ADDITIONAL CONTAMINATION RISK ASSESSMENT AND REMEDIATION METHOD STATEMENT

for

FORMER COLT INTERNATIONAL, NEW LANE, HAVANT PO9 2LZ

on behalf of

DREW SMITH GROUP

Report Reference: GWPR3724/CAR/August 2020		Status: FINAL
Issue:	Prepared By:	Verified By:
V1.04 August 2020	[redacted]	
	Roger Foord BA (Hons) MSc DIC CGeol. FGS Senior Engineer	Alec Ovens MSci RSoBRA FGS Geotechnical & Geo-Environmental Engineer	Francis Williams M.Geol. (Hons) FGS CGeol CEnv AGS Director
File Reference: Ground and Water/Project Files/ GWPR3514 Former Colt International, New Lane, Havant		

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

CONTENTS

1.0 INTRODUCTION
- 1.1 General
- 1.2 Aims of Investigation
- 1.3 Conditions and Limitations

2.0 PREVIOUS FINDINGS
- 2.1 Summary of Previous Findings
- 2.2 Summary of Previous Findings (Ground and Water Limited Contamination Assessment Report, ref. GWPR3192/CAR/December 2019).
- 2.3 Re-evaluated Conceptual Site Model
- 2.4 Remediation Strategy
  - 2.4.1 Human Health Risk
  - 2.4.2 Surface Water Risk
  - 2.4.3 Ground-gas Risk

3.0 DEMOLITION AND SITE PREPERATION

4.0 REMEDIATION VERIFICATION & ADDITIONAL CONTAMINATION ASSESSMENT
- 4.1 Capping Materials
  - 4.1.1 CLARIE Statistics
  - 4.1.2 Human Health – Asbestos contamination within the Made Ground
  - 4.1.3 Proposed Levels
- 4.2 Groundwater Risk Assessment
- 4.3 Ground Gas Risk Assessment
  - 4.3.1 Available Data
  - 4.3.2 Data Quality
  - 4.3.3 Risk Assessment
  - 4.3.4 Ground Gas Risk Assessment Summary
  - 4.3.5 Required Remediation

5.0 DEVELOPMENT OF A REMEDIATION STRATEGY
- 5.1 Option Appraisal
- 5.2 Remediation Strategy
- 5.3 Remediation and Validation Method Statement
- 5.4 Validation Strategy
- 5.5 Discovery Strategy
- 5.6 Waste Disposal
- 5.7 Imported Material
- 5.8 Duty of Care

FIGURES

Figure 1	Site Location Plan
Figure 2	Site Development Area
Figure 3	Aerial View of Site
Figure 4	Proposed Development
Figure 5	Speedeck Piled Raft Layout Plots 1 - 13
Figure 6	Speedeck Piled Raft Layout Plots 14 - 25
Figure 7	Speedeck Piled Raft Layout Plots 34 – 49, 65 – 67 and 74 - 75
Figure 8	Speedeck Piled Raft Layout Plots 68 - 73
Figure 9	Speedeck Piled Raft Layout Plots 76 - 94
Figure 10	Trial Hole Location Plan – Contamination Assessment (Phase 4)
Figure 11	Crushed Concrete/Demolition Rubble 6F2 Sampling Locations
Figure 12	Anticipated Gardens Construction/Finished Levels
Figure 13	Cable Percussion Borehole Location Plan
Figure 14	Ground Gas Risk Assessment Borehole Locations
Figure 15	Ground Gas Remediation Plan

APPENDICES

Appendix A	Conditions and Limitations
Appendix B	Thickness of 6F2 Crushed Concrete/Demolition Rubble Capping
Appendix C	Chemical Laboratory Testing – Crushed Concrete/Demolition Rubble
Appendix D	Soil Assessment Criteria
Appendix E	LQM PAH Profiling Tool
Appendix F	CLAIRE Statistical Analysis
Appendix G	Asbestos Risk Assessment
Appendix H	Cable Percussion Borehole Logs
Appendix I	Chemical Laboratory Testing – Groundwater
Appendix J	Waste Hazard Assessment

1.0 INTRODUCTION

1.1 General

Ground and Water Limited were instructed by Drew Smith Group to conduct contamination assessment and remediation verification works on a redevelopment site at the Former Colt International, New Lane, Havant PO9 2LZ.

1.2 Aims of the Investigation

The purpose of this Contamination Assessment Report (CAR) was to report on the progress of site works, following a phase of demolition and site preparation. A Groundwater risk assessment was also carried out, based on recent groundwater sampling.

This report must be read in conjunction with the following documentation:

- WYG Phase 1 Ground Investigation and Assessment Report, Ref.: *A090070-182*, dated June 2017;
- Campbell Reith Updated GQRA and Outline Remediation Strategy Report, Ref.: *12663*, dated May 2019;
- Ground and Water Limited Contamination Assessment Report, ref. GWPR3192/CAR/December 2019.

This report supersedes the previously issued report (V1.03) due to additional ground gas monitoring information and Remediation Method Statement.

1.3 Conditions and Limitations

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

The following disclaimer does not supersede the requirements of Drew Smith's appointment by Homes England and the obligations therein.

2.0 PREVIOUS FINDINGS

2.1 Summary of Previous Findings

This section of the report provides an overview of the findings and recommendations to date. The remedial requirements, groundwater risk assessment and ground-gas risk assessment are re-evaluated later in this report, but the conclusion to date have been provided for information. They have been provided to show the process and time frame around derivation.

Current Site Use:

The site comprised a ~31,100m^2 irregular-shaped plot of land, oriented in a north-west to south-east direction, located to the south-west of Bartons Road, south-east of Martin Road and north-west of New Lane. The site was located to the north-east of Havant, Hampshire.

The national grid reference for the centre of the site was approximately SU 72615 07997. A site location plan is given within Figure 1. A plan showing the site boundary can be seen in Figure 2.

The site formally comprised a factory and warehouse structure with associated offices, car parking and hard landscaping areas. All buildings on-site had been demolished at the time of site works, August 2019, with the site covered by a concrete slab over the footprint of the former structures and all tarmac parking areas/concrete hardstanding still present. An Electricity sub-station was noted in the south-western portion of site. An aerial view of the site is given within Figure 3. Further information on this is provided later in this report.

Proposed Development

At the time of reporting, August 2020, the proposed development will comprise the construction of ~100No. residential houses in the centre and the west of the site, and ~20No. commercial units in the east/south-east, with associated access roads, car parking areas and soft landscaping. It is planned that the plots at the western end of the site will have piled rafts with 225mm heave precautions (shaded red), plots along the northern and eastern boundaries shall have non voided piled raft foundations (shaded yellow), with the remainder of the plots in the centre and south-east corner of the site will have shallow strip foundations. A plan of the proposed development is shown within Figure 4. Details of the raft foundations for the various plots are given in Figures 5 – 9.

Geology and Radon:

The BGS Geological Map for the Fareham area (Sheet No. 316) revealed that the site is located on superficial Head Deposits overlying bedrock of the London Clay Formation. Superficial River Terrace Deposits were noted ~300m to the south-east. No areas of Made or Worked Ground were noted within 250m of the site.

Head Deposits – Chichester area

Head Deposits occur widely in valley floors, on valley sides and on interfluves. It is probably much more widespread than shown on the map. In general, clay-with-flints passes downslope into head, locally without a separating break of slope. Head accumulated largely by solifluction and hillwash, mainly under periglacial conditions during the Quaternary glaciations. Its composition varies according to the local sources of material and mode of landscape evolution. It is typically composed of reddish brown to yellow-brown, gravelly silty, sandy clay or diamicton, commonly with variable proportions of coarser material (chiefly broken flint nodules). Borehole records suggest that the head deposits are generally less than 3m thick, but may be over 5m locally.

Undifferentiated River Terrace Deposits
Extensive spreads of River Terrace Deposits occur along the Rivers Test, Itchen and Hamble. Eleven terraces have been provisionally recognised in the area. The deposits are variable in thickness, ranging from 1 to 5m, and generally consist of gravels, predominantly sub-angular to sub-rounded flints, with a considerable sand content. Poorly sorted clayey and sandy silts and silty clays overlie some of the terraces.

London Clay Formation – Hampshire Basin
In the Hampshire Basin area, the London Clay Formation comprises blue, brown and grey clay with yellow and grey sands and silts interspersed with pebble beds. Localised developments of sandstone also occur. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals 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 basement beds of the London Clay Formation are sandy with rounded flints.

A BGS borehole located ~150m south-east of site (in similar geology) revealed 0.15m of Topsoil to overlie a firm brown clay with medium to coarse flint gravels and cobbles to 1.37m bgl. This was then underlain by a brown fine-grained sand for the remainder of the borehole, a depth of 3.05m bgl. No groundwater was encountered within the borehole.

Another BGS borehole located ~300m west of site revealed 0.15m of Topsoil to overlie a medium-dense to dense light brown to blue-grey silty fine-grained sand to 9.14m bgl. This was underlain by a stiff to very stiff blue-grey sandy clay for the remaining depth of the borehole (12.19m bgl). Groundwater was noted at a depth of 1.70m bgl. A groundwater strike was noted at 1.52m bgl, standing at between 2.44 – 4.57m bgl at the end of subsequent days of drilling works.

Hydrogeology and Hydrology:
A review of the DEFRA 'Magic Map' revealed that site was located within a **Secondary (A) Aquifer** to the east, and within a **Secondary (Undifferentiated) Aquifer** in the western portion, both comprising of the superficial Head Deposits. The underlying bedrock deposits of the London Clay Formation was classified as **Unproductive Strata**.

Superficial drift deposits are described by the BGS as permeable unconsolidated (loose) deposits e.g. sands and gravels. Bedrock is described by the BGS as solid permeable or impermeable formations e.g. clay, sandstone, chalk and limestone.'

Secondary aquifers include a wide range of drift deposits with an equally wide range of water permeability and storage capacities. **Secondary (A) Aquifers** consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Undifferentiated Secondary Aquifers are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

Examination of the Defra records showed that the site was located within an **Inner Zone Ic (Subsurface Activity)** Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. This relates to the Principal Aquifer associated with the Lewes Nodular Chalk Member and Tarrant Chalk Member underlying the Unproductive Strata of the London Clay Formation.

It was noted that the site was located ~2km to the north-east of the Bedhampton and Havant Spring operated by Portsmouth Water, associated with Chalk Karst zones from the Principal Aquifer. A pathway for deep groundwater was noted to run beneath the site.

The nearest surface water feature to the site was a drain located ~10-20m to the east of the site (Thought to be the River Lavant, according to previous reports). Emsworth Harbour was noted ~2.65km to the south of site.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1 (an area with a **low** probability of flooding). However the land immediately to the south-east of site was noted to comprise a **Flood Zone 2** and **Flood Zone 3**, associated with the drain running to the east. **Environment Agency Flood Zone 2**, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. **Environment Agency Flood Zone 3** shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

From analysis of hydrogeological and topographical maps, shallow groundwater (associated with superficial deposits) was anticipated to be encountered at shallow to moderate depth (~2 – 4m below existing ground level (bgl)) and it was considered that the groundwater was flowing in an overall southerly direction towards Emsworth Harbour.

Radon

BRE 211 (2015) Map 4 of Hampshire, Berkshire and south Oxfordshire revealed the site **was not** located within an area where mandatory protection measures against the ingress of Radon were likely to be required. The site **was not** located within an area where a risk assessment was required.

Results of previous Site Investigations

Various site investigations were undertaken by numerous companies, some of which trial holes were undertaken through hardstanding, whereas trial holes from later site works were undertaken through crush material.

The phases of works undertaken prior to demolition are described below.

