

PHASE II GROUND INVESTIGATION & GENERIC RISK ASSESSMENT REPORT
High Peak, Barkway, Hertfordshire, SG8 8EY

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CON71-BARK-001

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Barkway
Hertfordshire
SG8 8EY

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Customer:
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London Road
Barkway
Hertfordshire
SG8 8EY

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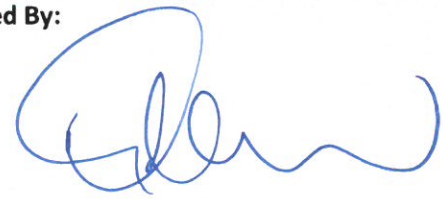

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EXECUTIVE SUMMARY

Stansted Environmental Services Limited has been commissioned by Laurel Developments to undertake a Phase II Generic Risk Assessment at High Peak, Barkway, Hertfordshire, SG8 8EY. The site is currently a garden associated with a residential property onsite and it is proposed to construct an additional three residential dwellings onsite with associated car parking and private gardens. The site may be approximated by National Grid reference TL 384347.

The site appears to have been undeveloped until the 1940s/50s when the site was part of the garden to High Peak. The majority of the site has remained undeveloped. The surrounding area has generally become developed since the 1940s; predominantly with residential developments. A garage/petrol filling station was constructed in the late 1970s some 10m west of the site.

The site is underlain by the Lowestoft Formation (chalky till) overlying the Lewes Nodular Chalk and Seaford Chalk (undifferentiated) Formation. The Lowestoft Formation has been identified as a Secondary (undifferentiated) Aquifer, corresponding to granular layers, while the underlying Lewes Nodular Chalk/Seaford Chalk Formation has been classified as a Principal Aquifer Strata by the Environment Agency. The site is shown within a Groundwater Source Protection Zone III (Total Catchment).

Site works were undertaken between 4th January and 11th January 2018 and comprised the sinking of a total of five boreholes. The exploratory holes completed give a good coverage across the site. Samples were sent for analysis to Concept Life Sciences who are both UKAS and MCERTS Accredited. The boreholes revealed the presence of the Lowestoft Formation to a minimum depth of 5.00m bgl. The chalk was not encountered. Standpipes were installed into selected boreholes with groundwater levels measured at about 1.14m bgl. The standing water level within a well onsite was measured at 6.97m bgl.

There appeared to be no olfactory or visual impact of contamination.

Contamination test results were compared with current guidance (S4ULs/C4SLs) as part of a generic risk assessment. With the exception of individual speciated PAHs, none of the standard determinands exceeded their relevant S4ULs or C4SLs. However, DBCP was found within the near surface Made Ground at the location of BH04. DBCP is a pesticide and its use was banned in the 1970s. Low levels of DBCP have led to reproductive issues in humans.

Therefore, it is recommended that an area around BH04 is removed from site and replaced with clean imported material. This will also remove the low levels of PAHs identified at this location.

Samples of the groundwater were analysed from standpipes installed during the site works and also the existing well onsite. Low levels of TPH and PAHs were noted in the groundwater sample obtained when compared to DWS. It should be noted that DWS are extremely onerous and apply to samples taken from consumers' taps. Therefore, given the very low levels identified, no ongoing risk is thought to exist to human health. In addition, the existing well onsite is to be decommissioned and so there will no access to appreciable quantities of water which could be used. Given the environmental setting of the site, it is judged that groundwater does not pose a significant risk to the site of controlled waters.

Gas monitoring has been undertaken on two occasions to date which generally indicates the site to be Characteristic Situation 1/NHBC Green.

The identified contamination has only been identified in the vicinity of BH04 at shallow depth. Therefore, it is envisaged that soils extending to about 2.5m around the location of BH04 and to a depth of 450mm should be removed from this area and replaced with clean inert materials. The clean imported material must comprise at least 150mm of organic topsoil. Suitable validation samples should be taken of the sides and base of the excavation and any imported soils should also be subject to validation testing.

This report should be submitted to the Local Authority as suitable evidence to discharge Parts (b), (c) & (e) of Condition 11 (17/00678/1), relating to contamination.

1. INTRODUCTION

Stansted Environmental Services Ltd has been commissioned by Laurel Developments, to undertake a Phase II Generic Risk Assessment for a site known as High Peak, London Road, Barkway, Hertfordshire, SG8 8EY. The purpose of the investigation was to evaluate the contamination status at the site and to develop a risk assessment based on the past uses of the site and the proposed end use.

It is the intention for the site to be redeveloped to provide a residential end-use with associated car parking, private gardens and landscaped areas.

The existing and proposed site layouts are included in Appendix A.

1.1 Planning Status

The proposed scheme, covered by North Herts District Council Planning Permission 17/00678/1 granted 5th August 2016 with conditions. This report was produced to assist in the discharge of Planning Condition 11 relating to Land Contamination, which has been reproduced below:

> *(a) No development approved by this permission shall be commenced prior to the submission to, and agreement of the Local Planning Authority of a written preliminary environmental risk assessment (Phase I) report containing a Conceptual Site Model that indicates sources, pathways and receptors. It should identify the current and past land uses of this site (and adjacent sites) with view to determining the presence of contamination likely to be harmful to human health and the built and natural environment.*
> *(b) If the Local Planning Authority is of the opinion that the report which discharges condition (a), above, indicates a reasonable likelihood of harmful contamination then no development approved by this permission shall be commenced until a Site Investigation (Phase II environmental risk assessment) report has been submitted to and approved by the Local Planning Authority which includes:*
> - *A full identification of the location and concentration of all pollutants on this site and the presence of relevant receptors, and;*
> - *The results from the application of an appropriate risk assessment methodology*
>
> *(c) No development approved by this permission (other than that necessary for the discharge of this condition) shall be commenced until a Remediation Method Statement report; if required as a result of (b), above; has been submitted to and approved by the Local Planning Authority.*
> *(d) This site shall not be occupied, or brought into use, until:*
> - *All works which form part of the Remediation Method Statement report pursuant to the discharge of condition (c) above have been fully completed and if required a formal agreement is submitted that commits to ongoing monitoring and/or maintenance of the remediation scheme.*
> - *A Remediation Verification Report confirming that the site is suitable for use has been submitted to, and agreed by, the Local Planning Authority.*
>
> *(e) Any contamination, other than that reported by virtue of condition (a) and (b), encountered during the development of this site shall be brought to the attention of the Local Planning Authority as soon as practically possible; a scheme to render this contamination harmless shall be submitted to and agreed by, the Local Planning Authority and subsequently fully implemented prior to the occupation of this site.*
>
> *Reason: To ensure that any contamination affecting the site is dealt with in a manner that safeguards human health, the built and natural environment and controlled waters.*

A Phase I Desk Study & Preliminary Risk Assessment (ref: CON71-BARK-001, dated 5th September 2017) has been produced to satisfy Part (a).

1.2 Project Objectives

The overall objective of the work has been to obtain and provide adequate information on the presence and extent of any potential contamination and should it be confirmed, provide a strategy for progression in support of the proposed residential redevelopment at High Peak in Barkway.

This report addresses Part (b) of Condition 11 of the Planning Application 17/00678/1 and should be read in conjunction with the Phase I Desktop Study report referenced above.

Attention is drawn to the fact that whilst every effort has been made to ensure the accuracy of the data supplied and any analysis derived from it, there is the potential for variations in ground conditions and contamination between and beyond the specific locations investigated. No liability can be accepted for any such variations. Furthermore, any recommendations are specific to the clients' requirements and no liability will be accepted should these be used by third parties without prior consultation with SES.

2. SITE SETTING

2.1 Site Location

The site is located at High Peak, London Road, Barkway, Hertfordshire, SG8 8EY and is approximated by the National Grid reference TL 384347. The site location is shown in Figure 1.

Figure 1: Site Location Plan



The proposed development site is rectangular in shape and covers an area of approximately 0.25 hectares. The site is bounded by residential dwellings, paddock and commercial premises.

2.2 Site Description

The site is currently in use as a residential home with gardens, known as High Peak, with the majority of the site covered by lawn, flower beds and small wooded areas. A garage and tarmac hardstanding was situated on the immediate eastern part of the site. The site is predominately flat and does not have undulating topography. A well was present to the South of the dwelling.

2.3 Geological Setting

Reference to the British Geological Survey website (www.bgs.ac.uk) indicates that the site is underlain by the Lewes Nodular Chalk and Seaford Chalk (undifferentiated) Formation.

Superficial deposits are represented by the Lowestoft Formation (chalky till).

The Lowestoft Formation has been identified as a Secondary (undifferentiated) Aquifer, corresponding to granular layers, while the underlying Lewes Nodular Chalk/Seaford Chalk Formation

has been classified as a Principal Aquifer Strata by the Environment Agency. The site is shown within a Groundwater Source Protection Zone III (Total Catchment).

The well onsite was dipped with groundwater found to at 6.97m bgl, on 31st January 2018, and the depth of the well in excess of 25m bgl.

The closest surface water feature is the River Quin a small river/stream which flows southwards about 282m to the East of the site.

3. SUMMARY OF PHASE I DESKTOP STUDY

A Desk Study & Preliminary Risk Assessment was undertaken using available sources of information and presented under reference CON71-BARK-001 – High Peak, Barkway, Hertfordshire, SG8 8EY; Phase I Desk Study & Preliminary Risk Assessment, dated 5th September 2017.

The site appears to have been undeveloped until the 1940s/50s when the site was part of the garden to High Peak. The majority of the site has remained undeveloped. The surrounding area has generally become developed since the 1940s; predominantly with residential developments. A garage/petrol filling station was constructed in the late 1970s some 10m northwest of the site.

The risk to human health from soil contamination onsite was considered very low. However, there was a risk that fuel oils may impact on the site from an adjacent garage. Further soil investigation and analysis was recommended to assess the risk to human health, buildings/services and the environment, including gas monitoring.

The initial Conceptual Site Model presented within the Phase I report is given overleaf:

Table 1: Initial Conceptual Site Model and Risk Assessment

Potential Source	Potential Contaminant	Potential Migration Pathway	Potential Receptor	Likelihood of Occurrence	Potential Magnitude	Overall Risk Classification	Discussion
Offsite Petrol Filling Station	TPH Vapours	Contact with or ingestion of contaminated soils. Inhalation of dust Migration into enclosed spaces leading to asphyxiation/explosion	Future Site Users Construction Workers Structures	Low	Medium	Low Risk	Fuel contamination may have migrated to site from the nearby PFS Vapours may have migrated to site

4. SITE WORK

The site work for the current phase of development was carried out between 4th January and 11th January 2018 on the basis of the practices set out in BS 10175:2001, BS 5930:2015, ISO 1997:2007. The locations of exploratory holes have been planned, where possible, in general accordance with CLR 4,

Five boreholes, designated BH01 to BH05, were sunk using rotary coring techniques at the positions shown on the exploratory hole plan, Appendix A. The depths of the boreholes, descriptions of strata encountered and comments on groundwater conditions are given on the exploratory holes records, Appendix B.

Representative disturbed samples were taken at the depths shown on the borehole and trial pit records and despatched to the laboratory. Samples for environmental purposes were collected in appropriate containers and kept in a cool box prior to dispatch to the laboratory.

Monitoring installations protected by a stopcock cover were installed in selected boreholes as detailed below:

Table 2: Standpipe Installation Details

Borehole Number	Depth to Base of Borehole m	Response Zone m	Nominal Pipe Diameter mm	Gas Valve/Lockable Cover
BH01	3.00	1.00 – 3.00	50	Yes
BH02	5.00	1.00 – 5.00	50	Yes
BH04	3.80	1.00 – 3.80	50	Yes
BH05	4.70	1.00 – 4.70	50	Yes

5. SUMMARY OF GROUND CONDITIONS

The sequence of the strata encountered during the investigation generally confirms the anticipated geology as interpreted from the geological map.

Interpolation of strata depths between locations should be undertaken with caution, particularly for depths of Made Ground where structures are still observed at the time of the investigation.

Table 3: Summary of Ground Conditions

Strata Encountered	Depth Encountered (m bgl)		Maximum Measured Strata Thickness m
	From	To	
Topsoil/Made Ground	Ground Level	0.30 – 0.40	0.40
Lowestoft Formation	0.30 – 0.40	>5.00	>4.70

Generally, beneath a surface covering of turf/topsoil, the exploratory holes encountered Made Ground to a maximum recorded depth of 0.40m. The Made Ground generally consisted of dark grey black gravelly sandy silty clay with fragments of brick and concrete. However, BH01 also encountered black gravelly sand to a depth of 0.20m bgl immediately below the topsoil.

The natural deposits comprised brown sandy gravelly Clay with the gravel comprising off-white subangular fine to medium fragment of Chalk. This deposit is believed to represent the Lowestoft Formation at this locality and its full depth was not proven.

A well is present on site, as shown on the Exploratory Hole Location Plan given in Appendix A. The well was dipped at 6.96m bgl (119.63m AOD) on 31st January 2018. The monitoring wells installed were generally dry although BH02 was dipped at 4.38m bgl (122.22m AOD). It is thought that this maybe rainwater which had seeped in to the well after a period of heavy rainfall. No sample was taken as the depth of water was only a few centimetres.

6. LABORATORY ANALYSIS

In order to test the pollutant linkages identified in the Phase I Desktop Study Report, and assess whether the soils beneath the site could pose a significant risk to human and environmental receptors, samples of the Made Ground and underlying natural soils were selected for analysis. The samples were placed in laboratory prepared vessels with a minimum of headspace and labelled accordingly prior to being despatched to accredited analytical laboratory in cool boxes.

The suite of analysis was selected with reference to the findings of the Phase I report as well as onsite observations and included the following determinands:

- A suite of metals comprising AS, B (water soluble), Cd, Cr, CrVI, Cu, Pb, Hg, Ni, Se and Zn;
- Speciated PolyAromatic Hydrocarbons (USEPA 16);
- Total Petroleum Hydrocarbons (CWG speciated analysis);
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and MTBE;
- Total Cyanide;
- Phenols (total monohydric);
- Asbestos (identification only);
- Soil Organic Matter (SOM); and
- pH and Water Soluble Sulphate.

In addition, selected samples were also tested for a suite of VOCs and SVOCs.

Water samples were also taken from BH01 and the well onsite and were tested for the same suite of contaminants outlined above.

The results for this site are in Appendix C.

7. GENERIC RISK ASSESSMENT

7.1 Results of Soil Analysis

The pH of the tested soils ranged from 8.2 to 11.0 with an average of 9.1. The Soil Organic Matter (SOM) of the samples ranged from 1.2% to 11% with an average of 3.7%. Therefore, a SOM of 2.5% has been used in this assessment.

A summary of the metal concentrations recorded in the tested samples is presented in the below table

Table 4: Results of Metals Analysis

Contaminant	Number of Samples Analysed	Range of Measured Concentration (mg/kg)	Location of Maximum Concentration and Depth bgl
Arsenic	8	11 – 20	BH04 at 0.30m
Water Soluble Boron	8	All results below LoD	
Cadmium	8	0.20 – 0.50	BH04 at 0.30m
Chromium	8	16 – 29	BH01 at 0.30m
Chromium VI	8	All results below LoD	
Copper	8	14 – 53	BH04 at 0.30m
Lead	8	12 – 160	BH04 at 0.30m
Mercury	8	All results below LoD	
Nickel	8	24 – 38	BH01 at 0.30m
Selenium	8	All results below LoD	
Zinc	8	52 – 270	BH03 at 0.30m

Concentrations of the sixteen PAH compounds analysed are summarised below:

Table 5: Results of PAH Analysis

Contaminant	Number of Samples Analysed	Range of Measured Concentration (mg/kg)	Location of Maximum Concentration and Depth bgl
Naphthalene	10	0.30 – 0.40	BH04 at 0.30m
Acenaphthylene	10	0.20 – 1.3	BH04 at 0.30m
Acenaphthene	10	0.20	BH04 at 0.30m
Fluorene	10	0.20	BH04 at 0.30m
Phenanthrene	10	0.20 – 5.4	BH04 at 0.30m
Anthracene	10	0.1 – 1.50	BH04 at 0.30m
Fluoranthene	10	0.10 – 16	BH04 at 0.30m
Pyrene	10	0.10 – 13	BH04 at 0.30m
Benzo(a)anthracene	10	0.30 – 9.5	BH04 at 0.30m
Chrysene	10	0.30 – 10	BH04 at 0.30m
Benzo(b)fluoranthene	10	0.20 – 8.0	BH04 at 0.30m
Benzo(k)fluoranthene	10	0.30 – 8.3	BH04 at 0.30m
Benzo(a)pyrene	10	0.30 – 10	BH04 at 0.30m

Contaminant	Number of Samples Analysed	Range of Measured Concentration (mg/kg)	Location of Maximum Concentration and Depth bgl
Indeno(123-cd)pyrene	10	0.10 – 5.2	BH04 at 0.30m
Dibenzo(ah)anthracene	10	0.10 – 2.1	BH04 at 0.30m
Benzo(ghi)perylene	10	0.20 – 6.2	BH04 at 0.30m

Neither monohydric phenols or total cyanide were recorded in excess of their respective Limits of Detection.

