GROUND INVESTIGATION REPORT

for the site at

KILN PLACE SITES, CAMDEN, LONDON NW5 4AN

on behalf of

NEILCOTT CONSTRUCTION

Report Reference: GWPR2317/GIR//December 2017		Status: FINAL
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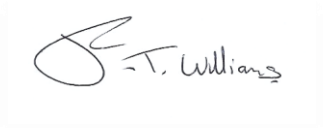
V5.01 DECEMBER 2017		
	Alice Tettmar BSc. (Hons) Geotechnical and Geo-Environmental Engineer	Francis Williams M.Geol. (Hons) FGS CGeol CEnv AGS Director
File Reference: Ground and Water/Project Files/ GWPR2317 London Borough of Camden, Kiln Place Sites		

Ground and Water Limited 15 Bow Street, Alton, Hampshire GU34 1NY
Tel: 0333 600 1221 E-mail: enquiries@groundandwater.co.uk Website: www.groundandwater.co.uk

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1.0 INTRODUCTION

1.1 General

Ground and Water Limited were instructed by Neilcott Construction Limited on the 24th April 2017 to conduct contamination assessment works on potential redevelopment site off Kiln Place, Camden, London NW5 4AN. The scope of the investigation was detailed within the Ground and Water fee proposal ref: GWQ3224Rev2 dated 27th February 2017.

Ground and Water Limited were instructed by Neilcott Construction Limited on the 13th October 2017 to conduct a second phase intrusive works and contamination testing. The scope of the investigation was detailed within the Ground and Water Limited fee proposal ref: GWQ3501, dated 6th October 2017.

1.2 Aims of the Investigation

The aim of the investigation was understood to be to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

It was not part of the remit of this report to comment on geotechnical aspects of the development.

This report consolidates all the information obtained from all phases of intrusive investigation undertaken. This report supersedes the following previously issued reports:

- GWPR2111/GIR/September 2017 – Ground Investigation Report
- GWPR2111A/GIR/October 2017 – Ground Investigation Report

The techniques adopted for the investigation were chosen considering the anticipated ground conditions and development proposals on-site, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

1.3 Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

This report relies upon the Ramboll UK Limited Geotechnical and Environmental Desk Study (61031879, July 2014) and Ground Contamination and Interpretive Report (61031879, June 2014). Total reliance has been placed on these reports and no liability can be taken for their short comings.

2.0 SITE SETTING

2.1 Site Location

The site comprised an irregular shaped site of land, totalling ~1.0947ha (10,947m^2), located on the western and northern side of Kiln Place. The site was located in the urban area of Gospel Oak in the London Borough of Camden, North London.

The national grid reference for the centre of the site was approximately TQ 28286 85413. A site location plan is given within Figure 1. A plan showing the boundary of the site can be seen in Figure 2.

2.2 Site Description

- **Site 1**:
  The site comprised a 730m^2 approximately rectangular shaped plot of land, orientated in a north-west to south-east direction, located to the south-east of its junction with Lamble Street and south-west of 7 – 34 Hemmingway Close. The site comprised a grassed soft landscaped bank with semi-mature to mature trees on top. Concrete and tarmac parking areas fronted the site.

- **Site 2:**
  The site comprised a 370m^2 L-shaped plot of land to the west of Kiln Place and south-east of No. 117 – 164 Kiln Place. The site comprised an area of grassed communal landscaping with semi-mature tree and paved communal area in the north-east.

- **Site 3:**
  The site comprised a 90m^2 square shaped plot of land on the south-west side of Kiln Place, on the northern side of No. 65 – 96 Kiln Place. The site comprised the single storey entrance to No. 73 – 96 Kiln Place.

- **Site 4:**
  The site comprised a 94m^2 square shaped plot of land to the south-east of Kiln Place, on the north-east corner of No. 1 - 64 Kiln Place. The site comprised the single storey entrance to No. 1 – 64 Kiln Place.

- **Site 5 & 6:**
  The site comprised a 310m^2 Z-shaped plot of land on the north/eastern side of Kiln Place, to the south-west of 97 – 116 Kiln Place. The site comprised the single storey entrance to 97 – 116 Kiln Place with car parking to the south and concrete/tarmac landscaping to the west.

An aerial view of the site showing an approximate site boundary is given within Figure 3.

2.3 Proposed Development

At the time of reporting, November 2017, it was our understanding that the proposed development will comprise the development of 15No. residential units on 6No. sites across the Kiln Place estate. This will be following the demolition of the foyer entrances and refuse storages for some of the existing plots. The playground was also to be improved along with landscaping, however, this was completed prior to this investigation.

A summary of the developments proposed at each site can be seen below:

- **Site 1:** Construction of 6No. residential homes with private garden areas;
- **Site 2:** Demolition of existing foyer entrances and extension of plot to create 2No. residential units;
- **Site 3:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units. New entrances/fencing will also be constructed for the existing plots (81 – 96).
- **Site 4:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units;
- **Site 5:** Demolition of existing foyer entrances and extension of plot to create 3No. residential units;
- **Site 6:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units;

It was our understanding that only Site 1 would include soft landscaping areas, with the remainder of the sites comprising a hard-standing capping.

A plan showing the proposed development can be seen in Figure 4.

2.4 Geology

The British Geological Survey Solid and Drift Geology Map for the Camden area (North London, Sheet No. 256) revealed that the site was located on the London Clay Formation. The site was located on an area of Worked Ground. An area where there was a propensity for a superficial covering of Head Deposits was noted ~50m south.

Worked Ground

Only major areas of worked ground, generally associated with mineral extraction, are shown on the published maps. In most cases the nature of the fill is unknown.

Head Deposits

The majority of Head Deposits are clay-dominated, derived from the London Clay. Generally, less than 2m thick, they probably accumulated in shallow mudslides of softened brecciated bedrock in the active layer. They consist of soft, ochreous brown silty clay with blue-grey mottling in places and angular, frost-shattered fragments of flint occur sporadically throughout. At the base of these deposits and interbedded in places, there is a bed of pebbly clay, generally less than 0.2m thick, with well-rounded flint pebbles derived from nearby outcrops of 'high level' gravel such as Stanmore Gravel.

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (claystones) occur throughout the formation. Crystal of Gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known

as the Basement Bed.

2.5 Hydrogeology and Hydrology

The Desk Study (*Ramboll UK Limited Geotechnical and Environmental Desk Study: Report 61031879, July 2014)* revealed the site to be located on **Unproductive strata** comprising the superficial Head Deposits and the bedrock deposits of the London Clay Formation.

The superficial drift deposits are described as permeable unconsolidated (loose) deposits, e.g. sands and gravels. The bedrock is described as solid permeable formations e.g. sandstone, chalk and limestone.

Examination of the Environment Agency records showed that the site was not located within a Groundwater Source Protection Zone as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature to the site was a lake located ~900m north of the site.

From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at moderate depth (5 - 8m below existing ground level (bgl)) and it was considered that the groundwater was flowing in an overall south-easterly direction in line with local topography.

Examination of the Environment Agency records showed that the site fell within a Flood Zone 1 (an area with a low probability of river or sea flooding). However the northern end of the site was possibly located within a flood zone associated with Hampstead Pond No. 1. (*Ramboll UK Limited Geotechnical and Environmental Desk Study: Report 61031879, July 2014).*

2.6 Radon

BRE 211 (2015) Map 5 of London, Sussex and West Kent revealed the site **was not** located within an area where mandatory protection measures against the ingress of Radon were required. The site **was not** located within an area where a risk assessment was required.

2.7 Summary of Previous Investigations Undertaken

Ramboll UK Limited Geotechnical and Environmental Desk Study: Report 61031879, July 2014:

A review of the above report revealed the following information;

The total site area was estimated as 1.53ha (15,300m^2). The site area comprised residential dwellings, car parking, green spaces, open communal areas and play area. The sites environs comprised residential, industrial and railway land.

The proposed development comprised 2 – 4 storey residential dwellings in standalone blocks and private gardens for Kiln Place East.

A review of the site history revealed the following;

In the 1860 historic map the site comprised steeply sloping land, up to the north-east with a bank along the eastern site boundary and drain at the toe of the slope. Houses were noted to the north with fields to the east and west, and railway to south.

By the 1894 – 1896 historic map part of the Gospel Oaks Brickworks covered the site. The drain

previously mentioned was culverted. A railway was noted immediately south. A Coal Alliance and Timber Yard were noted north-east and south of the previously mentioned railway.

By the 1916 historic the Brickworks extended across the entire site area with flooded excavations onsite and to the west. Buildings were noted to the east of the embankment. The Timber Yard to the south was expanded.

By the 1954 historic map the buildings, pits and ponds had been removed. WWII damage was noted. The buildings to the east of the embankment were noted as a Slag Wool Works. The south-west corner of the site was a Timber Yard.

Kiln Place Housing Estate was developed by the 1968 historic map. The Slag Wool Works to the east was marked as a works with Depot. The embankment to the east had been widened and increased in height.

By the 1980 historic map a Builder's Yard was noted to the east. By 2003 the works and Depot had been redeveloped into Hemmingway Close.

The site was located on Unproductive Strata comprising the London Clay Formation. The site was located in a Flood Zone 1, however the northern end of the site was possibly located within a flood zone associated with Hampstead Pond No. 1. No radon risk was noted and no landfills were noted within the close proximity of the site. A medium to high UXO risk was present.

Ramboll UK Limited: Ground Contamination and Interpretive Report: 61031879, June 2014:
The results of a ground investigation, undertaken between January - March 2014, were provided in the above report. A review of pertinent points raised in the report is given below;

The site works comprised two boreholes to 15m (BH1 & BH2) and 7No. Window Sampler Boreholes (WS1 – WS7) to 8m. 5No. combined bio-gas and groundwater monitoring wells were installed in BH1, BH2, WS2, WS5 and WS6. The construction of the wells installed can be seen tabulated below.

Combined Ground-gas and Groundwater Monitoring Well Construction				
Trial Hole	**Depth of Installation (mbgl)**	**Thickness of slotted piping with gravel filter pack (m)**	**Depth of plain piping with bentonite seal (m bgl)**	**Piping external diameter (mm)**
BH1	6.00m	5.00m	1.00m	50mm
BH2	7.00m	6.00m	1.00m	50mm
WS2	6.10m	5.10m	1.00m	50mm
WS5	4.00m	3.00m	1.00m	50mm
WS7	5.10m	4.10m	1.00m	50mm

The ground conditions encountered 4.2 – 7.5m of Made Ground over the London Clay Formation. The Made Ground contained clinker, slag, ash, metal, charcoal and/or wood. An organic odour was noted in BH2. No evidence was noted for gross contamination.

Groundwater was observed during the investigation at 2.20 – 5.60m bgl and 1.50 – 5.50m bgl during subsequent monitoring.

Heavy metals, such as mercury, lead and vanadium, along with cyanide and PAH's were observed in

the soils underlying the site. Loose fibres of Chrysotile were noted in WS2 at 1.00m bgl. No VOC's/SVOC's or hydrocarbons were noted.

The groundwater was tested and was shown to have high dissolved metal concentrations.

Gas monitoring indicated a Characteristic Situation 2. A maximum methane concentration of 10% was observed during a single round, with a maximum concentration of Carbon Dioxide of 6.5% noted on one occasion. A maximum flow of 1.2l/hr was recorded.

2.8 Tabulated Conceptual Site Model

A conceptual site model based on the findings from the Ramboll UK Limited Geotechnical and Environmental Desk Study (61031879, July 2014) and Ground Contamination and Interpretive Report (61031879, June 2014) can be seen summarised overleaf.

<table>
<tr><th colspan="3">Tabulated Conceptual Site Model – Plausible Pollutant Linkages Only</th></tr>
<tr><th>Potential Sources</th><th>Potential Absorption Pathways</th><th>Potential Receptors</th></tr>
<tr><td>On-site Sources

Contaminants present within general Made Ground/Worked Ground capping the site.
• Heavy and semi-metals; Lead, Arsenic
• Polycyclic Aromatic Hydrocarbons (PAH's) – benzo(a)pyrene and benzo(b)flourathene
• Heavy end Petroleum Hydrocarbons (TPH);
• Asbestos.</td><td rowspan="2">Direct ingestion of soil and soil derived household dust;

Dermal contact of soil and soil derived household dust;

Ingestion of soil with elevated concentration of determinants;

Dermal contact with impacted soils;

Consumption of home grown vegetables;

Direct ingestion of soil attached to vegetables;

Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinants

Inhalation of volatiles (indoors and outdoors) with elevated concentration of determinants.

Via anthropogenic pathways;

Via underlying geology; (Made Ground, London Clay)

Via surface water.</td><td rowspan="3">End users of the site (Residents)

Site operatives during demolition and redevelopment;

Maintenance workers;

Building materials and services.

Groundwater was not considered a potential receptor at this site.</td></tr>
<tr><td>Long history of industrial works use onsite including a Brickworks and Timber Yard from ~1894 – 1968:
• Heavy and semi-metals;
• Polycyclic Aromatic Hydrocarbons (PAH's);
• Heavy end Petroleum Hydrocarbons (TPH);
• Asbestos.</td></tr>
<tr><td>Capping of Worked Ground as identified on the BGS Maps

• Ground-gases including methane, carbon dioxide and carbon monoxide</td><td>Migration through anthropogenic & natural pathways

Inhalation

Possible Explosive Risk</td></tr>
</table>

3.0 FIELDWORK

3.1 Scope of Works

Site works were undertaken on the 20th June 2017 and comprising the drilling of 4No. Dart Windowless Sampler Boreholes (BH1 – BH4) to depths of between 2.00m – 5.00m bgl. 4No. trial pits (TP2 – TP4, TP6) were hand excavated to 0.50 – 1.40m bgl. 1No. foundation exposure (TP1/FE1) was hand excavated to 1.40m bgl.

Combined ground-gas and groundwater monitoring wells were installed within BH1, BH2, BH3 and BH4 to 2.00m, 3.00m, 5.00m and 4.50m bgl respectively. The construction of the wells installed can be seen tabulated below.

Combined Ground-gas and Groundwater Monitoring Well Construction				
Trial Hole	**Depth of Installation (mbgl)**	**Thickness of slotted piping with gravel filter pack (m)**	**Depth of plain piping with bentonite seal (m bgl)**	**Piping external diameter (mm)**
BH1	2.00m	1.00m	1.00m	50mm
BH2	3.00m	2.00m	1.00m	50mm
BH3	5.00m	4.00m	1.00m	50mm
BH4	4.50m	3.50m	1.00m	50mm

The second phase of the investigation was undertaken on the 26th October 2017 and comprised the machine excavation of 13No. trial pits (TPA – TPM) to depths of between 0.50m – 1.90m bgl.

The trial hole location plan can be viewed in Figure 5.

Prior to commencing the ground investigation, a walkover survey was carried out to identify the presence of underground services and drainage. Where underground services/drainage were suspected and/or positively identified, exploratory positions were relocated away from these areas.

As a further precautionary measure, the positions were hand scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

Upon completion of the site works, the trial holes were backfilled and made good/reinstated in relation to the surrounding area.

3.2 Sampling Procedures

Small disturbed samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons. A programme of chemical laboratory testing, scheduled by Ground and Water Limited and carried out by QTS Environmental Limited, was undertaken on samples recovered from the trial holes, based on the findings from the tabulated conceptual site model developed in section 2.8.

4.0 ENCOUNTERED GROUND CONDITIONS

4.1 Soil Conditions

All exploratory holes were logged by Alice Tettmar, Darina Jurovskaja and Harry Brock of Ground and Water Limited generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A deep capping of Made Ground was encountered overlying the London Clay Formation.

The ground conditions encountered during the investigation are described in this section. All trial hole logs can be seen in Appendix B and the trial hole location plan can be viewed in Figure 5.

It was understood that the Made Ground noted around Site 1 (TP2 – TP4, TP6, TPI - TPL) was of a different population to the Made Ground encountered in BH1 – BH4, due to the area being raised on a bank and located to the north-east of the main Kiln Place Estate. Therefore, due to their proposed developments, it was considered that for remainder of the report, Site 1 would be separated from the other Sites 2 – 6.

For the purposes of discussion, the succession of conditions encountered in the trial holes in descending order can be summarised as follows:

Site 1
Made Ground (TP2 – TP4, TP6, TPI - TPL)

Made Ground
Made Ground was encountered in all trial holes (TP2-TP4, TP6, TPI - TPL) from ground level and underlying turf from 0.05m bgl to the final depth of the trial holes (>0.50 – >1.10m bgl) in TP2 – TP4, TP6 and TPK. The Made Ground was proved to depths of between 0.55 – 1.30m bgl. The Made Ground generally comprised a dark brown to grey clayey silty gravelly sand to a dark brown/grey gravelly sandy silty clay. The sand was fine to coarse grained. The gravel was rare to abundant, fine to coarse, sub-angular flints, brick, concrete, metal, cast iron, carbonaceous material, ceramic and plastic fragments.

London Clay Formation
Soils of the London Clay Formation were encountered in TPI, TPJ and TPL underlying the Made Ground from 0.55 – 1.30m bgl to the final depth of the trial holes, depths of between 1.00m – 1.40m bgl. The soils generally comprised a brown to grey silty clay.

Sites 2 – 6
Made Ground (BH1 – BH4, TP1/FE1, TPA – TPH, TPM)

Made Ground
Made Ground was encountered in all trial holes from ground level in BH2 – BH4, TP1/FE1, TPA and TPF. In BH1, TPB, TPC, TPE, TPG and TPH the Made Ground was encountered underlying turf, reinforced concrete slabs and sub-base and tarmac and sub-base from 0.10 – 0.90m bgl. The Made Ground was noted to a depth of 1.60m bgl in TPH and to the final depths of the trail holes for the remainder, depths of between >0.50m - >5.00m bgl.

The soils generally comprised a dark brown/black/dark red/grey/light brown clayey silty gravelly sands/silty sandy gravel to a sandy silty gravelly clay. The sand was fine to coarse grained. The gravel was rare to abundant, fine to coarse, angular to sub-rounded flints, brick, concrete, tarmac fragments, glass, rusted metals, clinker, ceramic fragments and carbonaceous material.

In TPG, a layer of cement bound asbestos was noted between 0.30m – 0.50m bgl.

Strong hydrocarbon type odours were noted in TPA at 0.50m bgl, BH1 at 1.25m and 1.60m bgl, BH2 between 0.45m – 1.15m and 2.10m – 5.00m bgl, BH3 at 1.35m and between 4.00 – 4.65m bgl, and for the full depth of BH4 (GL – 5.00m bgl).

London Clay Formation
Soils of the London Clay Formation were encountered in TPH underlying the Made Ground from 1.60m bgl and in TPM, underlying a slab of brick paving and gravelly sandy sub-base from 0.50m bgl. The London Clay Formation was encountered to the final depths of the trial hole, depths of between 0.70 – 1.80m bgl.

TP/FE1 (Wall neighbouring Site 6)
Trial pit foundation exposure TP/FE1 was hand excavated from ground floor level on the southern side of Flats 117 – 164. The exact location of the trial hole can be seen in Figure 5 with a section drawing of the foundation encountered in Figure 6.

The foundation exposure was measured from ground level.

The foundation layout encountered comprised a brick wall from ground level to a depth of 0.48m bgl. Underlying this, a concrete footing stepped out by 0.28m was encountered to a depth in excess of 1.40m bgl. The final depth of the concrete footing could not be proved due to it extending further than could be excavated (>1.40m bgl).

Made Ground was noted from ground level to the full depth of the trial pit, a depth of 1.40m bgl. The soils comprised a dark brown to grey clayey silty gravelly sand to a dark brown silty sandy gravelly clay. The sand was very fine to medium grained. The gravel was rare to abundant, medium to coarse, sub-rounded to sub-angular flints, brick, glass and tarmac.

For more complete information about the soils encountered during the investigation, reference should be made to the detailed records given within Appendix B.

4.2 Roots Encountered
Roots were noted to 0.20m – 0.45m bgl in TP1, TP2, TP6, TPH and TPI only.

It must be noted that the chance of determining actual depth of fresh root penetration through a narrow diameter borehole is low. Roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

4.3 Groundwater Conditions
Groundwater was not encountered during the excavation of the trial holes. Groundwater monitoring was conducted on six occasions between July 2017 and September 2017, see results tabulated overpage.

Groundwater Observations			
Date	**Borehole**	**Water Level**	**Final Well Depth**
10/07/2017	BH1	1.50	2.00
	BH2	3.00	3.30
	BH3	3.24	4.10
	BH4	3.40	4.80
26/07/2017	BH1	1.30	2.00
	BH2	2.90	3.30
	BH3	3.30	4.10
	BH4	3.50	4.80
17/08/2017	BH1	2.82	3.31
	BH2	1.39	1.97
	BH3	3.22	4.13
	BH4	3.45	4.84
06/09/2017	BH1	1.35	2.00

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site. The investigation was undertaken in June to August 2017, when groundwater levels are likely to be falling to and at their annual lowest.