WYG Phase 1 & 2 Ground Investigation and Assessment Report, Ref.: A090070-182, dated June 2017

A Phase 1 Desk Study Investigation Report was undertaken by WYG in November 2016, which collated publicly available information to review the risks associated with ground conditions with potential to impact upon the redevelopment of the site for combined high density residential and commercial use. The Desk Study confirmed the requirement for intrusive ground investigations to allow a further assessment of risks. This data was collated and interpreted in order to define a Conceptual Site Model, undertake qualitative risk assessment and semi-quantitative risk assessment grading the pollutant linkages in accordance with a risk matrix. This was then used to inform a subsequent intrusive investigation. The pertinent points taken from the report summarising these works are discussed in this section of the report.

At the time of the site walkover in September 2016 and subsequent investigation in February 2017, the site was occupied by the Colt International factory, warehouse and office buildings with associated hardstanding, car parks and access roads. The local topography (which slopes to the south-east) is accommodated by a retaining wall on the north-west boundary, and an embankment running across the site.

In the southern portion of site was a building of brick and metal cladding construction used for fire testing of finished products. Adjacent to this building was an external cylindrical plastic (but likely double-skinned) Above Ground Storage Tank (AST) for 'fuel oil', of approximately 1000 litres capacity positioned on a breeze block plinth. South of the main factory building was a small brick outhouse, understood to have housed a diesel generator that previously provided a 'back up' power supply. Adjacent west of the outhouse was a former brick bund containing several brick plinths that supported and housed a large cylindrical diesel AST. The tank was no longer present.

An electricity sub-station was located on the eastern edge of the former diesel tank bund.

A review of historic Ordnance Survey maps dating back to 1867 indicated limited residential development on the site prior to redevelopment as a manufacturing facility for Colt International in the mid-1960s. The site layout remained largely unchanged since this period. It was reported that during the Second World War a cottage building in the north west of the site was requisitioned by the mining department of HMS Vernon Mining Department and used for military storage purposes.

The WYG Desk Based Assessment identified potential on-site sources of contamination which are summarised below.

- Former cylindrical diesel AST (circa 10,000 gallons) situated south of the main factory building.
- Double skinned plastic AST (circa 1000 litres capacity) for storage of 'fuel oil' adjacent to the Fire Testing facility.
- Ancillary facilities associated with unknown activities external north west of the factory building.
- Fuel supply (including above ground pipelines) providing fuel to heaters within the building.
- Made Ground.

Although not listed as a potential source of ground contamination, the presence of asbestos materials in building materials was also recognised. A number of current and commercial premises are located in the site vicinity, and of particular note is the Marsh Plant immediately south, Eaton on the opposite side of New Lane, and a gas holder approximately 300m south of the site. Based on the local topography (sloping south east) and the known hydrogeological setting (that includes a public water abstraction to the south west) a southerly groundwater flow direction is inferred. Therefore, commercial premises in the site vicinity are considered to be down gradient in terms of inferred groundwater flow and it is considered relatively unlikely that the site has been impacted by offsite sources of contamination.

Subsequent Phase 2 intrusive works were undertaken between the 1st and 3rd of February 2017 and comprised 14No. Window sample locations to depths ranging between 0.30 and 5.00m bgl with Standard Penetration Testing (SPTs) and installation of 7No. dual purpose ground-gas and groundwater monitoring wells. Samples were obtained for laboratory assessment and 2No. return monitoring visits were undertaken. Ground conditions encountered during the investigation were

consistent with those identified in the published literature and comprised a 0.40 to 2.00m thick layer of Made Ground over Head Deposits overlying the London Clay Formation at depths ranging between 0.80 and 2.80m bgl. The London Clay Formation persisted to the full depth of the investigation. Groundwater was encountered at depths ranging between 0.50 and 1.50m bgl during the investigation and between ground level and 2.79m bgl during return visits.

Contamination testing on soils and groundwater as well as ground-gas monitoring was undertaken following the ground investigation, and revealed the following.

- Minor elevations of methane and carbon dioxide (0.9 and 2.5% respectively) were recorded during gas monitoring.
- Target Screen Values (TSVs) were exceeded samples of soil for residential end use with home-grown produce, mainly in samples of Made Ground.
- Minor quantities of asbestos fibres were detected in three samples of Made Ground.
- Minor exceedances of Environmental Quality Standards (EQS) and Drinking Water Standards (DWS) of groundwater and leachate samples were also recorded.

From the desk-based and intrusive investigations undertaken at the site, a number of contamination sources and potential contamination sources have been identified. These have been tabulated into a Conceptual Site Model as seen overleaf.

Tabulated Conceptual Site Model – Plausible Pollutant Linkages Only		
Potential On-site Sources	**Potential Absorption Pathways**	**Potential Receptors**
Large former diesel AST (~10,000 gallons) situated south of the main factory building, & small double-skinned plastic AST (~1000 litres) for storage of 'fuel oil' situated on a plinth (not bunded) adjacent to the Fire Testing facility in the south of the site. • Total Petroleum Hydrocarbons (TPHs); • Poly-cyclic Aromatic Hydrocarbons (PAHs). Features of factory buildings, including oil-burning heaters and above-ground fuel pipes and the presence of an 'air pollution test facility'. • Heavy Metals and Semi-Metals including: Arsenic, Cadmium, Chromium, Lead, Copper, Zinc, Beryllium, Mercury etc; • Poly-cyclic Aromatic Hydrocarbons (PAHs); • Total Petroleum Hydrocarbons (TPHs); • Asbestos (building materials). Electricity Sub-station present in south of site. • PCB Oils.	Leaching of onsite sources of contamination. Lateral and vertical migration of gases/vapours. Overland surface water runoff. Contaminant migration through preferential pathways (e.g. piles, underground service ducts, and drains). Contaminant transport through off site migration of groundwater. Atmospheric transport and inhalation of airborne dusts, vapours and fibres (indoors and outdoors). Direct contact (dermal contact and ingestion) with soil, dust and water. Inhalation of vapours arising from soil contamination.	Future site users (users/ occupants of future commercial/ residential premises). Construction workers during future development works. Groundwater (Head Deposits, Thanet Sand Formation, White Chalk; Aquifers, SPZ). Surface waters (River Lavant). On-site buildings and services. Offsite workers and residents.

Campbell Reith Updated GQRA and Outline Remediation Strategy Report, Ref.: 12663, dated May 2019

Based on the findings of the previous Desk Study and Ground Investigation Reports undertaken by WYG, further (Phase 3) intrusive investigation and testing was done by Campbell Reith in order to increase sampling density and depth of trial holes.

During the summer of 2018 supplementary ground investigation was conducted with the objective of addressing the recommendations of the WYG 2017 report:

- Two Cable Percussive boreholes to a maximum depth of 17.50m bgl
- Seven Windowless Sampler boreholes to a maximum depth of 5.45m bgl

- Four Hand-dug Pits to a maximum depth of 1.20m bgl
- Nine machine dug Trial Pits to a maximum depth of 3.10m bgl
- Four Groundwater and ground gas monitoring visits.

The two deep Cable Percussive boreholes were progressed to 12.50 and 17.50m bgl, both encountering Made Ground overlying Superficial Head Deposits (BH202 only) and London Clay Formation to the base of the boreholes.

Nine exploratory locations (three Windowless Samplers, three Trial Pits and one Cable Percussive borehole) were progressed across the building footprint to provide additional coverage where the area had previously not been investigated. Trial pits TP209, TP210 and TP211 were progressed into the bank to the west of the monsoon drain, with the intention of investigating the drainage. There were no visual observations of contamination in the bank.

Superficial deposits were not considered to be present in significant thickness in the western car park. Variable Head Deposits were present across the bulk of the centre of the site, often trial pits did not prove the maximum depth of superficial deposits (~2.00 to 3.00m bgl). The borehole in the centre of the site demonstrated the base of the superficial deposits to be 3.20m bgl. A 12.50m deep borehole in the centre of the site encountered London Clay Formation from 3.20 to 12.50m bgl. The deep borehole in the western car park encountered London Clay Formation from 1.30 – 4.50m bgl, followed by brown mottled orange-brown silty, fine to coarse sand, from 4.50 to 11.50m, inferred to be the Bognor Sand Member. The London Clay Formation of stiff dark greenish-grey slightly sandy clay is present from 11.50 to 17.50m bgl.

Based on contamination testing results from both the WYG and Campbell Reith investigations, the following Contamination Risk Summary was derived.

- End Users: A High risk has been identified associated with concentrations of lead, polycyclic aromatic hydrocarbons and asbestos in shallow soils.
- Groundwater: A Very Low risk has been identified due to the London Clay Formation acting as an aquitard preventing shallow groundwater affecting the aquifer at depth. Should piling be proposed, a piling risk assessment should be conducted.
- Surface Water: A Low to Moderate risk has been identified due to identified hydrocarbon contamination in shallow soils in the south east of the site. Although no impact to the nearby river has been identified to date.
- Ground Gas: The site has been classified as a CIRIA Characteristic Situation 1 (CS1), however elevated concentrations of methane and carbon dioxide require local consideration of increasing to Characteristic Situation 2.
- Services: Made Ground has hydrocarbon contamination which should be assessed for the potential requirement for protective water supply pipework.
- Groundworks: A Low to moderate risk has been identified based on the assumption that basic health and safety provisions are in place. Additional assessments with regard to asbestos in soils may be required.

This risk summary was **not** thought to significantly change the Conceptual Site Model tabulated based on the results of the WYG investigation. Based on this investigation the following outline remediation strategy was derived.

- Human health exposure: a cover system is recommended in order to mitigate the potential risks to end users from shallow soils. The depth and validation criteria should be determined with regard to the detailed layout when available. This should be submitted to and approved

by the Local Planning Authority.

- Surface water risk: Although it has been shown that no discernible effect on the River Lavant, it is considered that there is a theoretical risk to surface waters from the odorous soils in the location of TP 202. It is recommended that localised source removal is conducted in the location of TP 202 and groundwater monitoring wells are installed between TP 202 and the River Lavant. The requirements of the monitoring should be agreed with the Local Planning Authority.
- Unforeseen Contamination: A watching brief for unforeseen contamination during slab removal is recommended. This is recommended to be conducted on a grid basis, where inspections should be made and evidence of unforeseen contamination should be investigated and remediated as required.

2.2 Summary of Previous Findings (Ground and Water Limited Contamination Assessment Report, ref. GWPR3192/CAR/December 2019).

A fourth phase of intrusive works and risk assessment was undertaken by Ground and Water Limited post demolition, through an existing capping of crushed concrete**. The purposes of contamination testing was to increase sampling density and reduce uncertainty. The data from the Phase 2 WYG and Phase 3 Campbell Reith investigations were combined with that from the Phase 4 Ground and Water Limited investigation.**

Phase 4 Fieldwork Undertaken

Additional fieldwork was undertaken on the 29th – 30th August and 2nd September 2019, and comprised the construction of 20No. Windowless Sampler Boreholes (WS1 – WS20) to a depth of between 1.80 – 3.00m bgl.

Sampling Procedures

The methodology for sampling locations can be seen tabulated overpage, this includes our interpretation of the WYG and Campbell Reith locations. A trial hole location plan is given within Fig 10.