A summary of the recorded petroleum hydrocarbons and BTEX compounds are given in the table below:

Table 6: Results of TPH Analysis

Contaminant	Number of Samples Analysed	Range of Measured Concentration (mg/kg)	Location of Maximum Concentration and Depth bgl
TPH aliphatic C_5-C_6	8	All results below LoD	
TPH aromatic C_6-C_7	8	All results below LoD	
TPH aliphatic C_6-C_8	8	All results below LoD	
TPH aromatic C_7-C_8	8	All results below LoD	
TPH aliphatic C_8-C_{10}	8	All results below LoD	
TPH aromatic C_8-C_{10}	8	All results below LoD	
TPH aliphatic C_{10}-C_{12}	8	6.0	BH04 at 0.30m
TPH aromatic C_{10}-C_{12}	8	All results below LoD	
TPH aliphatic C_{12}-C_{16}	8	7.0	BH04 at 0.30m
TPH aromatic C_{12}-C_{16}	8	All results below LoD	
TPH aliphatic C_{16}-C_{21}	8	12	BH04 at 0.30m
TPH aromatic C_{16}-C_{21}	8	2.0 – 110	BH04 at 0.30m
TPH aliphatic C_{21}-C_{35}	8	5.0 – 66	BH04 at 0.30m
TPH aromatic C_{21}-C_{35}	8	14 – 570	BH04 at 0.30m
Benzene	10	All results below LoD	
Toluene	10	All results below LoD	
Ethylbenzene	10	All results below LoD	
m/p Xylene	10	All results below LoD	
o Xylene	10	All results below LoD	

Two samples were also analysed for a suite of Volatile and Semi-Volatile Organic Compounds (VOCs & SVOCs). The sample from BH04 at 0.330m also indicated values in excess of the Limits of Detection for

- 1,2 Dibromo-3-Chloropropane (DBCP);
- Carbazole; and
- Dibenzofuran

No asbestos was identified in any of the samples selected for analysis.

7.2 Generic Human Health Risk Assessment

The statutory definition of contaminated land is defined in the Environmental Protection Act 1990, which was introduced by the Environment Act 1995, as;

'Land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

- significant harm is being caused or there is a significant possibility of such harm being caused; or
- significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.'

The definition of contaminated land is based on the principles of risk assessment. Risk is defined as a combination of:

- The probability, or frequency of exposure to a substance with the potential to cause harm; and
- The seriousness of the consequence.

The basis of an environmental risk assessment involves identifying a 'source' of contamination, a 'pathway' along which the contamination may migrate and a 'receptor' at risk from the contamination.

Current legislation defines the various elements of the pollution linkage as:

- A contaminant is a substance, which is in or under the ground and which has the potential to cause harm or to cause pollution of controlled waters;
- A pathway is one or more routes through which a receptor is being exposed to, or affected by, a contaminant, or could be so affected; and
- A receptor is either a living organism, an ecological system, a piece of land or property, or controlled water.

A pollutant linkage indicates that all three elements have been identified. The site can only be defined as 'Contaminated Land' if a pollutant linkage exists and the contamination meets the criteria in above.

It is understood that the proposed development will be a mix of dwellings with gardens and residential apartments with areas of soft landscaping.

In order to provide an indication of whether the soils present beneath the study area could pose a risk to human health, SES subjected the aforementioned chemical data to a Generic Risk Assessment (GRA). The initial screen of the chemical data was made against available Suitable 4 Use Levels (S4ULs) developed by LQM/CIEH (2015) and Category 4 Screening Levels (C4SLs) as developed by DEFRA (2014). Exceedances of assessment criteria may require further detailed/semi detailed quantitative risk assessment.

As the development includes private gardens which may be used for the growing of vegetables for consumption, the S4ULs for 'Residential with Homegrown Produce (RwHP)' have been adopted for this assessment. In this instance, the most sensitive receptor is judged to be a 6 year old female child.

The results of chemical analyses have been processed in accordance with recommendations set out in the CIEH and CL:AIRE document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration'. Where the concentrations determined on site are at or below the respective Generic

Assessment Criteria (GAC), they are considered not to pose a risk and are removed from further consideration, unless otherwise stated.

A comparison of the recorded concentrations of metals with the corresponding S4ULs is presented in the following table:

Table 7: Metals Statistics

Contaminant	Key statistics				S4UL* (RwHP)	
	Number of detects	Min. Value (mg/kg)	Max. Value (mg/kg)	Mean Value (mg/kg)	S4UL (mg/kg)	No. Samples exceeding assessment criteria
Arsenic	8	11	20	16	37	0
Cadmium	8	0.20	0.50	0.30	11	0
Chromium III	8	16	29	24	910	0
Copper	8	14	53	25	2400	0
Lead#	8	12	160	53	200	0
Nickel	8	24	38	30	180	0
Zinc	8	52	270	123	3700	0

Notes to Table

** Most appropriate screening values are Sustainable 4 Use Level (S4UL) for a residential end-use with homegrown produce, a sandy loam soil type, pH of 7 and a soil organic matter (SOM) of 6%.*

 # Category 4 Screening Level (2014) use in absence of suitable S4UL.

As the above table shows, metals recorded by the analysis were less than the respective S4ULs in all instances and are considered to have a negligible potential to pose a risk to human health via the direct contact, ingestion, dust inhalation and plant uptake exposure pathways.

A summary of the PAH compounds recorded by the analysis are included in the following table:

Table 8: PAH Statistics

Contaminant	Key statistics				S4UL* (RwHP)	
	Number of detects	Min. Value (mg/kg)	Max. Value (mg/kg)	Mean Value (mg/kg)	S4UL (mg/kg)	No. Samples exceeding assessment criteria
Naphthalene	2	0.30	0.40	0.35	5.6	0
Acenaphthylene	3	0.20	1.3	0.87	420	0
Acenaphthene	1		0.20		510	0
Fluorene	1		0.20		400	0
Phenanthrene	5	0.20	5.4	2.2	220	0
Anthracene	3	0.10	1.5	0.87	5400	0
Fluoranthene	6	0.10	16	5.8	560	0
Pyrene	6	0.10	13	4.7	1200	0
Benzo(a)anthracene	5	0.30	9.5	3.8	11	0
Chrysene	5	0.30	10	4.4	22	0

Contaminant	Key statistics				S4UL* (RwHP)	
	Number of detects	Min. Value (mg/kg)	Max. Value (mg/kg)	Mean Value (mg/kg)	S4UL (mg/kg)	No. Samples exceeding assessment criteria
Benzo(b)fluoranthene	4	0.20	8.0	2.4	3.3	1
Benzo(k)fluoranthene	4	0.30	8.3	2.7	93	0
Benzo(a)pyrene	5	0.30	10	4.2	2.7	2
Indeno(123-cd)pyrene	5	0.10	5.2	2.3	36	0
Dibenzo(ah)anthracene	3	0.10	2.1	0.87	0.28	2
Benzo(ghi)perylene	5	0.20	6.2	2.8	340	0

Notes to Table

** Most appropriate screening values are Sustainable 4 Use Level (S4UL) for a residential end-use with homegrown produce, a sandy loam soil type, pH of 7 and a soil organic matter (SOM) of 1%.*

As the above table demonstrates, a number of individual PAH exceeded their relevant S4UL. It is therefore considered that there is a potential of PAHs to pose a significant risk to human receptors via the direct contact, ingestion, dust inhalation and volatilisation exposure pathways.

A summary of the petroleum hydrocarbon and BTEX concentrations recorded by the analysis in included in the following table:

Table 9: TPH Statistics

Contaminant	Key statistics				S4UL* (RwHP)	
	Number of detects	Min. Value (mg/kg)	Max. Value (mg/kg)	Mean Value (mg/kg)	S4UL (mg/kg)	No. Samples exceeding assessment criteria
TPH aliphatic C_{10}-C_{12}	1		6		330	0
TPH aliphatic C_{12}-C_{16}	1		7		2400	0
TPH aliphatic C_{16}-C_{21}	1		12		92000	0
TPH aromatic C_{16}-C_{21}	5	2	110	26	540	0
TPH aliphatic C_{21}-C_{35}	5	5	66	18	92000	0
TPH aromatic C_{21}-C_{35}	5	14	570	131	1500	0

Notes to Table

** Most appropriate screening values are Sustainable 4 Use Level (S4UL) for a residential end-use with homegrown produce, a sandy loam soil type, pH of 7 and a soil organic matter (SOM) of 1%.*

As the above table demonstrates, none of the speciated petroleum hydrocarbons detected by the analysis exceeded the corresponding S4ULs and as such it is considered that they are likely to pose a negligible risk to human receptors.

Currently, there are no guidance values for the levels of 1,2 Dibromo-3-Chloropropane (DBCP), Carbazole or Dibenzofuran in the soil. Both Carbazole and Dibenzofuran are relatively stable and given the low levels identified are unlikely to pose any future risk to the end users of the site.

DBCP is a form of pesticide and soil fumigant and has been banned for use since the 1970s as it is toxic to human reproduction and a possible carcinogen.

7.3 Generic Groundwater Risk Assessment

Although the site is shown to be underlain by a Principal Aquifer, and a Groundwater Source Protection Zone III (Total Catchment), relating to the Lewes Nodular Chalk/Seaford Chalk Formation, it is overlain by the low permeability Lowestoft Formation which was proved to at least 5.00m bgl.

Groundwater and gas monitoring wells were installed into selected boreholes on completion of boring. Only BH01 recorded the presence of groundwater which was measured at levels between 1.14m bgl and 1.18m bgl. A sample was taken of the water within the standpipe installed on 2nd February 2017. In addition, a sample was taken from the well onsite which recorded a standing water level of 6.97m bgl.

An initial assessment of the risk to groundwater has been carried out on the basis of groundwater samples collected from the boreholes. The groundwater results have been screened against the Water Supply (Water Quality) Regulations 2000 (Drinking Water Standards – DWS). It should be noted that there is no TPH parameter guideline within the Water Supply Regulations 2000. As such, the guidance value of 10µg/l within the Water Supply Regulations 1989 has been adopted as a conservative approach.

Table 10: Summary of Groundwater Monitoring Results

Determinand		GAC		Min	Max	Mean
		EQS	DWS			
Metals						
Arsenic	µg/l	50	10	1.1	1.2	1.2
Boron	µg/l	2000	1000	All results below Limit of Detection		
Cadmium	µg/l	5	5		0.00017	
Chromium	µg/l	2	50	All results below Limit of Detection		
Copper	µg/l	0.5	2000	3.3	4.6	4.0
Mercury	µg/l	1	1	All results below Limit of Detection		
Nickel	µg/l	8	20	2.0	4.0	3.0
Lead	µg/l	4	10		0.70	
Selenium	µg/l		10	1.1	48	25
Zinc	µg/l	8	5000		52	
PAH						
Naphthalene	µg/l	10		0.02	0.02	0.03
Anthracene	µg/l	0.02		All results below Limit of Detection		
Fluoranthene	µg/l	0.02		0.03	0.08	0.06
Benzo(b)fluoranthene *	µg/l				0.06	
Benzo(k)fluoranthene *	µg/l				0.08	
Benzo(a)pyrene	µg/l	0.03			0.07	
Indeno(123-cd)pyrene *	µg/l				0.06	
Benzo(ghi)perylene *	µg/l				0.06	
* Sum of 4 (DWS)	µg/l		0.1		0.26	
Organics						
Total Petroleum Hydrocarbons	µg/l		10	130	360	245
Benzene	µg/l	30	1	All results below Limit of Detection		

Determinand		GAC		Min	Max	Mean
		EQS	DWS			
Toluene	µg/l	50		All results below Limit of Detection		
Ethylbenzene	µg/l	20		All results below Limit of Detection		
Xylene	µg/l	30		All results below Limit of Detection		
Miscellaneous						
pH				8.1	8.3	8.2

None of the VOCs or SVOCs analysed recorded levels greater than their respective Limits of Detection. It should be noted that the DBCP identified in the soil does not appear to have leached into the underlying groundwater.

Although the levels of PAHs and TPH measured were marginally in excess of the DWS, these are extremely onerous and are applicable to treated water supply for samples taken from a consumers tap. Therefore, they are not thought to be a cause of concern for the site users. In addition, the elevated PAHs and TPH were identified in BH01 which is an area which was in use for car parking and adjacent to the domestic garage onsite and may be as a result of fuel spills in this area.

It is recommended that the Environment Agency be consulted with regard to the significance of these results, particularly in light of the fact that there is no current guideline parameter for TPH in the Water Supply Regulations 2000.

7.4 Generic Gas Risk Assessment

Gas monitoring visits were made on two occasions to date and are summarised in Appendix B.

As the monitoring data shows, methane concentrations were recorded at less than the Limit of Detection (0.01% v/v) with carbon dioxide concentrations in the range from 0.12% v/v to 2.09%. Oxygen levels varied from atmospheric to marginally depleted (16.9%).

Flow rates were recorded over a three minute period during the return monitoring visits. The maximum of the three minute average flows was recorded at 0.4l/hr.

In accordance with the methodology published in CIRIA Document C665, the maximum recorded values were taken to calculate a Gas Screening Value for the site. The GSV calculated for carbon dioxide is 0.00836l/hr. The GSV calculated for methane is 0.0001l/hr. This value indicates the site to be Characteristic Situation 1/NHBC Green. It should be noted that the NHBC guidance assumes that a suspended floor slab and ventilated void are incorporated into the design.

It should be noted that these comments are based on two sets of readings which does not following the guidelines outlined in C665. However, further gas monitoring is to be undertaken to comply more closely with the guidance, the results of which will issued as an addendum to this report.

7.5 Revised Conceptual Model

General

In accordance with Environment Agency, CLR11 (2004) and R&D Publication 66:2008, Guidance for the Safe Development of Housing on Land Affected by Contamination, SES has developed the basic Conceptual Site Model (as contained within the previously issued Phase I Desktop Study) which identified potential contamination sources, migration pathways, and receptors within the study area.

Potential Sources of Contamination

Potential on-site sources of contaminants include;

- Speciated PAHs possibly associated with burning materials/bonfires within the existing garden.
- 1,2 Dibromo-3-Chloropropane (DBCP) possible used as a pesticide onsite.
- Elevated VOCs within ground gases which may migrate into enclosed spaces within any future structures.
- Elevated PAH & TPH within the shallow groundwater.

There are no off-site sources sufficiently close enough to impact the site.

Potential Receptors

SES has identified the following possible receptors;

- Future site users and construction workers.
- Buildings and services.

Generic pathways

The potential pathways for contaminants have been identified as;

- Direct ingestion, such as inhalation of dust and swallowing water.
- Indirect ingestion – absorption through skin.
- Plant uptake.
- Migration of ground gases into enclosed spaced.

Active Pollutant Linkages associated with the Subject Site

The site was formerly a private garden. The Phase I report indicated that a potential active pollutant linkage was noted based upon the presence of fuels form an adjacent garage to site with the proposed development possible introducing potential pathways between the fuels and receptors by introducing a more sensitive receptor to the site (full time residents) and greater envisaged use of soft landscaped areas (private back gardens).

Potential Pollution Linkages and Updated Risk Assessment

The intrusive investigations have shown that there may be a pollutant linkage due to elevated DBCP within the near surface soils. In addition, individual speciated PAHs were also found to be present.

In addition, elevated VOCs have been identified within ground gases which may have migrated from the adjacent garage.

The Conceptual Model has been updated to show the active pollution linkages and is presented in the table overleaf. The risk categorisation has been based upon CLR11.

Discussion of the Revised Conceptual Model

The scheme is for the construction of three new residential dwellings with parking and private gardens.

As noted above, there are currently limited active pollutant linkages. However, the Conceptual Site Model considers the pollutant linkages that could become active as a result of residential development at the site.

Table 11: Updated Conceptual Site Model and Risk Assessment

Potential Source	Potential Contaminant	Potential Migration Pathway	Potential Receptor	Probability	Consequence	Overall Risk Classification	Discussion
Onsite Pesticides Burning of materials	PAHs DBCP	Contact with or ingestion of contaminated soils Inhalation of dust and vapours Uptake of contaminants through soils, flora and fauna	Future Site Users Ecology Structures	Likely	Mild	Low/Moderate	The contamination is a hotspot which should be removed and replaced with clean material.
Onsite Groundwater	TPH PAH	Contact or ingestion with contaminated groundwater	Future Site Users	Likely	Minor	Very Low	The existing well onsite is to be decommissioned and so there will be no source of water onsite.
Offsite Landfill Gas	Ground Gases (VOCs)	Inhalation Migration into enclosed spaces leading to asphyxiation/explosion	Future Site Users Structures	Likely	Mild	Low/Moderate	VOCs have been identified likely to have originated from the adjacent garage. Gas vapour membranes will be required to ameliorate any risk.

8. MANAGEMENT OF CONTAMINATION

8.1 Remediation and Verification

The risk management framework set out in the Model Procedures for the Management of Land Contamination, CLR 11, is applicable to the redevelopment of sites that may be affected by contamination.