Isolated pockets of groundwater may be perched within any Made Ground found at other locations around the site.

4.4 Obstructions

No artificial or natural sub-surface obstructions were noted during construction of the trial holes.

5.0 PHASE 2 CONTAMINATION RISK ASSESSMENT

5.1 Results of the Phase 1 & Phase 2 Risk Assessment (Conceptual Site Model)

The tabulated Conceptual Site Model developed in section 2.8 of this report and based on the Ramboll Desk Study Report 61031879, July 2014 and Ramboll Ground Investigation Report 61031879, June 2014 is reproduced in this section and can be seen below.

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• Heavy end Petroleum Hydrocarbons (TPH);
• Asbestos.</td><td rowspan="2">Direct ingestion of soil and soil derived household dust;
Dermal contact of soil and soil derived household dust;
Ingestion of soil with elevated concentration of determinants;
Dermal contact with impacted soils;
Consumption of home grown vegetables;
Direct ingestion of soil attached to vegetables;
Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinants
Inhalation of volatiles (indoors and outdoors) with elevated concentration of determinants.
Via anthropogenic pathways;
Via underlying geology; (Made Ground, London Clay)
Via surface water.</td><td rowspan="3">End users of the site (Residents)
Site operatives during demolition and redevelopment;
Maintenance workers;
Building materials and services.
Groundwater was not considered a potential receptor at this site.</td></tr>
<tr><td>Long history of industrial works use onsite including a Brickworks and Timber Yard from ~1894 – 1968:
• Heavy and semi-metals;
• Polycyclic Aromatic Hydrocarbons (PAH's);
• Heavy end Petroleum Hydrocarbons (TPH);
• Asbestos.</td></tr>
<tr><td>Capping of Worked Ground as identified on the BGS Maps
• Ground-gases including methane, carbon dioxide and carbon monoxide</td><td>Migration through anthropogenic & natural pathways
Inhalation
Possible Explosive Risk</td></tr>
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Site 1

Made Ground was encountered in all trial holes (TP2-TP4, TP6, TPI - TPL) from ground level and underlying turf from 0.05m bgl to the final depth of the trial holes (>0.50 – >1.10m bgl) in TP2 – TP4, TP6 and TPK. The Made Ground was proved to depths of between 0.55 – 1.30m bgl. The Made Ground generally comprised a dark brown to grey clayey silty gravelly sand to a dark brown/grey gravelly sandy silty clay. The sand was fine to coarse grained. The gravel was rare to abundant, fine to coarse, sub-angular flints, brick, concrete, metal, cast iron, carbonaceous material, ceramic and plastic fragments.

Sites 2 - 6
Made Ground was encountered in all trial holes from ground level in BH2 – BH4, TP1/FE1, TPA and TPF. In BH1, TPB, TPC, TPE, TPG and TPH the Made Ground was encountered underlying turf, reinforced concrete slabs and sub-base and tarmac and sub-base from 0.10 – 0.90m bgl. The Made Ground was noted to a depth of 1.60m bgl in TPH and to the final depths of the trail holes for the remainder, depths of between >0.50m - >5.00m bgl.

The soils generally comprised a dark brown/black/dark red/grey/light brown clayey silty gravelly sands/silty sandy gravel to a sandy silty gravelly clay. The sand was fine to coarse grained. The gravel was rare to abundant, fine to coarse, angular to sub-rounded flints, brick, concrete, tarmac fragments, glass, rusted metals, clinker, ceramic fragments and carbonaceous material.

In TPG, a layer of concrete bound asbestos was noted between 0.30m – 0.50m bgl.

Strong hydrocarbon type odours were noted in TPA at 0.50m bgl, BH1 at 1.25m and 1.60m bgl, BH2 between 0.45m – 1.15m and 2.10m – 5.00m bgl, BH3 at 1.35m and between 4.00 – 4.65m bgl, and for the full depth of BH4 (GL – 5.00m bgl).

These ground conditions were expected given the results of the Desk Study and previous Ground Investigation undertaken by Ramboll UK Limited and consequently there was no need to re-evaluate the Conceptual Site Model.

5.2 Sampling Locations
The methodology for sampling locations can be seen tabulated overleaf. A trial hole location plan is given within Figure 4.

Methodology for Sampling Locations				
	Site No.	**Trial Holes**	**Sampling Strategy**	**Proposed End-use**
Phase I	Site 1	TP2	Random Sampling Locations	Proposed private garden areas
		TP3		Under proposed building
		TP4		Proposed private garden areas
		TP6		
	Site 2	BH4		Under proposed building
	Site 3	BH3		Proposed hardstanding area
	Site 4	BH2		Existing soft landscaping, located outside site boundary
	Site 5	BH1		Proposed amenity area
	Site 6	TP1	Targeted Sampling Location to Prove Existing Foundation Depths	Proposed hardstanding area
Phase II	Site 1	TPI	Targeted Sampling to Private Garden Areas	Proposed private garden areas
		TPJ		Proposed private garden areas
		TPK		Public Open Space near the Residential Housing
		TPL	Targeted Sampling Locations for Waste Classification	Under proposed building
	Site 2	TPG		Under proposed building
	Site 3	TPF		Under proposed building
	Site 4	TPE		Under proposed building
	Site 5	TPA		Under proposed building
		TPB		Under proposed building
		TPC		Under proposed building
		TPD		Under proposed building
	Site 6	TPH		Under proposed building
		TPM		Under proposed building

Site 1 Hotspot Radius:
The area of the site totals ~730m^2 and with 8No. sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately ~136.88 and a radius of approximately ~6.61m would be encountered (CLR 4).

Sites 2 - 6 Hotspot Radius':
The area of the site totals ~10,217m^2 and with 14No. sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately ~1,094.68m^2 and a radius of approximately ~18.67m would be encountered (CLR 4).

Sampling depths were chosen to reflect the receptor of concern, human health and typically comprised a surface or near surface sample and at approximately 0.5m depth increments thereafter, extending into the underlying natural soils.

The human health receptors relevant to the sampling depths were as follows:

Near surface samples	Direct ingestion, dermal contact and dust inhalation. Protection of end-users and maintenance workers e.g. Landscape Gardeners. Protection of shallow rooted plants Perched Water/Surface Water Run-off
>0.5m below ground level	Protection of deep rooted plants Perched Water/Surface Water Run-off

The depth of soil sampling can be seen within the trial hole logs presented in Appendix B.

5.3 Chemical Laboratory Testing – Human Health Risk Assessment

A programme of chemical laboratory testing, scheduled by Ground and Water Limited and carried out by QTS Environmental Limited, was undertaken on samples recovered from the trial holes. The testing schedule and suite was based on the Conceptual Site Model developed and revised within Section 7.1 of this report. The samples tested and the reasons for testing can be seen tabulated overpage.

Methodology for Chemical Laboratory Testing – Combined Phase I and Phase II				
Site No.	**Trial Holes**	**Depth (m bgl)**	**Proposed End Use**	**Sampling Strategy**
Site 1	TP3	0.20	Underneath Proposed Building	Representative Sample of Made Ground
	TPI	0.50	Proposed Private Garden Area	
		1.00		
	TPJ	Composite	Underneath Proposed Building	
		0.30		
		0.80		
		1.00		
	TPK	0.30	Public Open Space near the Residential Housing	
		0.50		
		0.80		
	TPL	0.30	Underneath Proposed Building	
		0.50		
Site 2 and 6	BH4	0.50	Under proposed building	Representative sample of Made Ground with hydrocarbon odours.
	BH4	2.30		
	BH4	4.50		
	TPG	Composite		Representative sample of Made Ground
		0.30		
		0.50		
		0.80		
		1.00		
		1.20		
	TPH	Composite		
		0.50		
		1.00		
Site 3	BH3	1.45	Proposed amenity area	Representative sample of Made Ground
	BH3	1.90		
	BH3	4.30		Representative sample of Made Ground with hydrocarbon odours.
	TPF	0.30	Under proposed building	Representative sample of Made Ground
		0.50		
Site 4	BH2	0.80	Existing soft landscaping, located outside site boundary	Representative sample of Made Ground
	BH2	3.50		
	TPE	Composite	Under proposed building	
		0.50		
		0.80		
		1.00		
Site 5	BH1	0.80	Proposed amenity area	Representative sample of Made Ground
	TPA	0.50	Under proposed building	
	TPB	Composite		
		0.20		
		0.50		
		0.80		
		1.00		
	TPC	Composite		
		0.50		
		1.00		
	TPD	0.30		
Opposite Site 1	TPM	Composite	Proposed amenity area	Representative sample of Made Ground

The analysis suite is presented below and comprised:

Analysis Suite Details	
Suite Details	**Sample Tested**
Semi Metals and Heavy Metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc	**Phase 1:** BH1/0.80m, BH2/0.80m, BH2/3.50m, BH3/1.45m, BH3/1.90m, BH3/4.30m, BH4/0.50m, BH4/2.30m, BH4/4.50m, TP3/0.20m bgl **Phase 2:** TPA/0.50m, TPB/0.20m, TPB/0.50m, TPB/0.80m, TPB/1.00m, TPB/Composite, TPC/0.50m, TPC/1.00m, TPC/Composite, TPD/0.30m, TPE/0.50m, TPE/0.80m, TPE/1.00m, TPE/Composite, TPF/0.30m, TPF/0.50m, TPG/0.30m, TPG/0.50m, TPG/0.80m, TPG/1.00m, TPG/1.20m, TPG/Composite, TPH/0.50m, TPH/1.00m, TPH/Composite, TPI/0.50m, TPI/1.00m, TPJ/0.30m, TPJ/0.80m, TPJ/1.00m, TPJ/Composite, TPK/0.30m, TPK/0.50m, TPK/0.80m, TPL/0.30m, TPL/0.50m, TPM/Composite.
Asbestos Screen	Phase 1: BH1/0.80m, BH2/0.80m, BH2/3.50m, BH3/1.45m, BH3/1.90m, BH3/4.30m, BH4/0.50m, BH4/2.30m, BH4/4.50m, TP3/0.20m bgl **Phase 2:** TPA/0.50m, TPB/0.20m, TPB/0.50m, TPB/0.80m, TPB/1.00m, TPB/Composite, TPC/0.50m, TPC/1.00m, TPC/Composite, TPD/0.30m, TPE/0.50m, TPE/0.80m, TPE/1.00m, TPE/Composite, TPF/0.30m, TPF/0.50m, TPG/0.30m, TPG/0.50m, TPG/0.80m, TPG/1.00m, TPG/1.20m, TPG/Composite, TPH/0.50m, TPH/1.00m, TPH/Composite, TPI/0.50m, TPI/1.00m, TPJ/0.30m, TPJ/0.80m, TPJ/1.00m, TPJ/Composite, TPK/0.30m, TPK/0.50m, TPK/0.80m, TPL/0.30m, TPL/0.50m, TPM/Composite
Polycyclic Aromatic Hydrocarbons (PAHs) incl. Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene	**Phase 1**: BH1/0.80m, BH2/0.80m, BH2/3.50m, BH3/1.45m, BH3/1.90m, BH3/4.30m, BH4/0.50m, BH4/2.30m, BH4/4.50m, TP3/0.20m bgl. **Phase 2:** TPB/Composite, TPC/Composite, TPE/Composite, TPG/Composite, TPH/Composite, TPJ/Composite, TPM/Composite
Fuel Oils – Speciated TPH including full aliphatic/aromatic split	**Phase 1**: BH1/0.80m, BH2/0.80m, BH2/3.50m, BH3/1.45m, BH3/1.90m, BH3/4.30m, BH4/0.50m, BH4/2.30m, BH4/4.50m, TP3/0.20m bgl **Phase 2**: TPB/Composite, TPE/Composite, TPG/Composite, TPJ/Composite
BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs)	**Phase 1**: BH1/0.80m, BH2/0.80m, BH2/3.50m, BH3/1.45m, BH3/1.90m, BH3/4.30m, BH4/0.50m, BH4/2.30m, BH4/4.50m, TP3/0.20m bgl **Phase 2:** TPB/Composite, TPE/Composite, TPG/Composite, TPJ/Composite

The chemical laboratory results are presented in Appendix C.

5.3.1 Soil Assessment Criteria

The derivation of Soil Assessment Criteria used within this report can be seen within Appendix D.

5.3.2 Determination of Representative Contamination Concentrations

At the time of reporting, November 2017, it was our understanding that the proposed development will comprise the development of 15No. residential units on 6 sites across the Kiln Place estate. This will be following the demolition of the foyer entrances and refuse storages for some of the existing Sites. The playground was also to be improved along with landscaping, however, this was completed prior to this investigation.

A summary of the developments proposed at each site can been below:

- **Site 1:** Construction of 6No. residential homes with private garden areas;
- **Site 2:** Demolition of existing foyer entrances and extension of plot to create 2No. residential units;
- **Site 3:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units. New entrances/fencing will also be constructed for the existing plots (81 – 96).
- **Site 4:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units;
- **Site 5:** Demolition of existing foyer entrances and extension of plot to create 3No. residential units;
- **Site 6:** Demolition of existing foyer entrances and extension of plot to create 1No. residential units;

It was our understanding that only Site 1 would include soft landscaping with the remainder of the site comprising a hard-standing capping.

Therefore, for initial assessment, the results of the chemical laboratory testing were compared to the LQM/CIEH Suitable 4 Use Levels (S4UL) and General Assessment Criteria (GAC) for a ***'Residential with homegrown produce (RwHG)'*** land-use scenario for samples retrieved from Site 1 and a **'*Residential without homegrown produce (RwoHG)'*** scenario was adopted from samples tested from Sites 2 – 6. TPK which falls outside of the proposed garden areas of Site 1 will be compared to the **"Public Open Space near Residential Housing (POSResi)".**

Where no LQM/CIEH S4UL/GAC/C4SL LLTC was available for a particular determinant then preliminary reference was made to the laboratory detection limit of the determinant. If a positive concentration was noted then further risk assessment was undertaken.

For Cyanide, where no LQM/CIEH S4UL/GAC/C4SL LLTC was available a Site Specific Assessment Criteria of 10mg/kg was adopted. This is based on ICRCL 59/83, TCL, ATRISK (SOIL) Screening Value and Dutch Intervention Value (ranging from 20 – 34mg/kg). Therefore, a SSAC of ~10mg/kg is considered conservative.

Where a contaminant of concern's LQM/CIEH S4UL/C4SL LLTC varies according to the Soil's Organic Matter (SOM), the SOM recorded for the soil sample was used to derive the appropriate SGV/GAC. The average SOM of the samples analysed was 4.14% (SOM ranged between 0.70 – 9.00%).

Double plot analysis using the ratio of fluoranthene and pyrene plotted against benzo(a)anthracene and chrysene indicated that the PAH's encountered in all samples tested were from a coal derived source and may be fragments of coal or coal ash. Since the source was not coal tar related the LQM/CIEH Suitable 4 Use Levels (S4UL) for Benzo(a)pyrene were applicable. The results can be seen in Appendix E.

The results of the comparison of the representative contaminant concentrations are presented in the table overpage.

Soil Guideline Values and General Acceptance Criteria Results			
Substance	**Sample Location Where available LQM/CIEH S4UL/, CSL4 LLTC or GAC were exceeded for relevant land-use scenario**		
	"Residential with Homegrown Produce" Land-Use Scenario (Site 1 only)	**"Residential without Homegrown Produce" Land-Use Scenario (Sites 2 – 6).**	**"Public Open Space Near Residential Housing" (POSResi) (Near Site 1)**
Arsenic	None	**BH1/0.80m (80mg/kg) and BH3/1.90m (108mg/kg)** **TPB/Composite (42mg/kg), TPC/Composite (115mg/kg), TPB/0.80m (53mg/kg), TPE/0.50m (40mg/kg).**	None
Boron	None	None	None
Cadmium	None	None	None
Chromium (III)	None	None	N/A
Hexavalent Chromium (VI)	None	None	None
Copper	None	None	None
Lead	**TP3/0.20m bgL (829mg/kg), TPI (477mg/kg), TPJ/0.30m (252mg/kg)**	**BH1/0.80m (13700mg/kg), BH2/0.80m (3040mg/kg), BH3/1.90m (6700mg/kg), BH3/4.30m (1460mg/kg), BH4/0.50m bgl (1130mg/kg), BH4/2.30m (4060mg/kg), BH4/4.50m (841mg/kg)** **TPB/Composite (1970mg/kg), TPC/Composite (1460mg/kg), TPE/Composite (909mg/kg), TPG/Composite (1760mg/kg), TPH/Composite (1460mg/kg), TPA/0.50m (1880mg/kg), TPB/0.20m (1230mg/kg), TPB/0.50m (2030mg/kg), TPB/0.80m (2330mg/kg), TPB/1.00m (1150mg/kg), TPC/0.50m (28,200mg/kg), TPC/1.00m (10,600mg/kg), TPD/0.30m (2710mg/kg), TPE/0.50m (1090mg/kg), TPE/0.80m (1960mg/kg), TPF/0.30m (1140mg/kg), TPF/0.50m (2750mg/kg), TPG/0.30m (483mg/kg), TPG/0.50m (1250mg/kg), TPG/0.80m (3140mg/kg), TPG/1.00m (1020mg/kg), TPG/1.20m 3680mg/kg), TPH/0.50m (3080mg/kg), TPH/1.00m (524mg/kg).**	None
Mercury (Elemental)	None	None	None
Nickel	None	None	None
Selenium	None	None	None
Vanadium	None	None	N/A
Zinc	None	None	None
Cyanide (Total)	None	None	None
Total Phenol	None	None	N/A
Napthalene	None	None	N/A
Acenapthylene	None	None	N/A
Acenapthene	None	None	N/A
Fluorene	None	None	N/A
Phenanthrene	None	None	N/A
Anthracene	None	None	N/A
Fluoranthene	None	None	N/A
Pyrene	None	None	N/A
Benzo(a)anthracene	None	None	N/A
Chrysene	None	None	N/A
Benzo(b)flouranthene	None	**BH1/0.80m (5.92mg/kg), BH2/0.80m (5.25mg/kg) and BH3/1.90m (9.55mg/kg).**	N/A
Benzo(k)flouranthene	None	None	N/A
Benzo(a)pyrene	None	**BH1/0.80m (3.90mg/kg), BH2/0.80m (3.75mg/kg) and BH3/1.90m (6.09mg/kg).**	N/A
Indeno(1,2,3-cd)pyrene	None	None	N/A
Dibenz(a,h)anthracene	None	None	N/A
Benzo(ghi)perylene	None	None	N/A

Cont'd overleaf:

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Soil Guideline Values and General Acceptance Criteria Results – Cont'd			
Substance	**Sample Location Where available LQM/CIEH S4UL/, CSL4 LLTC or GAC were exceeded for relevant land-use scenario**		
	"Residential with Homegrown Produce" Land-Use Scenario (Site 1 Only)	**"Residential without Homegrown Produce" Land-Use Scenario (Sites 2 – 6).**	**"Public Open Space Near Residential Housing" (POSResi) (Near Site 1)**
TPH C5 – C6 (aliphatic)	None	None	N/A
TPH C6 – C8 (aliphatic)	None	None	N/A
TPH C8 - C10 (aliphatic)	None	None	N/A
TPH C10 - C12 (aliphatic)	None	None	N/A
TPH C12 - C16 (aliphatic)	None	None	N/A
TPH C16 - C21 (aliphatic)	None	None	N/A
TPH C21 - C34 (aliphatic)	None	None	N/A
TPH C5 – C7 (aromatic)	None	None	N/A
TPH C7 – C8 (aromatic)	None	None	N/A
TPH C8 - C10 (aromatic)	None	None	N/A
TPH C10 - C12 (aromatic)	None	None	N/A
TPH C12 - C16 (aromatic)	None	None	N/A
TPH C16 - C21 (aromatic)	None	None	N/A
TPH C21 - C35 (aromatic)	None	None	N/A
Toluene	None	None	N/A
Ethylbenzene	None	None	N/A
Xylene (o, m & p)	None	None	N/A
MTBE	None	None	N/A
PCB Congeners	None	None	N/A
Asbestos Screen	**BH1/0.80m (0.002%) – Amosite fibre bundles BH3/1.90 (0.011%) – Chrysotile microscopic fibres BH4/0.50m (0.002%) – Chrysotile fibre bundles TP3/0.20m (0.003%) = Chrysotile and Amosite fibre bundles TPB/Composite (<0.001%) – Chrysotile fibre bundles TPA/0.50m (<0.001%) – Amosite fibre bundles TPB/0.80m (0.003%) - Amosite fibre bundles TPC/0.50m (<0.001%) - Amosite fibre bundles TPD/0.30m (0.001%) – Amosite fibre bundles TPE/0.50m (<0.001%) - Chrysotile fibre bundles TPG/0.50m (0.007%) - Chrysotile fibre bundles TPH/1.00m (0.005%) - Amosite fibre bundles TPK/0.30m (0.009%) – Small Chrysotile fibre bundles TPK/0.50m (0.004%) – Small Chrysotile fibre bundles TPK/0.80m (0.005%) – Small Chrysotile fibre bundles Cement bound asbestos sheets noted in TPG.**		

Site 1

In Site 1 the chemical laboratory testing revealed an elevated level of lead in excess of the C4SL LLTC of 210mg/kg for a ***'Residential with homegrown produce'*** land-use scenario in the six samples of Made Ground tested: TP3/0.20m bgL (829mg/kg), TPI (477mg/kg), TPJ/0.30m (252mg/kg), TPK/0.30m (545mg/kg), TPK/0.50m (609mg/kg), TPK/0.80m (476mg/kg).