Methodology for Sampling Locations and Chemical Laboratory Testing (Ground and Water Ltd)				
Trial Hole	**Depth (m bgl)**	**Sampling Strategy**	**Site Use (Existing)**	**Site Use (Proposed)**
WS1	2.80	Targeted sampling strategy	Access road/car park to south of former office building.	Commercial units and associated access roads/car parking.
WS2	2.45			
WS3	3.00		Concrete pad for former factory building.	
WS4	2.45		Concrete hardstanding adjacent to Electricity Sub-station.	Residential housing and associated garden areas.
WS5	1.80		Concrete pad for former factory building.	
WS6	2.45			
WS7	2.45			
WS8	2.45			Residential flats and associated car parking.
WS9	2.45			Residential housing and associated garden areas.
WS10	2.45			
WS11	2.00			Residential flats and associated car parking.
WS12	2.45			Residential housing and associated garden areas.
WS13	2.45			
WS14	2.00			
WS15	2.00			
WS16	2.45			Residential flats and associated car parking.
WS17	2.45		Tarmac car parking area.	Residential housing and associated garden areas.
WS18	2.45			
WS19	2.45			
WS20	2.45			
BH1	4.00	Random sampling strategy (assumed)	Tarmac car parking area.	Residential housing and associated garden areas.
BH2	3.50		Concrete hardstanding area to north of factory building.	Residential flats and associated car parking.
BH3	4.00			
BH4	5.00		Soft landscaping area adjacent to car park.	Soft landscaping adjacent to commercial units.
BH5	2.70		Tarmac car parking area south of offices.	Commercial units and associated access roads/car parking.
BH6	1.80		Hardstanding area surrounding Electricity Sub-station, south of factory building.	Residential housing and associated garden areas.
BH7	4.00			
BH8	0.80			
BH9	3.00			
BH10	0.30		Tarmac car parking area.	
BH11	3.00			
BH12	3.00		Soft landscaping west of factory building.	Soft landscaping adjacent to residential housing.
BH13	1.50		Soft landscaping along eastern boundary of site, adjacent to offices and associated parking.	Soft landscaping adjacent to commercial units.
BH14	4.00			Commercial units and associated access roads/car parking.
BH1-I	3.00		Concrete pad inside factory building.	Residential flats and associated car parking.
BH2-I	4.00			
BH3-I	3.00			

Cont'd Overleaf:

Cont'd from previous page:

Methodology for Sampling Locations and Chemical Laboratory Testing (WYG/Campbell Reith)				
Trial Hole	**Depth (m bgl)**	**Sampling Strategy**	**Site Use (Existing)**	**Site Use (Proposed)**
BH201	17.50	Targeted sampling strategy	Tarmac car parking area.	Residential housing and associated garden areas.
BH202	0.30		Concrete pad for former factory building.	
BH202a	12.50			
WS201	0.50		Tarmac car parking area.	
WS202	2.90			
WS203	5.45			
WS204	4.00		Concrete pad for former factory building.	
WS205	2.90			
WS206	2.45		Soft landscaping west of former factory building.	Soft landscaping adjacent to residential housing.
WS207	0.50		Concrete hardstanding area to north of factory building.	Residential flats and associated car parking.
TP202	2.50		Tarmac car parking area.	Commercial units and associated access roads.
TP204	3.10		Concrete pad for former factory building.	Residential housing and associated garden areas.
TP205	2.20			
TP206	3.00			
TP207	1.10			
TP208	2.70			
TP209	2.50		Soft landscaping west of former factory building.	Soft landscaping adjacent to residential housing.
TP210	1.90			
TP211	2.00			
HP201	0.40		Soft landscaping area adjacent to car park.	Soft landscaping adjacent to commercial units.
HP202	0.60			
HP203	1.00		Soft landscaping along eastern boundary of site, adjacent to offices and associated parking.	Commercial units and associated access roads.
HP204	0.80			

The area of the site totals ~31,100m^2 (3.10 Hectares) and with 20No. Ground and Water Limited sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 2,332.50m^2 and a radius of approximately 27.25m would be encountered (CLR 4, 1994).

Including the WYG and Campbell Reith data, a total of 60 sampling locations have been provided. Given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 777.50m^2 and a radius of approximately 15.73m would be encountered (CLR 4, 1994).

Soil Conditions

The ground conditions encountered during the investigation are described in this section. For the purposes of discussion, the succession of conditions encountered in the trial holes in descending order can be summarised below.

Made Ground
Head Deposits (WS1-WS2, WS4-WS6, WS8-WS17, WS20)
London Clay Formation (WS6-WS7, WS18-WS20)

Made Ground

Made Ground was encountered in all trial holes from beneath a 0.18 – 0.30m thick capping of Concrete within WS1 – WS16, and a 0.10 – 0.20m thick capping of Tarmac in WS17 – WS20, to a depth of between 0.30 – 1.50m bgl (and for the entire depth of WS3 to 3.00m bgl). The soils were

noted to be variable across the site, but most generally comprised a light to dark brown, grey-brown, pale yellow and orange to reddish-brown, sandy gravelly clay to sandy gravel (locally a gravelly slightly clayey sand). The sand was fine to coarse grained and the gravel was fine to coarse, angular to rounded flint rejects, brick, concrete, tarmac, metal, ceramic fragments, chalk fragments and charcoal/carbonaceous material. A hydrocarbon/creosote odour was noted within WS1, WS3 and WS16.

Within WS5 from 0.80 – 1.00m, WS9 from 0.25 – 0.40m, WS17 from 0.15 – 0.40m, WS18 from 0.20 – 0.70m and WS19 from 0.10 – 0.40m bgl, the Made Ground was recovered as a matrix-dominated chalk fill (Dm Grade according to CIRIA C574).

Head Deposits

Soils representative of the superficial Head Deposits were noted underlying the Made Ground to a depth of 1.80m bgl within WS6 and 1.00m bgl within WS20, and for the remaining depth of WS1-WS2, WS4-WS5 and WS8-WS17, a depth of between 1.80 – 2.80m bgl. A mixture of cohesive and granular deposits were noted.

Cohesive soils were noted underlying the Made Ground for the remaining depth of WS1-WS2, WS4 and WS8, and to a depth of between 1.00 – 1.80m bgl within WS5-WS6, WS9 and WS17, and generally comprised a light to mid-brown, mid to dark grey-brown and orange-brown sandy gravelly clay. The sand was fine to coarse grained and the gravel was occasional to frequent, fine to coarse, angular to sub-rounded (locally rounded) flint and occasional carbonaceous material.

Granular soils were noted underlying the cohesive deposits for the remaining depth of WS5, WS9 and WS17, and underlying the Made Ground for the remaining depth of WS10-WS16, and generally comprised an orange-brown, grey-brown and mid-brown mottled (locally slightly clayey) gravelly silty sand. The sand was fine to medium grained and the gravel was fine to coarse, angular to rounded flint.

A slight hydrocarbon odour was noted from ~1.50 - 2.00m bgl within WS1.

London Clay Formation

Soils of the London Clay Formation were noted underlying the Made Ground/ Head Deposits for the remaining depth of WS6-WS7 and WS18-WS20, and comprised a blue-grey, orange and grey-brown (locally slightly sandy) clay. The sand was fine grained. Shell fragments were noted at 1.70m bgl within WS20, and claystone fragments at 2.00m bgl within WS18 and WS20.

Roots were noted to a depth of between 0.50 – 2.00m bgl within WS6-WS8 and WS17-WS20. A summary of root depths within individual trial holes is tabulated below.

Summary of Root Depth		
Trial Hole	**Depth of Trial Hole (m bgl)**	**Depth of Roots (m bgl)**
WS6	2.45m	1.00m
WS7	2.45m	0.80m
WS8	2.45m	0.80m
WS17	2.45m	0.50m
WS18	2.45m	2.00m (Decayed)
WS19	2.45m	2.00m
WS20	2.45m	1.00m

A groundwater strike was noted at 1.70m bgl within WS8, and wet soils were encountered within WS1, WS2, WS10, WS13, WS16 and WS19 at depths of between 0.70 – 2.80m bgl. A summary of groundwater depths is tabulated overleaf.

Summary of Groundwater Encountered		
Trial Hole	**Depth of GW strike (m bgl)**	**Depth of wet soils (m bgl)**
WS1	-	2.40 – 2.80m
WS2	-	1.00 – 2.45m bgl
WS8	1.70m	-
WS10	-	0.80 – 1.10m
WS13	-	1.50m
WS16	-	1.50 – 2.00m
WS19	-	0.70 – 1.50m

Chemical Laboratory Testing – Human Health Risk Assessment

A programme of chemical laboratory testing, scheduled by Ground and Water Limited and carried out by DETS Limited, was undertaken on twenty-five soil samples recovered from the trial holes.

Twenty-five soil samples were sent off for analysis for a broad range of contaminants in accordance with DEFRA/CLEA methodologies.

The samples tested and the reasons for testing can be seen tabulated below.

Methodology for Sampling Locations and Chemical Laboratory Testing		
Trial Hole	**Depth (m bgl)**	**Sampling Strategy**
WS1	0.30	Samples of Made Ground surrounding the contamination hotspot 'TP202'.
WS1	2.00	
WS2	0.50	
WS3	2.00	
WS4	1.50	Sample of Made Ground from concrete hardstanding area to the south of site.
WS5	1.50	Representative samples of Made Ground beneath concrete slab of former Factory/Warehouse building.
WS6	0.50	
WS7	0.50	
WS8	0.30	
WS9	0.50	
WS11	0.80	
WS13	0.50	
WS14	0.50	
WS15	1.00	
WS16	0.50	
WS16	0.80	
WS16	1.00	
WS17	0.30	Representative samples of Made Ground from beneath tarmac parking area to the north-west of site.
WS17	0.50	
WS18	0.30	
WS18	1.00	
WS19	0.30	
WS19	0.80	
WS19	1.00	
WS20	0.30	

The analysis suite for the Ground and Water Limited Phase of Investigation is presented below/overleaf, and comprised.

- Semi Metals and Heavy Metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc (WS1/2.00m, WS3/2.00m, WS16/0.50m, WS16/0.80m, WS17/0.50m bgl);
- Lead (WS1/0.30m, WS1/2.00m, WS2/0.50m, WS3/2.00m, WS4/1.50m, WS5/1.50m, WS6/0.50m, WS7/0.50m, WS8/0.30m, WS9/0.50m, WS11/0.80m, WS13/0.50m, WS14/0.50m, WS15/1.00m, WS16/0.50m, WS16/0.80m, WS16/1.00m, WS17/0.30m, WS17/0.50m, WS18/0.30m, WS18/1.00m, WS19/0.30m, WS19/0.80m, WS19/1.00m, WS20/0.30m bgl);
- Asbestos Screen (WS1/0.30m, WS1/2.00m, WS2/0.50m, WS3/2.00m, WS4/1.50m, WS5/1.50m, WS6/0.50m, WS7/0.50m, WS8/0.30m, WS9/0.50m, WS11/0.80m, WS13/0.50m, WS14/0.50m, WS15/1.00m, WS16/0.50m, WS16/0.80m, WS16/1.00m, WS17/0.30m, WS17/0.50m, WS18/0.30m, WS18/1.00m, WS19/0.30m, WS19/0.80m, WS19/1.00m, WS20/0.30m bgl);
- Polycyclic Aromatic Hydrocarbons (PAH's) 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 (WS1/0.30m, WS1/2.00m, WS2/0.50m, WS4/1.50m, WS5/1.50m, WS6/0.50m, WS7/0.50m, WS8/0.30m, WS9/0.50m, WS11/0.80m, WS13/0.50m, WS14/0.50m, WS15/1.00m, WS16/1.00m, WS17/0.30m, WS17/0.50m, WS18/0.30m, WS18/1.00m, WS19/0.30m, WS19/0.80m, WS19/1.00m, WS20/0.30m bgl);
- Fuel Oils – Speciated TPH including full aliphatic/aromatic split (WS3/2.00m, WS16/0.50m, WS16/0.80m bgl);
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs) (WS3/2.00m, WS16/0.50m, WS16/0.80m bgl).

The results of the comparison of the representative contaminant concentrations for all rounds of chemical testing are presented in the table overleaf.