The risk management process set out in the Model Procedures has three main components:

- Risk assessment
- Options appraisal
- Implementation

This risk assessment has identified the presence of elevated arsenic, lead and individual speciated PAHs within the Made Ground across the site. Relevant pollutant linkages have been identified, as demonstrated in the updated conceptual model.

The remediation strategy will need to review methods of reducing or controlling the identified unacceptable risks. This could be done by removing or treating the sources of contamination, removing or modifying the pathways or removing or modifying the behaviour of the receptors, to ensure there is no significant risk of significant harm to either human health or controlled waters from the identified contamination, in relation to the proposed end use.

An important part of the risk management process is identifying and informing all stakeholders with an interest in the outcome of the risk management project. To this end, if the regulators have not yet been contacted with regard to the redevelopment of this site, it is recommended that they be supplied with a copy of both the Phase I Desktop Study Report and this Phase II Ground Investigation Report in order to enable liaison to be undertaken with them.

Following liaison with the relevant regulatory bodies, a remediation strategy should be formulated, which should incorporate an options appraisal and summarise in detail the chosen remedial approach, along with the verification proposals. The remediation strategy should then be approved by the relevant regulatory authorities prior to implementation.

Where remediation is required, a verification report will need to be formulated following implementation of the remediation strategy, which should provide a complete record of all remedial activities conducted on site and include all the data obtained to support the remedial objectives and demonstrate that the remediation has been effective. Any unexpected conditions encountered during the remedial works should also be detailed within the verification report.

8.2 Proposed Strategy

The remediation strategy should be applied to all areas of soft landscaping, including gardens, at ground level.

In areas that are to be covered by buildings or hard standing (including car parts and patios), no pathway is likely to exist between any source of contamination and the human receptors by ingestion or dermal contact, therefore no further remedial action is likely to be required.

The identified contamination has only been identified in the vicinity of BH04 at shallow depth. Therefore, it is envisaged that soils extending to about 2.5m around the location of BH04 and to a depth of 450mm should be removed from this area and replaced with clean inert materials. The

clean imported material must comprise at least 150mm of organic topsoil. A plan showing the extent of the soil removal is given in Appendix A.

With regards to the depth of material to be removed, consideration has been given to the following points:

Depth of earthworm activity: Worms can cause intermixing of the soils, including bringing soils from depth to the surface. However, research indicates that the main worm activity within the soil profile is within the upper 150mm, reducing rapidly with depth. The temporary shallow sub-horizontal burrows, which are more likely to lead to soil intermixing (due to their regular collapse) are generally to depths of up to 300mm.

Depth of burrows from burrowing animals: The main burrowing animals that are likely to affect soil cover in gardens are rats, mice moles, rabbits, badgers and foxes. It is likely that the presence of such animals will not present an obstacle to the implementation of the remediation strategy as they will be actively discouraged by the residents or prefer alternative locations in the fields surrounding the site.

Effects from plant/tree roots: Plants tend to have a shallow root mat influenced by soil density, availability of nutrients and availability of moisture.

Ranges of the minimum soil layer thickness required for various plants include: 150mm for grass; 200mm to 300mm for garden crops and up to 400mm for shrubs. However, it is considered that significant root penetration can be reduced if shallow soils have suitable nutrients and moisture.

Gardening activities: Whilst double digging (approximately 600mm) is undertaken by gardeners who are planting vegetables, it is recognised that this comprises digging out the soil to one spade depth (or to the depth of the Topsoil if less than this) and then loosening the soil to another spade depth using a fork moved backwards and forwards. However it is considered that mixing below the first spade depth will be minimal. Roots will preferentially grow laterally, not vertically and not penetrate the capillary break layer. The combination of geotextile and/or granular capillary break layer/no dig layer, will make it difficult for excavation below the capillary break layer using hand tools. Uptake of contaminants by crops is not a concern as the crops will root in the validated (uncontaminated) cover system soils. Due to the size of the gardens proposed at the site, it is considered likely that any planting of vegetables will be minimised, and that raised beds may be preferred to improve the aesthetics of the gardens, thus increasing the thickness of soils available for growing.

Where material is being imported to raise site levels and/or finish landscaped areas following excavation, it must be obtained from a reputable source and the supplier should provide a certificate of analysis confirming the chemical and physical nature of the material prior to importation. Independent analysis should then be undertaken when the material is imported to the site in order to confirm its chemical composition. Samples must be analysed in an accredited laboratory for a range of contaminants, the results of which can be screened against current criteria for residential end use.

A watching brief must be kept by the developer during all ground works. The excavation of material across the site must be documented by photographs and waste consignment documentation.

All design proposals must be approved by the Local Authority prior to development commencing.

8.3 Management of Unidentified Sources of Contamination

There is the possibility that sources of contamination may be present on the site, which was not detected during the investigation. Should such contamination be identified or suspected during the

site clearance or ground works, this should be dealt with accordingly. A number of options are available for handling this material, which include:

- The removal from site and disposal to a suitably licensed tip of all material suspected of being contaminated. The material would need to be classified prior to disposal;
- Short-term storage of the suspected material while undertaking verification testing for potential contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area; and
- Having a suitably experienced environmental engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

8.4 Risk Management During Site Works

During ground works, some simple measures may have to be put in place to mitigate the risk of any known or previously unidentified contamination affecting the site workers and the environs. The majority of the proposed measures represent good practice for the construction industry and include:

- Informing the site workers of the contamination on site and the potential health effects from exposure;
- Where appropriate, the provision of suitable Personal Protective Equipment (PPE) for workers who may be potentially impacted by working in areas of the contamination;
- Ensuring good hygiene is enforced on site and washing facilities are maintained on the site. Workers are discouraged from smoking, eating or drinking without washing their hands first;
- Dust monitoring, and if necessary, suppression measures should be put into practice where contamination is becoming airborne; and
- Where contaminated materials are being removed from the site they should be disposed of at a suitably licensed landfill, with a 'duty of care' system in place and maintained throughout the disposal operations.

8.5 Verification Plan

This remediation statement should be supported by a Validation Report, which is to be produced following completion of the works detailed above. It should provide a complete record of all remedial activities conducted on site and include all the data obtained to support the remedial objectives and demonstrate that the remediation has been effective. To this end, copies of Waste Transfer Notes and chemical test reports for all imported soils and topsoil should be included in the report.

Once the materials have been excavated, samples will need to be taken of the sides and base of the excavation in order to ascertain whether any residual contamination remains. In addition, at least one sample per 50m² of imported subsoil and topsoil (subject to a minimum of three samples) should also be taken. The samples will be analysed for the following suite of determinands:

- **Metals Suite** - arsenic, boron (water soluble), cadmium, chromium (hexavalent), chromium (total), copper, lead, mercury, nickel, selenium and zinc.
- **Organic Suite -** petroleum hydrocarbons – TPH CWG speciated analysis, benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH) – USEPA 16 suite, phenols.
- **Others** - pH, cyanide (free) organic matter content and asbestos.

A plan showing the proposed locations of subsoil/topsoil validation samples is given in Appendix D.

Any unexpected conditions encountered during the remedial works should also be detailed within the verification report.

9. CONCLUSIONS

Stansted Environmental Services Limited (SES) has been commissioned by Laurel Developments to undertake a Phase II Generic Risk Assessment at High Peak, Barkway, Hertfordshire, SG8 8EY. The site is currently a garden associated with a residential property onsite.

Site works were undertaken between 4th January and 11th January 2018 and comprised the sinking of a total of five boreholes. The exploratory holes completed give a good coverage across the site. Samples were sent for analysis to Concept Life Sciences who are both UKAS and MCERTS Accredited.

There appeared to be no olfactory or visual impact of contamination.

Contamination test results were compared with current guidance (S4ULs/C4SLs) as part of a generic risk assessment. With the exception of individual speciated PAHs, none of the standard determinands results exceeded their relevant S4ULs or C4SLs. However, DBCP was found within the near surface Made Ground at the location of BH04. DBCP is a pesticide and its use was banned in the 1970s. Low levels of DBCP has led to reproductive issues in humans.

Therefore, it is recommended that an area around BH04 is removed from site and replaced with clean imported material. This will also remove the low levels of PAHs identified at this location.

Samples of the groundwater were analysed from standpipe installed and also the existing well onsite. Low levels of TPH and PAHs were noted in the groundwater sample obtained when compared to DWS. It should be noted that DWS are extremely onerous and apply to samples taken from consumers' taps. Therefore, given the very low levels identified, no ongoing risk is thought to exist to human health. In addition, the existing well onsite is to be decommissioned and so there will no access to appreciable quantities of water which could be used. Given the environmental setting of the site, it is judged that groundwater does not pose a significant risk to the site of controlled waters.

Gas monitoring has been undertaken on two occasions to date which generally indicates the site to be Characteristic Situation 1/NHBC Green.

The identified contamination has only been identified in the vicinity of BH04 at shallow depth. Therefore, it is envisaged that soils extending to about 2.5m around the location of BH04 and to a depth of 450mm should be removed from this area and replaced with clean inert materials. The clean imported material must comprise at least 150mm of organic topsoil. Suitable validation samples should be taken of the sides and base of the excavation and any imported soils should also be subject to validation testing.

This report should be submitted to the Local Authority as suitable evidence to discharge Parts b, c & e of Condition 11 (17/00678/1), relating to contamination.

APPENDICES

A. PLANS & FIGURES

B. SITE WORK RECORDS

C. RESULTS OF LABORATORY ANALYSIS

D. VERIFICATION PLAN

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A. PLANS & FIGURES

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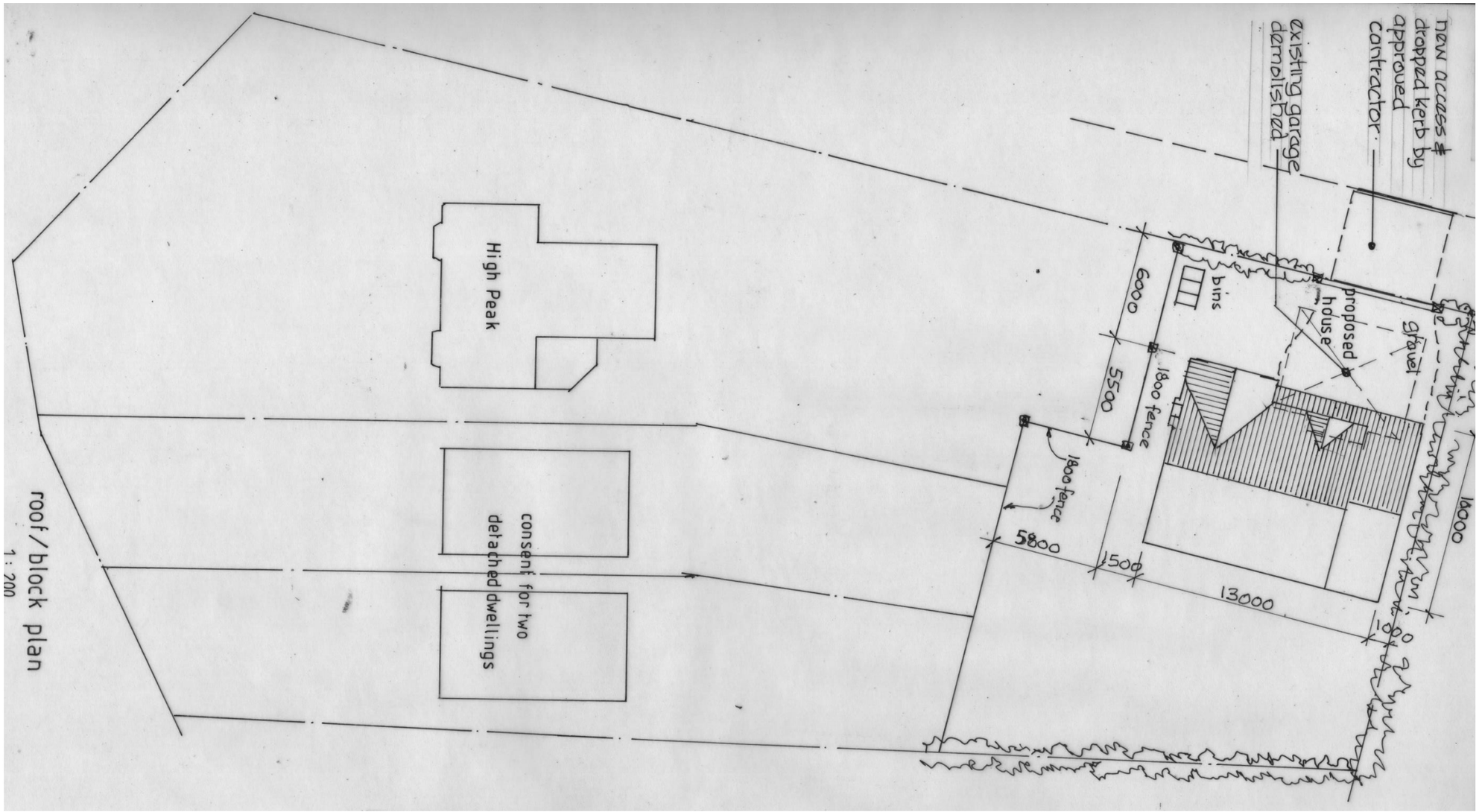
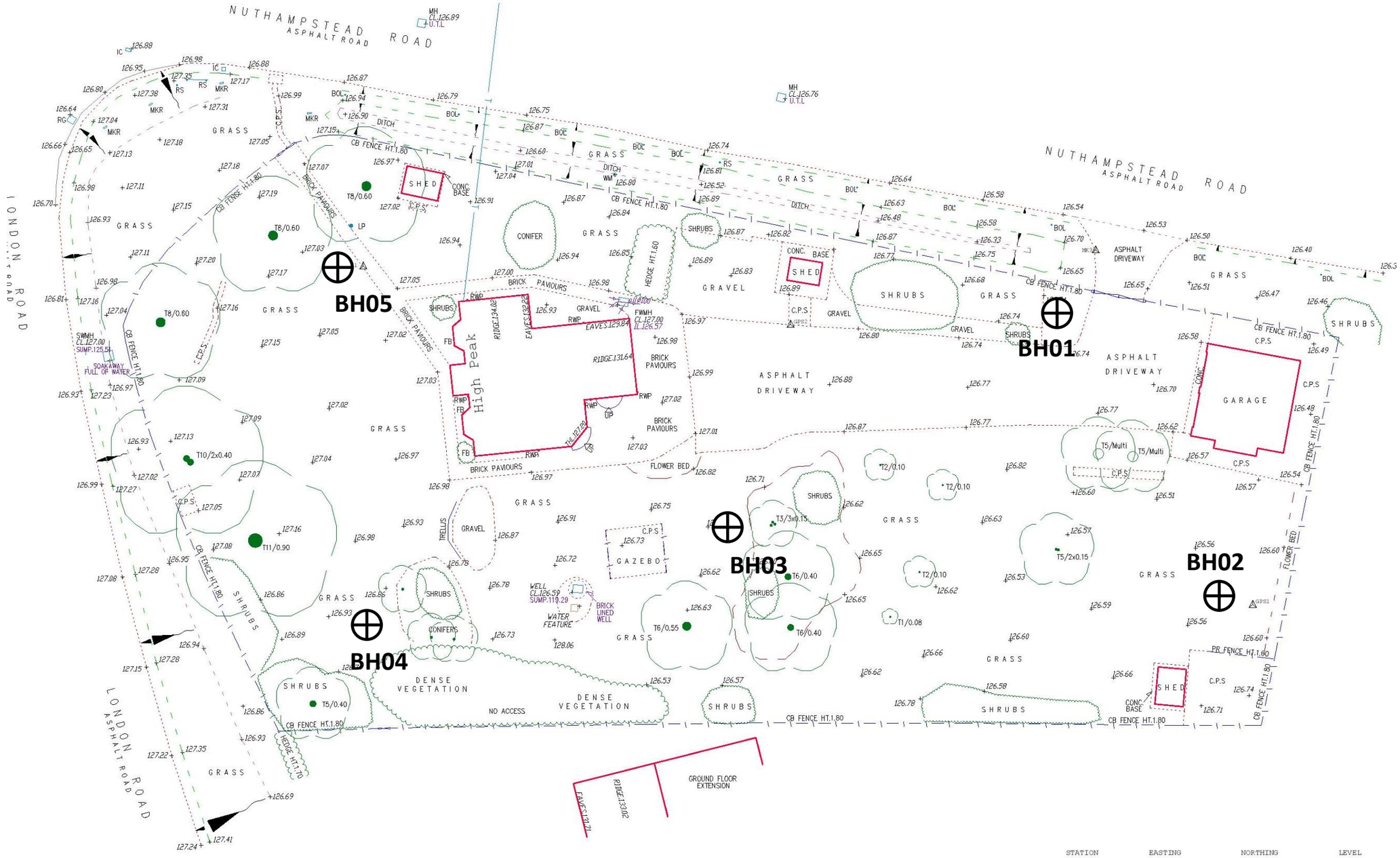


Originator	GB	**HIGH PEAK, BARKWAY** **CON71-BARK-001**	SES STANSTED ENVIRONMENTAL SERVICES
Checked & Approved	WGG	**PROPOSED DEVELOPMENT PLAN**	