Elevated concentrations of copper were noted in 2No. samples with a value above the phytotoxicity threshold trigger value of 250mg/kg: TPI/0.50m (262mg/kg) and TPJ/0.30m (327mg/kg).

Loose chrysotile and amosite asbestos fibres were noted within one sample of Made Ground tested (TP3/0.20m – 0.003%).

Chemical laboratory testing of the Made Ground revealed no other elevated levels of determinants above the guideline levels for a ***'Residential with homegrown produce'*** land-use scenario.

Sites 2 – 6

Chemical laboratory testing revealed an elevated level of lead in excess of the C4SL LLTC for a **"*Residential without Home-grown Produce*"** land use scenario of 330mg/kg were detected in 38No. samples tested: BH1/0.80m (13700mg/kg), BH2/0.80m (3040mg/kg), BH3/1.90m (6700mg/kg), BH3/4.30m (1460mg/kg), BH4/0.50m bgl (1130mg/kg), BH4/2.30m (4060mg/kg), BH4/4.50m (841mg/kg), TPB/Composite (1970mg/kg), TPC/Composite (1460mg/kg), TPE/Composite (909mg/kg), TPG/Composite (1760mg/kg), TPH/Composite (1460mg/kg), TPA/0.50m (1880mg/kg), TPB/0.20m (1230mg/kg), TPB/0.50m (2030mg/kg), TPB/0.80m (2330mg/kg), TPB/1.00m (1150mg/kg), TPC/0.50m (28,200mg/kg), TPC/1.00m (10,600mg/kg), TPD/0.30m (2710mg/kg), TPE/0.50m (1090mg/kg), TPE/0.80m (1960mg/kg), TPF/0.30m (1140mg/kg), TPF/0.50m (2750mg/kg), TPG/0.30m (483mg/kg), TPG/0.50m (1250mg/kg), TPG/0.80m (3140mg/kg), TPG/1.00m (1020mg/kg), TPG/1.20m 3680mg/kg), TPH/0.50m (3080mg/kg), TPH/1.00m (524mg/kg).

Chemical laboratory testing revealed an elevated level of arsenic in excess of the C4SL LLTC for a ***"Residential without Home-grown Produce"*** land use scenario of 40mg/kg were detected in 6No. samples tested: BH1/0.80m (80mg/kg), BH3/1.90m (108mg/kg), TPB/Composite (42mg/kg), TPC/Composite (115mg/kg), TPB/0.80m (53mg/kg), TPE/0.50m (40mg/kg).

Chemical laboratory testing revealed an elevated level of benzo(b)fluoranthene in excess of the C4SL LLTC for a ***"Residential without Home-grown Produce"*** land use scenario only of 4.00mg/kg in 3No. samples tested: BH1/0.80m (5.92mg/kg), BH2/0.80m (5.25mg/kg) and BH3/1.90m (9.55mg/kg).

Chemical laboratory testing revealed an elevated level of benzo(a)pyrene in excess of the C4SL LLTC for a ***'Residential without Home-grown Produce"*** land use scenario only of 3.20mg/kg in 3No. samples tested: BH1/0.80m (3.90mg/kg), BH2/0.80m (3.75mg/kg) and BH3/1.90m (6.09mg/kg).

Elevated concentrations of copper were noted in 13No. samples with a value above the phytotoxicity threshold trigger value of 250mg/kg: BH1/0.80m (312mg/kg), BH2/0.80m (1200mg/kg), BH3/1.90m (315mg/kg), TPB/Composite (245mg/kg), TPC/Composite (369mg/kg), TPA/0.50m (348mg/kg), TPB/0.50m (758mg/kg), TPB/0.80m (657mg/kg), TPF/0.30m (301mg/kg), TPF/0.50m (536mg/kg), TPG/1.20m (254mg/kg), TPH/0.50m (400mg/kg) and TPH/1.00m (321mg/kg).

Elevated concentrations of zinc were noted in 15No. samples above the phytotoxicity threshold trigger value of 1000mg/kg with values of 4600mg/kg (BH1/0.80m), 3940mg/kg (BH2/0.80m), 2710mg/kg (BH3/1.45m), 3660mg/kg (BH3/1.90m bgl), 1030mg/kg (BH3/4.30m), 4850mg/kg (BH4/0.50m), 2280mg/kg (TPC/Composite), 1200mg/kg (TPA/0.50m), 1030mg/kg (TPB/0.50m), 11,700mg/kg (TPC/0.50m), 1980mg/kg (TPC/1.00m), 1020mg/kg (TPF/0.50m), 10,800mg/kg (TPG/0.80m), 5590mg/kg (TPG/1.00m) and 2390mg/kg (TPG/1.20m).

Chemical laboratory testing revealed asbestos fibres comprising Amosite fibre bundles and Chrysotile fibres in 12No. samples tested: BH1/0.80m (0.002%), BH3/1.90 (0.011%), BH4/0.50m (0.002%), TP3/0.20 (0.003%), TPB/Composite (<0.001%), TPA/0.50m (<0.001%), TPB/0.80m (0.003%), TPC/0.50m (<0.001%), TPD/0.30m (0.001%), TPE/0.50m (<0.001%), TPG/0.50m (0.007%), TPH/1.00m (0.005%). A layer of cement bound asbestos was also noted in TPG at 0.50m bgl.

Chemical laboratory testing revealed no other elevated levels in excess of the C4SL LLTC for a ***"Residential without Home-grown Produce"*** land use scenario.

TPK – Near Site 1

Small bundles of chrysotile fibres were noted within three sample of Made Ground tested (TPK/0.30m, TPK/0.50m, TPK/0.80m bgl) with quantifications ranging between 0.004% - 0.009%.

Chemical laboratory testing revealed no other elevated levels in excess of the C4SL LLTC for a ***"Public Open Space near Residential (POSResi)"*** land use scenario.

Risk Assessment CIRIA733:
The risk assessments have been based on a sandy clay or sand soil (as per soil sample descriptions from QTS and the trial hole logs within Appendix B) in accordance with Addison et al 1988.

The asbestos type detected was based on the quantification results.

In accordance with CIRIA733 in order to determine a cumulative exposure in fibre/ml.years the following equation is required:

((Kasbestostype x Ksoil)/Koverall) x Soil Concentration = fibre/ml per mg/m3.

Fibre/ml per mg/m3 x Dust Concentration = f/ml.

(f/ml x Dry Days Exposure (hrs)) = f/ml.hr
Conversation to years by dividing by 1950hr (Occupational hours in year) = f/ml.year.

Apply age correction factor at which point exposure occurs.

Dust Concentration: 0.1mg/m3 – Based on ART model and Soil Dust Concentrations & Gardening

Dry Day Exposure: 150hrs/year.
No. of Years: 5yrs segments up until 55.
Age exposure correction for mesolthelioma: Taking risk as persisting for 80yrs.

The results of the risk assessments can be seen tabulated below.

Summary of Asbestos Risk Assessment (CIRIA733)							
Site	**Sample (m bgl)**	**Soil Type**	**Soils Concentration**	**Asbestos Type**	**Asbestos Form**	**Culminative Exposure Over 70 Years (f/ml/year)**	**Risk Level (Based on Table 14.1)**
Outside Site 1 Boundary	TPK/0.30m	Sandy Clay	0.009%	Chrysotile	Small Fibre Bundles	**0.00669 f/ml/year**	Insignificant
	TPK/0.50m	Sandy Clay	0.004%	Chrysotile	Small Fibre Bundles	**0.00298 f/ml/year**	Insignificant
	TPK/0.80m	Sandy Clay	0.005%	Chrysotile	Small Fibre Bundles	**0.00372 f/ml/year**	Insignificant
Site 1	TP3/0.20m	Sand	0.003%	Chrysotile	Fibre Bundles	**0.0038 f/ml/year**	Insignificant
	TP3/0.20m	Sand	0.003%	Amosite	Fibre Bundles	**0.00597 f/ml/year**	**Just over 2 in 100,000 people affected**
Site 2/6	BH4/0.50m	Sandy Clay	0.002%	Chrysotile	Fibre Bundles	**0.00149 f/ml/year**	Insignificant
	TPG/0.50m	Sand	0.007%.	Chrysotile	Fibre Bundles	**0.00888 f/ml/year**	Insignificant
	TPH/1.00m	Sandy Clay	0.001%	Amosite	Fibre Bundles	**0.000347 f/ml/year**	Insignificant
Site 3	BH3/1.90m	Sand	0.011%	Chrysotile	Fibre Bundles	**0.01396 f/ml/year**	**0.57 in 100,000 people affected**
Site 5	TPD/0.20m	Sand	0.001%	Amosite	Fibre Bundles	**0.00398 f/ml/year**	**1 in 100,000 people affected**
	BH1/0.80m	Sandy Clay	0.002%	Amosite	Fibre Bundles	**0.00195 f/ml/year**	**0.80 in 100,000 people affected.**
	TPB/0.80m	Sandy Clay	0.003%	Amosite	Fibre Bundles	**0.00292 f/ml/year**	**1.33 in 100,000 people affected.**

5.4. Qualitative Risk Assessment

Given there are no areas of soft landscaping in Sites 2 – 7, the levels of Lead and Asbestos do not pose a risk to end-users in these sites.

In Site 1, the isolated hotspot of asbestos noted in TP3/0.20m is under the proposed hardstanding and may be removed during foundation construction.

The levels of Lead noted in the proposed rear gardens of Site 1 need further risk assessment and may pose a risk to end-users in respect to human health.

5.5 CLAIRE Statistical Analysis

CLAIRE statistical analysis of the results of contamination testing from both phases of sampling within the Site 1 area was carried out targeting the contaminants identified as posing an unacceptable risk to end-users (Lead).

The Made Ground encountered was considered to be of the same population, therefore statistical analysis on all results obtained was deemed appropriate.

CLAIRE statistical analysis looks at the distribution of contaminants across the site to determine if

overall levels exceed the critical criteria and whether there are outliers within the sample population which can be treated as hotspots.

CLAIRE Statistical analysis of the distribution of the elevated levels of Lead within the Made Ground across Site 1 revealed the concentrations had a non-normal distribution, 3 outliers and with the mean of the sample population and the Upper Confidence Limit above the LQM/CIEH S4UL. The outliers relate to TPI/0.50m, TPJ/0.30m and TP3/0.20m bgl, meaning that the general distribution of the Lead in the Made Ground, with the outliers, were considered to pose a potential risk to end-users and remediation should be considered.

The results of the analysis can be seen in Appendix F. A précis of the results is tabulated below.

Soil Guideline Values and General Acceptance Criteria Results			
Substance	Outliers Present	Upper Confidence Limit of Sample Population (mg/kg)	Does the Upper Confidence Limit of the Sample Population Exceed the C4SL LLTC
			Residential with Home Grown Produce
Lead	**YES**	**672.86**	**210mg/kg Yes**

5.5 Ground Gas Risk Assessment

The Desk Study (*Ramboll UK Limited Geotechnical and Environmental Desk Study: Report 61031879, July 2014)* revealed that the site was located on an area of Worked Ground. Deep Made Ground with hydrocarbon odours were noted in the trial holes during the investigation.

Only major areas of worked ground, generally associated with mineral extraction, are shown on the published maps. In most cases the nature of the fill is unknown. Putrescible material within the Made Ground may create ground-gases such as methane and carbon dioxide. Made Ground is likely to be shallow and uncapped and consequently ground-gas will preferentially migrate to surface. However, given the amount of historic excavations within the area and in a close proximity to the site it was considered likely that ground-gas could affect the site.

The ground investigation undertaken by Ramboll UK Limited found 4.2 – 7.5m of Made Ground over the London Clay Formation. The Made Ground contained clinker, slag, ash, metal, charcoal and/or wood. An organic odour was noted in BH2. No evidence was noted for gross contamination. The Total Organic Carbon (TOC) ranged between 0.05 – 4.70%.

The ground investigation undertaken by Ground and Water Limited noted Made Ground from ground level to the final depths of all the boreholes, a depth of between >0.50m – >5.00m bgl. The soils generally comprised a dark brown/black/dark red/grey/light brown clayey silty gravelly sands/silty sandy gravel to a sandy silty gravelly clay to a dark brown to grey clayey silty gravelly sand.. The sand was fine to coarse grained. The gravel was rare to abundant, fine to coarse, angular to sub-rounded flints, brick, concrete, tarmac fragments, glass, rusted metals and clinker. The average SOM of the Made Ground analysed was 5.42% (SOM ranged between 2.70 – 8.00%).

A pragmatic approach to ground-gas risk assessment for the 21st Century (CIRIA/Environmental Protection UK Ground Gas Seminar – 22nd June 2011 and 13th September 2011) Geoff Card and Steve

Wilson) was used to undertake further assessment of the ground-gas risk.

The report suggested the following:

Given the uncertainty in the measurement of gas concentrations and flow rates in monitoring wells that can sometimes occur on low risk sites an alternative approach was proposed. Low risk sites were defined as those where the conceptual model has not identified any significant sources of ground-gas including:

1. Natural soils with a high carbonate content, such as Chalk, some Glacial Tills, etc;
2. Natural soils that are known to contain methane, such as Alluvium, Peat, etc;
3. Made Ground with a low organic content (2 – 6%) (ie predominantly soil, ash or clinker with occasional pieces of wood, etc). The maximum depth for applying this approach has been chosen as 5m. This value is used because there is a greater risk of unidentified degradable material with deeper deposits and the soil atmosphere is more likely to be predominantly anaerobic below this depth. (considered to represent the site);
4. Areas of flooded mine workings or mine workings that were abandoned by the early 20th Century (gas emissions from these types of mine workings are not likely to pose a significant risk). The exception may be where buildings are within 20m of a mine opening (shaft or adit).

This effectively means that gas monitoring is only required for;

1. High risk sites where gas can be emitted from the ground in large volumes (domestic or industrial landfill sites with a high degradable content, Made Ground with a higher degradable content, mine workings where there is still a large gas reservoir and a vent to the ground surface such as a shaft or fractured rock).
2. Sites with Made Ground where maximum depth is greater than 5m or average depth greater than 3m.
3. Sites where migration from an off-site source with a credible migration pathway needs to be assessed.

The previously undertaken Ground Investigation (Ramboll UK Limited Ground Contamination Interpretative Report, report 61031879, June 2014) installed 5No. combined ground-gas and groundwater monitoring wells (BH1, BH2, WS2, WS5 and WS7).

Ground and Water Limited installed 4No. combined ground-gas and groundwater monitoring wells within BH1 – BH4.

The construction of the wells installed can be seen tabulated below.

Combined Ground-gas and Groundwater Monitoring Well Construction					
	Trial Hole	**Depth of Installation (mbgl)**	**Thickness of slotted piping with gravel filter pack (m)**	**Depth of plain piping with bentonite seal (m bgl)**	**Piping external diameter (mm)**
Ramboll UK Limited Monitoring Wells	BH1	6.00m	5.00m	1.00m	50mm
	BH2	7.00m	6.00m	1.00m	50mm
	WS2	6.10m	5.10m	1.00m	50mm
	WS5	4.00m	3.00m	1.00m	50mm
	WS7	5.10m	4.10m	1.00m	50mm
Ground and Water Limited Monitoring Wells	BH1	2.00m	1.00m	1.00m	50mm
	BH2	3.00m	2.00m	1.00m	50mm
	BH3	5.00m	4.00m	1.00m	50mm
	BH4	4.50m	3.50m	1.00m	50mm

Ground-gas monitoring has been undertaken on nine occasions to date; five undertaken by Ramboll UK Limited between March – April 2014 and four undertaken by Ground and Water Limited from July – September 2017. The ground-gas monitoring undertaken by Ground and Water Limited was undertaken using an LMSXi landfill gas analyser and a GA5000 landfill gas analyser by Ramboll UK Limited. The results of the ground-gas monitoring can be seen tabulated overleaf.

***Ramboll UK Limited* Ground-Gas Monitoring Results.**									
Date	**Trial Hole**	**Atms Press (hPa)**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m BGL)**
25/03/2014 Weather: Mild and cloudy. Pressure over previous 48hours: Rising and filling 23rd and 24th, rising on 26th.	BH1	1004	21.3	0	0.5	0	7	-0.1	3.03
	BH2	1007	22.0	0	0.3	0	2	0.0	1.52
	WS2	1007	20.2	0	2.7	0	0	0.0	5.32
	WS5	1009	22.1	0	0.5	0	0	0.1	3.52
	WS7	1006	16.8	0	3.8	0	0	0.0	2.23
Date	**Trial Hole**	**Atms Press (hPa)**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m BGL)**
01/04/2014 Weather: Dry and sunny. Pressure over previous 48hours: Steady through 30th and 31st, remaining steady on 2nd.	BH1	1007	20.2	0	0.1	1	0	0.0	3.03
	BH2	1007	18.8	0	0.8	1	1	0.0	1.54
	WS2	1006	18.0	0	2.8	0	0	0.0	5.37
	WS5	1006	19.9	0	0.3	1	0	-0.1	3.51
	WS7	1006	17.5	0	2.4	0	1	-0.2	2.22
Date	**Trial Hole**	**Atms Press (hPa)**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m BGL)**
08/04/2014 Weather: Mild and sunny Pressure over previous 48hours: Falling through 6th and 7th, rising sharply on 9th	BH1	1014	20.0	0	0.2	1	0	0.0	3.51
	BH2	1015	17.1	0	0.9	1	0	0.0	1.59
	WS2	1013	18.2	0	3.3	0	0	0.0	5.08
	WS5	1014	19.6	0	0.4	1	0	-0.1	3.51
	WS7	1014	15.7	0	3.4	1	0	-0.1	2.24
Date	**Trial Hole**	**Atms Press (hPa)**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m BGL)**
15/04/2014 Weather: Mild and Sunny. Pressure over previous 48hours: Steady of over 13th and 14th, remaining steady over 16th	BH1	1025	18.9	10	1.0	2	0	0.0	3.02
	BH2	1025	14.6	0	0.7	1	0	-0.3	1.59
	WS2	1025	19.1	0	2.5	1	0	0.0	5.80
	WS5	1025	20.1	0	0.3	1	0	0.0	3.51
	WS7	1025	12.5	0	6.5	1	0	0.0	2.24
Date	**Trial Hole**	**Atms Press (hPa)**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m BGL)**
09/05/2014 Weather: Overcast Light winds. Pressure over previous 48hours: Rising and falling gently over 7th and 8th, gently rising on 10th	BH1	1006	20.3	0	1.0	0	1	0.0	3.81
	BH2	1006	10.5	0	3.7	0	1	1.2	1.52
	WS2	1006	19.5	0	2.5	0	1	0.0	4.15
	WS5	1005	21.3	0	0.5	0	0	0.1	3.47
	WS7	1006	17.5	0	3.9	0	1	0.0	2.27

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***Ground and Water Limited* Ground-Gas Monitoring Results Cont'd.**										
Date	Trial Hole	O_2 (%)	LEL (%)	CH_4 (%)	CO_2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (litre/hr)	Groundwater (m BGL)	Max Depth of Well
10/07/2017 pm Weather: Overcast Light winds. Pressure over previous 48hours: Steady through 8th and 9th; rising steeply on 11th.	Atmosphere (1022mb)	21.3	0	0	0.0	0	0	-	-	-
	BH1	13.3	0	0	2.6	0	0	0	1.50	2.00
	BH2	21.4	0	0	0.0	0	0	0	3.00	3.30
	BH3	21.4	0	0	0.0	0	0	0	3.24	4.10
	BH4	21.4	0	0	0.0	0	0	0	3.40	4.80
26/07/2017 am Weather: Dry. Overcast. Very light winds. Pressure over previous 48hours: Rising and falling on 24th and 25th; slightly rising on 27th.	Atmosphere (998)	20.8	0	0	0.0	0	0	-	-	-
	BH1	18.2	0	0	1.0	0	0	0	1.30	2.00
	BH2	18.4	0	0	1.8	0	0	0	2.90	3.30
	BH3	19.5	0	0	0.3	0	0	0	3.30	4.10
	BH4	20.3	0	0	0.5	0	0	0	3.50	4.80
17/08/2017 pm Weather: Dry. Overcast Moderate winds. Pressure over previous 48hours: Rising and falling sharply on 15th and 16th, remaining steady on 18th.	Atmosphere (1013mb)	20.6	0	0	0.1	0	0	-	-	-
	BH1	17	0	0	2.8	0	0	0	2.82	3.31
	BH2	19.3	0	0	0.7	0	0	0	1.39	1.97
	BH3	19.4	0	0	0.7	0	0	0	3.22	4.13
	BH4	20.1	0	0	0.6	0	0	0	3.45	4.84
06/09/2017 Weather: Dry, Overcast, Moderate Winds. Pressure over previous 48hours: Remaining steady on 4th and 5th , rising slightly on the 7th	Atmosphere (1014 mb)	19	0	0	0.2	0	0	0	-	-
	BH1	19	0	0	0.6	0	0	0	1.35	2.00
	BH2	Unable to access due to obstructions.								
	BH3									
	BH4									

5.5.1 Data Quality

A review was made of the quality of the available data for the site, which can be viewed in the table overleaf. CIRIA Report C665 (2007) and BS 8485:2015 stress the need for risk assessments to be based on good quality data and give guidance as to best practice in this respect.