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 Home-grown produce" Land-Use Scenario	**"Commercial" Land-Use Scenario**
Arsenic	None	None
Beryllium	None	None
Boron	None	None
Cadmium	None	None
Chromium (III)	None	None
Hexavalent Chromium (VI)	None	None
Copper	None	None
Lead	WS17/0.50m (859mg/kg), WS18/1.00m (274mg/kg), WS19/0.80m (403mg/kg), WS19/1.00m (444mg/kg).	None
Mercury (Elemental)	None	None
Nickel	None	None
Selenium	None	None
Vanadium	None	None
Zinc	None	None
Cyanide (Total)	None	None
Total Phenol	None	None
Naphthalene	BH11/0.30m (2.31mg/kg).	None
Acenapthylene	None	None
Acenapthene	None	None
Fluorene	None	None
Phenanthrene	BH201/0.25m (230mg/kg).	None
Anthracene	None	None
Fluoranthene	None	None
Pyrene	None	None
Benzo(a)anthracene	BH201/0.25m (130mg/kg), BH11/0.30m (14.64mg/kg).	None
Chrysene	BH201/0.25m (94mg/kg), BH11/0.30m (15.55mg/kg)	None
Benzo(b)fluoranthene	BH201/0.25m (110mg/kg), BH11/0.30m (18.65mg/kg), WS201/0.45m (4.3mg/kg).	WS1/0.30m (101mg/kg).
Benzo(k)fluoranthene	None	None
Benzo(a)pyrene	BH201/0.25m (84mg/kg), BH11/0.30m (16.19mg/kg), WS201/0.45m (3.5mg/kg).	WS1/0.30m (67.3mg/kg).
Indeno(1,2,3-cd)pyrene	BH201/0.25m (50mg/kg).	None
Dibenz(a,h)anthracene	BH201/0.25m (17mg/kg), BH11/0.30m (2.25mg/kg), WS201/0.45m (0.33mg/kg).	WS1/0.30m (8.54mg/kg).
Benzo(ghi)perylene	None	None
TPH C5 – C6 (aliphatic)	None	None
TPH C6 – C8 (aliphatic)	None	None
TPH C8 - C10 (aliphatic)	WS16/0.50m (76mg/kg), WS16/0.80m (66mg/kg).	None
TPH C10 - C12 (aliphatic)	WS16/0.50m (437mg/kg), WS16/0.80m (367mg/kg).	None
TPH C12 - C16 (aliphatic)	WS16/0.50m (1547mg/kg), WS16/0.80m (1246mg/kg).	None
TPH C16 - C21 (aliphatic)	None	None
TPH C21 - C34 (aliphatic)	None	None
TPH C5 – C7 (aromatic)	None	None
TPH C7 – C8 (aromatic)	None	None
TPH C8 – C10 (aromatic)	None	None
TPH C10 - C12 (aromatic)	WS16/0.50m (356mg/kg), WS16/0.80m (299mg/kg).	None
TPH C12 – C16 (aromatic)	WS16/0.50m (382mg/kg), WS16/0.80m (297mg/kg), BH201/0.25m (240mg/kg).	None
TPH C16 - C21 (aromatic)	BH201/0.25m (1600mg/kg).	None
TPH C21 - C35 (aromatic)	BH201/0.25m (7600mg/kg).	None
Benzene	None	None
Toluene	None	None
Ethylbenzene	None	None
Xylene (o, m & p)	None	None
MTBE	None	None
Asbestos Screen	BH2/0.60m (Amosite; 0.002%).	BH14/0.30m (Chrysotile; 0.012%), HP201/0.50m (Chrysotile; <0.001%)

CLAIRE Statistics

CLAIRE statistical analysis revealed the distribution of Lead and PAHs within the Made Ground was non-normal. Outliers were noted within all phases of works, however the Upper Confidence Limit only exceeded the threshold for a ***'Residential with Home-grown Produce'*** land use scenario for Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene. The outliers that had to be removed in order to bring the Upper Confidence Limit below the threshold comprised the samples BH201/0.25m, WS1/0.30m, BH11/0.30m, BH4/0.50m and WS2/0.50m.

As WS1, WS2 and BH4 were all located within the area of site with a ***'Commercial'*** land-use scenario, and only WS1 was noted to exceed the threshold for this land-use, it was considered that no remediation was necessary for WS2 or BH4. **Remediation could be considered for WS1 with respect to human health.**

As the remaining two outliers noted during initial CLAIRE statistical analysis (covering the entire site) and samples found to individually exceed the threshold for a ***'Residential with Home-Grown Produce'*** land-use scenario were all located within the north-western portion of site (a car parking area), then it was considered that a second CLAIRE statistical analysis over this area of site would help determine a more realistic remediation strategy for the proposed residential development.

This analysis confirmed that outliers were present within the north-western residential area samples at BH201/0.25m and BH11/0.30m. However, it also revealed that Lead was elevated across the site area, even with an outlier at WS17/0.50m bgl having been removed. Therefore, it was considered that remediation was necessary for the entire north-western car park area of site.

Remediation was also considered necessary for the elevated TPH values present within WS16. As this was the only trial hole where elevated determinands were noted outside of the north-western car park and ***'Commercial'*** area, hotspot removal in a ~15m radius surrounding WS16 was thought to be the most cost-effective solution.

Human Health – Asbestos contamination within the Made Ground

Fibres of Amosite asbestos was noted within BH2/0.60m bgl, and Chrysotile asbestos was noted within BH14/0.30m, CP3/0.35m (this location could not be found on trial hole location plans, so it was assumed this was BH3), and HP201/0.50m bgl. Asbestos quantifications revealed concentrations of between <0.001% and 0.012% for Chrysotile, and 0.002% for Amosite.

Given the presence of these fibres within the soils and the potential for these hotspots to coincide with publicly accessible areas on site, as well as workers during site redevelopment, it is considered likely that further risk assessment is necessary with respect to the asbestos detections noted.

The quantifications for BH2/0.60m and BH14/0.30m bgl were subject to risk assessment, as these were the highest noted for Amosite and Chrysotile respectively.

The risk assessment revealed revealed remediation of BH2 was considered necessary in order to eliminate the risk from Amosite fibres to end-users. No remediation procedures were considered necessary where Chrysotile fibres were detected.

Fragments of Chrysotile asbestos in the form of cement and bitumen were also noted in three samples tested; TP206/0.30m bgl, around the eastern portion of the residential area of site, and HP203/0.15m and HP201/0.20m bgl around the north-eastern and south-eastern boundary of site.

Through examination of the proposed development plans it was thought that these areas of soil are likely to comprise areas of soft landscaping, and although some soils may be excavated as part of redevelopment, there may still be a residual risk to end users. Therefore, remediation of these areas in the form of Made Ground removal and the use of a geo-textile membrane may be required.

An **Asbestos Management Strategy** should be put in place to ensure that any more potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

Groundwater Risk Assessment

A review of the DEFRA 'Magic Map' revealed that site was located within a **Secondary (A) Aquifer** to the east, and within a **Secondary (Undifferentiated) Aquifer** in the western portion, both comprising of the superficial Head Deposits. The underlying bedrock deposits of the London Clay Formation was classified as **Unproductive Strata**.

Examination of the Defra records showed that the site was located within an **Inner Zone Ic (Subsurface Activity)** Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. This relates to the Principal Aquifer associated with the Lewes Nodular Chalk Member and Tarrant Chalk Member underlying the Unproductive Strata of the London Clay Formation.

The nearest surface water feature to the site was a drain located ~10-20m to the east of the site (Thought to be the River Lavant, according to previous reports). Emsworth Harbour was noted ~2.65km to the south of site.

During the Ground and Water investigation, a groundwater strike was noted at 1.70m bgl within WS8, and wet soils were encountered within WS1, WS2, WS10, WS13, WS16 and WS19 at depths of between 0.70 – 2.80m bgl. During the WYG investigation, groundwater strikes were encountered at depths ranging between 0.50 and 1.80m bgl and then between ground level and 2.79m bgl during return visits to monitor wells installed across the site. The CampbellReith investigation revealed groundwater strikes between 1.40 – 17.40m bgl, with slight seepage noted at depths of between 0.40 – 2.50m bgl.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1 (an area with a **low** probability of flooding). However, the land immediately to the south-east of site was noted to comprise a **Flood Zone 2** and **Flood Zone 3**, associated with the drain running to the east.

Given the olfactory evidence to suggest hydrocarbon-type contamination on-site, and corresponding exceedances of PAHs and lighter-end TPHs noted during the investigation, the Made Ground encountered onsite **was** considered to pose a possible risk to shallow groundwater.

Details on this sampling and testing, as noted within the WYG Phase 1 Ground Investigation and Assessment Report (Ref.: *A090070-182*, dated June 2017), is detailed below.

An initial visit was made to the site (10th February 2017) to complete well development. Subsequently, two monitoring trips were completed dated 20th and 27th February 2017. During these visits ground water sampling and groundwater level monitoring was undertaken. Groundwater was removed from the well as part of well development, using low flow method. All wells were purged dry due to slow flow rate.

Groundwater samples were collected using the low-flow technique, whereby the sample is extracted at the same rate that water flows into the well, i.e. the water level within the well remains constant throughout. As a precaution, due to the slow flow rate and low recharge, the wells were only purged until the water ran clear, which approximately removed 0.5 litres of groundwater.

The environmental chemistry of 13No. groundwater samples selected by WYG were analysed by Jones Environmental Laboratory. The analysis suite is presented below and comprised.

- Metals Suite – Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium (III), Copper, Lead, Molybdenum, Mercury, Nickel, Selenium, Zinc;
- Calcium;
- Chloride;
- Polycyclic Aromatic Hydrocarbons (USEPA Standard 16) suite;
- Total Petroleum Hydrocarbons (TPH) Criteria Working group testing;
- Total Hardness;
- Phenols by HPLC;
- Standard inorganics including pH, sulphate, total cyanide;
- Nitrate and Nitrite;
- Dissolved Organic Carbon;
- Ammonical Nitrogen as NH_3 and NH_4;
- BTEX by GC-MS;
- Total Alkalinity as $CaCO_3$;
- Volatile Organic Compounds.

Of the 13 groundwater samples tested, exceedances with regard to annual average (AA) and maximum allowable concentration (MAC) Environmental Quality Standards were noted within 9 samples from BH1, BH4, BH5, BH11 and BH14. Where determinands were found to be under detection limits, no further risk assessment was considered necessary. Any above detection limits are tabulated below and overleaf.