16/08/2017



STATION	EASTING	NORTHING	LEVEL
GPS1	8551.433	4836.631	126.592
GPS2	8521.402	4854.837	126.853
MK1	8493.640	4858.622	127.069
MK2	8461.939	4879.586	126.611
MK3	8541.235	4859.664	126.645

0m 2m 4m 6m 8m 10m 20m

SCALE 1:200

LEGEND

⊕ Location of Borehole

Originator	GB	**HIGH PEAK, BARKWAY** **CON71-BARK-001**
Checked & Approved	WGG	**EXPLORATORY HOLE LOCATION PLAN**

SES STANSTED ENVIRONMENTAL SERVICES

16/08/2017

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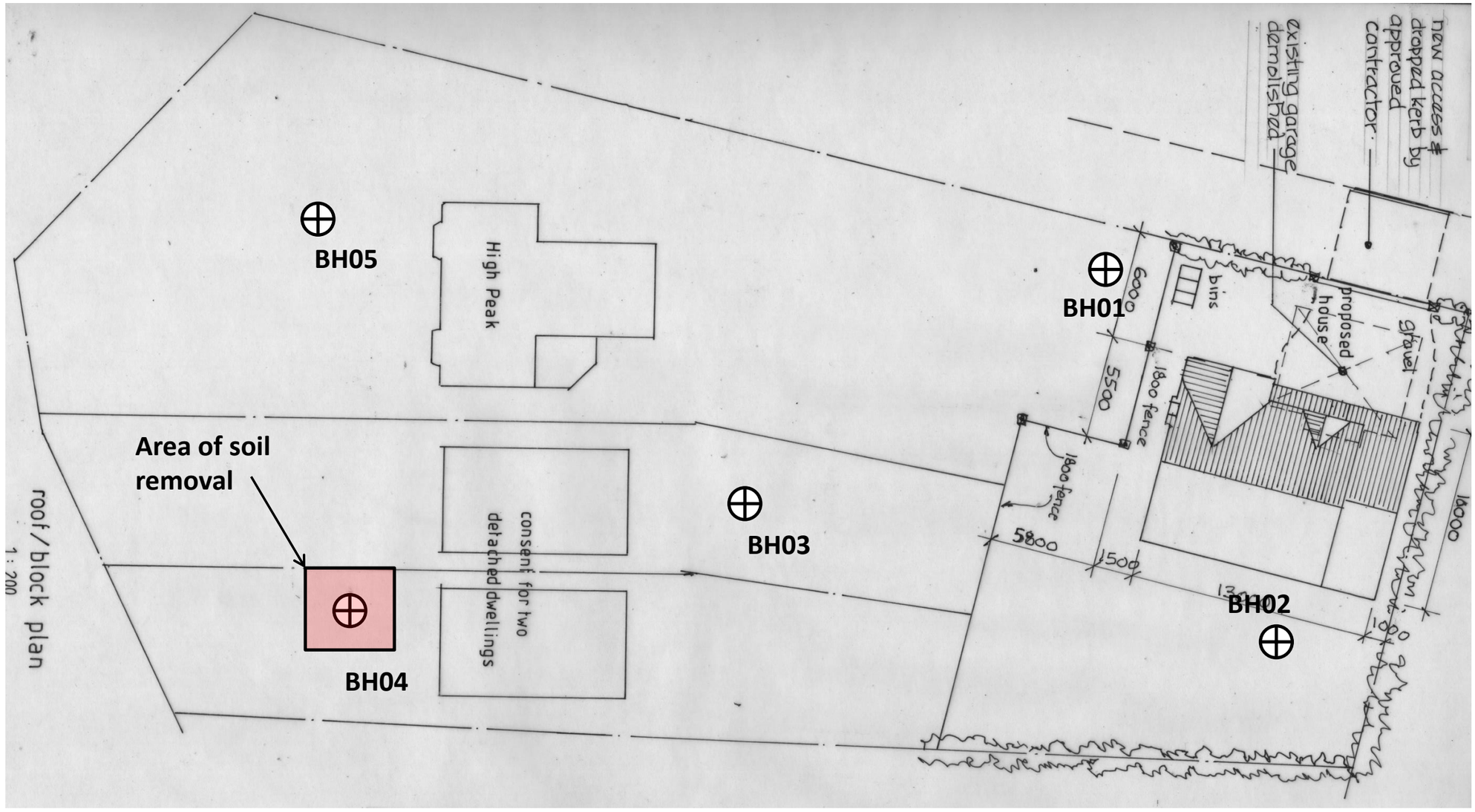

Originator	GB	HIGH PEAK, BARKWAY CON71-BARK-001	SES STANSTED ENVIRONMENTAL SERVICES
Checked & Approved	WGG	SOIL REMEDIATION PLAN	

16/08/2017

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B. SITE WORK RECORDS

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KEY TO EXPLORATORY HOLE RECORDS

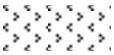
Samples

D	Small Disturbed Sample
B	Bulk Disturbed Sample
ES	Environmental Sample (Tub, jar and vial)
U	Undisturbed Sample (100mm nominal diameter) with Number of Blows to Achieve 450mm Penetration
UT	Undisturbed Thin Walled Sample (100mm nominal diameter)
U38	Hand Driven 'Undisturbed' Sample (38mm nominal diameter)
P	Undisturbed Piston Sample
W	Water Sample
ICBR	Insitu California Bearing Ration Sample
*	Denotes No Sample Recovery

Tests

S	Standard Penetration Test (using spoon)
C	Standard Penetration Test (using cone)
N	SPT/CPT 'N' Value (number of blows for full 300mm penetration)
50/225	Number of Blows/Total Penetration (mm) for SPT/CPT
25/25SP	As Above for Seating Drive Only
Vh	Insitu Hand Vane Test (kPa)
m	Insitu CBR Test using MexeProbe
V	Insitu Field Vane Test (kPa)
pp	Pocket Penetrometer (kg/cm²)
ppm	Total Volatile Organic Compound (parts per million)

Observations, Backfill & Installations

▼	Groundwater Strike (depth shown in metres below ground level)
	Gravel Backfill
	Bentonite Backfill
	Arisings Backfill
	Concrete Backfill
	Plain Pipe
	Slotted Pipe

Stansted Environmental Services Limited The Stansted Centre, Parsonage Road Takeley,Essex,CM22 5PU	**Site** High Peak, Barkway		**Borehole Number** **BH01**
Machine : Massenza MI3 **Flush :** Water **Core Dia :** 101 mm **Method :** Rotary	**Casing Diameter** 101mm cased to 3.00m	**Ground Level (mOD)** 126.60	**Client** Laurel Developments	**Job Number** CON71-BARK-001
	Location See site plan	**Dates** 08/01/2018	**Project Contractor** -	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						126.50	0.10	CONCRETE PAVING (MADEGROUND)			
						126.40	0.20 (0.20)	Black gravelly SAND. Sand id fine to coarse. Gravel is fine to medium of granites. (MADEGROUND)			
						126.20	0.40	Soft grey slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of various lithologies including fragments of granites, concrete and brick. (MADEGROUND)			
1.20-1.65					1,2/2,4,4,5 SPT N=15						
							(2.60)	Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-angular fine to medium fragments of Chalk and flints			
2.00-2.45					1,2/4,4,4,6 SPT N=18						
3.00-3.45					1,3/3,5,5,7 SPT N=20	123.60	3.00	Complete at 3.00m			

Remarks
Area CAT scanned before any excavation to check for underground services
Inspection pit hand dug to 1.2mbgl before the use of Rotary rig

Scale (approx)	Logged By
1:50	MAO

Figure No.
B2

Produced by the GEOtechnical DAtabase SYstem (GEODASY) (C) all rights reserved

Stansted Environmental Services Limited The Stansted Centre, Parsonage Road Takeley,Essex,CM22 5PU	**Site** High Peak, Barkway		**Borehole Number** **BH02**
Machine : Massenza MI3 **Flush :** Water **Core Dia :** 101 mm **Method :** Rotary	**Casing Diameter** 101mm cased to 5.00m	**Ground Level (mOD)** 126.60	**Client** Laurel Developments	**Job Number** CON71-BARK-001
	Location See sit eplan	**Dates** 04/01/2018- 05/01/2018	**Project Contractor** -	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						126.50	0.10 (0.25)	Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine of sandstones. Frequent rootlets (<2mm) (TOPSOIL)			
						126.25	0.35	Soft black slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of various lithologies including fragments of granites, concrete and brick. (MADEGROUND)			
1.20-1.65					2,2/2,4,4,4 SPT N=14			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of flints, granite and white Chalk fragments.			
2.00-2.45					1,2/4,4,4,5 SPT N=17						
							(4.65)				
3.00-3.45					2,2/4,4,5,5 SPT N=18						
4.00-4.45					1,14/14,11,11,12 SPT N=48						
5.00-5.45					2,6/6,6,6,6 SPT N=24	121.60	5.00	Complete at 5.00m			

Remarks
Inspection pit hand dug to 1.2mbgl before the use of Rotary rig
Area CAT scanned before any excavation to check for underground services

Scale (approx)	Logged By
1:50	MAO

Figure No.
B3

Produced by the GEOtechnical DAtabase SYstem (GEODASY) (C) all rights reserved

Stansted Environmental Services Limited The Stansted Centre, Parsonage Road Takeley,Essex,CM22 5PU	**Site** High Peak, Barkway		**Borehole Number** **BH03**
Machine : Massenza MI3 **Flush :** Water **Core Dia :** 101 mm **Method :** Rotary	**Casing Diameter** 101mm cased to 5.00m	**Ground Level (mOD)** 126.60	**Client** Laurel Developments	**Job Number** CON71-BARK-001
	Location See site plan	**Dates** 04/01/2018- 05/01/2018	**Project Contractor** -	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						126.50	0.10	Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine of sandstones. Frequent rootlets (<2mm) (TOPSOIL)		
						126.30	(0.20) 0.30	Soft black slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of various lithologies including fragments of granites, concrete and brick. (MADEGROUND)		
1.20-1.65					2,2/2,4,4,4 SPT N=14			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of flints, granite and white Chalk fragments.		
2.00-2.45					2,1/2,1,4,7 SPT N=14					
							(4.70)			
3.00-3.45					1,2/2,2,3,4 SPT N=11					
4.00-4.45					4,5/6,6,6,7 SPT N=25					
5.00-5.45					2,5/6,6,7,10 SPT N=29	121.60	5.00	Complete at 5.00m		

Remarks
Area CAT scanned before any excavation to check for underground services
Inspection pit hand dug to 1.2mbgl before the use of Rotary rig

Scale (approx)	Logged By
1:50	MAO

Figure No.
B4

Produced by the GEOtechnical DAtabase SYstem (GEODASY) (C) all rights reserved

Stansted Environmental Services Limited The Stansted Centre, Parsonage Road Takeley,Essex,CM22 5PU	**Site** High Peak, Barkway		**Borehole Number** **BH04**
Machine : Massenza MI3 **Flush :** Water **Core Dia :** 101 mm **Method :** Rotary	**Casing Diameter** 101mm cased to 3.80m	**Ground Level (mOD)** 126.70	**Client** Laurel Developments	**Job Number** CON71-BARK-001
	Location See site plan	**Dates** 09/01/2018	**Project Contractor** -	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						126.60	0.10	Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine of sandstones. Frequent rootlets (<2mm) (TOPSOIL)			
						126.30	(0.30) 0.40	Soft black slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of various lithologies including fragments of granites, concrete and brick. (MADEGROUND)			
1.20-1.65					1,2/4,4,4,5 SPT N=17			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of flints, granite and white Chalk fragments.			
2.00-2.45					2,4/4,6,5,6 SPT N=21		(3.40)				
3.00-3.45					2,4/4,5,6,10 SPT N=25						
3.80-4.25					6,4/3,4,5,5 SPT N=17	122.90	3.80	Complete at 3.80m			

Remarks
Inspection pit hand dug to 1.2mbgl before the use of Rotary rig
Area CAT scanned before any excavation to check for underground services

Scale (approx)	Logged By
1:50	MAO

Figure No.
B5

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Stansted Environmental Services Limited The Stansted Centre, Parsonage Road Takeley,Essex,CM22 5PU	**Site** High Peak, Barkway		**Borehole Number** **BH05**
Machine : Massenza MI3 rig **Flush :** Water **Core Dia :** 101 mm **Method :** Rotary	**Casing Diameter** 101mm cased to 4.70m	**Ground Level (mOD)** 126.90	**Client** Laurel Developments	**Job Number** CON71-BARK-001
	Location See site plan	**Dates** 10/01/2018- 11/01/2018	**Project Contractor** -	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						126.80	0.10 (0.30)	Black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine of sandstones. Frequent rootlets (<2mm) (TOPSOIL)			
						126.50	0.40	Soft black slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of various lithologies including fragments of granites, concrete and brick. (MADEGROUND)			
1.20-1.65					1,2/2,4,4,4 SPT N=14			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of flints, granite and white Chalk fragments.			
2.00-2.45					2,2/2,3,3,4 SPT N=12		(4.30)				
3.00-3.45					2,1/2,4,4,6 SPT N=16						
4.00-4.45					1,2/3,5,5,6 SPT N=19						
						122.20	4.70	Complete at 4.70m			

Remarks
Inspection pit hand dug to 1.2mbgl before the use of Rotary rig
Area CAT scanned before any excavation to check for underground services

Scale (approx)	Logged By
1:50	MAO

Figure No.
B6

Produced by the GEOtechnical DAtabase SYstem (GEODASY) (C) all rights reserved

Date of Visit	17/01/2018		Time	08:30		
Background Readings	CH_4 - % v/v	CO_2 - % v/v	O_2 - % v/v	H_2S - ppm	CO - ppm	VOC - ppm
	0.00	0.03	21.0	0	NR	NR

Weather Condtions	Clear, Windy, Cold
Ground Conditions	Damp
Atmospheric Pressure	999.6 mbar

Hole No.	Time	Atmos Pressure	Flow Rate	CH_4 % v/v		CO_2 % v/v		O_2 % v/v		H2S ppm		CO ppm		VOC ppm		Water Level	Depth of Well	Sample Collected	Sample Notes
	hr:mm	mb	l/hr	peak	steady	peak	steady	peak	steady	peak	steady	peak	steady	peak	steady	m bgl	m bgl	Y/N	
BH01	09:00	974.40	0.2	0.00	0.00	0.12	0.08	21.0	22.1	0	0	-	-	-	-	1.14	2.97	N	
BH02	08:50	986.40	0.4	0.00	0.00	0.21	0.11	20.8	21.9	0	0	-	-	-	-	DRY	4.43	N	
BH04	08:40	985.90	0.2	0.00	0.00	0.23	0.17	19.9	21.2	0	0	-	-	-	-	DRY	3.05	N	
BH05	08:30	985.10	0.0	0.00	0.00	0.17	0.14	20.6	21.0	0	0	-	-	-	-	DRY	4.19	N	

Comments

ND - below limit of detection of instrument; NR - not read

Readings taken by:	GB	Checked by:	WGG

Originator	GB	**High Peak, Barkway** **CON71-BARK-001**	SES STANSTED ENVIRONMENTAL SERVICES
Checked & Approved	WGG	**RESULTS OF GAS & GROUNDWATER MONITORING**	

Date of Visit	31/01/2018		Time	16:00		
Background Readings	CH_4 - % v/v	CO_2 - % v/v	O_2 - % v/v	H_2S - ppm	CO - ppm	VOC - ppm
	0.00	0.03	20.9	0	NR	16.0

Weather Condtions	Damp
Ground Conditions	Damp
Atmospheric Pressure	1011.50 mbar

Hole No.	Time hr:mm	Atmos Pressure mb	Flow Rate l/hr	CH_4 % v/v peak	CH_4 % v/v steady	CO_2 % v/v peak	CO_2 % v/v steady	O_2 % v/v peak	O_2 % v/v steady	H2S ppm peak	H2S ppm steady	CO ppm peak	CO ppm steady	VOC ppm peak	VOC ppm steady	Water Level m bgl	Depth of Well m bgl	Sample Collected Y/N	Sample Notes
BH01	16:45	977.48	0.0	0.00	0.00	0.37	0.19	20.2	21.6	0	0	-	-	-	-	1.18	2.97	N	
BH02	16:35	976.43	0.0	0.00	0.00	0.38	0.34	20.9	21.6	0	0	-	-	-	-	4.38	4.41	N	
BH04	16:05	982.81	-0.2	0.00	0.00	2.09	1.84	16.9	17.3	0	0	-	-	-	-	DRY	3.10	N	
BH05	16:15	985.10	-0.2	0.00	0.00	0.97	0.88	19.4	20.1	0	0	-	-	-	-	DRY	4.26	N	

Comments

ND - below limit of detection of instrument; NR - not read

Readings taken by:	GB	Checked by:	WGG

Originator	GB	**High Peak, Barkway** **CON71-BARK-001**	SES STANSTED ENVIRONMENTAL SERVICES
Checked & Approved	WGG	**RESULTS OF GAS & GROUNDWATER MONITORING**	

14/02/2018

C. RESULTS OF LABORATORY ANALYSIS

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CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

3 Crittall Drive
Springwood Industrial Estate
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CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: 709114-1