Review of Data Quality			
Data Type	**Current Situation**	**UK Practice**	**Recommendation**
Geological and hydro-geological conditions	With regard to the ground-gas risk assessment the data from logged trial holes is good.	CIRA C665 & C659, Wilson and Card (1999) and BS 8485:2015 recommend that geology and hydrogeology be fully understood.	**No further action required.**
Monitoring period	The monitoring has been undertaken on a total of nine occasions over 2No. three month periods, March 2014 – May 2014 and July 2017 – September 2017. Monitoring has been undertaken during a period of relatively stable high, medium and medium/low pressure.	CIRIA C665 recommends prolonged monitoring over a range of weather conditions. Wilson and Card (1999) recommend that for less than 12 months monitoring the protective measures should be made more conservative.	Monitoring over 2No. three-month period (March 2014 – May 2014 and July 2017 – September 2017) period has generally shown concentrations of carbon dioxide <4% by volume. A maximum carbon dioxide conc. of 6.5% was noted on 9/05/2014. No levels of Methane above the detection limit were noted, expect on one occasion (9/05/2014) showing 10.0% by vol. Carbon monoxide levels were generally low (between 0 – 2ppm), with the expectation of one occasion (25/03/2014) where 7ppm was encountered. Hydrogen Sulphide levels generally ranged between 0 – 2ppm across the nine readings undertaken. All readings were taken within unflooded boreholes (groundwater level >1.00m bgl). Monitoring visits have targeted worse-case falling atmospheric pressure conditions. Low (998mb) and falling atmospheric pressure noted on the 26.07.2017.
Gas data sets	Borehole flow velocity has been measured on each monitoring occasion.	Borehole flow velocity and borehole gas volume (carbon dioxide and methane) required for gas flux categorisation. Modified Wilson and Card classification, CIRIA C665 (2007).	Flow rates were generally minimal, ranging from -0.3 – 0.1. A maximum flow rate of 1.2 litre/hr was noted on 09.05.2017.

Based on the documentation presented in "BS 8485:2015, Code of practice for the characterization and remediation from ground gas in affected developments", the Data Category for the site could be characterised as **"*adequate*"** given that nine monitoring rounds had been completed over a range of atmospheric pressures and weather conditions.

5.5.2 Risk Assessment

CIRIA Report 665 gives tables of Characteristic Situations for protection from ground-gas for residential developments. These were developed from a survey of UK practice and thus empirically reflect UK practice, rather than being derived by risk analysis of site specific gas data.

CIRIA Report 665 gives tables of Characteristic Situations for protection from ground-gas for residential developments.

5.5.2.1 Carbon Dioxide and Methane

The lowest oxygen concentration recorded was 10.5% by volume in BH2 (9th May 2014).

No levels of Methane above the detection limit were noted, expect on one occasion (9/05/2014) showing 10.0% by vol. in WS7.

Generally the concentrations of carbon dioxide were <4% by volume. A maximum carbon dioxide conc. of 6.5% was noted on 9/05/2014 in WS7.

Based on the documentation presented in "BS 8485:2007, Code of practice for the characterization and remediation from ground gas in affected developments", the *hazardous gas flow rate (Q_{hg})* should be calculated using:

$$Q_{hg}=C_{hg}/100 * q$$

Where:

C_{hg} is the measured hazardous gas concentration (in percentage volume-by-volume);

q is the flow rate (in litres per hour) of combined gases found by direct measurement. If gas borehole flow was not detectable, it should be assumed to be at the detection limit of the equipment used.

The risk assessment was undertaken using a credible, a medium to high risk and a worst-case approach.

Credible Approach (Generalised Ground-Gas and Flow Rate Detection Limit)
Based on using a flow rate of 0.1l/hr (detection limit of the gas analysers), the Q_{hg} for carbon dioxide was calculated to be:

Q_{hg} (l/hr) = 4.00 (gas analyser detection limit)/100 * 0.1 (borehole flow rate)

Q_{hg} for Carbon Dioxide = 0.004 l/hr

Generally, the levels of methane were below the detection limit meaning further risk assessment was not required for this scenario.

This would indicate the site falls into a Characteristic Situation 1 (CS1) where no precautions against the ingress of ground-gas are necessary.

Low Approach (Generalised Ground-Gas and Increased Flow Rate)
Based on using a flow rate of 0.1l/hr (detection limit of the gas analysers), the Q_{hg} for carbon dioxide was calculated to be:

Q_{hg} (l/hr) = 4.00 (gas analyser detection limit)/100 * 0.3 (borehole flow rate)

Q_{hg} for Carbon Dioxide = **0.012 l/hr**

Generally, the levels of methane were below the detection limit meaning further risk assessment was not required for this scenario.

This would indicate the site falls into a Characteristic Situation 1 (CS1) where no precautions against the ingress of ground-gas are necessary.

Medium Approach (Generalised Ground-Gas and Peak Flow Rate)
Based on using a flow rate of 0.1l/hr (detection limit of the gas analysers), the Q_{hg} for carbon dioxide was calculated to be:

Q_{hg} (l/hr) = 4.00 (gas analyser detection limit)/100 * 1.2 (borehole flow rate)

Q_{hg} for Carbon Dioxide = **0.048 l/hr**

Generally, the levels of methane were below the detection limit meaning further risk assessment was not required for this scenario.

This would indicate the site falls into a Characteristic Situation 1 (CS1) where no precautions against the ingress of ground-gas are necessary.

On the vast majority of monitoring visits no flow was recorded, this is as expected from the conceptual site model and potential source, which is deep Made Ground with low organic content.

High Approach (Peak Ground-Gas and Increased Flow Rate)

A flow rate of -0.3 l/hr was noted in BH2 on the 15th April 2014. For the medium to high risk this has been assumed that this could be hints of a sustained positive flow of 0.1 – 0.3l/hour. However, flow of this kind is not expected given the source of the slow decay or organic matter in Made Ground.

Consequently, the Q_{hg} for carbon dioxide was calculated to be:

Q_{hg} (l/hr) = 6.5 (gas analyser detection limit)/100 * 0.3 (borehole flow rate)

Q_{hg} for Carbon Dioxide = **0.0195 l/hr**

The Q_{hg} for methane was calculated to be:

Q_{hg} (l/hr) = 10.0 (gas analyser detection limit)/100 * 0.3 (borehole flow rate)

Q_{hg} for methane = **0.03 l/hr**

This would indicate the site falls into a Characteristic Situation 1 (CS1) where no precautions against the ingress of ground-gas are necessary.

Worst Possible Approach (Peak Flow Rate and Gas Concentration)

A maximum peak flow rate of 1.2l/hr was noted in BH2 on the 9th May 2014.

Consequently, the Q_{hg} for carbon dioxide was calculated to be:

Q_{hg} (l/hr) = 6.5 (gas analyser detection limit)/100 * 1.2 (borehole flow rate)

Q_{hg} for Carbon Dioxide = 0.078 l/hr

The Q_{hg} for methane was calculated to be:

Q_{hg} (l/hr) = 10.0 (gas analyser detection limit)/100 * 1.2 (borehole flow rate)

Q_{hg} for methane = 0.12 l/hr

This would indicate the site falls into the Character Situation 2 (CS2).

A summary of the above ground-gas scenarios compared with Character Situations under CIRA 665 is tabulated overleaf.

Comparison of Bio-Gas Monitoring Scenarios with Character Situations (CIRIA 665)									
Gas Screening Values (l/hr) "Credible approach"		**Gas Screening Values (l/hr) "Low risk approach"**		**Gas Screening Values (l/hr) "Medium approach"**		**Gas Screening Values (l/hr) "High approach"**		**Gas Screening Values (l/hr) "Worst possible approach"**	
Co_2	CH_4	Co_2	CH_4	Co_2	CH_4	Co_2	CH_4	Co_2	CH_4
0.004 (CS1)	n/a	0.021 CS1	n/a	0.048 CS1	n/a	0.0195 (CS1)	0.03 (CS1)	0.078 (CS2)	0.12 (CS2)

The maximum level of carbon dioxide (6.5%) and methane (10.0%) encountered on the 15th April 2014 was likely to be an anomaly due to no levels of carbon dioxide above 5% and no other levels of methane being noted in the other eight ground-gas monitoring visits. Additionally, of those other eight, the visit undertaken at the lowest atmospheric pressure (998mb on 26th July 2017) where increased ground-gas levels are to be expected, revealed no levels of methane above the detection limit or concerning levels of carbon dioxide (>5%). Therefore, it is considered reasonable to discount this increased methane reading and consider a less conservative approach regarding the carbon dioxide readings.

The worst possible approach which used the peak flow of 1.2litre/hr found in BH2 on 9th May 2014 was likely created by the shallow groundwater encountered in the same borehole (1.52m bgl). Using this reading within a worst-case scenario is unlikely to be representative of the general ground-gas situation at the site, given no other flow rates were detected during the other monitoring visits.

With accordance with the pragmatic approach outlined by Wilson and Card, due to soils having on average a low organic content (5.42%) and small volumes of ground-gas being emitted, it can be considered as a low risk site relating to ground-gases.

Based on the generalised level of ground-gas and flow rates identified over the nine monitoring visits, a Character Situation of CS1 is considered applicable. Therefore, no precautions against the ingress of ground-gas are necessary.

5.6 Re-Evaluated Phase 3 Conceptual Site Model

Following completion of the Phase 3 Site Investigation, the revised CSM developed within Section 7.1 of this report was re-evaluated and can be seen overleaf. The plausible pollutant linkages remaining after risk assessment are shown and where risk assessment has indicated no unacceptable risk to sensitive receptors, the pollutant linkages have been crossed out.

Tabulated Conceptual Site Model – Plausible Pollutant Linkages Only		
Potential Sources	**Potential Absorption Pathways**	**Potential Receptors**
On-site Sources Contaminants present within general Made Ground/Worked Ground capping the site. • Heavy and semi-metals; **Lead, Arsenic** • Polycyclic Aromatic Hydrocarbons (PAH's) – **benzo(a)pyrene and benzo(b)flourathene** • ~~Heavy end Petroleum Hydrocarbons (TPH);~~ • **Asbestos.** **Chrysotile and Amosite Asbestos was noted in TP3/0.20m, TPD/0.20m, TPB/0.80m that may create a risk to between 1 – just over 2 100,000 people.** **Elevated levels of lead may pose a risk to end-users in soft landscaped areas.**	Direct ingestion of soil and soil derived household dust; Dermal contact of soil and soil derived household dust; Ingestion of soil with elevated concentration of determinants; Dermal contact with impacted soils; Consumption of home grown vegetables; Direct ingestion of soil attached to vegetables; Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinants Inhalation of volatiles (indoors and outdoors) with elevated concentration of determinants. **Elevated concentrations of asbestos will be locked under hardstanding post-development, it is unlikely that this risk will remain.**	End users of the site (Residents) Site operatives during demolition and redevelopment; Maintenance workers; Building materials and services. **Groundwater was not considered a potential receptor at this site.**
Long history of industrial works use onsite including a Brickworks and Timber Yard from ~1894 – 1968: • Heavy and semi-metals; **Lead, Arsenic** • Polycyclic Aromatic Hydrocarbons (PAH's) – **benzo(a)pyrene and benzo(b)flourathene** • ~~Heavy end Petroleum Hydrocarbons (TPH);~~ • **Asbestos.** **Chrysotile and Amosite Asbestos was noted in TP3/0.20m, TPD/0.20m, TPB/0.80m that may create a risk to between 1 – just over 2 100,000 people.** **Elevated levels of lead may pose a risk to end-users in soft landscaped areas.**	Via anthropogenic pathways; Via underlying geology; (Made Ground, London Clay) Via surface water.	
~~Capping of Worked Ground as identified on the BGS Maps~~ • ~~Ground gases including methane, carbon dioxide and carbon monoxide~~ Risk assessment indicates the site falls within CS1, where no protection measures against the ingress of ground-gas are required.	Migration through anthropogenic & natural pathways Inhalation Possible Explosive Risk	

5.7 Remediation Strategy

We have assessed that the contamination noted does not pose a risk to groundwater and therefore remediation was solely necessary with respect to human health.

Given the proposed development, the risk assessment has indicated only Site 1 will require remediation due to the areas of proposed soft landscaping. Any contaminants encountered in Site 2 – 6 will be locked under hardstanding or removed during the foundation/service excavation. Any Method Statement and Risk Assessment should include the provision of potential asbestos to protect service and maintenance workers during their works.

Risk Assessment has revealed elevated levels of Lead in the soils of Site 1.

Based on the results of the contamination testing to date the following remediation options are available.

Risk Assessment has indicated that the determinants noted pose no unacceptable risk to groundwater and therefore the Made Ground can remain under areas of permanent hardstanding. However, given elevated levels of Lead, remediation is required in the private garden areas in Site 1.

The BRE *"Cover Systems for Land Regeneration, Thickness Design of Cover Systems for Contaminated Land, BRE, March 2004",* allows for the design of cover systems to impacted soils where the concentration of determinants within the ground does not exceed any of the respective SGVs or GACs by more than six.

Using the Upper Critical Confidence Limit of lead in the Made Ground of Site 1 (672mg/kg) was not over six times the relevant SGV for a ***"Residential with homegrown produce"*** land-use scenario (based on SOM value of 2.5%), the BRE Cover Systems could be applied.

The BRE Cover Systems spreadsheet was based on a mixing zone of 600mm. The lower the concentration of the elevated determinants in the imported Topsoil, the lesser the amount of clean cover will be required.

An **example cover thickness** has been calculated of ~485mm using an approximate assumed concentration of lead (100mg/kg) likely to be present in any imported Topsoil, which can be viewed in Appendix G. **The actual cover thickness would need to be calculated once a source of imported Topsoil was known with available chemical results certificates.**

Excavation of the soft landscaped garden areas must be independently inspected to validate that the calculated depth has been achieved **before any Topsoil is imported onto the site**.

In relation to end-users the presence of permanent hardstanding (i.e. a building, car parking area or roads) will sever any plausible pollutant linkages present.

Complete removal of affected Made Ground from the site has not been considered given the cost implications and that a simple capping system could be adopted. This would prevent needless lorry movements and prevent waste unnecessarily being sent to landfills with only a finite capacity.

The measures outlined in the following sections are designed to ensure that the potential

contamination does not endanger groundworkers or end-users of the proposed development and those end-users do not come into contact with potentially contaminated materials.

5.8 Validation Strategy

Any remedial works undertaken on the site will need to be inspected and independently validated by a Ground and Water Limited Engineer. All remedial excavations will need to be inspected, documented and photographed.

5.9 Discovery Strategy

There may be areas of contamination that have not been identified during the course of the intrusive investigation. For example, there may have been underground storage tanks (UST's) not identified during the Desk Study and/or Ground Investigation for which there is no historical or contemporary evidence.

Such occurrences may be discovered during the demolition and construction phases for the redevelopment of the site.

Groundworkers should be instructed to report to the Site Manager any evidence for such contamination; this may comprise visual indicators, such as fibrous materials within the soil, discolouration, or odours and emission. Upon discovery advice must be taken from a suitably qualified person before proceeding, such that appropriate remedial measures and health and safety protection may be applied.

Should a new source of contamination be suspected or identified then the Local Authority will need to be informed.

5.10 Waste Disposal

Foundation and remedial excavations on-site are likely to produce waste which will require classification and then recycling or removal from site.

Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal all waste must be classified as;

- Inert;
- Non-hazardous or;
- Hazardous.

The Environment Agency's Hazardous Waste Technical Guidance (WM3) document outlines the methodology for classifying wastes.

Once classified, the waste can be removed to the appropriately licensed facilities with some waste requiring pre-treatments prior to disposal.

Any Hazardous waste destined to Landfill will need to be pre-treated prior to disposal.

Asbestos is the name given to a group of naturally occurring minerals which consist of flexible fibres. The most common types of asbestos are Chrysotile (white), Amosite (brown) and Crocidolite (blue). The properties of asbestos, in particular its strength, high thermal and electrical insulation, chemical resistance and fire resistance made it a very useful building material.

However, breathing in asbestos fibres can cause diseases of the respiratory system. Whilst its use has now been banned, there are still many buildings which have asbestos containing materials which were installed before the ban came into effect.

Asbestos is both carcinogenic and toxic. The threshold limit for carcinogenic materials (0.1%) is lower than the threshold for toxic materials (3%). In practice, this means that any material containing more than 0.1% asbestos is classed as hazardous waste.

Therefore, the asbestos found in the Made Ground encountered in BH1/0.80, BH3/1.90, BH4/0.50m, TP3/0.20m, TPD/0.30m, TPE/0.50m, TPG/0.50m, TPH/1.00m, TPK/0.30m, TPK/0.50m and TPK/0.80m can be classed as **NON-HAZARDOUS** based on their asbestos quantification limits below the hazardous waste threshold of 0.1%.

Any waste containing cement bound asbestos material encountered in TPG 0.30 – 0.50m bgl may be Hazardous and will need separate stockpiling.

However, based on a risk phrase analysis of the remaining chemical laboratory test results from, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, 30No. samples of Made Ground were encountered on-site were classed as **NON-HAZARDOUS.** The remaining 20No. samples of Made Ground encountered were classed as **HAZARDOUS**. 4No. of these hazardous samples were classed as hazardous despite having lower asbestos quantifications (TPA/0.50m, TPB/0.80m, TPB/Composite and TPC/0.50m). The results of the assessment are given within Appendix H. A precis of the results can be seen below:

Summary of Testing in accordance with EC Hazardous Waste Directive				
Site No.	**Trial Hole Number**	**Depth (m bgl)**	**Waste Classification**	**WAC Test Results**
Site 1	TPI	0.50m	Non-Hazardous	**INERT Waste Landfill**
	TPI	0.80m	N/A	
	TPI	1.00m	Non-Hazardous	
	TPJ	0.30m	Non-Hazardous	
	TPJ	0.80m	Non-Hazardous	
	TPJ	1.00m	Non-Hazardous	
	TPJ	Composite	Non-Hazardous	
	TPK*	0.30m	Non-Hazardous*[1]	N/A
	TPK*	0.50m	Non-Hazardous*[1]	
	TPK*	0.80m	Non-Hazardous*[1]	
	TPL	0.30m	Non-Hazardous	**Stable Non-Reactive Hazardous*[2]**
	TPL	0.50m	Non-Hazardous	
	TP2	0.30m	N/A	**INERT Waste Landfill**
	TP3	0.20m	Non-Hazardous	N/A
	TP4	0.20m	N/A	**Stable Non-Reactive Hazardous*[2]**
	TP6	0.60m		
Site 2 and 6	TPG	0.30m	**Potentially Hazardous due to presence of cement bound asbestos**	**N/A**
	TPG	0.50m		
	TPG	0.80m	**HAZARDOUS**	
	TPG	1.00m	**HAZARDOUS**	
	TPG	1.20m	**HAZARDOUS**	
	TPG	Composite	**HAZARDOUS**	

Cont'd from previous page

Summary of Testing in accordance with EC Hazardous Waste Directive – Cont'd				
Site No.	**Trial Hole Number**	**Depth (m bgl)**	**Waste Classification**	**WAC Test Result**
Site 2 and 6 Cont'd	TPH	0.50m	**HAZARDOUS**	N/A
	TPH	1.00m	Non-Hazardous	
	TPH*	Composite	Non-Hazardous*[1]	
	BH4	0.50m	**HAZARDOUS**	
	BH4	0.80m	**N/A**	**Hazardous Waste Landfill*[3]**
	BH4	2.30m	**HAZARDOUS**	N/A
Site 3	TPF	0.30m	Non-Hazardous	N/A
	TPF	0.50m	**HAZARDOUS**	
	BH3	1.45m	**HAZARDOUS**	
	BH3	1.90m	**HAZARDOUS**	
Site 4	TPE	0.50m	Non-Hazardous	N/A
	TPE	0.80m	Non-Hazardous	
	TPE	1.00m	Non-Hazardous	
	TPE	Composite	Non-Hazardous	
	BH2	0.50m	**N/A**	**Stable Non-Reactive Hazardous*[2]**
	BH2	0.80m	**HAZARDOUS**	N/A
	BH2	3.50m	Non-Hazardous	
Site 5	TPA	0.50m	**HAZARDOUS**	N/A
	TPB	0.20m	Non-Hazardous	
	TPB	0.50m	**HAZARDOUS**	
	TPB	0.80m	**HAZARDOUS**	
	TPB	1.00m	Non-Hazardous	
	TPB	Composite	**HAZARDOUS**	
	TPC	0.50m	**HAZARDOUS**	
	TPC	1.00m	**HAZARDOUS**	
	TPC	Composite	**HAZARDOUS**	
	TPD	0.30m	Non-Hazardous*[1]	N/A
	BH1	0.20m	**N/A**	**Stable Non-Reactive Hazardous*[2]**
	BH1	0.80m	**HAZARDOUS**	N/A
Opposite Site 1	TPM	Composite	Non-Hazardous	N/A

*[1] Non-Hazardous material that includes asbestos fibres.
*[2] Stable Non-Reactive HAZARDOUS waste in a Non-Hazardous Landfill
*[3] Hazardous due to Loss on Ignition (LOI) of 14.90%.