Tabulated Results For Groundwater Testing

Determinant	Units	EQS Source	EQS Level	Samples where EQS Level was exceeded
Dissolved Nickel	µg/l	AA-EQS Freshwater	4	BH5/Round 1 (6.7µg/l), Round 2 (7.0µg/l) BH11/Round 1 (4.3µg/l), Round 2 (4.4µg/l)
Anthracene	µg/l	AA-EQS Freshwater	0.1	BH1/Round 1 (0.47µg/l), Round 2 (0.14µg/l) BH5/Round 2 (0.15µg/l)
Fluoranthene	µg/l	AA-EQS Freshwater	0.0063	BH1/Round 1 (0.83µg/l), Round 2 (0.27µg/l) BH4/Round 1 (0.01µg/l) BH5/Round 2 (2.45µg/l) BH11/Round 1 (0.04µg/l), Round 2 (0.11µg/l) BH14/Round 1 (0.03µg/l)
Benzo(a)pyrene	µg/l	AA-EQS Freshwater	0.00017	BH1/Round 1 (0.02µg/l) BH5/Round 2 (0.35µg/l)
Benzo(ghi)perylene	µg/l	MAC-EQS Freshwater	0.0082	BH1/Round 1 (0.01µg/l) BH5/Round 2 (0.23µg/l)
Notes	EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration			

(continued overpage)

(continued from previous page)

Tabulated Results For Groundwater Testing (cont)				
Determinant	Units	EQS Source	EQS Level	Samples where EQS Level was exceeded
Benzo(k)fluoranthene	µg/l	MAC-EQS Freshwater	0.017	BH5/Round 2 (0.23µg/l)
Benzo(b)fluoranthene	µg/l	MAC-EQS Freshwater	0.017	BH1/Round 1 (0.03µg/l) BH5/Round 2 (0.58µg/l)
Total Cyanide	µg/l	AA-EQS Freshwater	1	BH1/Round 1 (2µg/l), Round 2 (4µg/l) BH5/Round 1 (2µg/l), Round 2 (3µg/l) BH11/Round 1 (3µg/l), Round 2 (4µg/l)
Ammonia as Nitrogen	µg/l	EQS Freshwater	300	BH1/Round 1 (3,150µg/l), Round 2 (870µg/l) BH5/Round 1 (1,530µg/l), Round 2 (1,470µg/l) BH11/Round 1 (10,100µg/l), Round 2 (4,070µg/l) BH14/Round 1 (1,150µg/l), Round 2 (1,140µg/l)
Notes	EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration			

The testing revealed that a number of contaminants, in particular PAH compounds, metals, ammonia and cyanide exceeded the relevant EQS Freshwater standards. The exceedances for Nickel and Cyanide were noted to be marginal (within an order of magnitude of the threshold), however greater exceedances were noted for Ammonia within groundwater collected from BH1 and BH11 in the west of the site, and also in BH5 and BH14 in the south-east.

Relatively high concentrations of PAH compounds (fluoranthene, benzo(a)pyrene, benzo(ghi)perylene and benzo(b)fluoranthene) were also recorded within BH1 and BH5. It was noted during the WYG investigation that in BH1, superficial strata was not recorded and the shallow groundwater encountered was considered to be perched within the Made Ground overlying the London Clay Formation. BH1 was located in the north-west of the site ~250m from the nearest surface water feature to site (thought to be the River Lavant), and based on the inconsistent contaminant concentrations recorded within the groundwater, the absence of a confirmed continuous groundwater pathway and the travel distance to surface water features, it was considered **unlikely** that the groundwater contaminants recorded within BH1 would risk impacting watercourses surrounding the site (such as the River Lavant). This was confirmed by water sampling and testing of the on-site Monsoon Drain and nearby River Lavant undertaken by WYG, which revealed **no** exceedances with regard to EQS thresholds.

The exceedances of PAH compounds within BH5 were thought to be directly related to contaminants within the surrounding soils (such as those noted within WS1), as it was noted within the WYG report that minimal recovery of groundwater occurred following purging of the well and the groundwater sampled contained a high silt content. **It was therefore considered likely that hotspot remediation of WS1 would eliminate the source of PAHs into groundwater in this area, and no further remediation would be necessary.**

In addition to groundwater sampling, WYG also conducted leachate analysis on 3No. soil samples recovered during the investigation. The analysis suite is presented below and comprised:

- Metals Suite – Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium (III),

Copper, Lead, Molybdenum, Mercury, Nickel, Selenium, Zinc;
- Polycyclic Aromatic Hydrocarbons (USEPA Standard 16) suite.

Of the 3 samples tested for leachates, exceedances with regard to annual average (AA) and maximum allowable concentration (MAC) Environmental Quality Standards were noted within 3 samples from BH1, BH5 and BH14. Where determinands were found to be under detection limits, no further risk assessment was considered necessary. Any above detection limits are tabulated below.

Tabulated Results For Groundwater Testing				
Determinant	**Units**	**EQS Source**	**EQS Level**	**Samples where EQS Level was exceeded**
Dissolved Nickel	µg/l	AA-EQS Freshwater	4	BH14/Round 1 (6.6µg/l)
Fluoranthene	µg/l	AA-EQS Freshwater	0.0063	BH1/1.50m (0.02µg/l) BH1/0.60m (0.70µg/l) BH14/0.30m (0.02µg/l)
Benzo(a)pyrene	µg/l	AA-EQS Freshwater	0.00017	BH5/0.60m (0.13µg/l)
Benzo(ghi)perylene	µg/l	MAC-EQS Freshwater	0.0082	BH5/0.60m (0.08µg/l)
Benzo(k)fluoranthene	µg/l	MAC-EQS Freshwater	0.017	BH5/0.60m (0.08µg/l)
Benzo(b)fluoranthene	µg/l	MAC-EQS Freshwater	0.017	BH5/0.60m (0.2µg/l)
Notes	EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration			

The exceedances noted within leachate samples correspond to those present within groundwater, with nickel and PAH exceedances noted in boreholes where groundwater contamination was also present. It was however noted within the WYG report that the method of leachate derivation can result in concentrations that exceed those present under natural conditions. It was therefore considered that the occurrences of contamination within groundwater provided a more meaningful assessment of the potential risks to controlled waters (such as the drain/River Lavant to the east of site).

With regard to the groundwater and leachate testing conducted during previous phases of investigation, it was confirmed that the thickness of the London Clay Formation underlying the site was considered sufficient to protect the underlying Principal Aquifer from perched groundwater contamination, and there were not sufficient pathways for contamination to affect watercourses close to the site. This was confirmed by upstream and downstream testing of the nearby River Lavant, as well as the on-site Monsoon Drain, revealing no elevated contaminants with regard to EQS thresholds.

However, it was agreed that further groundwater monitoring wells should be installed and further groundwater monitoring undertaken to reduce uncertainty. This is detailed later in this report.

Ground Gas Risk Assessment

Based on the WYG and Campbell Reith ground gas monitoring and risk assessment, given the elevated Methane and Carbon Dioxide values recorded, it was recommended that precautions up to a Characteristic Situation 2 in accordance with BS8485 (2015) are installed within the proposed buildings. An updated ground gas risk assessment is presented in section 4.3.

2.3 Re-Evaluated Conceptual Site Model

Following evaluation of the Site Investigation, the CSM developed within Section 2.7 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 On-site Sources	**Potential Absorption Pathways**	**Potential Receptors**
Large former diesel AST (~10,000 gallons) situated south of the main factory building, & small double-skinned plastic AST (~1000 litres) for storage of 'fuel oil' situated on a plinth (not bunded) adjacent to the Fire Testing facility in the south of the site: • **Total Petroleum Hydrocarbons (TPHs);** • **Poly-cyclic Aromatic Hydrocarbons (PAHs).** Chemical testing revealed elevated TPHs and PAHs within soils in NW portion of site, and WS1 in SE Commercial area. Features of factory buildings, including oil-burning heaters and above-ground fuel pipes and the presence of an 'air pollution test facility': • Heavy Metals and Semi-Metals including: Arsenic, Cadmium, Chromium, **Lead**, Copper, Zinc, Beryllium, Mercury etc; • **Poly-cyclic Aromatic Hydrocarbons (PAHs);** • **Total Petroleum Hydrocarbons (TPHs);** • **Asbestos (building materials).** Chemical testing revealed elevated Lead, TPHs and PAHs within soils in NW portion of site, and WS1 in SE Commercial area. Amosite fibres presented risk to end-users in BH2, fragments requiring removal also noted to NE and SE boundaries. ~~Electricity Sub-station present in south of site:~~ • ~~PCB Oils.~~ No evidence of PCB oil contamination noted during chemical testing.	Leaching of onsite sources of contamination. Lateral and vertical migration of gases/vapours. Overland surface water runoff. ~~Contaminant migration through preferential pathways (e.g. piles, underground service ducts, and drains).~~ ~~Contaminant transport through off-site migration of groundwater.~~ **Groundwater testing revealed elevated Ammonia, Nickel, Cyanide and PAHs within wells. However, limited superficial soils and impermeable bedrock thought to protect underlying Principal Aquifer, and no sufficient pathways for contaminants to affect nearby watercourses.** Atmospheric transport and inhalation of airborne dusts, vapours and fibres (indoors and outdoors). Direct contact (dermal contact and ingestion) with soil, dust and water. Inhalation of vapours arising from soil contamination.	Future site users (users/ occupants of future commercial/ residential premises). Construction workers during future development works. ~~Groundwater (Head Deposits, Thanet Sand Formation, White Chalk; Aquifers, SPZ).~~ Surface waters (River Lavant). On-site buildings and services. Offsite workers and residents.
Ground gases associated with on-site contaminants noted during chemical testing. • **Carbon dioxide;** • **Methane;** • Hydrogen Sulphide; • Carbon Monoxide; • Trace Gases/VOC's Elevated CO2 and CH4 concentrations noted during monitoring within WS202; site classified CS2.	Migration through anthropogenic and natural pathways Inhalation Asphyxiation	Site occupiers. Buildings. Construction workers, service and maintenance operatives, especially in confined spaces.

2.4 Remediation Strategy

Based on the results of the intrusive works and chemical analyses undertaken to-date, the following remedial measures were considered at the time of reporting:

2.4.1 Human Health Risk

At the time of reporting, the original remediation strategy was to excavate the Made Ground for a 16m radius around the WS16 hotspot (which would also remove BH2). The resulting void was then to be backfilled with verified clean topsoil/sub-soil.

Excavation and removal/remediation of the Made Ground for a 16m radius around the WS1 hotspot in the employment zone. To be backfilled with certified clean topsoil/sub-soil.

However, the contamination assessment for the residential site has been superseded by the more recent demolition works discussed later on within the report. The resulting remediation strategy relating to human health risk is also discussed later within the report.

2.4.2 Surface Water Risk

Based on discussion it was considered necessary, in order to comply with Home England conditions, for the employment area to be remediated.

Excavation and removal/remediation of the Made Ground for a 16m radius around the WS1 hotspot in the employment zone. To be backfilled with certified clean topsoil/sub-soil. Following the hotspot removal, groundwater monitoring and sampling should be undertaken to verify that no harmful levels of contaminants were within the groundwater and reduce uncertainty. **This is dealt with overall in a separate report (ref. GWPR3514/GRA/April 2020), however the results of the additional groundwater monitoring are also discussed in this report.**

2.4.3 Ground-gas Risk

Based on the WYG/Campbell Reith ground-gas monitoring and risk assessment, given the elevated Carbon Dioxide and Methane values recorded, it is recommended that precautions up to a Characteristic Situation 2, in accordance with BS8485 (2015), are installed within the proposed buildings. The voided and non-voided plots can be seen in Figure 4.

An updated ground gas risk assessment is presented in section 4.3 of this report. The assessment above is therefore superseded.

3.0 DEMOLITION AND SITE PREPARATION

It is understood that as part of the site preparation works the site underwent demolition with existing concrete recycled into a 6F2 type materials (crushed concrete/demolition rubble).

The site was then levelled, with sub-surface concrete obstructions removed, and a layer of the crushed concrete/demolition rubble (6F2) placed across to a thickness ranging from 150 – 500mm. The thickness at any given point can be seen in Appendix B.

The materials generally comprised an orange brown and grey sandy gravel, locally clayey. The sand was fine to coarse grained and the gravel was fine to coarse, angular to rounded flints (0 - 65%), concrete (30 – 50%), brick (30 - 50%), tarmac (0 - 5%), carbonaceous material (0 – 10%) and chalk fragments (0 – 5%).

Locally a membrane was found, plastic fragments and concrete boulders.

4.0 ADDITIONAL CONTAMINATION ASSESSMENT

4.1 Capping Material

A Ground and Water Limited Engineer attended site on the 4th December 2019 to take samples of the crushed concrete/demolition rubble capping the site, following demolition and site preparation. The samples were mainly taken from the northern areas of the site.

27No. samples of the capping were taken from across the site at a depth of ~0.10m bgl and analysed. The location of the sampling points can be seen in Figure 11.