Date of Report: 23-Jan-2018

Customer: Stansted Environmental Services Ltd
The Stansted Centre
Parsonage Road
Takeley
Essex
CM22 6PU

Customer Contact: Mr Gavin Greenwood

Customer Job Reference: CON71-BARK-001
Customer Site Reference: High Peak, Barkway
Date Job Received at Concept: 16-Jan-2018
Date Analysis Started: 17-Jan-2018
Date Analysis Completed: 23-Jan-2018

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

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

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

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

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

UKAS TESTING
1549

Report checked and authorised by :
Christopher Payne
Customer Service Advisor

Issued by :
Christopher Payne
Customer Service Advisor

Concept Reference: 709114
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
SES Suite 1

				Concept Reference	**709114 001**	**709114 003**	**709114 006**	**709114 009**
				Customer Sample Reference	**BH01 @ 0.30m**	**BH02 @ 0.30m**	**BH03 @ 0.30m**	**BH05 @ 0.30m**
				Date Sampled	**11-JAN-2018**	**05-JAN-2018**	**04-JAN-2018**	**03-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**				
Arsenic	T257	A40	2.0	mg/kg	**16**	**16**	**18**	**17**
Boron (water-soluble)	T82	A40	1	mg/kg	<1	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	**0.2**	**0.3**	**0.5**	**0.2**
Chromium	T245	A40	0.5	mg/kg	**29**	**24**	**28**	**27**
Copper	T245	A40	1.0	mg/kg	**22**	**27**	**26**	**25**
Lead	T257	A40	0.5	mg/kg	**20**	**110**	**41**	**48**
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	**38**	**27**	**35**	**31**
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3
Zinc	T257	A40	0.5	mg/kg	**91**	**90**	**270**	**92**
Asbestos ID	T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected	Asbestos not detected
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1
pH	T7	A40			**8.4**	**9.0**	**8.1**	**8.4**
Soil Organic Matter	T287	A40	0.1	%	**1.2**	**2.1**	**2.2**	**2.2**
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	**0.01**	**0.02**	<0.01	<0.01
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	<1

Concept Reference: 709114
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE)

				Concept Reference	**709114 001**	**709114 003**	**709114 006**	**709114 009**
				Customer Sample Reference	**BH01 @ 0.30m**	**BH02 @ 0.30m**	**BH03 @ 0.30m**	**BH05 @ 0.30m**
				Date Sampled	**11-JAN-2018**	**05-JAN-2018**	**04-JAN-2018**	**03-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**				
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.2**	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	**0.2**	**0.5**	**0.3**
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.1**	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	**0.1**	**0.7**	**2.0**	**0.9**
Pyrene	T16	AR	0.1	mg/kg	**0.1**	**0.6**	**1.8**	**0.8**
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	**0.3**	**1.3**	**0.4**
Chrysene	T16	AR	0.1	mg/kg	<0.1	**0.3**	**1.5**	**0.5**
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1	**0.2**	**1.0**	**0.5**
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<0.1	**0.3**	**1.5**	**0.5**
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	**0.3**	**1.7**	**0.5**
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	**0.1**	**0.8**	**0.3**
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	**0.4**	**0.1**
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	**0.2**	**0.9**	**0.3**
PAH(total)	T16	AR	0.1	mg/kg	**0.2**	**3.3**	**14**	**5.1**

Concept Reference: 709114
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
TPH UKCWG

	Concept Reference	709114 001	709114 003	709114 006	709114 009
	Customer Sample Reference	BH01 @ 0.30m	BH02 @ 0.30m	BH03 @ 0.30m	BH05 @ 0.30m
	Date Sampled	11-JAN-2018	05-JAN-2018	04-JAN-2018	03-JAN-2018

Determinand	Method	Test Sample	LOD	Units				
Benzene	T54	AR	1	µg/kg	<1	<1	<1	<1
Toluene	T54	AR	1	µg/kg	<1	<1	<1	<1
EthylBenzene	T54	AR	1	µg/kg	<1	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	<1	<1	<1
O Xylene	T54	AR	1	µg/kg	<1	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	**2**	**3**	**8**	**5**
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	**7**	**5**	**7**	**6**
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	**15**	**14**	**36**	**18**

Index to symbols used in 709114-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos subcontracted to REC Limited
sample 3,6,9 for phenols have been analysed exceeding recommended holding times. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T82	ICP/OES (Sim)
T546	Colorimetry (CF)
T7	Probe
T54	GC/MS (Headspace)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T6	ICP/OES
T16	GC/MS
T287	Calc TOC/0.58
T219	GC/FID (SE)
T245	ICP/OES (Aqua Regia Extraction)
T27	PLM

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T257	A40	2.0	mg/kg	U	001,003,006,009
Boron (water-soluble)	T82	A40	1	mg/kg	N	001,003,006,009
Cadmium	T257	A40	0.1	mg/kg	U	001,003,006,009
Chromium	T245	A40	0.5	mg/kg	U	001,003,006,009
Copper	T245	A40	1.0	mg/kg	U	001,003,006,009
Lead	T257	A40	0.5	mg/kg	U	001,003,006,009
Mercury	T245	A40	1.0	mg/kg	U	001,003,006,009
Nickel	T257	A40	0.5	mg/kg	U	001,003,006,009
Selenium	T257	A40	3	mg/kg	U	001,003,006,009
Zinc	T257	A40	0.5	mg/kg	U	001,003,006,009
Asbestos ID	T27	A40			SU	001,003,006,009
Chromium VI	T6	A40	1	mg/kg	N	001,003,006,009
pH	T7	A40			N	001,003,006,009
Soil Organic Matter	T287	A40	0.1	%	N	001,003,006,009
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	U	001,003,006,009
Cyanide(Total)	T546	AR	1	mg/kg	U	001,003,006,009
Phenols(Mono)	T546	AR	1	mg/kg	U	001,003,006,009
Benzene	T54	AR	1	µg/kg	U	001,003,006,009
Toluene	T54	AR	1	µg/kg	U	001,003,006,009
EthylBenzene	T54	AR	1	µg/kg	U	001,003,006,009
M/P Xylene	T54	AR	1	µg/kg	U	001,003,006,009
O Xylene	T54	AR	1	µg/kg	U	001,003,006,009
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001,003,006,009
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	001,003,006,009
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	001,003,006,009
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	001,003,006,009
Naphthalene	T16	AR	0.1	mg/kg	U	001,003,006,009
Acenaphthylene	T16	AR	0.1	mg/kg	U	001,003,006,009
Acenaphthene	T16	AR	0.1	mg/kg	U	001,003,006,009
Fluorene	T16	AR	0.1	mg/kg	U	001,003,006,009
Phenanthrene	T16	AR	0.1	mg/kg	U	001,003,006,009
Anthracene	T16	AR	0.1	mg/kg	U	001,003,006,009
Fluoranthene	T16	AR	0.1	mg/kg	N	001,003,006,009
Pyrene	T16	AR	0.1	mg/kg	N	001,003,006,009
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	001,003,006,009
Chrysene	T16	AR	0.1	mg/kg	U	001,003,006,009
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	001,003,006,009
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	001,003,006,009
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	001,003,006,009
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	001,003,006,009
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	001,003,006,009
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	001,003,006,009
PAH(total)	T16	AR	0.1	mg/kg	U	001,003,006,009

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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Concept Life Sciences

Certificate of Analysis

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Springwood Industrial Estate
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Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: 709469-2

Date of Report: 24-Jan-2018

Customer: Stansted Environmental Services Ltd
The Stansted Centre
Parsonage Road
Takeley
Essex
CM22 6PU

Customer Contact: Mr Gavin Greenwood

Customer Job Reference: CON71-BARK-001
Customer Site Reference: High Peak, Barkway
Date Job Received at Concept: 18-Jan-2018
Date Analysis Started: 18-Jan-2018
Date Analysis Completed: 24-Jan-2018

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

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

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

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

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

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1549

Report checked and authorised by :
Christopher Payne
Customer Service Advisor

Issued by :
Christopher Payne
Customer Service Advisor

Concept Reference: 709469
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
SES Suite 1

				Concept Reference	**709469 001**
				Customer Sample Reference	**BH04 @ 0.30m**
				Date Sampled	**17-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Arsenic	T257	A40	2.0	mg/kg	**20**
Boron (water-soluble)	T82	A40	1	mg/kg	<1
Cadmium	T257	A40	0.1	mg/kg	**0.5**
Chromium	T245	A40	0.5	mg/kg	**27**
Copper	T245	A40	1.0	mg/kg	**53**
Lead	T257	A40	0.5	mg/kg	**160**
Mercury	T245	A40	1.0	mg/kg	<1.0
Nickel	T257	A40	0.5	mg/kg	**27**
Selenium	T257	A40	3	mg/kg	<3
Zinc	T257	A40	0.5	mg/kg	**240**
Asbestos ID	T27	A40			Asbestos not detected
Chromium VI	T6	A40	1	mg/kg	<1
pH	T7	A40			**8.1**
Soil Organic Matter	T287	A40	0.1	%	**5.7**
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	**0.01**
Cyanide(Total)	T546	AR	1	mg/kg	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1

Concept Reference: 709469
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE)

				Concept Reference	**709469 001**
				Customer Sample Reference	**BH04 @ 0.30m**
				Date Sampled	**17-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Naphthalene	T16	AR	0.1	mg/kg	**0.4**
Acenaphthylene	T16	AR	0.1	mg/kg	**1.3**
Acenaphthene	T16	AR	0.1	mg/kg	(2) <0.3
Fluorene	T16	AR	0.1	mg/kg	(2) <0.3
Phenanthrene	T16	AR	0.1	mg/kg	**4.6**
Anthracene	T16	AR	0.1	mg/kg	**1.0**
Fluoranthene	T16	AR	0.1	mg/kg	**15**
Pyrene	T16	AR	0.1	mg/kg	**13**
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	**7.4**
Chrysene	T16	AR	0.1	mg/kg	**9.5**
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	**8.0**
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	**8.3**
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	**8.4**
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	**5.2**
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	**2.1**
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	**6.2**
PAH(total)	T16	AR	0.1	mg/kg	**90**

Concept Reference: 709469
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
TPH UKCWG

Concept Reference	**709469 001**
Customer Sample Reference	**BH04 @ 0.30m**
Date Sampled	**17-JAN-2018**

Determinand	Method	Test Sample	LOD	Units	
Benzene	T54	AR	1	µg/kg	<1
Toluene	T54	AR	1	µg/kg	<1
EthylBenzene	T54	AR	1	µg/kg	<1
M/P Xylene	T54	AR	1	µg/kg	<1
O Xylene	T54	AR	1	µg/kg	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	**6**
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	**7**
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	**12**
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	**110**
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	**66**
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	**570**

Index to symbols used in 709469-2

Value	Description
AR	As Received
A40	Assisted dried < 40C
2	LOD Raised Due to Matrix Interference
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos subcontracted to REC Limited

Method Index

Value	Description
T245	ICP/OES (Aqua Regia Extraction)
T82	ICP/OES (Sim)
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T219	GC/FID (SE)
T546	Colorimetry (CF)
T7	Probe
T54	GC/MS (Headspace)
T6	ICP/OES
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T287	Calc TOC/0.58
T16	GC/MS
T27	PLM

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T257	A40	2.0	mg/kg	U	001
Boron (water-soluble)	T82	A40	1	mg/kg	N	001
Cadmium	T257	A40	0.1	mg/kg	U	001
Chromium	T245	A40	0.5	mg/kg	U	001
Copper	T245	A40	1.0	mg/kg	U	001
Lead	T257	A40	0.5	mg/kg	U	001
Mercury	T245	A40	1.0	mg/kg	U	001
Nickel	T257	A40	0.5	mg/kg	U	001
Selenium	T257	A40	3	mg/kg	U	001
Zinc	T257	A40	0.5	mg/kg	U	001
Asbestos ID	T27	A40			SU	001
Chromium VI	T6	A40	1	mg/kg	N	001
pH	T7	A40			N	001
Soil Organic Matter	T287	A40	0.1	%	N	001
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	U	001
Cyanide(Total)	T546	AR	1	mg/kg	U	001
Phenols(Mono)	T546	AR	1	mg/kg	U	001
Benzene	T54	AR	1	µg/kg	U	001
Toluene	T54	AR	1	µg/kg	U	001
EthylBenzene	T54	AR	1	µg/kg	U	001
M/P Xylene	T54	AR	1	µg/kg	U	001
O Xylene	T54	AR	1	µg/kg	U	001
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	001
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	001
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	001
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	001
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	001
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	001
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	001
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	001
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	001
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	001
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	001
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	001
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	001
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	001
Naphthalene	T16	AR	0.1	mg/kg	U	001
Acenaphthylene	T16	AR	0.1	mg/kg	U	001
Acenaphthene	T16	AR	0.1	mg/kg	U	001
Fluorene	T16	AR	0.1	mg/kg	U	001
Phenanthrene	T16	AR	0.1	mg/kg	U	001
Anthracene	T16	AR	0.1	mg/kg	U	001
Fluoranthene	T16	AR	0.1	mg/kg	N	001
Pyrene	T16	AR	0.1	mg/kg	N	001
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	001
Chrysene	T16	AR	0.1	mg/kg	U	001
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	001
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	001
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	001
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	001
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	001
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	001
PAH(total)	T16	AR	0.1	mg/kg	U	001

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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Concept Life Sciences

Certificate of Analysis

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CM7 2RT
Tel : 01376 560120
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Report Number: 710306-1

Date of Report: 31-Jan-2018

Customer: Stansted Environmental Services Ltd
The Stansted Centre
Parsonage Road
Takeley
Essex
CM22 6PU

Customer Contact: Mr Gavin Greenwood

Customer Job Reference: CON71-BARK-001
Customer Site Reference: High Peak, Barkway
Date Job Received at Concept: 16-Jan-2018
Date Analysis Started: 22-Jan-2018
Date Analysis Completed: 31-Jan-2018

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

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

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

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

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

UKAS TESTING
1549

Report checked and authorised by :
Christopher Payne
Customer Service Advisor

Issued by :
Christopher Payne
Customer Service Advisor

Concept Reference: 710306
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
SES Suite 1

				Concept Reference	**710306 002**	**710306 003**	**710306 004**
				Customer Sample Reference	**BH01 @ 0.60m**	**BH02 @ 0.60m**	**BH03 @ 0.60m**
				Date Sampled	**11-JAN-2018**	**05-JAN-2018**	**04-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Arsenic	T257	A40	2.0	mg/kg	**11**	**12**	**14**
Boron (water-soluble)	T82	A40	1	mg/kg	<1	<1	<1
Cadmium	T257	A40	0.1	mg/kg	**0.2**	**0.2**	**0.3**
Chromium	T245	A40	0.5	mg/kg	**16**	**17**	**24**
Copper	T245	A40	1.0	mg/kg	**14**	**17**	**18**
Lead	T257	A40	0.5	mg/kg	**12**	**12**	**17**
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	**24**	**24**	**33**
Selenium	T257	A40	3	mg/kg	<3	<3	<3
Zinc	T257	A40	0.5	mg/kg	**55**	**52**	**90**
Asbestos ID	T27	A40			Asbestos not detected	Asbestos not detected	Asbestos not detected
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1
pH	T7	A40			**8.6**	**9.1**	**8.6**
Soil Organic Matter	T287	A40	0.1	%	**0.5**	**0.2**	**0.9**
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	<0.01	**0.02**	<0.01
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1

Concept Reference: 710306
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
Total and Speciated USEPA16 PAH (SE)

				Concept Reference	**710306 002**	**710306 003**	**710306 004**
				Customer Sample Reference	**BH01 @ 0.60m**	**BH02 @ 0.60m**	**BH03 @ 0.60m**
				Date Sampled	**11-JAN-2018**	**05-JAN-2018**	**04-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Chrysene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	(13) <0.1	(13) <0.1	(13) <0.1
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	(13) <0.1	(13) <0.1	(13) <0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	(13) <0.1	(13) <0.1	(13) <0.1
PAH(total)	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1

Concept Reference: 710306
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil

Semi-Volatile Organic Compounds (USEPA 625) (SE)