It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM2, therefore producing an initial classification in accordance with the guidance, landfill operators have their own assessment tools and can often come to different conclusions. As a result, some landfill operators could refuse to take apparently suitable waste. It is recommended that the receiving landfill views the results of this assessment and the chemical laboratory results to determine their own classification.

The results of the WAC test can be seen in Appendix C.

Hazardous waste will require pre-treatment prior to disposal in order to reduce the waste classification. For example, any cement bound asbestos encountered in TPG 0.30/0.50m bgl may require handpicking. Consideration could be given to treatment of any heavy metals contaminated waste but given the limited space on site, this may not be practical.

Consideration could be given to the supervision of excavations by a Ground and Water Limited Engineer to allow.

Stockpiled contaminated Made Ground, destined for removal from site, must be placed on an impermeable liner with raised edge and must be covered at all times.

5.11 Imported Material

Any soil which is to be imported onto the site must undergo chemical analysis to prove that it is suitable for the purpose for which it is intended.

The Topsoil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, either prior to placing (ideally) or after placing, to ensure that the human receptor cannot come into contact with compounds that could be detrimental to human health. The compounds that are to be tested for are those given in the LQM CIEH Generic Assessment Criteria, which can be viewed in Appendix D of this report.

Additional verification of any imported soil will also need to occur onsite, once received, to validate the accompanying lab certificate. Any samples taken from a stockpile of imported soil or placed soil should be at a rate of one sample per 50m^3 of material and be tested for semi-metals, heavy metals, speciated PAH's and speciated TPH.

5.12 Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust were generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

The presence of loose Asbestos fibres/potential cement debris within the Made Ground will need to be take into account when producing Method Statement for construction and remedial works. Dampening down of excavation is likely to be required along with PP3 marks, gloves and overalls for all site operatives. Perimeter dust monitoring may be required.

APPENDIX A
Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to Kiln Place Sites, Camden, London NW5 4AN.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

APPENDIX B
Fieldwork Logs

Ground and Water Ltd

Trialpit No
TPA
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kiln Place	GWPR2317	Level: -	26/10/2017
Location: Camden		Dimensions: -	Scale 1:25
		Depth 0.70m	
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D					MADE GROUND: Brown clayey gravelly sand. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, angular to sub-rounded brick, cement, tile, concrete, glass and flint. Becomes more clayey with depth. Hydrocarbon odour noted ~0.50m bgl.
0.50	D					
			0.70			Trialpit Complete at 0.70 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd

Trialpit No
TPB
Sheet 1 of 1

Project Name Kiln Place	Project No. GWPR2317	Co-ords: - Level: -	Date 26/10/2017
Location: Camden		Dimensions: - Depth 1.20m	Scale 1:25
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.10			MADE GROUND: Concrete slab.
0.20	D					MADE GROUND: Brown gravelly sandy silt. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete, tile, glass and tarmac. Becomes more clayey with depth. Carbonaceous material appears ~0.80m bgl.
0.50	D					
0.80	D					
1.00	D					
			1.20			Trialpit Complete at 1.20 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPC** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.90m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.15			MADE GROUND: Tarmac
			0.25			MADE GROUND: Purple gravelly sub-base.
0.30	D					MADE GROUND: Yellow brown silty sandy clay. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete, flint, tarmac, tiles and glass. Rusted metal observed at ~0.30m bgl and carbonaceous material noted ~0.40m bgl. Becomes siltier and colour becomes darker with depth.
0.50	D					
0.80	D					
1.00	D					
			1.50			MADE GROUND: Dark brown gravelly sandy silt. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded flint, carbonaceous material, brick, tiles and metal fragments.
			1.90			Trialpit Complete at 1.90 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd

Trialpit No
TPD
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kiln Place	GWPR2317	Level: -	26/10/2017
Location: Camden		Dimensions: -	Scale 1:25
		Depth 0.50m	
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20			MADE GROUND: Yellow-brown gravelly sand. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, cement, flint, concrete and tile.
0.30	D					LONDON CLAY FORMATION: Grey brown gravelly CLAY. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.
0.50	D		0.50			Trialpit Complete at 0.50 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPE** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.60m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Concrete slab.
0.50	D		0.50			MADE GROUND: Sandy gravelly sub-base.
0.80	D					
1.00	D		0.90			MADE GROUND: Dark brown/grey clayey silty gravelly sand. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete and flint.
			1.60			Trialpit Complete at 1.60 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd

Trialpit No
TPF
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kiln Place	GWPR2317	Level: -	26/10/2017
Location: Camden		Dimensions: -	Scale 1:25
		Depth 0.50m	
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.40			MADE GROUND: Brown sandy gravel. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded concrete, rusted metal, brick and shale.
0.50	D		0.50			MADE GROUND: Dark brown gravelly silty clay. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete and flint.
						Trialpit Complete at 0.50 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPG** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.25m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.05			MADE GROUND: Turfing
0.30	D		0.30			MADE GROUND: Dark brown sandy gravelly very silty clay. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, flint, concrete and shales.
0.50	D		0.50			MADE GROUND: Concrete layer. Asbestos cement sheet noted.
0.80	D					MADE GROUND: Dark brown clayey sandy gravelly silt. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete and rusted metal. Carbonaceous material appears ~1.20m bgl.
1.00	D					
1.20	D		1.25			Trialpit Complete at 1.25 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd

Trialpit No
TPH
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kiln Place	GWPR2317	Level: -	26/10/2017
Location: Camden		Dimensions: -	Scale 1:25
		Depth 1.80m	
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.05			MADE GROUND: Turf
0.30	D					MADE GROUND: Dark brown sandy gravelly clayey silt. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete and plaster. Very large bricks noted at 0.50m bgl.
0.50	D					
0.80	D					
1.00	D		0.90			MADE GROUND: Dark brown/grey sandy silty gravelly clay. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, concrete and carbonaceous material.
			1.60			LONDON CLAY FORMATION: Dark grey gravelly silty CLAY. Gravel is rare, fine, sub-angular carbonaceous material.
			1.80			Trialpit Complete at 1.80 m

Remarks: Roots noted to 0.35m bgl.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPI** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.40m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D					MADE GROUND: Dark brown/grey gravelly sandy silty clay. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded concrete, brick, metal, cast iron and flint.
0.50	D					
0.80	D					
			1.30			LONDON CLAY FORMATION: Grey silty CLAY. Decayed tree roots noted at 1.40m bgl.
			1.40			Trialpit Complete at 1.40 m

Remarks: Roots noted to 0.45m bgl.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPJ** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.30m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.05			MADE GROUND: Turf
0.30	D					MADE GROUND: Dark brown/grey gravelly clayey silty sand. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded concrete, plastic, brick and flint.
0.50	D		0.55			LONDON CLAY FORMATION: Brown-grey CLAY.
0.80	D					
1.00	D					
			1.30			Trialpit Complete at 1.30 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPK** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth 1.10m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.05			MADE GROUND: Turf
0.30	D					MADE GROUND: Dark brown/brown gravelly very sandy very silty clay. Sand is fine to coarse grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded brick, tarmac, coal fragments, tile and metal. Becomes siltier ~0.80m bgl.
0.50	D					
0.80	D					
1.00	D					
			1.10			Trialpit Complete at 1.10 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

Ground and Water Ltd

Trialpit No
TPL
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kiln Place	GWPR2317	Level: -	26/10/2017
Location: Camden		Dimensions: -	Scale 1:25
		Depth 1.00m	
Client: Neilcott Construction			Logged By HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.40			MADE GROUND: Concrete slab
0.50	D		0.80			MADE GROUND: Brown sandy silty gravelly clay. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded concrete, flint and brick.
			1.00			LONDON CLAY FORMATION: Brown-grey CLAY.
						Trialpit Complete at 1.00 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

Ground and Water Ltd			Trialpit No **TPM** Sheet 1 of 1
Project Name: Kiln Place	Project No.: GWPR2317	Co-ords: - Level: -	Date: 26/10/2017
Location: Camden		Dimensions: - Depth: 0.70m	Scale: 1:25
Client: Neilcott Construction			Logged By: HB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.15			MADE GROUND: Brick paving.
			0.20			MADE GROUND: Yellow sand sub-base.
0.30	D					MADE GROUND: Gravelly sand sub-base.
0.50	D		0.50			LONDON CLAY FORMATION: Grey-brown CLAY.
			0.70			Trialpit Complete at 0.70 m

Remarks: No roots noted.

Groundwater: No groundwater encountered.

AGS

APPENDIX C
Chemical Laboratory Test Results

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-60827

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2111
Order No:	None Supplied
Sample Receipt Date:	29/06/2017
Sample Scheduled Date:	29/06/2017
Report Issue Number:	1
Reporting Date:	05/07/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 17-60827	**Date Sampled**	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	BH1	BH2	BH2	BH3	BH3
Project / Job Ref: GWPR2111	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	0.80	3.50	1.45	1.90
Reporting Date: 05/07/2017	**QTSE Sample No**	276656	276658	276659	276660	276661

Determinand	**Unit**	**RL**	**Accreditation**	(n)				(n)	(n)
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Detected	Not Detected	Not Detected	Not Detected	Detected
Sample Matrix (S)	Material Type	N/a	NONE	Fibre bundles present				Chrysotile present as microscopic loose fibrous asbestos debris
Asbestos Type (S)	PLM Result	N/a	**ISO17025**	Amosite				Chrysotile
pH	pH Units	N/a	**MCERTS**	8.2	7.5	7.9	8.1	7.8
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	375	53	285	1820	1810
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.38	0.05	0.28	1.82	1.81
Organic Matter	%	< 0.1	**MCERTS**	7.3	8	4.7	5.1	6
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**	4.2	4.6	2.7	3	3.5
Arsenic (As)	mg/kg	< 2	**MCERTS**	80	35	15	31	108
W/S Boron	mg/kg	< 1	NONE	< 1	1.3	< 1	< 1	2.4
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	4.8	6.8	0.2	1.1	5.4
Chromium (Cr)	mg/kg	< 2	**MCERTS**	95	28	24	23	53
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**	312	1200	67	111	315
Lead (Pb)	mg/kg	< 3	**MCERTS**	13700	2050	276	3040	6700
Mercury (Hg)	mg/kg	< 1	NONE	16.3	3.2	< 1	1	6.6
Nickel (Ni)	mg/kg	< 3	**MCERTS**	47	149	20	19	80
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	54	55	61	52	54
Zinc (Zn)	mg/kg	< 3	**MCERTS**	4600	3940	232	2710	3660
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate								
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	TP / BH No	BH3	BH4	BH4	BH4	TP3
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	4.30	0.50	2.30	4.50	0.20
Reporting Date: 05/07/2017	QTSE Sample No	276662	276663	276665	276666	276669

Determinand	Unit	RL	Accreditation			(n)	(n)	(n)	
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Detected	Not Detected	Not Detected	Detected
Sample Matrix (S)	Material Type	N/a	NONE		Fibre bundle present			Chrysotile and Amosite present as fibre bundles
Asbestos Type (S)	PLM Result	N/a	ISO17025		Chrysotile			Chrysotile Amosite
pH	pH Units	N/a	MCERTS	8.0	8.0	10.5	7.9	8.0
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	523	1780	1390	1890	315
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.52	1.78	1.39	1.88	0.31
Organic Matter	%	< 0.1	MCERTS	8	3.2	2.7	4.9	4.3
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	4.7	1.8	1.6	2.8	2.5
Arsenic (As)	mg/kg	< 2	MCERTS	21	17	18	21	22
W/S Boron	mg/kg	< 1	NONE	3.7	1	< 1	3.9	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1.5	1.1	0.8	0.8	0.8
Chromium (Cr)	mg/kg	< 2	MCERTS	30	26	25	27	27
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	71	67	65	82	77
Lead (Pb)	mg/kg	< 3	MCERTS	1460	1130	4060	841	829
Mercury (Hg)	mg/kg	< 1	NONE	1.8	1.2	< 1	1.6	1.3
Nickel (Ni)	mg/kg	< 3	MCERTS	24	19	26	20	20
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	48	40	25	46	46
Zinc (Zn)	mg/kg	< 3	MCERTS	1030	4850	764	588	597
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-60827	**Date Sampled**	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	BH1	BH2	BH2	BH3	BH3
Project / Job Ref: GWPR2111	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	0.80	3.50	1.45	1.90
Reporting Date: 05/07/2017	**QTSE Sample No**	276656	276658	276659	276660	276661

Determinand	**Unit**	**RL**	**Accreditation**	(n)			(n)	(n)
Naphthalene	mg/kg	< 0.1	**MCERTS**	0.16	0.17	< 0.1	< 0.1	0.28
Acenaphthylene	mg/kg	< 0.1	**MCERTS**	0.12	0.13	< 0.1	< 0.1	0.22
Acenaphthene	mg/kg	< 0.1	**MCERTS**	0.21	0.28	< 0.1	< 0.1	1.35
Fluorene	mg/kg	< 0.1	**MCERTS**	0.18	0.40	< 0.1	< 0.1	0.64
Phenanthrene	mg/kg	< 0.1	**MCERTS**	4.67	7.94	1.10	0.27	10.70
Anthracene	mg/kg	< 0.1	**MCERTS**	0.72	0.65	< 0.1	< 0.1	1.98
Fluoranthene	mg/kg	< 0.1	**MCERTS**	12.10	10.40	1.12	0.48	24.40
Pyrene	mg/kg	< 0.1	**MCERTS**	11.10	8.86	0.95	0.43	20.60
Benzo(a)anthracene	mg/kg	< 0.1	**MCERTS**	4.86	3.62	0.33	0.23	8.68
Chrysene	mg/kg	< 0.1	**MCERTS**	6.02	4.56	0.44	0.24	11.20
Benzo(b)fluoranthene	mg/kg	< 0.1	**MCERTS**	5.92	5.25	0.51	0.37	9.55
Benzo(k)fluoranthene	mg/kg	< 0.1	**MCERTS**	2.50	1.86	0.19	0.13	3.80
Benzo(a)pyrene	mg/kg	< 0.1	**MCERTS**	3.91	3.75	0.31	0.26	6.09
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	**MCERTS**	3.61	2.25	0.20	0.21	4.04
Dibenz(a,h)anthracene	mg/kg	< 0.1	**MCERTS**	0.41	0.31	< 0.1	< 0.1	0.60
Benzo(ghi)perylene	mg/kg	< 0.1	**MCERTS**	3.16	1.97	0.19	0.26	3.31
Total EPA-16 PAHs	mg/kg	< 1.6	**MCERTS**	59.7	52.4	5.3	2.9	107

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	TP / BH No	BH3	BH4	BH4	BH4	TP3
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	4.30	0.50	2.30	4.50	0.20
Reporting Date: 05/07/2017	QTSE Sample No	276662	276663	276665	276666	276669

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Naphthalene	mg/kg	< 0.1	MCERTS	2.69	< 0.1	< 0.1	0.59	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	2.45	< 0.1	< 0.1	1.94	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	1.93	< 0.1	< 0.1	1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	11.80	1.39	0.22	2.33	0.77
Anthracene	mg/kg	< 0.1	MCERTS	1.43	0.24	< 0.1	0.28	0.15
Fluoranthene	mg/kg	< 0.1	MCERTS	11.60	2.59	0.51	2.34	2.09
Pyrene	mg/kg	< 0.1	MCERTS	9	2.18	0.44	1.83	1.86
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	3.55	0.94	0.20	0.59	1
Chrysene	mg/kg	< 0.1	MCERTS	3.36	1.06	0.25	0.65	1.06
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	3.05	1.24	0.28	0.58	1.43
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.18	0.40	0.13	0.23	0.48
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	2.37	0.90	0.20	0.41	1.10
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.09	0.56	0.14	0.20	0.75
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.90	0.50	0.14	0.19	0.68
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	56.6	12	2.5	13.2	11.4

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	TP / BH No	BH1	BH2	BH2	BH3	BH3
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.80	0.80	3.50	1.45	1.90
Reporting Date: 05/07/2017	QTSE Sample No	276656	276658	276659	276660	276661

Determinand	Unit	RL	Accreditation					
				(n)			(n)	(n)
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	6	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	90	< 10	< 10	< 10	26
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	96	< 21	< 21	< 21	26
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	3	3	< 2	< 2	10
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	58	54	< 3	< 3	93
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	258	162	< 10	< 10	248
Aromatic (C5 - C35)	mg/kg	< 21	NONE	319	219	< 21	< 21	351
Total >C5 - C35	mg/kg	< 42	NONE	415	219	< 42	< 42	377

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kiln Place, Camden	TP / BH No	BH3	BH4	BH4	BH4	TP3	
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	4.30	0.50	2.30	4.50	0.20	
Reporting Date: 05/07/2017	QTSE Sample No	276662	276663	276665	276666	276669	

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	10	< 2	< 2	7	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	52	7	< 3	13	6
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	44	11	< 10	< 10	17
Aromatic (C5 - C35)	mg/kg	< 21	NONE	106	< 21	< 21	< 21	22
Total >C5 - C35	mg/kg	< 42	NONE	106	< 42	< 42	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - BTEX / MTBE							
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	TP / BH No	BH1	BH2	BH2	BH3	BH3
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.80	0.80	3.50	1.45	1.90
Reporting Date: 05/07/2017	QTSE Sample No	276656	276658	276659	276660	276661

Determinand	Unit	RL	Accreditation					
				(n)			(n)	(n)
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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4480

Soil Analysis Certificate - BTEX / MTBE								
QTS Environmental Report No: 17-60827	Date Sampled	20/06/17	20/06/17	20/06/17	20/06/17	20/06/17
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	TP / BH No	BH3	BH4	BH4	BH4	TP3
Project / Job Ref: GWPR2111	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	4.30	0.50	2.30	4.50	0.20
Reporting Date: 05/07/2017	QTSE Sample No	276662	276663	276665	276666	276669

Determinand	Unit	RL	Accreditation			(n)	(n)	(n)	
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17			**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	BH1					
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.20					
Reporting Date: 05/07/2017		**QTSE Sample No**	276655					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	2			3%	5%	6%
Loss on Ignition	%	< 0.01	4.20			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	10.4			100	--	--
pH[MU]	pH Units	N/a	8.2			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.6			--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**	
Arsenic[U]			0.02	0.02		< 0.2	0.5	2	25
Barium[U]			0.03	< 0.02		0.2	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			0.035	0.015		< 0.20	0.5	10	70
Copper[U]			0.04	0.02		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.008	0.004		< 0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			0.035	0.036		0.4	0.5	10	50
Antimony[U]			0.011	0.007		0.07	**0.06**	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.019	0.015		< 0.2	4	50	200
Chloride[U]			6	5		50	800	15000	25000
Fluoride[U]			0.6	< 0.5		< 1	10	150	500
Sulphate[U]			92	25		328	1000	20000	50000
TDS			197	128		1364	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			13.4	12.9		129	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.19						
Dry Matter (%)			93.4						
Moisture (%)			7						
Stage 1									
Volume Eluate L2 (litres)			0.34						
Filtered Eluate VE1 (litres)			0.21						