The analysis suite for the Ground and Water Limited Phase of Investigation is presented below and comprised.

- Semi Metals and Heavy Metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc (All samples, TP1 – TP27);
- Asbestos Screen (All samples, TP1 – TP27);
- Polycyclic Aromatic Hydrocarbons (PAH's) 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 (All samples, TP1 – TP27);
- Fuel Oils – Speciated TPH including full aliphatic/aromatic split (TP3, TP6, TP9, TP12, TP15, TP18, TP21, TP24, TP27);
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs) (TP3, TP6, TP9, TP12, TP15, TP18, TP21, TP24, TP27).

The results of the analysis can be seen in Appendix C.

The results of the chemical laboratory testing were compared to the LQM/CIEH Suitable 4 Use Levels (S4UL) for a ***"Residential with home-grown produce"*** land-use scenario for the majority of site, with a ***"Commercial"*** land-use scenario for the eastern portion, as these were considered the most appropriate land-use scenarios for the proposed development. The soil assessment criteria used in this assessment are given within Appendix D.

Where no LQM/CIEH S4UL/C4SL LLTC was available for a particular determinand then preliminary reference was made to the laboratory detection limit of the determinand. 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/GAC/C4SL LLTC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each soil sample was used to derive the appropriate SGV/GAC. The SOM of capping material ranged between 0.3 – 1.3%, therefore the results were analysed against the 1.0% SOM category.

Double plot analysis of the speciated PAH's undertaken in Phase 4 of the investigation revealed all of the PAH's to be coal/coal ash and part of the urban background, with the exception of WS18/1.00m bgl which appeared to be coal tar/creosote-derived.

Analysis of the speciated PAH's from TP20 also revealed a coal/coal ash/coal derived soot. As most PAH's were not coal tar derived, then the benzo(a)pyrene S4UL is suitable for use. A copy of the LQM PAH Profiling Tool used can be seen in Appendix E.

The results of the comparison of the representative contaminant concentrations for crushed concrete/demolition rubble are presented in the table overleaf.

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 Home-grown produce" Land-Use Scenario	**"Commercial" Land-Use Scenario**
Arsenic	None	None
Beryllium	None	None
Boron	None	None
Cadmium	None	None
Chromium (III)	None	None
Hexavalent Chromium (VI)	None	None
Copper	None	None
Lead	TP22/0 10m bgl	None
Mercury (Elemental)	None	None
Nickel	None	None
Selenium	None	None
Vanadium	None	None
Zinc	None	None
Cyanide (Total)	None	None
Total Phenol	None	None
Naphthalene	None	None
Acenapthylene	None	None
Acenapthene	None	None
Fluorene	None	None
Phenanthrene	None	None
Anthracene	None	None
Fluoranthene	None	None
Pyrene	None	None
Benzo(a)anthracene	None	None
Chrysene	None	None
Benzo(b)fluoranthene	TP20/0 10m bgl	None
Benzo(k)fluoranthene	None	None
Benzo(a)pyrene	TP20/0 10m bgl	None
Indeno(1,2,3-cd)pyrene	None	None
Dibenz(a,h)anthracene	TP20/0 10m bgl	None
Benzo(ghi)perylene	None	None
TPH C5 – C6 (aliphatic)	None	None
TPH C6 – C8 (aliphatic)	None	None
TPH C8 - C10 (aliphatic)	None	None
TPH C10 - C12 (aliphatic)	None	None
TPH C12 - C16 (aliphatic)	None	None
TPH C16 - C21 (aliphatic)	None	None
TPH C21 - C34 (aliphatic)	None	None
TPH C5 – C7 (aromatic)	None	None
TPH C7 – C8 (aromatic)	None	None
TPH C8 – C10 (aromatic)	None	None
TPH C10 – C12 (aromatic)	None	None
TPH C12 – C16 (aromatic)	None	None
TPH C16 - C21 (aromatic)	None	None
TPH C21 - C35 (aromatic)	None	None
Benzene	None	None
Toluene	None	None
Ethylbenzene	None	None
Xylene (o, m & p)	None	None
MTBE	None	None
Asbestos Screen	TP21/0.10m (Amosite; <0.001%)	TP21/0.10m (Amosite; <0.001%)

The chemical laboratory testing revealed elevated levels of Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(a,h)anthracene within one sample tested (TP20/0.10m bgl) in excess of the ***"Residential with Home-grown Produce"*** land-use scenario.

An elevated level of Lead was also noted within TP22 in excess of the ***"Residential with Home-grown Produce"*** land-use scenario.

With the exception of a positive Asbestos screen within the sample from TP21, no other elevated levels of determinands in excess of the ***"Residential with Home-grown Produce"*** land-use scenario were noted. None of the levels noted exceeded the ***"Commercial"*** land-use scenario.

A positive Asbestos identification was noted in the sample from TP21. Quantification revealed Amosite present as bundles, at <0.001%. An Asbestos Risk Assessment is provided in 4.1.2 of this report.

4.1.1 CLAIRE Statistics

The results of CLAIRE statistical analysis of the distribution of elevated levels of Lead and PAHs within the crushed concrete/demolition rubble can be seen tabulated below.

The crushed concrete/demolition rubble encountered was generally described as an orange brown and grey sandy gravels, locally clays. The sand was fine to coarse grained and the gravel was fine to coarse, angular to rounded flints (0 - 65%), concrete (30 – 50%), brick (30 - 50%) tarmac (0 - 5%), carbonaceous material (0 – 10%), chalk. Bit was considered that the materials was all likely from the same course and, therefore, the use of CLAIRE statistics was deemed appropriate.

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 LQM/CIEH S4UL or CSL4 LLTC	
			Residential with Home Grown Produce	Commercial
Lead (with outliers)	Yes	154.61	No	No
Benzo(b)fluoranthene (with outliers)	Yes	2.160	No	No
Benzo(a)pyrene (with outliers)	Yes	1.440	No	No
Dibenz(a,h)anthracene (with outliers)	Yes	1.920	No	No

The table above shows that the distribution of Lead and PAHs within the Made Ground was non-normal. The outlier related to TP20 for the PAH's and TP22 for the lead. However, with the outliers present the Upper Confidence Limit did not exceeded the threshold for a ***'Residential with Home-grown Produce'*** land use scenario for any determinand. The evidence level ranged from 97 – 99%. Based on the above, the isolated levels of lead and PAH's did not post a risk to end-users.

4.1.2 Human Health – Asbestos contamination within the Made Ground

A positive Asbestos identification was noted in the sample from TP21. Quantification revealed Amosite present as bundles, at <0.001%.

Given the presence of these fibres within the soils and the potential for these hotspots to coincide with publicly accessible areas on site, as well as workers during site redevelopment, it is considered likely that further risk assessment is necessary with respect to the asbestos detections noted.

The quantification for TP21 was subject to risk assessment.

Based on a comparison of the results of the asbestos risk assessment in Appendix G with Tables 14.1 and 14.3 of CIRIA733, BH14 revealed a lifetime risk of mesothelioma of **0.8 per 100,000 people exposed (highest arguable 6).** The risk of Lung Cancer was probably **insignificant.**

A risk of less than 1 in 100,000 people exposed is deemed to be a publicly acceptable risk.

4.1.3 Proposed Levels

The client would like to utilise the existing level on top of the recycled 6F2 crushed concrete/demolition rubble.

The testing to date has indicated that the existing demolition rubble/crushed concrete capping appears suitable for use. The majority of the materials shows no elevated levels of determinands, but three small hotspots are present which appear to pose no unacceptable risk to end-users.

The crushed concrete/demolition rubble will provide a break layer against end-users in private gardens/communal gardens digging further. A minimum 600mm capping of clean subsoil and Topsoil will provide protection against the minor risks highlighted in the testing. The required reduce dig or Topsoil Capping required on a plot by plot basis can be seen in Section 5.2 of this report.

4.2 Groundwater Risk Assessment

In order to reduce uncertainty in the groundwater risk assessment undertaken to date, further groundwater monitoring wells were installed onsite between the 16th and 21st January 2020.

5No. cable percussion boreholes (BH1 – BH5) were constructed across the site to 15.00 - 20.00m bgl. Standard in-situ testing and sampling was undertaken for geotechnical analysis, which will be the subject of a separate report. 5No. combined ground-gas and groundwater monitoring wells were installed within each borehole, the construction of which can be seen tabulated overleaf.

Combined Ground-gas and Groundwater Monitoring Well Construction					
Trial Hole	Borehole Depth (m bgl)	Depth of Installation (m bgl)	Thickness of slotted piping with gravel filter pack (m)	Depth of plain piping with bentonite seal (m bgl)	Piping external diameter (mm)
BH1	15.00	5.00	4.00	1.00	63
BH2	20.00	5.00	4.00	1.00	63
BH3	18.45	5.00	4.00	1.00	63
BH4	15.45	5.00	4.00	1.00	63
BH5	15.45	5.00	4.00	1.00	63

A trial hole location plan can be seen in Figure 13.

The ground conditions encountered in the boreholes can be seen tabulated below. Trial hole logs are given in Appendix H.

Summary of Strata Encountered (BH1 – BH5).		
Strata	Depth Encountered (m bgl)	Thickness (m)
TOPSOIL (BH5): (Drillers Description)	GL	0.20
MADE GROUND: Generally comprised a greyish brown to light brown silty sandy gravel. The sand was fine to coarse grained. The gravel was fine to coarse, sub-angular to sub-rounded, slate, brick, flint, and concrete. Occasional fragments of metal, glass and plastic.	GL	0.20 – 1.00
MADE GROUND (BH1 & BH2, BH5): Generally comprised a brown and orangish brown sandy gravelly silty clay. The sand was fine to coarse grained. The gravel was fine to coarse, sub-angular to rounded, flint with rare glass and brick.	0.20 - 0.50	0.30 – 1.20
HEAD DEPOSITS (Cohesive) (BH1, BH3 – BH5): Generally comprised Orangish brown, brown and grey sandy gravelly silty clay. Gravel is fine to coarse, sub-angular to rounded, flint. Cobble of flint in TP9.	1.00 – 1.60	1.00 - 9.10
HEAD DEPOSITS (Granular) (BH2): Generally comprised an orangish brown occasionally clayey silty sand. The sand was fine to medium grained. Occasional fine to coarse, sub-rounded to rounded, flint.	0.50	4.50
HEAD DEPOSITS (Cohesive) (BH2): Orangish brown and grey silty sandy CLAY. Sand is fine to medium grained.	5.00	1.00
LONDON CLAY FORMATION (BH2,): Generally comprised a dark grey silty clay. Fine selenite noted. Shell fragments from 8.00 – 12.00m bgl. Sandy from 18.00m bgl in BH2	2.00 – 10.70	>10.95 – >15.45

No roots were noted in any trial holes during the site investigation.

Perched water and groundwater were encountered at varying depths during the site investigation in all trial holes except BH3, TP2, TP3, TP6, TP7 & TP9. Due to water added into the boreholes to aid drilling, it was not possible to fully determine the groundwater conditions.

Depth of Perched/Groundwater within Trial Holes		
Trial Hole	**Water Encountered**	**Water Depth (m bgl)**
BH1	Groundwater 1 Hour after drilling	11.50
BH2	Groundwater Seepage	8.00
BH4	Groundwater	12.50, 13.20 and 13.80
BH5	Groundwater	3.00
TP1	Perched water	0.80
TP4	Minor Groundwater	2.40
TP5	Perched water from historic soakaway	1.00
TP8	Minor Perched water seepage	1.00 – 1.20

The results of return visits to dip the wells installed can be seen tabulated below.