					Concept Reference	710306 001	710306 005
					Customer Sample Reference	BH01 @ 0.30m	BH04 @ 0.30m
					Date Sampled	11-JAN-2018	17-JAN-2018
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Phenol	T16	AR	0.1	mg/kg	<0.1	<0.1
Bis (2-chloroethyl) ether	T16	AR	0.1	mg/kg	<0.1	<0.1
2-Chlorophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
1,3-Dichlorobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
1,4-Dichlorobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
1,2-Dichlorobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
Bis (2-chloroisopropyl) ether	T16	AR	0.1	mg/kg	<0.1	<0.1
2-methyl phenol	T16	AR	0.1	mg/kg	<0.1	<0.1
3/4-Methylphenol	T16	AR	0.1	mg/kg	<0.1	<0.1
Hexachloroethane	T16	AR	0.1	mg/kg	<0.1	<0.1
Nitrobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
Isophorone	T16	AR	0.1	mg/kg	<0.1	<0.1
2-Nitrophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
2,4-Dimethylphenol	T16	AR	0.1	mg/kg	<0.1	<0.1
Bis (2-chloroethoxy) methane	T16	AR	0.1	mg/kg	<0.1	<0.1
2,4-Dichlorophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
1,2,4-Trichlorobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
Naphthalene	T16	AR	0.1	mg/kg	<0.1	**0.3**
4-Chloroaniline	T16	AR	0.1	mg/kg	<0.1	<0.1
Hexachlorobutadiene	T16	AR	0.1	mg/kg	<0.1	<0.1
4-Chloro-3-methylphenol	T16	AR	0.1	mg/kg	<0.1	<0.1
2-Methylnaphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1
Hexachlorocyclopentadiene	T16	AR	0.1	mg/kg	<0.1	<0.1
2,4,6-Trichlorophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
2,4,5-Trichlorophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
2-Chloronaphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1
2-Nitroaniline	T16	AR	0.1	mg/kg	<0.1	<0.1
Dimethyl phthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
2,6-Dinitrotoluene	T16	AR	0.1	mg/kg	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	**1.1**
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	**0.2**
3-Nitroaniline	T16	AR	0.1	mg/kg	<0.1	<0.1
Dibenzofuran	T16	AR	0.1	mg/kg	<0.1	**0.2**
2,4-Dinitrotoluene	T16	AR	0.1	mg/kg	<0.1	<0.1
Diethyl phthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	**0.2**
4-Chlorophenyl phenylether	T16	AR	0.1	mg/kg	<0.1	<0.1
4-Nitroaniline	T16	AR	0.1	mg/kg	<0.1	<0.1
Azobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
4-Bromophenyl phenylether	T16	AR	0.1	mg/kg	<0.1	<0.1
Hexachlorobenzene	T16	AR	0.1	mg/kg	<0.1	<0.1
Pentachlorophenol	T16	AR	0.1	mg/kg	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	**5.4**
Anthracene	T16	AR	0.1	mg/kg	<0.1	**1.5**
Carbazole	T16	AR	0.1	mg/kg	<0.1	**0.4**
Di-n-butylphthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
Fluoranthene	T16	AR	0.1	mg/kg	<0.1	**16**
Pyrene	T16	AR	0.1	mg/kg	<0.1	**12**
Butyl benzylphthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	**9.5**
Chrysene	T16	AR	0.1	mg/kg	<0.1	**10**
Bis (2-ethylhexyl)phthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
Di-n-octylphthalate	T16	AR	0.1	mg/kg	<0.1	<0.1
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	<0.1	**17**
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	**10**
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	**5.2**
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	(2) <0.3
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	**6.2**

Concept Reference: 710306
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
TPH UKCWG

				Concept Reference	**710306 002**	**710306 003**	**710306 004**
				Customer Sample Reference	**BH01 @ 0.60m**	**BH02 @ 0.60m**	**BH03 @ 0.60m**
				Date Sampled	**11-JAN-2018**	**05-JAN-2018**	**04-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Benzene	T54	AR	1	µg/kg	<1	<1	<1
Toluene	T54	AR	1	µg/kg	<1	<1	<1
EthylBenzene	T54	AR	1	µg/kg	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	<1	<1
O Xylene	T54	AR	1	µg/kg	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	<2	<2	<2

Concept Reference: 710306
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Soil Analysed as Soil
VOC (SE)

					Concept Reference	710306 001	710306 005
					Customer Sample Reference	BH01 @ 0.30m	BH04 @ 0.30m
					Date Sampled	11-JAN-2018	17-JAN-2018
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
1,1,1,2-Tetrachloroethane	T54	AR	5	µg/kg		<5	<5
1,1,1-Trichloroethane	T54	AR	5	µg/kg		<5	<5
1,1,2,2-Tetrachloroethane	T54	AR	5	µg/kg		<5	<5
1,1,2-Trichloroethane	T54	AR	5	µg/kg		<5	<5
1,1,2-Trichloroethylene	T54	AR	5	µg/kg		<5	<5
1,1-Dichloroethane	T54	AR	5	µg/kg		<5	<5
1,1-Dichloroethylene	T54	AR	5	µg/kg		<5	<5
1,1-Dichloropropene	T54	AR	5	µg/kg		<5	<5
1,2,3-Trichlorobenzene	T54	AR	5	µg/kg		<5	<5
1,2,3-Trichloropropane	T54	AR	5	µg/kg		<5	<5
1,2,4-Trichlorobenzene	T54	AR	5	µg/kg		<5	<5
1,2,4-Trimethylbenzene	T54	AR	5	µg/kg		<5	<5
1,2-Dibromo-3-Chloropropane	T54	AR	10	µg/kg		<10	**23**
1,2-dibromoethane	T54	AR	5	µg/kg		<5	<5
1,2-Dichlorobenzene	T54	AR	5	µg/kg		<5	<5
1,2-Dichloroethane	T54	AR	5	µg/kg		<5	<5
1,2-Dichloropropane	T54	AR	5	µg/kg		<5	<5
1,3,5-Trimethylbenzene	T54	AR	5	µg/kg		<5	<5
1,3-Dichlorobenzene	T54	AR	5	µg/kg		<5	<5
1,3-Dichloropropane	T54	AR	5	µg/kg		<5	<5
1,4-Dichlorobenzene	T54	AR	5	µg/kg		<5	<5
Ethyl-2-Methylbenzene	T54	AR	5	µg/kg		<5	<5
2,2-Dichloropropane	T54	AR	5	µg/kg		<5	<5
2-Chlorotoluene	T54	AR	5	µg/kg		<5	<5
4-Chlorotoluene	T54	AR	5	µg/kg		<5	<5
Benzene	T54	AR	1	µg/kg		<1	<1
Bromobenzene	T54	AR	5	µg/kg		<5	<5
Bromochloromethane	T54	AR	5	µg/kg		<5	<5
Bromodichloromethane	T54	AR	5	µg/kg		<5	<5
Bromoform	T54	AR	5	µg/kg		<5	<5
Bromomethane	T54	AR	5	µg/kg		<5	<5
Carbon tetrachloride	T54	AR	5	µg/kg		<5	<5
Chlorobenzene	T54	AR	5	µg/kg		<5	<5
Chlorodibromomethane	T54	AR	5	µg/kg		<5	<5
Chloroethane	T54	AR	5	µg/kg		<5	<5
Chloroform	T54	AR	5	µg/kg		<5	<5
Chloromethane	T54	AR	5	µg/kg		<5	<5
Cis-1,2-Dichloroethylene	T54	AR	5	µg/kg		<5	<5
Cis-1,3-Dichloropropene	T54	AR	5	µg/kg		<5	<5
Dibromomethane	T54	AR	5	µg/kg		<5	<5
Dichlorodifluoromethane	T54	AR	5	µg/kg		<5	<5
EthylBenzene	T54	AR	1	µg/kg		<1	<1
Hexachlorobutadiene	T54	AR	5	µg/kg		<5	<5
Isopropyl benzene	T54	AR	5	µg/kg		<5	<5
m/p ethyl toluene	T54	AR	5	µg/kg		<5	<5
M/P Xylene	T54	AR	1	µg/kg		<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg		<1	<1
n-Butylbenzene	T54	AR	10	µg/kg		<10	<10
n-Propylbenzene	T54	AR	5	µg/kg		<5	<5
O Xylene	T54	AR	1	µg/kg		<1	<1
p-Isopropyltoluene	T54	AR	5	µg/kg		<5	<5
S-Butylbenzene	T54	AR	5	µg/kg		<5	<5
Styrene	T54	AR	5	µg/kg		<5	<5
T-Butylbenzene	T54	AR	5	µg/kg		<5	<5
Tertiary amyl methyl ether	T54	AR	5	µg/kg		<5	<5
Tetrachloroethene	T54	AR	5	µg/kg		<5	<5
Toluene	T54	AR	1	µg/kg		<1	<1
Trans-1,2-Dichloroethene	T54	AR	5	µg/kg		<5	<5
Trans-1,3-Dichloropropene	T54	AR	5	µg/kg		<5	<5
Trichlorofluoromethane	T54	AR	5	µg/kg		<5	<5

Concept Reference:	710306
Project Site:	High Peak, Barkway
Customer Reference:	CON71-BARK-001
Soil	Analysed as Soil
VOC (SE)	

				Concept Reference	**710306 001**	**710306 005**
				Customer Sample Reference	**BH01 @ 0.30m**	**BH04 @ 0.30m**
				Date Sampled	**11-JAN-2018**	**17-JAN-2018**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Vinyl chloride	T54	AR	5	µg/kg	<5	<5

Index to symbols used in 710306-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
13	Results have been blank corrected.
2	LOD Raised Due to Matrix Interference
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos subcontracted to REC Limited
003 and 004 - These samples have been analysed for Phenols, PAH and BTEX exceeding recommended holding times. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T245	ICP/OES (Aqua Regia Extraction)
T16	GC/MS
T7	Probe
T546	Colorimetry (CF)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T287	Calc TOC/0.58
T219	GC/FID (SE)
T54	GC/MS (Headspace)
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T6	ICP/OES
T27	PLM
T82	ICP/OES (Sim)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
1,1,1,2-Tetrachloroethane	T54	AR	5	µg/kg	U	001,005
1,1,1-Trichloroethane	T54	AR	5	µg/kg	U	001,005
1,1,2,2-Tetrachloroethane	T54	AR	5	µg/kg	U	001,005
1,1,2-Trichloroethane	T54	AR	5	µg/kg	U	001,005
1,1,2-Trichloroethylene	T54	AR	5	µg/kg	U	001,005
1,1-Dichloroethane	T54	AR	5	µg/kg	U	001,005
1,1-Dichloroethylene	T54	AR	5	µg/kg	U	001,005
1,1-Dichloropropene	T54	AR	5	µg/kg	U	001,005
1,2,3-Trichlorobenzene	T54	AR	5	µg/kg	U	001,005
1,2,3-Trichloropropane	T54	AR	5	µg/kg	U	001,005
1,2,4-Trichlorobenzene	T54	AR	5	µg/kg	U	001,005
1,2,4-Trimethylbenzene	T54	AR	5	µg/kg	U	001,005
1,2-Dibromo-3-Chloropropane	T54	AR	10	µg/kg	U	001,005
1,2-dibromoethane	T54	AR	5	µg/kg	U	001,005
1,2-Dichlorobenzene	T54	AR	5	µg/kg	U	001,005
1,2-Dichloroethane	T54	AR	5	µg/kg	U	001,005
1,2-Dichloropropane	T54	AR	5	µg/kg	U	001,005
1,3,5-Trimethylbenzene	T54	AR	5	µg/kg	U	001,005

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
1,3-Dichlorobenzene	T54	AR	5	µg/kg	U	001,005
1,3-Dichloropropane	T54	AR	5	µg/kg	U	001,005
1,4-Dichlorobenzene	T54	AR	5	µg/kg	U	001,005
Ethyl-2-Methylbenzene	T54	AR	5	µg/kg	U	001,005
2,2-Dichloropropane	T54	AR	5	µg/kg	U	001,005
2-Chlorotoluene	T54	AR	5	µg/kg	U	001,005
4-Chlorotoluene	T54	AR	5	µg/kg	U	001,005
Benzene	T54	AR	1	µg/kg	U	001-005
Bromobenzene	T54	AR	5	µg/kg	U	001,005
Bromochloromethane	T54	AR	5	µg/kg	U	001,005
Bromodichloromethane	T54	AR	5	µg/kg	U	001,005
Bromoform	T54	AR	5	µg/kg	U	001,005
Bromomethane	T54	AR	5	µg/kg	U	001,005
Carbon tetrachloride	T54	AR	5	µg/kg	U	001,005
Chlorobenzene	T54	AR	5	µg/kg	U	001,005
Chlorodibromomethane	T54	AR	5	µg/kg	U	001,005
Chloroethane	T54	AR	5	µg/kg	U	001,005
Chloroform	T54	AR	5	µg/kg	U	001,005
Chloromethane	T54	AR	5	µg/kg	N	001,005
Cis-1,2-Dichloroethylene	T54	AR	5	µg/kg	U	001,005
Cis-1,3-Dichloropropene	T54	AR	5	µg/kg	U	001,005
Dibromomethane	T54	AR	5	µg/kg	U	001,005
Dichlorodifluoromethane	T54	AR	5	µg/kg	N	001,005
EthylBenzene	T54	AR	1	µg/kg	U	001-005
Hexachlorobutadiene	T54	AR	5	µg/kg	U	001,005
Isopropyl benzene	T54	AR	5	µg/kg	U	001,005
m/p ethyl toluene	T54	AR	5	µg/kg	U	001,005
M/P Xylene	T54	AR	1	µg/kg	U	001-005
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001-005
n-Butylbenzene	T54	AR	10	µg/kg	U	001,005
n-Propylbenzene	T54	AR	5	µg/kg	U	001,005
O Xylene	T54	AR	1	µg/kg	U	001-005
p-Isopropyltoluene	T54	AR	5	µg/kg	U	001,005
S-Butylbenzene	T54	AR	5	µg/kg	U	001,005
Styrene	T54	AR	5	µg/kg	U	001,005
T-Butylbenzene	T54	AR	5	µg/kg	U	001,005
Tertiary amyl methyl ether	T54	AR	5	µg/kg	U	001,005
Tetrachloroethene	T54	AR	5	µg/kg	U	001,005
Toluene	T54	AR	1	µg/kg	U	001-005
Trans-1,2-Dichloroethene	T54	AR	5	µg/kg	U	001,005
Trans-1,3-Dichloropropene	T54	AR	5	µg/kg	U	001,005
Trichlorofluoromethane	T54	AR	5	µg/kg	U	001,005
Vinyl chloride	T54	AR	5	µg/kg	U	001,005
Arsenic	T257	A40	2.0	mg/kg	U	002-004
Boron (water-soluble)	T82	A40	1	mg/kg	N	002-004
Cadmium	T257	A40	0.1	mg/kg	U	002-004
Chromium	T245	A40	0.5	mg/kg	U	002-004
Copper	T245	A40	1.0	mg/kg	U	002-004
Lead	T257	A40	0.5	mg/kg	U	002-004
Mercury	T245	A40	1.0	mg/kg	U	002-004
Nickel	T257	A40	0.5	mg/kg	U	002-004
Selenium	T257	A40	3	mg/kg	U	002-004
Zinc	T257	A40	0.5	mg/kg	U	002-004
Asbestos ID	T27	A40			SU	002-004
Chromium VI	T6	A40	1	mg/kg	N	002-004
pH	T7	A40			N	002-004
Soil Organic Matter	T287	A40	0.1	%	N	002-004
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	U	002-004
Cyanide(Total)	T546	AR	1	mg/kg	U	002-004
Phenols(Mono)	T546	AR	1	mg/kg	U	002-004
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	002-004
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	002-004
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	002-004
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	002-004
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	002-004

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	002-004
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	002-004
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	002-004
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	002-004
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	002-004
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	002-004
PAH(total)	T16	AR	0.1	mg/kg	U	002-004
Phenol	T16	AR	0.1	mg/kg	U	001,005
Bis (2-chloroethyl) ether	T16	AR	0.1	mg/kg	U	001,005
2-Chlorophenol	T16	AR	0.1	mg/kg	U	001,005
1,3-Dichlorobenzene	T16	AR	0.1	mg/kg	U	001,005
1,4-Dichlorobenzene	T16	AR	0.1	mg/kg	U	001,005
1,2-Dichlorobenzene	T16	AR	0.1	mg/kg	U	001,005
Bis (2-chloroisopropyl) ether	T16	AR	0.1	mg/kg	U	001,005
2-methyl phenol	T16	AR	0.1	mg/kg	U	001,005
3/4-Methylphenol	T16	AR	0.1	mg/kg	U	001,005
Hexachloroethane	T16	AR	0.1	mg/kg	U	001,005
Nitrobenzene	T16	AR	0.1	mg/kg	U	001,005
Isophorone	T16	AR	0.1	mg/kg	U	001,005
2-Nitrophenol	T16	AR	0.1	mg/kg	N	001,005
2,4-Dimethylphenol	T16	AR	0.1	mg/kg	N	001,005
Bis (2-chloroethoxy) methane	T16	AR	0.1	mg/kg	U	001,005
2,4-Dichlorophenol	T16	AR	0.1	mg/kg	N	001,005
1,2,4-Trichlorobenzene	T16	AR	0.1	mg/kg	U	001,005
Naphthalene	T16	AR	0.1	mg/kg	U	001-005
4-Chloroaniline	T16	AR	0.1	mg/kg	U	001,005
Hexachlorobutadiene	T16	AR	0.1	mg/kg	U	001,005
4-Chloro-3-methylphenol	T16	AR	0.1	mg/kg	U	001,005
2-Methylnaphthalene	T16	AR	0.1	mg/kg	U	001,005
Hexachlorocyclopentadiene	T16	AR	0.1	mg/kg	N	001,005
2,4,6-Trichlorophenol	T16	AR	0.1	mg/kg	N	001,005
2,4,5-Trichlorophenol	T16	AR	0.1	mg/kg	N	001,005
2-Chloronaphthalene	T16	AR	0.1	mg/kg	U	001,005
2-Nitroaniline	T16	AR	0.1	mg/kg	U	001,005
Dimethyl phthalate	T16	AR	0.1	mg/kg	U	001,005
2,6-Dinitrotoluene	T16	AR	0.1	mg/kg	U	001,005
Acenaphthylene	T16	AR	0.1	mg/kg	U	001-005
Acenaphthene	T16	AR	0.1	mg/kg	U	001-005
3-Nitroaniline	T16	AR	0.1	mg/kg	U	001,005
Dibenzofuran	T16	AR	0.1	mg/kg	U	001,005
2,4-Dinitrotoluene	T16	AR	0.1	mg/kg	U	001,005
Diethyl phthalate	T16	AR	0.1	mg/kg	U	001,005
Fluorene	T16	AR	0.1	mg/kg	U	001-005
4-Chlorophenyl phenylether	T16	AR	0.1	mg/kg	U	001,005
4-Nitroaniline	T16	AR	0.1	mg/kg	U	001,005
Azobenzene	T16	AR	0.1	mg/kg	U	001,005
4-Bromophenyl phenylether	T16	AR	0.1	mg/kg	U	001,005
Hexachlorobenzene	T16	AR	0.1	mg/kg	U	001,005
Pentachlorophenol	T16	AR	0.1	mg/kg	N	001,005
Phenanthrene	T16	AR	0.1	mg/kg	U	001-005
Anthracene	T16	AR	0.1	mg/kg	U	001-005
Carbazole	T16	AR	0.1	mg/kg	U	001,005
Di-n-butylphthalate	T16	AR	0.1	mg/kg	U	001,005
Fluoranthene	T16	AR	0.1	mg/kg	N	001-005
Pyrene	T16	AR	0.1	mg/kg	N	001-005
Butyl benzylphthalate	T16	AR	0.1	mg/kg	N	001,005
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	001-005
Chrysene	T16	AR	0.1	mg/kg	U	001-005
Bis (2-ethylhexyl)phthalate	T16	AR	0.1	mg/kg	N	001,005
Di-n-octylphthalate	T16	AR	0.1	mg/kg	U	001,005
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	U	001,005
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	001-005
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	001-005
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	001-005
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	001-005