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17				**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	BH2						
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied						
Order No: None Supplied		**Depth (m)**	0.50						
Reporting Date: 05/07/2017		**QTSE Sample No**	276657						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	1.7				3%	5%	6%
Loss on Ignition	%	< 0.01	5.20				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	5				100	--	--
pH[MU]	pH Units	N/a	7.9				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.4				--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]			0.05	0.07		0.7	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]			< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.018	0.010		0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			< 0.005	0.016		< 0.2	0.5	10	50
Antimony[U]			0.038	0.035		0.35	**0.06**	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.032	0.029		0.3	4	50	200
Chloride[U]			10	4		43	800	15000	25000
Fluoride[U]			1.1	1.1		11	**10**	150	500
Sulphate[U]			37	16		180	1000	20000	50000
TDS			207	112		1212	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			6.4	6.2		62.1	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.22						
Dry Matter (%)			79.5						
Moisture (%)			25.8						
Stage 1									
Volume Eluate L2 (litres)			0.31						
Filtered Eluate VE1 (litres)			0.17						

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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17			**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	BH4					
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.80					
Reporting Date: 05/07/2017		**QTSE Sample No**	276664					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	2.2			3%	5%	6%
Loss on Ignition	%	< 0.01	14.90			--	--	**10%**
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	8.0			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.2			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.05	0.05		0.5	20	100	300
Cadmium[U]	0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.006	0.002		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.008	< 0.005		< 0.06	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	0.122	0.041		0.5	4	50	200
Chloride[U]	10	4		39	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	1579	1611		16093	**1000**	20000	50000
TDS	1840	1640		16525	**4000**	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	5.1	3.2		33.4	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.22						
Dry Matter (%)	81						
Moisture (%)	23.4						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.11						

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17				**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TP2						
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied						
Order No: None Supplied		**Depth (m)**	0.30						
Reporting Date: 05/07/2017		**QTSE Sample No**	276667						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	1.9				3%	5%	6%
Loss on Ignition	%	< 0.01	4.40				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	12				500	--	--
Total PAH[MU]	mg/kg	< 1.7	15.4				100	--	--
pH[MU]	pH Units	N/a	8.1				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2.5				--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]			0.03	0.04		0.4	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]			0.02	< 0.01		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.015	0.008		< 0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]			0.008	0.006		< 0.06	0.06	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.007	< 0.005		< 0.2	4	50	200
Chloride[U]			20	4		60	800	15000	25000
Fluoride[U]			< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]			32	13		148	1000	20000	50000
TDS			187	112		1207	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			14.4	6.9		77.4	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.19						
Dry Matter (%)			94.6						
Moisture (%)			5.8						
Stage 1									
Volume Eluate L2 (litres)			0.34						
Filtered Eluate VE1 (litres)			0.20						

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17			**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TP4					
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.20					
Reporting Date: 05/07/2017		**QTSE Sample No**	276668					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	2			3%	5%	6%
Loss on Ignition	%	< 0.01	3.92			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	8.5			100	--	--
pH[MU]	pH Units	N/a	8.0			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.9			--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**	
Arsenic[U]			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]			0.04	0.03		0.3	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]			0.04	0.02		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.024	0.009		0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			0.023	0.026		0.3	0.5	10	50
Antimony[U]			0.012	0.006		0.07	**0.06**	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.020	0.016		< 0.2	4	50	200
Chloride[U]			6	3		36	800	15000	25000
Fluoride[U]			0.6	< 0.5		< 1	10	150	500
Sulphate[U]			15	7		75	1000	20000	50000
TDS			140	92		978	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			13.5	7.3		80.6	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.18						
Dry Matter (%)			96						
Moisture (%)			4.2						
Stage 1									
Volume Eluate L2 (litres)			0.34						
Filtered Eluate VE1 (litres)			0.21						

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QTS Environmental Report No: 17-60827		**Date Sampled**	20/06/17			**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TP6					
Project / Job Ref: GWPR2111		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.40					
Reporting Date: 05/07/2017		**QTSE Sample No**	276670					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	2.6			3%	5%	6%
Loss on Ignition	%	< 0.01	4.60			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	7.7			100	--	--
pH[MU]	pH Units	N/a	8.1			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2.5			--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**	
Arsenic[U]			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]			0.03	0.03		0.3	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]			0.02	0.01		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.013	0.006		< 0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]			0.008	0.008		0.08	**0.06**	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.010	< 0.005		< 0.2	4	50	200
Chloride[U]			10	4		42	800	15000	25000
Fluoride[U]			0.6	< 0.5		< 1	10	150	500
Sulphate[U]			22	6		79	1000	20000	50000
TDS			175	116		1216	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			11.1	6.9		72.7	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.18						
Dry Matter (%)			94.7						
Moisture (%)			5.6						
Stage 1									
Volume Eluate L2 (litres)			0.34						
Filtered Eluate VE1 (litres)			0.17						

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-60827	
Ground & Water Ltd	
Site Reference: Kiln Place, Camden	
Project / Job Ref: GWPR2111	
Order No: None Supplied	
Reporting Date: 05/07/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
276655	BH1	None Supplied	0.20	6.6	Brown sandy clay with brick and concrete
276656	BH1	None Supplied	0.80	10.7	Black sandy clay with stones and glass
276657	BH2	None Supplied	0.50	20.5	Light brown sandy clay with brick
276658	BH2	None Supplied	0.80	18.2	Black sandy clay with brick and glass
276659	BH2	None Supplied	3.50	19.1	Brown sandy clay with brick
276660	BH3	None Supplied	1.45	16.2	Black sandy clay with coal and metal
276661	BH3	None Supplied	1.90	13.5	Black sandy clay with coal
276662	BH3	None Supplied	4.30	24.5	Black clay with vegetation
276663	BH4	None Supplied	0.50	12	Brown sandy clay with brick and chalk
276664	BH4	None Supplied	0.80	19	Light grey sandy clay with chalk
276665	BH4	None Supplied	2.30	13	Brown sandy clay with chalk and brick
276666	BH4	None Supplied	4.50	20.2	Black clay
276667	TP2	None Supplied	0.30	5.4	Brown sandy clay with stones
276668	TP4	None Supplied	0.20	4	Brown sandy clay with stones and brick
276669	TP3	None Supplied	0.20	9.1	Brown sandy clay with stones and brick
276670	TP6	None Supplied	0.40	5.2	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-60827
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2111
Order No: None Supplied
Reporting Date: 05/07/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
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Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
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Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
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Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-61171

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2111
Order No:	None Supplied
Sample Receipt Date:	29/06/2017
Sample Scheduled Date:	06/07/2017
Report Issue Number:	1
Reporting Date:	11/07/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING
4480

Soil Analysis Certificate						
QTS Environmental Report No: 17-61171	**Date Sampled**	20/06/17	20/06/17	20/06/17	20/06/17	
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kiln Place, Camden	**TP / BH No**	BH1	BH3	BH4	TP3	
Project / Job Ref: GWPR2111	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	**Depth (m)**	0.80	1.90	0.50	0.20	
Reporting Date: 11/07/2017	**QTSE Sample No**	277940	277941	277942	277943	

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	0.002	0.011	0.002	0.003	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-61171
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2111
Order No: None Supplied
Reporting Date: 11/07/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
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Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
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Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
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Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-64917

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2111
Order No:	None Supplied
Sample Receipt Date:	29/09/2017
Sample Scheduled Date:	29/09/2017
Report Issue Number:	1
Reporting Date:	05/10/2017

Authorised by:

Russell Jarvis
Associate Director of Client Services

Authorised by:

Dave Ashworth
Deputy Quality Manager

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-64917	**Date Sampled**	20/06/17
Ground & Water Ltd	**Time Sampled**	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TP1
Project / Job Ref: GWPR2111	**Additional Refs**	None Supplied
Order No: None Supplied	**Depth (m)**	0.30
Reporting Date: 05/10/2017	**QTSE Sample No**	293112

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	1.2	3%	5%	6%
Loss on Ignition	%	< 0.01	5	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	2.8	100	--	--
pH[MU]	pH Units	N/a	8.2	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.4	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	0.001			0.01	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	0.039			0.39	0.5	10	50
Antimony[U]	0.008			0.08	**0.06**	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	< 0.005			< 0.05	4	50	200
Chloride[U]	2			20	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	5			48	1000	20000	50000
TDS	76			760	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	18.9			189	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.10						
Dry Matter (%)	91.1						
Moisture (%)	9.8						
Stage 1							
Volume Eluate L10 (litres)	0.89						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-64917	
Ground & Water Ltd	
Site Reference: Kiln Place, Camden	
Project / Job Ref: GWPR2111	
Order No: None Supplied	
Reporting Date: 05/10/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 293112	TP1	None Supplied	0.30	14.3	Brown sandy clay with stones and brick

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

$ samples exceeded recommended holding times

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-64917
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2111
Order No: None Supplied
Reporting Date: 05/10/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
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Ground & Water Ltd
2 The Long Barn
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Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-66407

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2317
Order No:	None Supplied
Sample Receipt Date:	01/11/2017
Sample Scheduled Date:	01/11/2017
Report Issue Number:	2
Reporting Date:	23/11/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
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Lenham Heath
Maidstone
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Tel : 01622 850410

4480

Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPC	TPE	TPG	TPH
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite	Composite	Composite	Composite
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 23/11/2017	**QTSE Sample No**	299073	299074	299075	299076	299077

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE	Fibre bundles in soil				
Asbestos Type (S)	PLM Result	N/a	**ISO17025**	Chrysotile				
pH	pH Units	N/a	**MCERTS**	8.4	7.8	8.1	7.9	8.3
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	115	420	688	1610	300
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.12	0.42	0.69	1.61	0.30
Organic Matter	%	< 0.1	**MCERTS**	2.9	9	2	2.1	2.2
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**	1.7	5.2	1.1	1.2	1.3
Arsenic (As)	mg/kg	< 2	**MCERTS**	42	115	33	21	23
W/S Boron	mg/kg	< 1	NONE	< 1	2.1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	1.3	3.8	1.1	1	1.2
Chromium (Cr)	mg/kg	< 2	**MCERTS**	48	37	28	25	31
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**	248	369	133	96	156
Lead (Pb)	mg/kg	< 3	**MCERTS**	1670	1460	909	1760	971
Mercury (Hg)	mg/kg	< 1	NONE	1.2	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	48	76	27	22	29
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	57	92	55	41	51
Zinc (Zn)	mg/kg	< 3	**MCERTS**	920	2280	452	932	690
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPJ	TPM	TPA	TPB	TPB
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	0.50	0.20	0.50
Reporting Date: 23/11/2017	**QTSE Sample No**	299078	299079	299080	299081	299082

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE			Fibre bundles in soil		
Asbestos Type (S)	PLM Result	N/a	**ISO17025**			Amosite		
pH	pH Units	N/a	**MCERTS**	8.7	8.8			
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	165	231			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.17	0.23			
Organic Matter	%	< 0.1	**MCERTS**	1.1	0.7			
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**	0.6	0.4			
Arsenic (As)	mg/kg	< 2	**MCERTS**	10	11	36	29	30
W/S Boron	mg/kg	< 1	NONE	< 1	1	1.1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	0.4	0.2	1.4	1	1.3
Chromium (Cr)	mg/kg	< 2	**MCERTS**	13	30	29	27	34
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	**MCERTS**	26	34	348	171	758
Lead (Pb)	mg/kg	< 3	**MCERTS**	123	113	1880	1230	2030
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	1.3	1.3	1.2
Nickel (Ni)	mg/kg	< 3	**MCERTS**	11	28	34	30	34
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	24	55			
Zinc (Zn)	mg/kg	< 3	**MCERTS**	175	174	1200	670	1030
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

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Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPB	TPC	TPC	TPD
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	1.00	0.50	1.00	0.30
Reporting Date: 23/11/2017	**QTSE Sample No**	299083	299084	299085	299086	299087

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Detected	Not Detected	Detected	Not Detected	Detected
Sample Matrix (S)	Material Type	N/a	NONE	Fibre bundles in soil		Fibre bundles in soil		Fibre bundles in soil
Asbestos Type (S)	PLM Result	N/a	ISO17025	Amosite		Amosite		Amosite
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS					
Organic Matter	%	< 0.1	MCERTS					
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	53	35	37	37	19
W/S Boron	mg/kg	< 1	NONE	1.4	< 1	3.2	1.8	2.6
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1.6	1.2	1.3	1.9	0.6
Chromium (Cr)	mg/kg	< 2	MCERTS	35	31	33	26	26
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS	657	220	96	129	99
Lead (Pb)	mg/kg	< 3	MCERTS	2330	1150	28200	10600	2710
Mercury (Hg)	mg/kg	< 1	NONE	1.6	< 1	< 1	1.2	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	50	54	32	28	24
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS	962	815	11700	1980	606
Total Phenols (monohydric)	mg/kg	< 2	NONE					

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Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPE	TPE	TPE	TPF	TPF
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	0.80	1.00	0.30	0.50
Reporting Date: 23/11/2017	**QTSE Sample No**	299088	299089	299090	299091	299092

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE	Fibre bundles in soil				
Asbestos Type (S)	PLM Result	N/a	ISO17025	Chrysotile				
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS					
Organic Matter	%	< 0.1	MCERTS					
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	40	34	17	22	25
W/S Boron	mg/kg	< 1	NONE	2.1	1.1	< 1	1	1.2
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1	0.9	0.3	0.8	1
Chromium (Cr)	mg/kg	< 2	MCERTS	65	32	20	17	19
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS	147	114	34	301	536
Lead (Pb)	mg/kg	< 3	MCERTS	1090	1960	302	1140	2750
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	1.9
Nickel (Ni)	mg/kg	< 3	MCERTS	39	30	18	16	16
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS	512	446	131	598	1020
Total Phenols (monohydric)	mg/kg	< 2	NONE					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPG	TPG	TPG	TPG	TPG
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.30	0.50	0.80	1.00	1.20
Reporting Date: 23/11/2017	**QTSE Sample No**	299093	299094	299095	299096	299097

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE		Fibre bundles in soil			
Asbestos Type (S)	PLM Result	N/a	**ISO17025**		Chrysotile			
pH	pH Units	N/a	**MCERTS**					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**					
Organic Matter	%	< 0.1	**MCERTS**					
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**					
Arsenic (As)	mg/kg	< 2	**MCERTS**	19	19	34	23	25
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	0.7	1.1	4	3.1	1.2
Chromium (Cr)	mg/kg	< 2	**MCERTS**	22	23	27	19	25
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	**MCERTS**	70	119	119	71	254
Lead (Pb)	mg/kg	< 3	**MCERTS**	483	1250	3140	1020	3680
Mercury (Hg)	mg/kg	< 1	NONE	1.1	< 1	< 1	1.5	2.7
Nickel (Ni)	mg/kg	< 3	**MCERTS**	20	15	33	24	20
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	**MCERTS**	302	770	10800	5590	2390
Total Phenols (monohydric)	mg/kg	< 2	NONE					

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Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPH	TPH	TPI	TPI	TPJ
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	1.00	0.50	1.00	0.30
Reporting Date: 23/11/2017	**QTSE Sample No**	299098	299099	299100	299101	299102

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE		Fibre bundles in soil			
Asbestos Type (S)	PLM Result	N/a	**ISO17025**		Amosite			
pH	pH Units	N/a	**MCERTS**					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**					
Organic Matter	%	< 0.1	**MCERTS**					
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**					
Arsenic (As)	mg/kg	< 2	**MCERTS**	19	16	15	7	14
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	1.1	1.4	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	1.1	0.9	0.6	< 0.2	0.6
Chromium (Cr)	mg/kg	< 2	**MCERTS**	28	36	36	37	20
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	**MCERTS**	400	321	262	107	327
Lead (Pb)	mg/kg	< 3	**MCERTS**	3080	524	477	93	252
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	22	33	35	35	19
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	**MCERTS**	732	894	454	172	280
Total Phenols (monohydric)	mg/kg	< 2	NONE					

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Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPJ	TPJ	TPK	TPK	TPK
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	1.00	0.30	0.50	0.80
Reporting Date: 23/11/2017	**QTSE Sample No**	299103	299104	299105	299106	299107

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Detected	Detected	Detected
Sample Matrix (S)	Material Type	N/a	NONE			Small fibre bundles in soil	Small fibre bundles in soil	Small fibre bundles in soil
Asbestos Type (S)	PLM Result	N/a	**ISO17025**			Chrysotile	Chrysotile	Chrysotile
pH	pH Units	N/a	**MCERTS**					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**					
Organic Matter	%	< 0.1	**MCERTS**					
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**					
Arsenic (As)	mg/kg	< 2	**MCERTS**	6	8	17	16	17
W/S Boron	mg/kg	< 1	NONE	< 1	1.8	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2	1.7	1.3	0.8
Chromium (Cr)	mg/kg	< 2	**MCERTS**	24	36	24	21	19
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	**MCERTS**	159	48	70	65	156
Lead (Pb)	mg/kg	< 3	**MCERTS**	109	36	545	609	476
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	1.3	1.2	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	21	32	25	20	19
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	**MCERTS**	122	100	288	317	239
Total Phenols (monohydric)	mg/kg	< 2	NONE					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17			
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Kiln Place, Camden	**TP / BH No**	TPL	TPL			
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.30	0.50			
Reporting Date: 23/11/2017	**QTSE Sample No**	299108	299109			

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected			
Sample Matrix (S)	Material Type	N/a	NONE					
Asbestos Type (S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS					
Organic Matter	%	< 0.1	MCERTS					
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	10	9			
W/S Boron	mg/kg	< 1	NONE	2.9	3			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	35	36			
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS	20	22			
Lead (Pb)	mg/kg	< 3	MCERTS	45	29			
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	27	34			
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS	79	77			
Total Phenols (monohydric)	mg/kg	< 2	NONE					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPC	TPE	TPG	TPH
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite	Composite	Composite	Composite
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 23/11/2017	**QTSE Sample No**	299073	299074	299075	299076	299077

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.27	< 0.1	< 0.1	0.13
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	0.24	< 0.1	< 0.1	< 0.1	0.13
Fluorene	mg/kg	< 0.1	MCERTS	0.22	< 0.1	< 0.1	< 0.1	0.13
Phenanthrene	mg/kg	< 0.1	MCERTS	3.83	1.43	1.32	0.98	2.28
Anthracene	mg/kg	< 0.1	MCERTS	0.60	0.20	0.26	0.18	0.51
Fluoranthene	mg/kg	< 0.1	MCERTS	5.09	2.30	3.19	2.11	5.50
Pyrene	mg/kg	< 0.1	MCERTS	3.99	1.94	2.82	1.85	4.62
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.60	0.95	1.62	1.11	2.62
Chrysene	mg/kg	< 0.1	MCERTS	1.74	1.05	1.57	1.11	2.47
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.79	1.25	2.06	1.50	2.87
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.64	0.42	0.72	0.51	0.95
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.29	0.87	1.52	1.14	2.12
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.68	0.53	0.89	0.74	1.14
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	0.17	0.12	0.24
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.63	0.48	0.79	0.74	1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	22.5	11.7	16.9	12.1	26.7

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17			
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Kiln Place, Camden	**TP / BH No**	TPJ	TPM			
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite			
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied			
Reporting Date: 23/11/2017	**QTSE Sample No**	299078	299079			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	0.20	0.15			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	0.44	0.38			
Pyrene	mg/kg	< 0.1	MCERTS	0.38	0.35			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.23	0.22			
Chrysene	mg/kg	< 0.1	MCERTS	0.23	0.21			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.32	0.28			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.23	0.21			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.15	0.14			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.15	0.14			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.3	2.1			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPE	TPG	TPJ	
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite	Composite	Composite	
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 23/11/2017	**QTSE Sample No**	299073	299075	299076	299078	

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	9	5	5	< 3	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	28	21	16	< 10	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	36	27	21	< 21	
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 17-66407	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPE	TPG	TPJ	
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	Composite	Composite	Composite	
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 23/11/2017	**QTSE Sample No**	299073	299075	299076	299078	