Depth of Groundwater Strikes/Standing Groundwater Within Trial Holes			
Trial Hole	**Date**	**Depth of Groundwater**	**Depth to Base of Trial Hole/Standpipe (m bgl)**
BH1	29/01/20	4.85	4.93
	27/02/20	4.79	5.05
BH2	29/01/20	1.14	2.13
	27/02/20	0.90	2.04
BH3	29/01/20	0.66	4.25
	27/02/20	0.87	4.20
BH4	29/01/20	1.45	4.88
	27/02/20	0.42	5.01
BH5	29/01/20	1.20	4.80
	27/02/20	1.24	4.95

The results of the above analysis indicate that the well in BH2 may be silted up given the granular nature of the Head Deposits encountered at that location.

A programme of chemical laboratory testing, scheduled by Ground and Water Limited and carried out by DETS Limited, was undertaken on groundwater samples recovered from the monitoring standpipe installed within BH1 – BH5.

Samples were recovered from the boreholes on the 26th February 2020. The samples were taken to determine if the groundwater underlying the site was impacted from historic uses onsite or within the site's environs.

The testing schedule and suite was based on the Conceptual Site Model given within 2.1 of this report and the results of the intrusive ground investigation.

During the sampling visit the well was purged (three times the volume of water in the well) prior to sampling.

The analysis suite is presented below and comprised.

- Semi Metals and Heavy Metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc (BH1 – BH5)
- Polycyclic Aromatic Hydrocarbons (PAH's) 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 (BH1 –

BH5);

- Fuel Oils – Speciated TPH including full aliphatic/aromatic split (BH1 – BH5);
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs) (BH1 – BH5).
- Volatile Organic Compounds (VOCs) (BH1, BH3, BH5).

The results of the groundwater analysis can be seen tabulated in the following pages.

Tabulated Results for Groundwater Testing - Metals/Semi Metals				
Determinant	**Units**	**Source**	**Threshold Level**	**Samples where EQS Level was exceeded**
Total Cyanide	**ug/l**	**AA-EQS**	**1**	**BH3 (10ug/l), BH4 (17ug/l),**
Sulphate as SO_4	**mg/l**	**AA-EQS**	**400**	**BH1 (518mg/l)**
Arsenic (dissolved)	ug/l	AA-EQS	50	None
Boron (dissolved)	ug/l	AA-EQS	2000	None
Cadmium (dissolved)	ug/l	AA-EQS	≤0.08	Below detection Limit
Chromium (dissolved)	**ug/l**	**AA-EQS**	**4.7**	**BH4 (17ug/l)**
Chromium (hexavalent)	ug/l	AA-EQS	3.4	Below detection Limit
Copper (dissolved)	**ug/l**	**AA-EQS**	**1 (bioavailable)**	**BH1 (15ug/l), BH2 (11ug/l), BH3 (8ug/l), BH4 (42ug/l), BH5 (8ug/l)**
Lead (dissolved)	ug/l	AA-EQS	1.5 (bioavailable)	Below Detection Limit
Mercury (dissolved)	ug/l	MAC-EQS	0.07	None
Nickel (dissolved)	**ug/l**	**AA-EQS**	**4 (bioavailable)**	**BH1 (14ug/l), BH4 (15ug/l)**
Selenium (dissolved)	ug/l	DWS	10	None
Vanadium (dissolved)	**ug/l**	**AA-EQS**	**20**	**BH3 (29ug/l)**
Zinc (dissolved)	**ug/l**	**AA-EQS**	**10.9 (bioavailable)**	**BH1 (22ug/l), BH2 (20ug/l), BH3 (16ug/l), BH4 (14ug/l), BH5 (16ug/l)**
Total Phenols (monohydric)	**ug/l**	**AA-EQS**	**7.7**	**BH3 (19ug/l), BH4 (44ug/l)**
Notes	DWS = UK Drinking Water Standards EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration WHO = World Health Organisation			

Tabulated Results for Groundwater Testing - BTEX (Benzene, Toluene, Ethylbenzene & Xylene)				
Determinant	**Units**	**Source**	**Threshold Level**	**Samples where EQS Level was exceeded**
Benzene	ug/l	AA-EQS	10	None
Toluene	ug/l	AA-EQS	74	None
Ethylbenzene	ug/l	WHO	300	None
Xylene (p, m & o)	ug/l	AA-EQS	30	None
MTBE	ug/l	No available standards	-	Below detection Limit
Notes	DWS = UK Drinking Water Standards EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration WHO = World Health Organisation			

Tabulated Results for Groundwater Testing - Polyaromatic Hydrocarbons (PAHs)				
Determinant	**Units**	**Source**	**Threshold Level**	**Samples where EQS Level was exceeded**
Naphthalene	ug/l	AA-EQS	2	None
Acenaphthylene	ug/l	No available standards	-	Below detection Limit
Acenaphthene	ug/l	No available standards	-	BH3 (0.08ug/l), BH4 (0.45ug/l)
Fluorene	ug/l	No available standards	-	BH3 (0.05ug/l), BH4 (0.16ug/l)
Phenanthrene	ug/l	No available standards	-	BH3 (0.09ug/l), BH4 (0.45ug/l)
Anthracene	ug/l	AA-EQS	0.1	BH3 (0.02ug/l), BH4 (0.11ug/l)
Fluoranthene	ug/l	AA-EQS	0.0063	BH3 (0.05ug/l), BH4 (0.19ug/l)
Pyrene	ug/l	No available standards	-	BH3 (0.03ug/l), BH4 (0.12ug/l)
Benzo(a)anthracene	ug/l	No available standards	-	Below detection Limit
Chrysene	ug/l	No available standards	-	BH4 (0.02ug/l)
Benzo(b)fluoranthene	ug/l	AA-EQS	0.00017	Below detection Limit
Benzo(k)fluoranthene	ug/l	AA-EQS	0.00017	Below detection Limit
Benzo(a)pyrene	ug/l	AA-EQS	0.00017	Below detection Limit
Indeno(1,2,3-cd)pyrene	ug/l	AA-EQS	0.00017	Below detection Limit
Dibenz(a,h)anthracene	ug/l	No available standards	-	Below detection Limit
Benzo(ghi)perylene	ug/l	AA-EQS	0.00017	Below detection Limit

Notes
DWS = UK Drinking Water Standards
EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater)
AA = Annual Average
MAC = Maximum Allowable Concentration
WHO = World Health Organisation

Tabulated Results for Groundwater Testing - Total Petroleum Hydrocarbons (TPH)				
Determinant	**Units**	**Source**	**Threshold Level**	**Samples where EQS Level was exceeded**
Aliphatic >C5 - C6	ug/l	DWS	10	None
Aliphatic >C6 - C8	ug/l	DWS	10	None
Aliphatic >C8 - C10	ug/l	DWS	10	None
Aliphatic >C10 - C12	ug/l	DWS	10	None
Aliphatic >C12 - C16	ug/l	DWS	10	None
Aliphatic >C16 - C21	ug/l	DWS	10	None
Aliphatic >C21 - C34	ug/l	DWS	10	None
Aliphatic (C5 - C34)	ug/l	DWS	10	None
Aromatic >C5 - C7	ug/l	DWS	10	None
Aromatic >C7 - C8	ug/l	DWS	10	None
Aromatic >C8 - C10	ug/l	DWS	10	None
Aromatic >C10 - C12	ug/l	DWS	10	None
Aromatic >C12 - C16	ug/l	DWS	10	None
Aromatic >C16 - C21	ug/l	DWS	10	None
Aromatic >C21 - C35	ug/l	DWS	10	None
Aromatic (C5 - C35)	ug/l	DWS	10	None
Total >C5 - C35	ug/l	DWS	10	None

Notes
DWS = UK Drinking Water Standards
EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater)
AA = Annual Average
MAC = Maximum Allowable Concentration
WHO = World Health Organisation

Tabulated Results for Groundwater Testing - Polyaromatic Hydrocarbons (PAHs)				
Determinant	**Units**	**Source**	**Threshold Level**	**Samples where EQS Level was exceeded**
Dichlorodifluoromethane	ug/l	No available standards	-	Below detection Limit
Vinyl Chloride	ug/l	DWS	0.5	Below detection Limit
Chloromethane	ug/l	No available standards	-	Below detection Limit
Chloroethane	ug/l	DWS	0.5	Below detection Limit
Bromomethane	ug/l	No available standards	-	Below detection Limit
Trichlorofluoromethane	ug/l	No available standards	-	Below detection Limit
1,1-Dichloroethene	ug/l	WHO	30	Below detection Limit
trans-1,2-Dichloroethene	ug/l	WHO	50	Below detection Limit
1,1-Dichloroethane	ug/l	WHO	30	Below detection Limit
cis-1,2-Dichloroethene	ug/l	WHO	50	Below detection Limit
2,2-Dichloropropane	ug/l	No available standards	-	Below detection Limit
Chloroform	ug/l	AA-EQS	2.5	Below detection Limit
Bromochloromethane	ug/l	No available standards	-	Below detection Limit
1,1,1-Trichloroethane	ug/l	AA-EQS	100	Below detection Limit
1,1-Dichloropropene	ug/l	No available standards	-	Below detection Limit
Carbon Tetrachloride	ug/l	AA-EQS	12	Below detection Limit
1,2-Dichloroethane	ug/l	AA-EQS	10	Below detection Limit
1,2-Dichloropropane	ug/l	DWS	0.1	Below detection Limit
Trichloroethene (TCE)	ug/l	AA-EQS	10	Below detection Limit
Bromodichloromethane	ug/l	No available standards	-	Below detection Limit
Dibromomethane	ug/l	No available standards	-	Below detection Limit
TAME	ug/l	No available standards	-	Below detection Limit
cis-1,3-Dichloropropene	ug/l	DWS	0.1	Below detection Limit
trans-1,3-Dichloropropene	ug/l	DWS	0.1	Below detection Limit
1,1,2-Trichloroethane	ug/l	AA-EQS	400	Below detection Limit
1,3-Dichloropropane	ug/l	No available standards	-	Below detection Limit
Tetrachloroethene (PCE)	ug/l	AA-EQS	10	Below detection Limit
Dibromochloromethane	ug/l	No available standards	-	Below detection Limit
1,2-Dibromoethane	ug/l	No available standards	-	Below detection Limit
Chlorobenzene	ug/l	No available standards	-	Below detection Limit
1,1,1,2-Tetrachloroethane	ug/l	No available standards	-	Below detection Limit
Styrene	ug/l	AA-EQS	50	Below detection Limit
Bromoform	ug/l	No available standards	-	Below detection Limit
Isopropylbenzene	ug/l	No available standards	-	Below detection Limit
1,1,2,2-Tetrachloroethane	ug/l	No available standards	-	Below detection Limit
1,2,3-Trichloropropane	ug/l	No available standards	-	Below detection Limit
n-Propylbenzene	ug/l	No available standards	-	Below detection Limit
Bromobenzene	ug/l	No available standards	-	Below detection Limit
2-Chlorotoluene	ug/l	No available standards	-	Below detection Limit
1,3,5-Trimethylbenzene	ug/l	No available standards	-	Below detection Limit
4-Chlorotoluene	ug/l	No available standards	-	Below detection Limit
tert-Butylbenzene	ug/l	No available standards	-	Below detection Limit
1,2,4-Trimethylbenzene	ug/l	No available standards	-	Below detection Limit
sec-Butylbenzene	ug/l	No available standards	-	Below detection Limit
p-Isopropyltoluene	ug/l	No available standards	-	Below detection Limit
1,3-Dichlorobenzene	ug/l	No available standards	-	Below detection Limit
1,4-Dichlorobenzene	ug/l	WHO	300	Below detection Limit
n-Butylbenzene	ug/l	No available standards	-	Below detection Limit
1,2-Dichlorobenzene	ug/l	WHO	100	Below detection Limit
1,2-Dibromo-3-chloropropane	ug/l	WHO	1	Below detection Limit
Hexachlorobutadiene	ug/l	MAC-EQS	0.6	Below detection Limit

Notes	DWS = UK Drinking Water Standards EQS = Environmental Quality Standard for Protection of Aquatic Life (Freshwater or Saltwater) AA = Annual Average MAC = Maximum Allowable Concentration WHO = World Health Organisation

The results of the groundwater testing can be seen in Appendix I.