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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Concept Life Sciences

Certificate of Analysis

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Report Number: 713172-1

Date of Report: 09-Feb-2018

Customer: Stansted Environmental Services Ltd
The Stansted Centre
Parsonage Road
Takeley
Essex
CM22 6PU

Customer Contact: Mr Gavin Greenwood

Customer Job Reference: CON71-BARK-001
Customer Site Reference: High Peak, Barkway
Date Job Received at Concept: 02-Feb-2018
Date Analysis Started: 05-Feb-2018
Date Analysis Completed: 09-Feb-2018

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

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

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

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

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

UKAS TESTING
1549

Report checked and authorised by :
Christopher Payne
Customer Service Advisor

Issued by :
Christopher Payne
Customer Service Advisor

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water
Metals (SE)

Concept Reference	**713172 001**	**713172 002**
Customer Sample Reference	**Well @ 6.94m**	**BH1 @ 1.02m**
Date Sampled	**02-FEB-2017**	**02-FEB-2017**

Determinand	Method	Test Sample	LOD	Units		
As (Dissolved)	T281	F	0.0002	mg/l	**0.0011**	**0.0012**
B (Dissolved)	T281	F	0.05	mg/l	<0.05	<0.05
Cd (Dissolved)	T281	F	0.00002	mg/l	**0.00017**	<0.00002
Cr (Dissolved)	T281	F	0.001	mg/l	<0.001	<0.001
Cu (Dissolved)	T281	F	0.0005	mg/l	**0.0046**	**0.0033**
Pb (Dissolved)	T281	F	0.0003	mg/l	**0.0007**	<0.0003
Hg (Dissolved)	T281	F	0.00005	mg/l	<0.00005	<0.00005
Ni (Dissolved)	T281	F	0.001	mg/l	**0.002**	**0.004**
Se (Dissolved)	T281	F	0.0005	mg/l	**0.0011**	**0.048**
Zn (Dissolved)	T281	F	0.002	mg/l	**0.052**	<0.002
Ammonia expressed as N	T686	F	0.05	mg/l	<0.05	<0.05
Chromium VI	T686	F	0.003	mg/l	<0.003	<0.003
Total Oxidised Nitrogen	T686	F	0.1	mg/l	**3.4**	**1.0**
Sulphate ion	T686	F	0.5	mg/l	**47**	**96**
Alkalinity expressed as CaCO3	T22	F	20	mg/l	**340**	**300**
Chemical Oxygen Demand	T221	F	20	mg/l	<20	**36**
Biochemical Oxygen Demand (Allyl Thiourea)	T264	F	1	mg/l	**34**	**35**
Electrical Conductivity	T7	F	1	µS/cm	**800**	**1000**
Diss Oxygen	T7	AR	1.0	mg/l	**8.4**	**4.7**
pH	T7	F			**8.07**	**8.27**
Suspended Solids (Total)	T2	AR	10	mg/l	**2400**	**1700**
Total Organic Carbon	T21	F	1	mg/l	**8**	**11**
Cyanide(Total)	T546	F	0.01	mg/l	<0.01	<0.01

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water
Total and Speciated USEPA16 PAH (SE)

Concept Reference	**713172 001**	**713172 002**
Customer Sample Reference	**Well @ 6.94m**	**BH1 @ 1.02m**
Date Sampled	**02-FEB-2017**	**02-FEB-2017**

Determinand	Method	Test Sample	LOD	Units		
Naphthalene	T149	AR	0.01	µg/l	(13) **0.02**	(13) **0.02**
Acenaphthylene	T149	AR	0.01	µg/l	<0.01	<0.01
Acenaphthene	T149	AR	0.01	µg/l	<0.01	<0.01
Fluorene	T149	AR	0.01	µg/l	<0.01	<0.01
Phenanthrene	T149	AR	0.01	µg/l	<0.01	**0.03**
Anthracene	T149	AR	0.01	µg/l	<0.01	<0.01
Fluoranthene	T149	AR	0.01	µg/l	**0.03**	**0.08**
Pyrene	T149	AR	0.01	µg/l	**0.03**	**0.08**
Benzo(a)Anthracene	T149	AR	0.01	µg/l	<0.01	**0.06**
Chrysene	T149	AR	0.01	µg/l	<0.01	**0.06**
Benzo(b)fluoranthene	T149	AR	0.01	µg/l	<0.01	**0.06**
Benzo(k)fluoranthene	T149	AR	0.01	µg/l	<0.01	**0.08**
Benzo(a)Pyrene	T149	AR	0.01	µg/l	<0.01	**0.07**
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	<0.01	**0.06**
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	<0.01	**0.03**
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	<0.01	**0.06**
PAH(total)	T149	AR	0.01	µg/l	**0.07**	**0.69**

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water
TPH (CWG) with MTBE & BTEX SE

				Concept Reference	**713172 001**	**713172 002**
				Customer Sample Reference	**Well @ 6.94m**	**BH1 @ 1.02m**
				Date Sampled	**02-FEB-2017**	**02-FEB-2017**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Benzene	T54	AR	1	µg/l	<1	<1
Toluene	T54	AR	1	µg/l	<1	<1
EthylBenzene	T54	AR	1	µg/l	<1	<1
M/P Xylene	T54	AR	1	µg/l	<1	<1
O Xylene	T54	AR	1	µg/l	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/l	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	<0.020	<0.020
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	**0.02**	**0.02**
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	**0.01**	<0.01
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	<0.01	<0.01
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	**0.04**	**0.01**
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	**0.03**	<0.01
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	**0.13**	**0.03**
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	**0.02**	**0.01**
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	**0.11**	**0.06**

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water

Semi-Volatile Organic Compounds (USEPA 625) (SE)

					Concept Reference	713172 001	713172 002
					Customer Sample Reference	Well @ 6.94m	BH1 @ 1.02m
					Date Sampled	02-FEB-2017	02-FEB-2017
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Phenol	T71	AR	1	µg/l		<1	<1
Bis (2-chloroethyl) ether	T71	AR	1	µg/l		<1	<1
2-Chlorophenol	T71	AR	1	µg/l		<1	<1
1,3-Dichlorobenzene	T71	AR	1	µg/l		<1	<1
1,4-Dichlorobenzene	T71	AR	1	µg/l		<1	<1
1,2-Dichlorobenzene	T71	AR	1	µg/l		<1	<1
Bis (2-chloroisopropyl) ether	T71	AR	1	µg/l		<1	<1
2-methyl phenol	T71	AR	1	µg/l		<1	<1
3/4-Methylphenol	T71	AR	1	µg/l		<1	<1
Hexachloroethane	T71	AR	1	µg/l		<1	<1
Nitrobenzene	T71	AR	1	µg/l		<1	<1
Isophorone	T71	AR	1	µg/l		<1	<1
2-Nitrophenol	T71	AR	1	µg/l		<1	<1
2,4-Dimethylphenol	T71	AR	1	µg/l		<1	<1
Bis (2-chloroethoxy) methane	T71	AR	1	µg/l		<1	<1
2,4-Dichlorophenol	T71	AR	1	µg/l		<1	<1
1,2,4-Trichlorobenzene	T71	AR	1	µg/l		<1	<1
Naphthalene	T71	AR	1	µg/l		<1	<1
4-Chloroaniline	T71	AR	1	µg/l		<1	<1
Hexachlorobutadiene	T71	AR	1	µg/l		<1	<1
4-Chloro-3-methylphenol	T71	AR	1	µg/l		<1	<1
2-Methylnaphthalene	T71	AR	1	µg/l		<1	<1
Hexachlorocyclopentadiene	T71	AR	1	µg/l		<1	<1
2,4,6-Trichlorophenol	T71	AR	1	µg/l		<1	<1
2,4,5-Trichlorophenol	T71	AR	1	µg/l		<1	<1
2-Chloronaphthalene	T71	AR	1	µg/l		<1	<1
2-Nitroaniline	T71	AR	1	µg/l		<1	<1
Dimethyl phthalate	T71	AR	1	µg/l		<1	<1
2,6-Dinitrotoluene	T71	AR	1	µg/l		<1	<1
Acenaphthylene	T71	AR	1	µg/l		<1	<1
Acenaphthene	T71	AR	1	µg/l		<1	<1
3-Nitroaniline	T71	AR	1	µg/l		<1	<1
Dibenzofuran	T71	AR	1	µg/l		<1	<1
2,4-Dinitrotoluene	T71	AR	1	µg/l		<1	<1
Diethyl phthalate	T71	AR	1	µg/l		<1	<1
Fluorene	T71	AR	1	µg/l		<1	<1
4-Chlorophenyl phenylether	T71	AR	1	µg/l		<1	<1
4-Nitroaniline	T71	AR	1	µg/l		<1	<1
Azobenzene	T71	AR	1	µg/l		<1	<1
4-Bromophenyl phenylether	T71	AR	1	µg/l		<1	<1
Hexachlorobenzene	T71	AR	1	µg/l		<1	<1
Phenanthrene	T71	AR	1	µg/l		<1	<1
Anthracene	T71	AR	1	µg/l		<1	<1
Carbazole	T71	AR	1	µg/l		<1	<1
Di-n-butylphthalate	T71	AR	1	µg/l		<1	<1
Fluoranthene	T71	AR	1	µg/l		<1	<1
Pyrene	T71	AR	1	µg/l		<1	<1
Butyl benzylphthalate	T71	AR	1	µg/l		<1	<1
Benzo(a)Anthracene	T71	AR	1	µg/l		<1	<1
Chrysene	T71	AR	1	µg/l		<1	<1
Bis (2-ethylhexyl)phthalate	T71	AR	1	µg/l		<1	<1
Di-n-octylphthalate	T71	AR	1	µg/l		<1	<1
Benzo(b/k)Fluoranthene	T71	AR	1	µg/l		<1	<1
Benzo(a)Pyrene	T71	AR	1	µg/l		<1	<1
Indeno(123-cd)Pyrene	T71	AR	1	µg/l		<1	<1
Dibenzo(ah)Anthracene	T71	AR	1	µg/l		<1	<1
Benzo(ghi)Perylene	T71	AR	1	µg/l		<1	<1

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water
VOC (SE)

					Concept Reference	713172 001	713172 002
					Customer Sample Reference	Well @ 6.94m	BH1 @ 1.02m
					Date Sampled	02-FEB-2017	02-FEB-2017
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Methyl tert-Butyl Ether	T54	AR	1	µg/l		<1	<1
1,2,3-Trichloropropane	T54	AR	1	µg/l		<1	<1
1,3,5-Trimethylbenzene	T54	AR	1	µg/l		<1	<1
Styrene	T54	AR	1	µg/l		<1	<1
Trichloroethene	T54	AR	1	µg/l		<1	<1
n-Propylbenzene	T54	AR	1	µg/l		<1	<1
Toluene	T54	AR	1	µg/l		<1	<1
1,2-Dichlorobenzene	T54	AR	1	µg/l		<1	<1
Hexachlorobutadiene	T54	AR	1	µg/l		<1	<1
1,1-Dichloropropene	T54	AR	1	µg/l		<1	<1
1,2,4-Trimethylbenzene	T54	AR	1	µg/l		<1	<1
Cis-1,3-Dichloropropene	T54	AR	1	µg/l		<1	<1
Isopropyl benzene	T54	AR	1	µg/l		<1	<1
1,1,2-Trichloroethane	T54	AR	1	µg/l		<1	<1
1,2,3-Trichlorobenzene	T54	AR	1	µg/l		<1	<1
2-Chlorotoluene	T54	AR	1	µg/l		<1	<1
Carbon tetrachloride	T54	AR	1	µg/l		<1	<1
Cis-1,2-Dichloroethylene	T54	AR	1	µg/l		<1	<1
T-Butylbenzene	T54	AR	1	µg/l		<1	<1
Trichlorofluoromethane	T54	AR	1	µg/l		<1	<1
p-Isopropyltoluene	T54	AR	1	µg/l		<1	<1
Benzene	T54	AR	1	µg/l		<1	<1
1,4-Dichlorobenzene	T54	AR	1	µg/l		<1	<1
1,2-Dichloropropane	T54	AR	1	µg/l		<1	<1
1,2-dibromoethane	T54	AR	1	µg/l		<1	<1
Ethyl-2-Methylbenzene	T54	AR	5	µg/l		<5	<5
4-Chlorotoluene	T54	AR	1	µg/l		<1	<1
Bromochloromethane	T54	AR	1	µg/l		<1	<1
Bromoform	T54	AR	1	µg/l		<1	<1
Dibromochloromethane	T54	AR	1	µg/l		<1	<1
Dibromomethane	T54	AR	1	µg/l		<1	<1
Tertiary amyl methyl ether	T54	AR	1	µg/l		<1	<1
Vinyl chloride	T54	AR	1	µg/l		<1	<1
1,1,1,2-Tetrachloroethane	T54	AR	1	µg/l		<1	<1
1,1-Dichloroethylene	T54	AR	1	µg/l		<1	<1
2,2-Dichloropropane	T54	AR	1	µg/l		<1	<1
Bromobenzene	T54	AR	1	µg/l		<1	<1
Bromomethane	T54	AR	1	µg/l		<1	<1
Chloromethane	T54	AR	1	µg/l		<1	<1
n-Butylbenzene	T54	AR	1	µg/l		<1	<1
EthylBenzene	T54	AR	1	µg/l		<1	<1
O Xylene	T54	AR	1	µg/l		<1	<1
1,2,4-Trichlorobenzene	T54	AR	1	µg/l		<1	<1
Bromodichloromethane	T54	AR	1	µg/l		<1	<1
Chlorobenzene	T54	AR	1	µg/l		<1	<1
Chloroform	T54	AR	1	µg/l		<1	<1
S-Butylbenzene	T54	AR	1	µg/l		<1	<1
Tetrachloroethene	T54	AR	1	µg/l		<1	<1
Trans-1,3-Dichloropropene	T54	AR	1	µg/l		<1	<1
1,3-Dichlorobenzene	T54	AR	1	µg/l		<1	<1
1,2-Dichloroethane	T54	AR	1	µg/l		<1	<1
M/P Xylene	T54	AR	1	µg/l		<1	<1
1,1,1-Trichloroethane	T54	AR	1	µg/l		<1	<1
1,1,2,2-Tetrachloroethane	T54	AR	1	µg/l		<1	<1
1,1-Dichloroethane	T54	AR	1	µg/l		<1	<1
1,2-Dibromo-3-Chloropropane	T54	AR	1	µg/l		<1	<1
1,3-Dichloropropane	T54	AR	1	µg/l		<1	<1
Chloroethane	T54	AR	1	µg/l		<1	<1
Dichlorodifluoromethane	T54	AR	1	µg/l		<1	<1
Trans-1,2-Dichloroethene	T54	AR	1	µg/l		<1	<1

Concept Reference: 713172
Project Site: High Peak, Barkway
Customer Reference: CON71-BARK-001

Water Analysed as Water
VOC (SE)

Concept Reference	**713172 001**	**713172 002**
Customer Sample Reference	**Well @ 6.94m**	**BH1 @ 1.02m**
Date Sampled	**02-FEB-2017**	**02-FEB-2017**