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-66407	
Ground & Water Ltd	
Site Reference: Kiln Place, Camden	
Project / Job Ref: GWPR2317	
Order No: None Supplied	
Reporting Date: 23/11/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
299073	TPB	Composite	None Supplied	21.6	Brown sandy clay with stones
299074	TPC	Composite	None Supplied	20.9	Brown sandy clay with stones and concrete
299075	TPE	Composite	None Supplied	17.9	Brown sandy clay with brick
299076	TPG	Composite	None Supplied	13.2	Brown sandy clay with brick and concrete
299077	TPH	Composite	None Supplied	15.7	Brown sandy clay with brick and concrete
299078	TPJ	Composite	None Supplied	13.6	Brown sandy clay with brick and concrete
299079	TPM	Composite	None Supplied	19.1	Brown clay with stones
299080	TPA	None Supplied	0.50	11.9	Brown sandy clay with brick and rubble
299081	TPB	None Supplied	0.20	18.8	Brown sandy clay with brick and concrete
299082	TPB	None Supplied	0.50	17.4	Brown sandy clay with brick and concrete
299083	TPB	None Supplied	0.80	15.9	Brown sandy clay with brick and concrete
299084	TPB	None Supplied	1.00	13.9	Brown sandy clay with brick and concrete
299085	TPC	None Supplied	0.50	15.9	Brown sandy clay with brick and concrete
299086	TPC	None Supplied	1.00	14	Brown sandy clay with brick and concrete
299087	TPD	None Supplied	0.30	20.1	Brown sandy clay with brick and concrete
299088	TPE	None Supplied	0.50	20.8	Brown sandy clay with brick and concrete
299089	TPE	None Supplied	0.80	16.3	Brown sandy clay with brick and concrete
299090	TPE	None Supplied	1.00	15.4	Brown sandy clay with brick and concrete
299091	TPF	None Supplied	0.30	18.5	Brown sandy clay with brick and concrete
299092	TPF	None Supplied	0.50	8.9	Brown sandy clay with brick and concrete
299093	TPG	None Supplied	0.30	11.4	Brown sandy clay with stones
299094	TPG	None Supplied	0.50	12.5	Brown sandy clay with stones and concrete
299095	TPG	None Supplied	0.80	13.3	Brown sandy clay with stones and brick
299096	TPG	None Supplied	1.00	10.7	Brown sandy clay with stones and concrete
299097	TPG	None Supplied	1.20	15.2	Brown sandy clay with stones and concrete
299098	TPH	None Supplied	0.50	12.6	Brown sandy clay with brick and concrete
299099	TPH	None Supplied	1.00	18.9	Brown sandy clay with brick
299100	TPI	None Supplied	0.50	18.6	Brown sandy clay with brick
299101	TPI	None Supplied	1.00	19	Brown clay
299102	TPJ	None Supplied	0.30	11.3	Brown sandy clay with stones
299103	TPJ	None Supplied	0.80	16	Brown sandy clay with stones
299104	TPJ	None Supplied	1.00	17.2	Brown clay
299105	TPK	None Supplied	0.30	9.6	Brown sandy clay with stones and concrete
299106	TPK	None Supplied	0.50	8.8	Brown sandy clay with stones and concrete
299107	TPK	None Supplied	0.80	6.7	Brown sandy clay with stones
299108	TPL	None Supplied	0.30	16.6	Brown sandy clay
299109	TPL	None Supplied	0.50	15	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-66407
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2317
Order No: None Supplied
Reporting Date: 23/11/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-66747

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2317
Order No:	None Supplied
Sample Receipt Date:	08/11/2017
Sample Scheduled Date:	08/11/2017
Report Issue Number:	2
Reporting Date:	23/11/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING
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Soil Analysis Certificate						
QTS Environmental Report No: 17-66747	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPB	TPA	TPB	TPC	TPD
Project / Job Ref: GWPR2317	**Additional Refs**	Composite	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	None Supplied	0.50	0.80	0.50	0.30
Reporting Date: 23/11/2017	**QTSE Sample No**	300593	300594	300595	300596	300597

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001	< 0.001	0.003	< 0.001	0.001

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING
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Soil Analysis Certificate						
QTS Environmental Report No: 17-66747	**Date Sampled**	26/10/17	26/10/17	26/10/17	26/10/17	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TPE	TPG	TPH	TPK	TPK
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	0.50	1.00	0.30	0.50
Reporting Date: 23/11/2017	**QTSE Sample No**	300598	300599	300600	300601	300602

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001	0.007	0.005	0.009	0.004

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

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Rose Lane
Lenham Heath
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Tel : 01622 850410

UKAS TESTING
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Soil Analysis Certificate						
QTS Environmental Report No: 17-66747	**Date Sampled**	26/10/17				
Ground & Water Ltd	**Time Sampled**	None Supplied				
Site Reference: Kiln Place, Camden	**TP / BH No**	TPK				
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	0.80				
Reporting Date: 23/11/2017	**QTSE Sample No**	300603				

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	0.005				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-66747
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2317
Order No: None Supplied
Reporting Date: 23/11/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-68050

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2317
Order No:	None Supplied
Sample Receipt Date:	06/12/2017
Sample Scheduled Date:	06/12/2017
Report Issue Number:	1
Reporting Date:	12/12/2017

Authorised by:

Russell Jarvis
Associate Director of Client Services

Authorised by:

Dave Ashworth
Deputy Quality Manager

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17	
Ground & Water Ltd	**Time Sampled**	None Supplied	
Site Reference: Kiln Place, Camden	**TP / BH No**	TP9 / TPI	
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied	
Order No: None Supplied	**Depth (m)**	0.50	
Reporting Date: 12/12/2017	**QTSE Sample No**	305526	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.6	3%	5%	6%
Loss on Ignition	%	< 0.01	5	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	3.2	100	--	--
pH[MU]	pH Units	N/a	8.5	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.4	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	0.026			0.26	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	< 0.005			< 0.05	4	50	200
Chloride[U]	4			35	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	8			75	1000	20000	50000
TDS	88			880	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	5.3			52.7	500	800	1000

Leach Test Information	
Sample Mass (kg)	0.12
Dry Matter (%)	77.9
Moisture (%)	28.4
Stage 1	
Volume Eluate L10 (litres)	0.88

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

				Landfill Waste Acceptance Criteria Limits		
QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17				
Ground & Water Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden	**TP / BH No**	TP9 / TPI				
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.00				
Reporting Date: 12/12/2017	**QTSE Sample No**	305527				
Determinand	**Unit**	**MDL**				
TOC[MU]	%	< 0.1	0.1	3%	5%	6%
Loss on Ignition	%	< 0.01	4.40	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	8.2	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.3	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	0.009			0.09	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	0.006			0.06	4	50	200
Chloride[U]	3			34	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	35			348	1000	20000	50000
TDS	120			1201	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	4.9			48.5	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.12						
Dry Matter (%)	77.3						
Moisture (%)	29.4						
Stage 1							
Volume Eluate L10 (litres)	0.87						

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TP10 / TPJ
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied
Order No: None Supplied	**Depth (m)**	0.30
Reporting Date: 12/12/2017	**QTSE Sample No**	305528

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits: Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	1.3	3%	5%	6%
Loss on Ignition	%	< 0.01	8.20	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	26.8	100	--	--
pH[MU]	pH Units	N/a	9.1	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.9	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**	**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg): Inert Waste Landfill**	**Stable Non-reactive**	**Hazardous Waste Landfill**
Arsenic[U]	0.03	0.3	0.5	2	25
Barium[U]	< 0.02	< 0.2	20	100	300
Cadmium[U]	< 0.0005	< 0.005	0.04	1	5
Chromium[U]	< 0.005	< 0.05	0.5	10	70
Copper[U]	< 0.01	< 0.1	2	50	100
Mercury[U]	< 0.0005	< 0.01	0.01	0.2	2
Molybdenum[U]	0.006	0.06	0.5	10	30
Nickel[U]	< 0.007	< 0.07	0.4	10	40
Lead[U]	< 0.005	< 0.05	0.5	10	50
Antimony[U]	< 0.005	< 0.05	0.06	0.7	5
Selenium[U]	0.008	0.08	0.1	0.5	7
Zinc[U]	< 0.005	< 0.05	4	50	200
Chloride[U]	3	25	800	15000	25000
Fluoride[U]	< 0.5	< 5	10	150	500
Sulphate[U]	7	70	1000	20000	50000
TDS	108	1081	4000	60000	100000
Phenol Index	< 0.01	< 0.1	1	-	-
DOC	10.5	105	500	800	1000

Leach Test Information	
Sample Mass (kg)	0.11
Dry Matter (%)	83.7
Moisture (%)	19.4
Stage 1	
Volume Eluate L10 (litres)	0.88

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17
Ground & Water Ltd	**Time Sampled**	None Supplied
Site Reference: Kiln Place, Camden	**TP / BH No**	TP10 / TPJ
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied
Order No: None Supplied	**Depth (m)**	0.80
Reporting Date: 12/12/2017	**QTSE Sample No**	305529

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits** Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
TOC[MU]	%	< 0.1	0.3	3%	5%	6%
Loss on Ignition	%	< 0.01	2.40	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	8.5	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.6	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**	**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.1	0.5	2	25
Barium[U]	< 0.02	< 0.2	20	100	300
Cadmium[U]	< 0.0005	< 0.005	0.04	1	5
Chromium[U]	< 0.005	< 0.05	0.5	10	70
Copper[U]	< 0.01	< 0.1	2	50	100
Mercury[U]	< 0.0005	< 0.01	0.01	0.2	2
Molybdenum[U]	0.003	0.03	0.5	10	30
Nickel[U]	< 0.007	< 0.07	0.4	10	40
Lead[U]	< 0.005	< 0.05	0.5	10	50
Antimony[U]	< 0.005	< 0.05	0.06	0.7	5
Selenium[U]	< 0.005	< 0.05	0.1	0.5	7
Zinc[U]	< 0.005	< 0.05	4	50	200
Chloride[U]	2	16	800	15000	25000
Fluoride[U]	< 0.5	< 5	10	150	500
Sulphate[U]	23	230	1000	20000	50000
TDS	98	980	4000	60000	100000
Phenol Index	< 0.01	< 0.1	1	-	-
DOC	4.4	44.1	500	800	1000

Leach Test Information	
Sample Mass (kg)	0.11
Dry Matter (%)	82.3
Moisture (%)	21.6
Stage 1	
Volume Eluate L10 (litres)	0.88

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

				Landfill Waste Acceptance Criteria Limits		
QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17				
Ground & Water Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden	**TP / BH No**	TP10 / TPJ				
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.00				
Reporting Date: 12/12/2017	**QTSE Sample No**	305530				
Determinand	**Unit**	**MDL**				
TOC[MU]	%	< 0.1	0.2	3%	5%	6%
Loss on Ignition	%	< 0.01	4.30	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	8.0	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.4	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	0.02			0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	0.001			0.01	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	0.007			0.07	4	50	200
Chloride[U]	2			23	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	620			6205	**1000**	20000	50000
TDS	759			7592	**4000**	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	3.2			32	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.11						
Dry Matter (%)	78.8						
Moisture (%)	27						
Stage 1							
Volume Eluate L10 (litres)	0.88						

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QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
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Maidstone
Kent ME17 2JN
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68050		**Date Sampled**	26/10/17				**Landfill Waste Acceptance Criteria Limits**	
Ground & Water Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TP12 / TPJ						
Project / Job Ref: GWPR2317		**Additional Refs**	None Supplied						
Order No: None Supplied		**Depth (m)**	0.30						
Reporting Date: 12/12/2017		**QTSE Sample No**	305531						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	0.4				3%	5%	6%
Loss on Ignition	%	< 0.01	4.90				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7				100	--	--
pH[MU]	pH Units	N/a	7.8				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.3				--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01			< 0.1	0.5	2	25
Barium[U]			< 0.02			< 0.2	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			< 0.005			< 0.05	0.5	10	70
Copper[U]			< 0.01			< 0.1	2	50	100
Mercury[U]			< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]			< 0.001			< 0.01	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			< 0.005			< 0.05	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7
Zinc[U]			0.008			0.08	4	50	200
Chloride[U]			3			33	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			760			7600	**1000**	20000	50000
TDS			847			8469	**4000**	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			3.6			35.7	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.11						
Dry Matter (%)			84.2						
Moisture (%)			18.8						
Stage 1									
Volume Eluate L10 (litres)			0.88						

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

				Landfill Waste Acceptance Criteria Limits		
QTS Environmental Report No: 17-68050	**Date Sampled**	26/10/17				
Ground & Water Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden	**TP / BH No**	TP12 / TPJ				
Project / Job Ref: GWPR2317	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	0.50				
Reporting Date: 12/12/2017	**QTSE Sample No**	305532				
Determinand	**Unit**	**MDL**				
TOC[MU]	%	< 0.1	0.5	3%	5%	6%
Loss on Ignition	%	< 0.01	7.60	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	7.9	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.2	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	0.016			0.16	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	0.005			0.05	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	0.005			0.05	0.1	0.5	7
Zinc[U]	0.005			0.05	4	50	200
Chloride[U]	5			51	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	1129			11290	**1000**	20000	50000
TDS	1189			11891	**4000**	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	4.1			41.3	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.11						
Dry Matter (%)	82.5						
Moisture (%)	21.2						
Stage 1							
Volume Eluate L10 (litres)	0.88						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68050		**Date Sampled**	26/10/17				**Landfill Waste Acceptance Criteria Limits**	
Ground & Water Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TP10 / TPJ						
Project / Job Ref: GWPR2317		**Additional Refs**	Composite						
Order No: None Supplied		**Depth (m)**	None Supplied						
Reporting Date: 12/12/2017		**QTSE Sample No**	305533						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	0.7				3%	5%	6%
Loss on Ignition	%	< 0.01	1				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	2.8				100	--	--
pH[MU]	pH Units	N/a	8.3				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.9				--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01			< 0.1	0.5	2	25
Barium[U]			< 0.02			< 0.2	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			< 0.005			< 0.05	0.5	10	70
Copper[U]			< 0.01			< 0.1	2	50	100
Mercury[U]			< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]			0.008			0.08	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			0.014			0.14	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7
Zinc[U]			0.007			0.07	4	50	200
Chloride[U]			2			16	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			26			260	1000	20000	50000
TDS			76			760	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			4.4			44.4	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.10						
Dry Matter (%)			85.9						
Moisture (%)			16.4						
Stage 1									
Volume Eluate L10 (litres)			0.89						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-68050	
Ground & Water Ltd	
Site Reference: Kiln Place, Camden	
Project / Job Ref: GWPR2317	
Order No: None Supplied	
Reporting Date: 12/12/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 305526	TP9 / TPI	None Supplied	0.50	22	Brown sandy clay with brick
$ 305527	TP9 / TPI	None Supplied	1.00	22.7	Brown clay
$ 305528	TP10 / TPJ	None Supplied	0.30	16.2	Brown sandy clay with stones
$ 305529	TP10 / TPJ	None Supplied	0.80	17.8	Brown sandy clay with stones
$ 305530	TP10 / TPJ	None Supplied	1.00	21.1	Brown clay
$ 305531	TP12 / TPJ	None Supplied	0.30	15.8	Brown sandy clay
$ 305532	TP12 / TPJ	None Supplied	0.50	17.5	Brown sandy clay
$ 305533	TP10 / TPJ	Composite	None Supplied	14.1	Brown sandy clay with brick and concrete

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

$ samples exceeded recommended holding times

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 17-68050
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2317
Order No: None Supplied
Reporting Date: 12/12/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Alice Tettmar
Ground & Water Ltd
2 The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-68426

Site Reference:	Kiln Place, Camden
Project / Job Ref:	GWPR2317
Order No:	None Supplied
Sample Receipt Date:	15/12/2017
Sample Scheduled Date:	15/12/2017
Report Issue Number:	1
Reporting Date:	21/12/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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UKAS TESTING 4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-68426		**Date Sampled**	26/10/17				**Landfill Waste Acceptance Criteria Limits**		
Ground & Water Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kiln Place, Camden		**TP / BH No**	TPI						
Project / Job Ref: GWPR2317		**Additional Refs**	None Supplied						
Order No: None Supplied		**Depth (m)**	0.80						
Reporting Date: 21/12/2017		**QTSE Sample No**	307163						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	0.2				3%	5%	6%
Loss on Ignition	%	< 0.01	2.80				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7				100	--	--
pH[MU]	pH Units	N/a	7.6				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1				--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01			< 0.1	0.5	2	25
Barium[U]			< 0.02			< 0.2	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			< 0.005			< 0.05	0.5	10	70
Copper[U]			< 0.01			< 0.1	2	50	100
Mercury[U]			< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]			0.005			0.05	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			< 0.005			< 0.05	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7
Zinc[U]			0.007			0.07	4	50	200
Chloride[U]			8			76	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			18			182	1000	20000	50000
TDS			147			1470	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			5.4			54	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.11						
Dry Matter (%)			78.8						
Moisture (%)			27						
Stage 1									
Volume Eluate L10 (litres)			0.88						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-68426	
Ground & Water Ltd	
Site Reference: Kiln Place, Camden	
Project / Job Ref: GWPR2317	
Order No: None Supplied	
Reporting Date: 21/12/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 307163	TPI	None Supplied	0.80	21.2	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

$ samples exceeded recommended holding times

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-68426
Ground & Water Ltd
Site Reference: Kiln Place, Camden
Project / Job Ref: GWPR2317
Order No: None Supplied
Reporting Date: 21/12/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10 C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

APPENDIX D
Soil Assessment Criteria

Appendix D
Soil Guideline Values and Genera Assessment Criteria

D1 Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'.

D1.1 Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: *Human health toxicological assessment of contaminants in soil.*
2) EA Science Report SC050021/SR3: *Updated technical background to the CLEA model.*
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.06 (2009)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- *do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures.*
- *do not cover risks to the environment, such as groundwater, ecosystems or buildings.*
- *do not provide a definitive test for telling when human health risks are significant.*
- *are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.*

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

D1.2 Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models as follows:

1 Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

2) Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

3) Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

D1.4 LQM/CIEH SUITABLE 4 USE LEVELS (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J.,. *The LQM/CIEH S4UL's for Human Health Risk Assessment*. **Land Quality Press**. 2015

The LQM/CIEH S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure, as calculated by the CLEA software, equals the Health Criteria Value.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

S4UL's have been derived for the basic CLEA land-uses, as described above, and for two new land uses:

- Public Open Spaces near Residential Housing (POSresi)
- Public Park (POSpark).

Public Open Spaces near Residential Housing (POSresi)
Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

Public Park (POSpark)
An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

D1.5 Category 4 Screening Levels (C4SLs)
In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.06 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

• A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
• A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a

significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

"4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:
(a) Land where no relevant contaminant linkage has been established.
(b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.
(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.
(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).

4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

"The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):
"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made

that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

"4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

D1.6 CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

CL:AIRE, *The Soil Generic Assessment Criteria for Human Health Risk Assessment.* **Contaminated Land: Applications in the Real Environment**. 2009.

Within this report CL:AIRE provided Generic Assessment Criteria (GAC's) in accordance with the CLEA software and the principles outlined above for a further 35 contaminants sometime encountered on land affected by contamination.

D1.7 Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of an S4UL/GAC/C4SL is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses then a DQRA may be undertaking to develop site specific values for relevant soil contaminants.

⇒ Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.

⇒ Developing more accurate parameters using site data.

D1.8 Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- ICRCL 70/90: *Notes on the restoration and aftercare of metalliferous mining sites for pasture and grazing*.

D1.9 Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

The DEFRA discussion paper Assessing risks from land contamination – a proportionate approach ('the way forward') (CLAN06/2006) aimed to increase understanding of the role that statistics can play in quantifying the uncertainty attached to the estimates of the mean concentration of contaminants in soil. In direct response CLAIRE/CIEH published a joint report, *Guidance in comparing soil contamination data with a critical concentration* (CLAIRE/CIEH 2008). A software implementation of the statistical techniques given in the report was published by ESI International (2008).

Treatment of Hot-Spots

⇒ A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.

⇒ Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

D2 Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of this report are tabulated in the following pages:

C4SL Low Level of Toxicological Concern

C4SL Low Level of Toxicological Concern						
Contaminant	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Lead	<210	<330	<84	<6000	<760	<1400

Phytotoxicity Recommendations

ICRCL 70/90 ***Restoration of metalliferous mining areas***

Phytotoxicity (Harmful to Plants) Threshold Trigger Values	
Copper	250mg/kg
Zinc	1000mg/kg
Notes: Many cultivars and specifically grasses have a high tolerance and there will be no ill-effect at the threshold trigger values given for neutral or near neutral pH. Site observation of plant vitality may give additional guidance.	

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LQM CIEH Suitable 4 Use Levels (S4UL's)

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Contaminant	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Metals:						
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	20
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	180	180	230	980	230	3400
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Contaminant	**Soil Organic Matter**	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Benzene	**1.0% SOM**	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	**1.0% SOM**	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	**1.0% SOM**	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	**1.0% SOM**	60	88	**28**	6600	**41000**	**17000**
	2.5% SOM	140	210	**67**	15000	**42000**	24000
	6.0% SOM	330	480	**160**	33000	**43000**	33000
m-Xylene	**1.0% SOM**	59	82	31	6200	**41000**	17000
	2.5% SOM	140	190	74	**14000**	**42000**	24000
	6.0% SOM	320	450	170	31000	**43000**	33000
p-Xylene	**1.0% SOM**	**56**	**79**	29	**5900**	**41000**	**17000**
	2.5% SOM	**130**	**180**	69	**14000**	**42000**	**23000**
	6.0% SOM	**310**	**430**	**160**	**30000**	**43000**	**31000**
The most health protective value in each scenario for Xylene is highlighted in bold.							

