
Lead	M	mg/kg	5	185	488	256	29.0	49.0	86.3
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	34.5	28.5	24.3	32.0	17.4	21.2
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	281	493	748	86.2	103	154
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	8.1	8.1	7.5	7.9	8.0	7.8
Total Organic Carbon	N	%	0.01	7.2	5.4	3.8	0.38	3.4	5.4



Results Summary

Report No.: 22-39877, issue number 1

ELAB Reference	274498	274499	274500	274502	274503	274504
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	HP2	HP1	HP3	HP4	HP5	HP6
Sample Depth (m)	0.35	0.00 - 0.20	0.00 - 0.20	0.5	0.20	0.40
Sampling Date	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022

Determinand	Codes	Units	LOD						
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	0.3	0.1	n/t	< 0.1	< 0.1	0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	0.2	n/t	< 0.1	< 0.1	0.4
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	n/t	< 0.1	< 0.1	0.8
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	n/t	< 0.1	< 0.1	0.7
Phenanthrene	M	mg/kg	0.1	0.4	1.0	n/t	< 0.1	< 0.1	7.0
Anthracene	M	mg/kg	0.1	0.2	0.2	n/t	< 0.1	< 0.1	1.9
Fluoranthene	M	mg/kg	0.1	0.5	2.7	n/t	< 0.1	0.4	15.1
Pyrene	M	mg/kg	0.1	0.6	1.9	n/t	< 0.1	0.4	13.0
Benzo(a)anthracene	M	mg/kg	0.1	0.3	1.5	n/t	< 0.1	0.1	6.9
Chrysene	M	mg/kg	0.1	0.3	2.0	n/t	< 0.1	0.1	8.1
Benzo(b)fluoranthene	M	mg/kg	0.1	0.6	1.6	n/t	< 0.1	0.8	8.3
Benzo(k)fluoranthene	M	mg/kg	0.1	0.6	1.7	n/t	< 0.1	0.7	11.6
Benzo(a)pyrene	M	mg/kg	0.1	0.6	1.6	n/t	< 0.1	0.7	9.0
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	0.2	1.1	n/t	< 0.1	0.2	6.9
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	0.2	n/t	< 0.1	< 0.1	1.1
Benzo(g,h,i)perylene	M	mg/kg	0.1	0.2	1.0	n/t	< 0.1	0.3	5.6
Total PAH(16)	M	mg/kg	0.4	5.0	17.0	n/t	< 0.4	3.9	96.4
Naphthalene GCMS	N	mg/kg	0.01	n/t	n/t	0.07	n/t	n/t	n/t
Acenaphthylene GCMS	N	mg/kg	0.01	n/t	n/t	0.03	n/t	n/t	n/t
Acenaphthene GCMS	N	mg/kg	0.01	n/t	n/t	< 0.01	n/t	n/t	n/t
Fluorene GCMS	N	mg/kg	0.01	n/t	n/t	0.03	n/t	n/t	n/t
Phenanthrene GCMS	N	mg/kg	0.01	n/t	n/t	0.06	n/t	n/t	n/t
Anthracene GCMS	N	mg/kg	0.01	n/t	n/t	0.02	n/t	n/t	n/t
Fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	0.13	n/t	n/t	n/t
Pyrene GCMS	N	mg/kg	0.01	n/t	n/t	0.15	n/t	n/t	n/t
Benzo(a)anthracene GCMS	N	mg/kg	0.01	n/t	n/t	0.11	n/t	n/t	n/t
Chrysene GCMS	N	mg/kg	0.01	n/t	n/t	0.16	n/t	n/t	n/t
Benzo(b)fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	0.23	n/t	n/t	n/t
Benzo(k)fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	0.21	n/t	n/t	n/t
Benzo(a)pyrene GCMS	N	mg/kg	0.01	n/t	n/t	0.24	n/t	n/t	n/t
Indeno(1,2,3-cd)pyrene GCMS	N	mg/kg	0.01	n/t	n/t	0.27	n/t	n/t	n/t
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	n/t	n/t	0.07	n/t	n/t	n/t
Benzo(g,h,i)perylene GCMS	N	mg/kg	0.01	n/t	n/t	0.37	n/t	n/t	n/t
Total PAH(16) GCMS	N	mg/kg	0.04	n/t	n/t	2.15	n/t	n/t	n/t

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The Environmental Laboratory Ltd. Reg. No. 3882193



Results Summary

Report No.: 22-39877, issue number 1

ELAB Reference	274498	274499	274500	274502	274503	274504
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	HP2	HP1	HP3	HP4	HP5	HP6
Sample Depth (m)	0.35	0.00 - 0.20	0.00 - 0.20	0.5	0.20	0.40
Sampling Date	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022	07/04/2022

Determinand	Codes	Units	LOD						
TPH CWG									
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t	n/t
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t	n/t
>C8-C10 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t	n/t
>C10-C12 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t	n/t
>C12-C16 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	2.1	< 1.0	n/t	n/t
>C16-C21 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	7.6	< 1.0	n/t	n/t
>C21-C35 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	24.5	7.3	68.5	< 1.0	n/t	n/t
>C35-C40 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	18.0	1.5	32.4	1.9	n/t	n/t
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t	n/t
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t	n/t
>C8-C10 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t	n/t
>C10-C12 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t	n/t
>C12-C16 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	1.3	< 1.0	n/t	n/t
>C16-C21 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	8.0	< 1.0	n/t	n/t
>C21-C35 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	58.3	22.2	77.4	3.9	n/t	n/t
>C35-C40 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	34.2	7.9	23.5	4.0	n/t	n/t
Total (>C5-C40) Ali/Aro (HS_1D_MS+EH_CU_1D_Total)	N	mg/kg	1	135	38.9	221	9.7	n/t	n/t



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Results Summary

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Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
274498	0.35	HP2	Brown Soil, Stones, Clinker, Plant Material	No asbestos detected	n/t	n/t	n/t	n/t
274499	0.00 - 0.20	HP1	Brown Soil, Stones, Clinker, Plant Material	No asbestos detected	n/t	n/t	n/t	n/t
274500	0.00 - 0.20	HP3	Brown Soil, Stones, Clinker, Plant Material, Rusted Nails	No asbestos detected	n/t	n/t	n/t	n/t
274501	ACM?	HP3	Board Fragments	No asbestos detected	n/t	n/t	n/t	n/t
274502	0.5	HP4	Brown Soil (Clay)	No asbestos detected	n/t	n/t	n/t	n/t
274503	0.20	HP5	Brown Soil, Stones, Plant Material, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
274504	0.40	HP6	Brown Soil, Stones, Clinker, Plant Material	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 22-39877, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
PAH (GC-MS)	N	As submitted sample	19/04/2022		GC-MS
Hexavalent chromium	N	As submitted sample	12/04/2022	110	Colorimetry
pH	M	Air dried sample	14/04/2022	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	13/04/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	12/04/2022	133	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	14/04/2022	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	14/04/2022	181	GC-MS
Total organic carbon/Total sulphur	N	Air dried sample	13/04/2022	210	IR
Aliphatic hydrocarbons in soil	N	As submitted sample	12/04/2022	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	14/04/2022	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	12/04/2022	214	GC-FID
Asbestos identification	U	Air dried sample	14/04/2022	280	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 22-39877, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