Determinand	Method	Test Sample	LOD	Units		
m/p ethyl toluene	T54	AR	5	µg/l	<5	<5

Index to symbols used in 713172-1

Value	Description
AR	As Received
F	Filtered
13	Results have been blank corrected.
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T264	Probe (Incubation Carbonaceous) (5 Days)
T21	OX/IR
T281	ICP/MS (Filtered)
T71	GC/MS (1l ext.)
T54	GC/MS (Headspace)
T149	GC/MS (SIR)
T7	Probe
T221	Colorimetry (CE)
T22	Titration
T686	Discrete Analyser
T546	Colorimetry (CF)
T2	Grav
T219	GC/FID (SE)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Phenol	T71	AR	1	µg/l	N	001-002
Bis (2-chloroethyl) ether	T71	AR	1	µg/l	U	001-002
2-Chlorophenol	T71	AR	1	µg/l	U	001-002
1,3-Dichlorobenzene	T71	AR	1	µg/l	U	001-002
1,4-Dichlorobenzene	T71	AR	1	µg/l	U	001-002
1,2-Dichlorobenzene	T71	AR	1	µg/l	U	001-002
Bis (2-chloroisopropyl) ether	T71	AR	1	µg/l	U	001-002
2-methyl phenol	T71	AR	1	µg/l	N	001-002
3/4-Methylphenol	T71	AR	1	µg/l	N	001-002
Hexachloroethane	T71	AR	1	µg/l	U	001-002
Nitrobenzene	T71	AR	1	µg/l	U	001-002
Isophorone	T71	AR	1	µg/l	U	001-002
2-Nitrophenol	T71	AR	1	µg/l	U	001-002
2,4-Dimethylphenol	T71	AR	1	µg/l	N	001-002
Bis (2-chloroethoxy) methane	T71	AR	1	µg/l	U	001-002
2,4-Dichlorophenol	T71	AR	1	µg/l	U	001-002
1,2,4-Trichlorobenzene	T71	AR	1	µg/l	U	001-002
Naphthalene	T71	AR	1	µg/l	U	001-002
4-Chloroaniline	T71	AR	1	µg/l	U	001-002
Hexachlorobutadiene	T71	AR	1	µg/l	U	001-002
4-Chloro-3-methylphenol	T71	AR	1	µg/l	U	001-002
2-Methylnaphthalene	T71	AR	1	µg/l	U	001-002
Hexachlorocyclopentadiene	T71	AR	1	µg/l	N	001-002
2,4,6-Trichlorophenol	T71	AR	1	µg/l	N	001-002
2,4,5-Trichlorophenol	T71	AR	1	µg/l	N	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
2-Chloronaphthalene	T71	AR	1	µg/l	U	001-002
2-Nitroaniline	T71	AR	1	µg/l	U	001-002
Dimethyl phthalate	T71	AR	1	µg/l	U	001-002
2,6-Dinitrotoluene	T71	AR	1	µg/l	U	001-002
Acenaphthylene	T71	AR	1	µg/l	U	001-002
Acenaphthene	T71	AR	1	µg/l	U	001-002
3-Nitroaniline	T71	AR	1	µg/l	U	001-002
Dibenzofuran	T71	AR	1	µg/l	U	001-002
2,4-Dinitrotoluene	T71	AR	1	µg/l	U	001-002
Diethyl phthalate	T71	AR	1	µg/l	U	001-002
Fluorene	T71	AR	1	µg/l	U	001-002
4-Chlorophenyl phenylether	T71	AR	1	µg/l	U	001-002
4-Nitroaniline	T71	AR	1	µg/l	U	001-002
Azobenzene	T71	AR	1	µg/l	U	001-002
4-Bromophenyl phenylether	T71	AR	1	µg/l	U	001-002
Hexachlorobenzene	T71	AR	1	µg/l	U	001-002
Phenanthrene	T71	AR	1	µg/l	U	001-002
Anthracene	T71	AR	1	µg/l	U	001-002
Carbazole	T71	AR	1	µg/l	U	001-002
Di-n-butylphthalate	T71	AR	1	µg/l	U	001-002
Fluoranthene	T71	AR	1	µg/l	U	001-002
Pyrene	T71	AR	1	µg/l	U	001-002
Butyl benzylphthalate	T71	AR	1	µg/l	U	001-002
Benzo(a)Anthracene	T71	AR	1	µg/l	U	001-002
Chrysene	T71	AR	1	µg/l	U	001-002
Bis (2-ethylhexyl)phthalate	T71	AR	1	µg/l	U	001-002
Di-n-octylphthalate	T71	AR	1	µg/l	U	001-002
Benzo(b/k)Fluoranthene	T71	AR	1	µg/l	U	001-002
Benzo(a)Pyrene	T71	AR	1	µg/l	U	001-002
Indeno(123-cd)Pyrene	T71	AR	1	µg/l	U	001-002
Dibenzo(ah)Anthracene	T71	AR	1	µg/l	U	001-002
Benzo(ghi)Perylene	T71	AR	1	µg/l	U	001-002
1,1,1,2-Tetrachloroethane	T54	AR	1	µg/l	N	001-002
1,1,1-Trichloroethane	T54	AR	1	µg/l	U	001-002
1,1,2,2-Tetrachloroethane	T54	AR	1	µg/l	N	001-002
1,1,2-Trichloroethane	T54	AR	1	µg/l	U	001-002
1,1-Dichloroethane	T54	AR	1	µg/l	U	001-002
1,1-Dichloroethylene	T54	AR	1	µg/l	U	001-002
1,1-Dichloropropene	T54	AR	1	µg/l	U	001-002
1,2,3-Trichlorobenzene	T54	AR	1	µg/l	U	001-002
1,2,3-Trichloropropane	T54	AR	1	µg/l	N	001-002
1,2,4-Trichlorobenzene	T54	AR	1	µg/l	U	001-002
1,2,4-Trimethylbenzene	T54	AR	1	µg/l	U	001-002
1,2-Dibromo-3-Chloropropane	T54	AR	1	µg/l	N	001-002
1,2-Dichlorobenzene	T54	AR	1	µg/l	U	001-002
1,2-Dichloroethane	T54	AR	1	µg/l	U	001-002
1,2-Dichloropropane	T54	AR	1	µg/l	U	001-002
1,2-dibromoethane	T54	AR	1	µg/l	N	001-002
1,3,5-Trimethylbenzene	T54	AR	1	µg/l	U	001-002
1,3-Dichlorobenzene	T54	AR	1	µg/l	U	001-002
1,3-Dichloropropane	T54	AR	1	µg/l	U	001-002
1,4-Dichlorobenzene	T54	AR	1	µg/l	U	001-002
Ethyl-2-Methylbenzene	T54	AR	5	µg/l	U	001-002
2,2-Dichloropropane	T54	AR	1	µg/l	U	001-002
2-Chlorotoluene	T54	AR	1	µg/l	U	001-002
4-Chlorotoluene	T54	AR	1	µg/l	U	001-002
Benzene	T54	AR	1	µg/l	U	001-002
Bromobenzene	T54	AR	1	µg/l	U	001-002
Bromochloromethane	T54	AR	1	µg/l	U	001-002
Bromodichloromethane	T54	AR	1	µg/l	U	001-002
Bromoform	T54	AR	1	µg/l	N	001-002
Bromomethane	T54	AR	1	µg/l	U	001-002
Carbon tetrachloride	T54	AR	1	µg/l	U	001-002
Chlorobenzene	T54	AR	1	µg/l	U	001-002
Chloroethane	T54	AR	1	µg/l	U	001-002
Chloroform	T54	AR	1	µg/l	U	001-002
Chloromethane	T54	AR	1	µg/l	U	001-002
Cis-1,2-Dichloroethylene	T54	AR	1	µg/l	U	001-002
Cis-1,3-Dichloropropene	T54	AR	1	µg/l	U	001-002
Dibromochloromethane	T54	AR	1	µg/l	U	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Dibromomethane	T54	AR	1	µg/l	U	001-002
Dichlorodifluoromethane	T54	AR	1	µg/l	N	001-002
EthylBenzene	T54	AR	1	µg/l	U	001-002
Hexachlorobutadiene	T54	AR	1	µg/l	N	001-002
Isopropyl benzene	T54	AR	1	µg/l	U	001-002
M/P Xylene	T54	AR	1	µg/l	U	001-002
S-Butylbenzene	T54	AR	1	µg/l	U	001-002
Styrene	T54	AR	1	µg/l	U	001-002
T-Butylbenzene	T54	AR	1	µg/l	U	001-002
Tertiary amyl methyl ether	T54	AR	1	µg/l	U	001-002
Tetrachloroethene	T54	AR	1	µg/l	U	001-002
Trans-1,2-Dichloroethene	T54	AR	1	µg/l	U	001-002
Trans-1,3-Dichloropropene	T54	AR	1	µg/l	U	001-002
Trichloroethene	T54	AR	1	µg/l	U	001-002
Trichlorofluoromethane	T54	AR	1	µg/l	U	001-002
Vinyl chloride	T54	AR	1	µg/l	U	001-002
m/p ethyl toluene	T54	AR	5	µg/l	U	001-002
n-Butylbenzene	T54	AR	1	µg/l	U	001-002
n-Propylbenzene	T54	AR	1	µg/l	U	001-002
p-Isopropyltoluene	T54	AR	1	µg/l	U	001-002
Toluene	T54	AR	1	µg/l	U	001-002
O Xylene	T54	AR	1	µg/l	U	001-002
Methyl tert-Butyl Ether	T54	AR	1	µg/l	U	001-002
TPH (C5-C6 aliphatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C6-C7 aromatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C6-C8 aliphatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C7-C8 aromatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C8-C10 aliphatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C8-C10 aromatic)	T54	AR	0.020	mg/l	N	001-002
TPH (C10-C12 aliphatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C10-C12 aromatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C12-C16 aliphatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C12-C16 aromatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C16-C21 aliphatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C16-C21 aromatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C21-C35 aliphatic)	T219	AR	0.01	mg/l	N	001-002
TPH (C21-C35 aromatic)	T219	AR	0.01	mg/l	N	001-002
As (Dissolved)	T281	F	0.0002	mg/l	U	001-002
B (Dissolved)	T281	F	0.05	mg/l	U	001-002
Cd (Dissolved)	T281	F	0.00002	mg/l	U	001-002
Cr (Dissolved)	T281	F	0.001	mg/l	U	001-002
Cu (Dissolved)	T281	F	0.0005	mg/l	U	001-002
Pb (Dissolved)	T281	F	0.0003	mg/l	U	001-002
Hg (Dissolved)	T281	F	0.00005	mg/l	U	001-002
Ni (Dissolved)	T281	F	0.001	mg/l	U	001-002
Se (Dissolved)	T281	F	0.0005	mg/l	U	001-002
Zn (Dissolved)	T281	F	0.002	mg/l	U	001-002
Ammonia expressed as N	T686	F	0.05	mg/l	U	001-002
Chromium VI	T686	F	0.003	mg/l	U	001-002
Total Oxidised Nitrogen	T686	F	0.1	mg/l	U	001-002
Sulphate ion	T686	F	0.5	mg/l	U	001-002
Alkalinity expressed as CaCO3	T22	F	20	mg/l	U	001-002
Chemical Oxygen Demand	T221	F	20	mg/l	N	001-002
Biochemical Oxygen Demand (Allyl Thiourea)	T264	F	1	mg/l	N	001-002
Electrical Conductivity	T7	F	1	µS/cm	U	001-002
Diss Oxygen	T7	AR	1.0	mg/l	N	001-002
pH	T7	F			U	001-002
Suspended Solids (Total)	T2	AR	10	mg/l	N	001-002
Total Organic Carbon	T21	F	1	mg/l	U	001-002
Cyanide(Total)	T546	F	0.01	mg/l	U	001-002
Naphthalene	T149	AR	0.01	µg/l	U	001-002
Acenaphthylene	T149	AR	0.01	µg/l	U	001-002
Acenaphthene	T149	AR	0.01	µg/l	U	001-002
Fluorene	T149	AR	0.01	µg/l	U	001-002
Phenanthrene	T149	AR	0.01	µg/l	U	001-002
Anthracene	T149	AR	0.01	µg/l	U	001-002
Fluoranthene	T149	AR	0.01	µg/l	U	001-002
Pyrene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Anthracene	T149	AR	0.01	µg/l	U	001-002
Chrysene	T149	AR	0.01	µg/l	U	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Benzo(b)fluoranthene	T149	AR	0.01	µg/l	N	001-002
Benzo(k)fluoranthene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Pyrene	T149	AR	0.01	µg/l	U	001-002
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	U	001-002
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	U	001-002
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	U	001-002
PAH(total)	T149	AR	0.01	µg/l	N	001-002

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D. VERIFICATION PLAN

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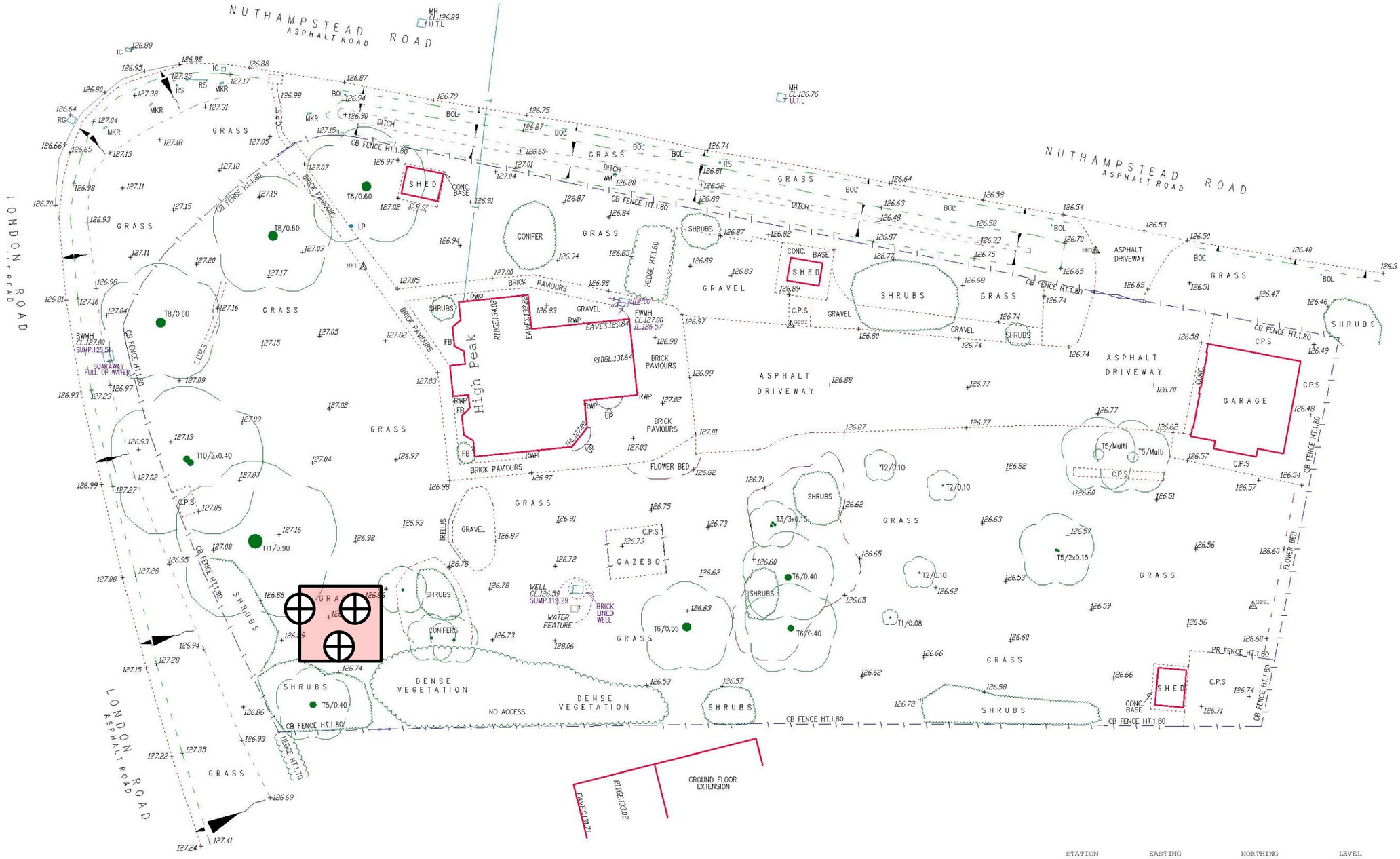

STATION	EASTING	NORTHING	LEVEL
GPS1	8551.433	4836.631	126.592
GPS2	8521.402	4854.837	126.853
MK1	8493.640	4858.622	127.069
MK2	8461.539	4875.586	126.611
MK3	8541.235	4859.664	126.645

0m 2m 4m 6m 8m 10m 20m

SCALE 1:200

LEGEND

⊕ Location of Validation Samples

Originator	GB	**HIGH PEAK, BARKWAY** **CON71-BARK-001**
Checked & Approved	WGG	**VERIFICATION PLAN**

SES STANSTED ENVIRONMENTAL SERVICES

16/08/2017