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LQM/CIEH Suitable 4 Use Levels For TPH

Aliphatic		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 [l]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	770 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000

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LQM/CIEH Suitable 4 Use Levels For TPH

Aromatic		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)

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LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAH's)

Determinants		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Acenapthene	1.0% SOM	210	3,000 (57.0) [sol]	34	84,000(57.0) [sol]	15,000	29,000
	2.5% SOM	510	4,700(141) [sol]	85	97,000(141) [sol]	15,000	30,000
	6.0% SOM	1100	6,000(336) [sol]	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) [sol]	28	83,000(86.1) [sol]	15,000	29,000
	2.5% SOM	420	4,600(212) [sol]	69	97,000(212) [sol]	15,000	30,000
	6.0% SOM	920	6,000(506) [sol]	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) [vap]	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.60	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40

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LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAH's)

Determinants		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Flouranthene	1.0% SOM	280	1,500	52	2,3000	3,100	6,300
	2.5% SOM	560	1,600	130	2,3000	3,100	6,300
	6.0% SOM	890	1,600	290	2,3000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) ^{sol}	27	63,000(30.9) ^{sol}	9,900	20,000
	2.5% SOM	400	3,800(76.5) ^{sol}	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) ^{sol}	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	2.30	2.6	4.10	190 † (76.4) ^{sol}	4,900 †	1,200 † (76.4) ^{sol}
	2.5% SOM	5.60	5.6	10	460 † (183) ^{sol}	4,900 †	1,900 † (183) ^{sol}
	6.0% SOM	13	13	24	1,100 † (432) ^{sol}	4,900 †	3,000
Phenanthrene	1.0% SOM	95	1,300(183) ^{sol}	18	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.

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LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds

Contaminant	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Chloroalkanes & alkenes						
1,2 Dichloroethane						
1.0% SOM	0.0071	0.0092	0.0046	0.67	29	21
2.5% SOM	0.011	0.013	0.0083	0.97	29	24
6.0% SOM	0.019	0.023	0.016	1.70	29	28
1,1,2,2 Tetrachloroethane						
1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane						
1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene						
1.0% SOM	0.18	0.18	0.65	19	1,400	810 ^{sol}(424)
2.5% SOM	0.39	0.40	1.50	42	1,400	1,100 ^{sol}(951)
6.0% SOM	0.90	0.92	3.60	95	1,400	1,500
1,1,1 Trichloroethane						
1.0% SOM	8.80	9.00	48	660	140,000	57,000 ^{vap}(1425)
2.5% SOM	18	18	110	1,300	140,000	76,000 ^{vap}(2915)
6.0% SOM	39	40	240	3,000	140,000	100,000 ^{vap}(6392)
Tetrachloromethene						
1.0% SOM	0.026	0.026	0.45	2.90	890	190
2.5% SOM	0.056	0.056	1.00	6.30	920	270
6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene						
1.0% SOM	0.016	0.017	0.041	1.20	120	70
2.5% SOM	0.034	0.036	0.091	2.60	120	91
6.0% SOM	0.075	0.080	0.210	5.70	120	120
Trichloromethane						
1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride						
1.0% SOM	0.00064	0.00077	0.00055	0.059	3.50	4.80
2.5% SOM	0.00087	0.00100	0.00100	0.077	3.50	5.00
6.0% SOM	0.00014	0.00150	0.00180	0.120	3.50	5.40

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LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds

Contaminant	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Explosives						
2,4,6 Trinitrotoluene						
1.0% SOM	1.60	65	0.24	1,000	130	260
2.5% SOM	3.70	66	0.58	1,000	130	270
6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)						
1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)^{sol}
2.5% SOM	250	13,000	38	210,000	26,000	51,000
6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)						
1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)^{vap}
2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)^{vap}
6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)^{vap}
Atrazine						
1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
6.0% SOM	17.40	620	2.70	9,400	1,200	2,400
Pesticides						
Aldrin						
1.0% SOM	5.70	7.30	3.20	170	18	30
2.5% SOM	6.60	7.40	6.10	170	18	31
6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin						
1.0% SOM	0.97	7.00	0.17	170	18	30
2.5% SOM	2.00	7.30	0.41	170	18	30
6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos						
1.0% SOM	0.032	6.40	0.0049	140	16	26
2.5% SOM	0.066	6.50	0.0100	140	16	26
6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan						
1.0% SOM	7.40	160(0.003)^{vap}	1.20	5,600(0.003)^{vap}	1,200	2,400
2.5% SOM	18	280(0.007)^{vap}	2.90	7,400(0.007)^{vap}	1,200	2,400
6.0% SOM	41	410(0.016)^{vap}	6.80	8,400(0.016)^{vap}	1,200	2,400

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LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds

Contaminant	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Pesticides						
Beta - Endosulfan						
1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes						
1.0% SOM	0.23	6.90	0.035	170	24	47
2.5% SOM	0.55	9.20	0.087	180	24	48
6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes						
1.0% SOM	0.085	3.70	0.013	65	8.10	15
2.5% SOM	0.200	3.80	0.032	65	8.10	15
6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes						
1.0% SOM	0.06	2.90	0.0092	67	8.2	14
2.5% SOM	0.14	3.30	0.0230	69	8.2	15
6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes						
Chlorobenzene						
1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene						
1.0% SOM	23	24	94	2,000 (571)[sol]	90,000	24,000(571)[sol]
2.5% SOM	55	57	230	4,800 (1370)[sol]	95,000	36,000(1370)[sol]
6.0% SOM	130	130	540	11,000 (3240)[sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene						
1.0% SOM	0.40	0.44	0.25	30	300	390
2.5% SOM	1.00	1.10	0.60	73	300	440
6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene						
1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene						
1.0% SOM	1.50	1.50	4.70	102	1,800	770(134[vap]
2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]

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LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds

Contaminant	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Chlorobenzenes						
1,2,3,- Trichlorobenzene						
1.0% SOM	1.50	1.50	4.70	102	1,800	770(134)[vap]
2.5% SOM	3.60	3.70	12	250	1,800	1,100(330[lvap]
6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,- Trichlorobenzene						
1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,- Trichlorobenzene						
1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]
1,2,3,4,- Tetrachlorobenzene						
1.0% SOM	15	24	4.40	1,700(122[lvap]	830	1,500(122)[vap]
2.5% SOM	36	56	11	3,080(304)[vap]	830	1,600
6.0% SOM	78	120	26	4,400(728)[vap]	830	1,600
1,2,3,5,- Tetrachlobenzene						
1.0% SOM	0.66	0.75	0.38	49(39.4)[vap]	78	110(39)[vap]
2.5% SOM	1.60	1.90	0.90	120(98.1)[vap]	79	120
6.0% SOM	3.70	4.30	2.20	240(235)[vap]	79	130
1,2,4, 5,- Tetrachlobenzene						
1.0% SOM	0.33	0.73	0.06	42(19.7)[sol]	13	25
2.5% SOM	0.77	1.70	0.16	72(49.1)[sol]	13	26
6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene						
1.0% SOM	5.80	19	1.20	640(43.0)[sol]	100	190
2.5% SOM	12	30	3.10	770(107)[sol]	100	190
6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene						
1.0% SOM	1.80(0.20)[vap]	4.10 (0.20)[vap]	0.47	110(0.20)[vap]	16	30
2.5% SOM	3.30(0.50)[vap]	5.70 (0.50)[vap]	1.10	120	16	30
6.0% SOM	4.90	6.70 (1.2)[vap]	2.50	120	16	30

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LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds						
Contaminant	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Phenols & Chlorophenols						
Phenols						
1.0% SOM	280	750	66	760[dir](31,000)	760[dir](11,000)	760[dir](8,600)
2.5% SOM	550	1,300	140	1,500[dir](35,000)	1,500[dir](11,000)	1,500[dir](9,700)
6.0% SOM	1100	2,300	280	3,200[dir](37,000)	3,200[dir](11,000)	3,200[dir](11,000)
Chlorophenols (4 Congeners)						
1.0% SOM	0.87	94	0.13	3,500	620	1,100
2.5% SOM	2.00	150	0.30	4,000	620	1,100
6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols						
1.0% SOM	0.22	27(16.4)[vap]	0.03	400	60	110
2.5% SOM	0.52	29	0.08	400	60	120
6.0% SOM	1.20	31	0.19	400	60	120
Others						
Carbon Disulphide						
1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
2.5% SOM	0.29	0.29	10	22	11,000	1,900
6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene						
1.0% SOM	0.29	0.32	0.25	31	25	48
2.5% SOM	0.70	0.78	0.61	68	25	50
6.0% SOM	1.60	1.80	1.40	120	25	51

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CL:AIRE Soil Generic Assessment Criteria				
Contaminant	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Metals:				
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000

ND – Not Derived.
NA – Not Applicable

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CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds				
Contaminant	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
1,1,2 Trichloroethane				
1.0% SOM	0.60	0.88	0.28	94
2.5% SOM	1.20	1.8	0.61	190
6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane				
1.0% SOM	2.40	2.50	9.20	280
2.5% SOM	3.90	4.10	17	450
6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene				
1.0% SOM	0.23	0.23	2.80	26
2.5% SOM	0.40	0.41	5.60	46
6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene				
1.0% SOM	0.35	0.41	0.38	42
2.5% SOM	0.85	0.99	0.93	99
6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane				
1.0% SOM	0.024	0.024	0.62	3.3
2.5% SOM	0.042	0.042	1.20	5.9
6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol				
1.0% SOM	19	210	3.10	16000*
2.5% SOM	43	410	7.20	24000*
6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene				
1.0% SOM	1.50	170*	0.22	3700*
2.5% SOM	3.20	170	0.49	3700*
6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene				
1.0% SOM	0.78	78	0.12	1900*
2.5% SOM	1.70	84	0.27	1900*
6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene				
1.0% SOM	3.70	3.80	40	390*
2.5% SOM	9.20	9.30	98	960*
6.0% SOM	22	22	230	2200*

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CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds				
Contaminant	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Biphenyl				
1.0% SOM	66*	220*	14	18000*
2.5% SOM	160	500*	35	33000*
6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate				
1.0% SOM	280*	2700*	47*	85000*
2.5% SOM	610*	2800*	120*	86000*
6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene				
1.0% SOM	0.87	0.91	3.2	97
2.5% SOM	2.0	2.1	7.6	220
6.0% SOM	4.7	4.9	18	520
Bromodichloromethane				
1.0% SOM	0.016	0.019	0.016	2.1
2.5% SOM	0.030	0.034	0.032	3.7
6.0% SOM	0.061	0.070	0.068	7.6
Bromoform				
1.0% SOM	2.8	5.2	0.95	760
2.5% SOM	5.9	11	2.1	1500
6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate				
1.0% SOM	1400*	42000*	220*	940000*
2.5% SOM	3300*	44000*	550*	940000*
6.0% SOM	7200*	44000*	1300*	950000*
Chloroethane				
1.0% SOM	8.3	8.4	110	960
2.5% SOM	11	11	200	1300
6.0% SOM	18	18	380	2100
Chloromethane				
1.0% SOM	0.0083	0.0085	0.066	1.0
2.5% SOM	0.0098	0.0099	0.13	1.2
6.0% SOM	0.013	0.013	0.23	1.6
***Cis* 1,2 Dichloroethene**				
1.0% SOM	0.11	0.12	0.26	14
2.5% SOM	0.19	0.20	0.50	24
6.0% SOM	0.37	0.39	1.0	47

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CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds				
Contaminant	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Dichloromethane				
1.0% SOM	0.58	2.10	0.10	270
2.5% SOM	0.98	2.80	0.19	360
6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate				
1.0% SOM	120*	1800*	19*	150000*
2.5% SOM	260*	3500*	41*	220000*
6.0% SOM	570*	6300*	94*	290000*
Di-*n*-butyl phthalate				
1.0% SOM	13*	450*	2.00	15000*
2.5% SOM	31*	450*	5.00	15000*
6.0% SOM	67*	450*	12	15000*
Di-*n*-octyl phthalate				
1.0% SOM	2300*	3400*	940*	89000*
2.5% SOM	2800*	3400*	2100*	89000*
6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane				
1.0% SOM	0.20	0.22	0.27	22*
2.5% SOM	0.48	0.54	0.67	53*
6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene				
1.0% SOM	11	12	32	1400*
2.5% SOM	27	28	79	3300*
6.0% SOM	64	67	190	7700*
Methyl *tert*-butyl ether				
1.0% SOM	49	73	23	7900
2.5% SOM	84	120	44	13000
6.0% SOM	160	220	90	24000
Propylbenzene				
1.0% SOM	34	40	34	4100*
2.5% SOM	82	97	83	9700*
6.0% SOM	190	230	200	21000*
Styrene				
1.0% SOM	8.10	35	1.60	3300*
2.5% SOM	19	78	3.70	6500*
6.0% SOM	43	170	8.70	11000*

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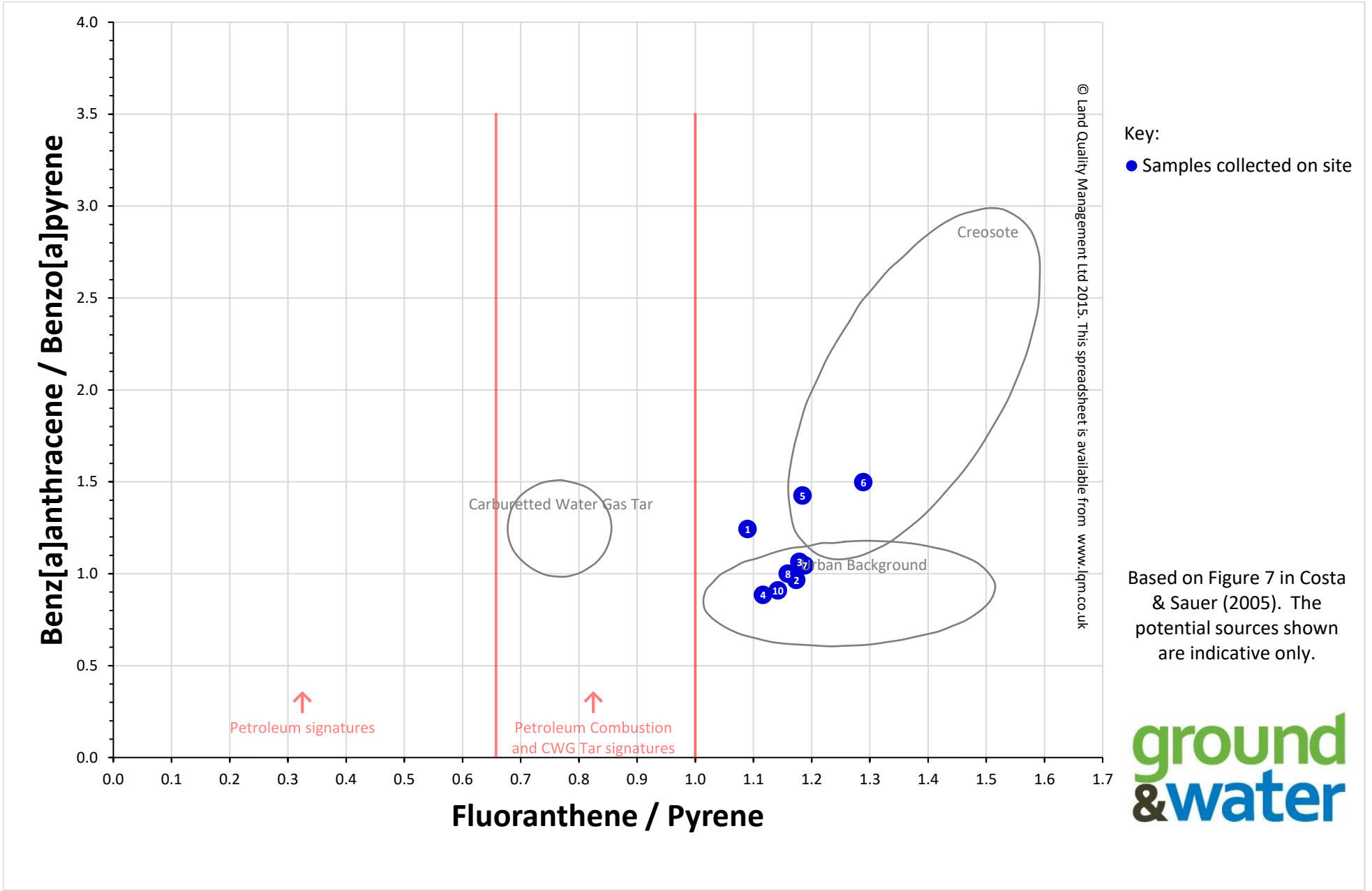
CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds				
Contaminant	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Total Cresols (2-, 3-, and 4-methylphenol)				
1.0% SOM	80	3700	12	160000
2.5% SOM	180	5400	27	180000*
6.0% SOM	400	6900	63	180000*
***Trans* 1,2 Dichloroethene**				
1.0% SOM	0.19	0.19	0.93	22
2.5% SOM	0.34	0.35	1.90	40
6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide				
1.0% SOM	0.25	1.40	0.042	130*
2.5% SOM	0.59	3.10	0.100	180*
6.0% SOM	1.30	5.70	0.240	200*

Notes: *Soil concentration above soil saturation limit

APPENDIX E
PAH Double Ratio Spreadsheet

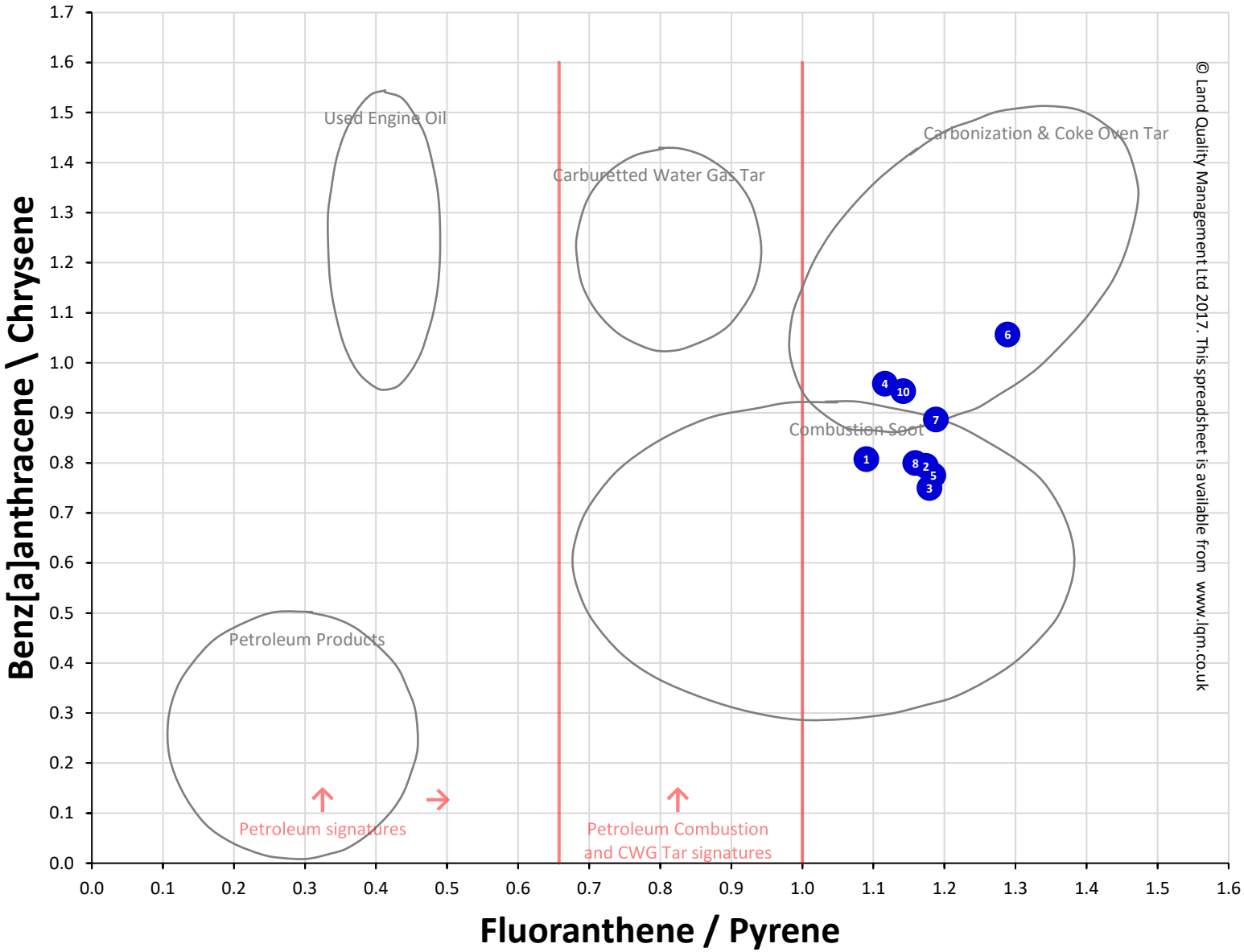


Key:

● Samples collected on site

Based on Figure 7 in Costa & Sauer (2005). The potential sources shown are indicative only.

ground &water



Key:

- Samples collected on site

Based on Figure 6 in Costa & Sauer (2005) with additional details based on a conference presentation by Costa (2005) in San Diego. The potential sources shown are indicative only.

ground &water