The testing revealed that a number of contaminants, in particular PAH compounds, metals, cyanide and Phenols exceeded the relevant EQS Freshwater standards.

During the intrusive site investigation, the shallow groundwater encountered was considered to be perched within the Made Ground overlying the superficial Head Deposits and the London Clay Formation

The boreholes were located ~50 to ~210m northeast of the from the nearest surface water feature to site (thought to be the River Lavant), and based on the inconsistent contaminant concentrations recorded within the groundwater, the absence of a confirmed continuous groundwater pathway and the travel distance to surface water features, it was considered unlikely that the groundwater contaminants recorded within BH1 – BH5 would risk impacting watercourses surrounding the site (such as the River Lavant).

This was confirmed by water sampling and testing of the on-site Monsoon Drain and nearby River Lavant undertaken by WYG, which revealed no exceedances with regard to EQS thresholds.

Therefore, the exceedances noted during groundwater sampling to-date suggested that there was a low to moderate risk to surface/perched waters. However, the thickness of London Clay Formation recorded during the intrusive site investigation was considered sufficient to protect the underlying Principal Aquifer associated with the Lewes Nodular Chalk Member and Tarrant Chalk Member, and therefore the risk to deep groundwater was considered to be negligible.

The very slight PAH's and heavy metals contamination are considered reasonable for the setting of the site. Remediation to what could be considered conservative EQS/DWS standards with respect to metallic and PAH' contamination is unlikely to be cost effective, compared to the potential positive impact likely. Therefore, no further remediation with respect to the risks to controlled waters is required.

4.3 Updated Ground Gas Risk Assessment

In order to reduce uncertainty in the ground gas risk assessment undertaken to date, further monitoring was undertaken onsite. At the time of reporting, August 2020, three phases of monitoring, equating to 11No. monitoring visits have been undertaken and are considered.

4.3.1 Available Data

Site Model

The site historical review indicated that the site was the location of the Colt International factory, warehouse and office buildings from the mid-1960s to the time of the site walkover in September 2016. In the southern portion of the site, above ground storage tanks for 'fuel oil' was noted, adjacent to a generator. The desk study identified the main sources of contamination to be associated with former tanks onsite, fuel supply (pipes around the site) and Made Ground. No significant offsite source of contamination was identified. A gas holder was noted ~300m south of the site, however groundwater flow was anticipated to be in line with local topography and

therefore this was down gradient of the site.

The geological and hydrogeological model is discussed in detail earlier in this report, however can be summarized such that, relatively thin Made Ground (generally <1.50m bgl, extending to 3.00m bgl in WS3) of varying soil content, overlying Head deposits (mixture of cohesive and granular soils), overlying London Clay Formation (cohesive soils with sand horizons). Sand was encountered within the boreholes within the center of the site. The geology of the site can therefore be separated into three; northwest, central and southeast. This is reported within GWPR3514/GIR/March2020. The Head deposits were classified as a Secondary (Undifferentiated) Aquifer of low to moderate permeability and are typically made up of discontinuous beds. The London Clay Formation was classified as Unproductive Strata. The site was not within a location where mandatory protection measures against the ingress of Radon were likely to be required.

WYG Ground Investigation and Assessment

Review of the WYG Ground Investigation and Assessment (A090070-182, June 2017) indicated that two rounds of ground gas monitoring were undertaken at the site (10/02/2017 and 27/02/2017) as part of their investigation. The construction of the boreholes can be seen in the table below and the location can be seen on Figure 14.

Combined Ground-gas and Groundwater Monitoring Well Construction						
Trial Hole	**Depth of Installation (m bgl)**	**Thickness of slotted piping with gravel filter pack (m)**	**Depth of plain piping with bentonite seal (m bgl)**	**Piping internal diameter (mm)**	**Response Zone (m bgl)**	**Strata Screened**
BH1	1.00	0.80	0.20	50	0.20 – 1.00	MG
BH2	3.00	2.00	1.00	50	1.00 – 3.00	Head
BH4	4.00	3.00	1.00	50	1.00 – 3.00	MG, Head, LCF
BH5	2.70	1.00	1.70	19	1.70 – 2.70	Head
BH7	2.00	1.50	0.50	50	0.50 – 2.00	MG
BH11	1.00	0.20	0.80	50	0.20 – 1.00	MG
BH14	2.50	0.90	1.40	50	1.40 – 2.50	Head

Ground-gas monitoring was undertaken on two occasions. The results of the ground-gas monitoring can be seen tabulated below and summarised in the subsequent paragraph. Where monitoring results will be in under consideration in line with CIRIA C665 and BS8485:2015+A1:2019, the table has been highlighted orange.

Ground-gas Monitoring from Wells (Steady-State Conditions)										
Date	**Trial Hole**	**O_2 (%)**	**LEL (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m bgl)**	**PID (ppm)**
Date: 10/02/2017 Time: unknown Weather: Clear and Sunny Pressure: 1022mb Pressure from previous 24h: Steady	BH1	22.1	/	0.1	0.1	0	0	0.1	NR	/
	BH2	21.4	/	0.1	0.2	0	0	0.1	NR	/
	BH4	18.2	/	0.1	2.5	0	1	0.0	NR	/
	BH5	14.2	/	0.9	0.3	0	40	0.2	NR	/
	BH7	20.9	/	0.2	0.2	0	1	0.1	NR	/
	BH11	21.8	/	0.1	0.4	0	1	0.0	NR	/
	BH14	21.1	/	0.1	0.4	0	0	0.0	NR	/
Date: 27/02/2017	BH1	20.3	NT	0.0	0.1	1	0	0.3	0.00	NT

Ground-gas Monitoring from Wells (Steady-State Conditions)										
Date	Trial Hole	O_2 (%)	LEL (%)	CH_4 (%)	CO_2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (litre/hr)	Groundwater (m bgl)	PID (ppm)
Time: 11:40 – 15:45 Weather: Rain Pressure: 986mb Pressure from previous 24h: falling from 1001mb	BH2	20.7	NT	0.0	0.1	1	0	0.4	0.32	NT
	BH4	20.8	NT	0.0	0.1	1	0	0.3	1.63	NT
	BH5	20.6	NT	0.0	0.1	1	0	0.2	0.95	NT
	BH7	20.8	NT	0.0	0.1	1	0	0.2	Dry	NT
	BH11	20.5	NT	0.0	0.1	1	0	0.2	Dry	NT
	BH14	20.4	NT	0.0	0.1	1	0	0.2	1.40	NT

Monitoring visits were recorded during one steady atmospheric condition and following a falling atmospheric pressure trend. Steady-state ground gas concentrations recorded were typically the same as the peak gas concentrations recorded. No peak flow greater than the steady-state in the table above was recorded. Maximum methane concentration recorded was 0.9 %v/v, the maximum carbon dioxide concentration recorded was 2.5 l/hr and the maximum flow recorded was 0.4 l/hr. The maximum flow recorded was within a flooded well and as a result of the possible piston effect should be discounted. Therefore the maximum flow rate recorded was 0.3 l/hr.

Campbell Reith Hill Ground Investigation Factual Report

Review of the Campbell Reith Hill Ground Investigation Factual Report (GL20590, September 2018) indicated that four rounds of ground gas monitoring were undertaken at the site (30/05/2018, 21/06/2018, 26/06/2018 and 07/09/2018) as part of their investigation. An additional six boreholes were installed prior to monitoring and the construction of the boreholes can be seen in the table below and the location can be seen on Figure 14. During the monitoring, the WYG boreholes were also monitored.

Combined Ground-gas and Groundwater Monitoring Well Construction						
Trial Hole	Depth of Installation (m bgl)	Thickness of slotted piping with gravel filter pack (m)	Depth of plain piping with bentonite seal (m bgl)	Piping internal diameter (mm)	Response Zone (m bgl)	Strata Screened
BH201	12.00	7.00	5.00	50	5.00 – 12.00	Head and LCF
BH202A	12.00	8.00	4.00	50	4.00 – 12.00	LCF
WS202	2.60	1.60	1.00	50	1.00 – 2.60	MG and Head
WS204	3.90	3.00	0.90	50	0.90 – 3.90	MG and Head
WS205	2.80	2.00	0.80	50	0.80 – 2.80	Head
WS206	2.00	1.00	1.00	50	1.00 – 2.00	Head

Ground-gas monitoring was undertaken on four occasions. The results of the ground-gas monitoring can be seen tabulated below and summarised in the subsequent paragraph. Where monitoring results will be in under consideration in line with CIRIA C665 and BS8485:2015+A1:2019, the table has been highlighted orange.

Ground-gas Monitoring from Wells (Steady-State Conditions)										
Date	Trial Hole	O_2 (%)	LEL (%)	CH_4 (%)	CO_2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (litre/hr)	Groundwater (m bgl)	PID (ppm)
Date: 30/05/2018 Time: 09:45 – 17:00 Weather: Dry and overcast Pressure: 1013mb	BH1	20.8	0.5	0.1	0.0	0	0	0.0	0.15	0.4
	BH2	17.1	0.5	0.1	0.7	0	13	0.1	NR	2.2
	BH4	16.7	1.0	0.2	4.8	0	0	0.0	1.82	0.9
	BH7	10.3	31.5	5.0	0.1	0	2	4.2	0.91	0.4

Ground-gas Monitoring from Wells (Steady-State Conditions)										
Date	Trial Hole	O_2 (%)	LEL (%)	CH_4 (%)	CO_2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (litre/hr)	Groundwater (m bgl)	PID (ppm)
Pressure from previous 24h: falling from 1017mb	BH11	19.4	0.5	0.1	0.3	0	0	0.0	0.30	0.4
	BH201	17.6	0.5	0.1	1.6	0	2	0.0	Dry	0.5
	BH202A	17.1	0.5	0.1	0.7	0	13	0.1	NR	2.2
	WS202	12.9	1.5	1.6	7.4	0	4	-0.3	Dry	1.6
	WS204	17.6	5.5	0.1	0.0	0	4	-0.1	1.56	1.7
	WS205	11.9	0.5	0.1	0.0	0	0	-0.2	NR	6.0
	WS206	20.0	2.0	0.1	0.8	0	0	-0.2	0.78	1.4
Date: 21/06/2018 Time: 10:55 – 13:45 Weather: Rain Pressure: 1023mb Pressure from previous 24h: steady	BH1	20.1	2.5	0.0	0.2	0	1	0.0	0.38	0.9
	BH2	NR	NR	NR	NR	NR	NR	NR	NR	NR
	BH4	20.1	0.0	0.0	3.4	0	1	0.0	2.00	0.9
	BH7	0.0	28.0	5.6	13.3	8	1	0.0	1.67	1.8
	BH11	16.6	0.5	0.0	1.8	0	1	0.0	0.82	0.6
	BH201	14.0	0.0	0.0	2.6	1	3	-0.1	5.14	2.3
	BH202A	/	/	/	/	/	/	/	Flooded	/
	WS202	3.6	73.0	14.6	7.6	0	4	0.0	Dry	0.2
	WS204	12.5	0.0	0.0	0.0	0	13	0.0	1.42	2.1
	WS205	7.5	0.0	0.0	0.0	0	3	0.4	1.31	2.7
	WS206	19.8	1.0	0.0	1.2	0	2	0.0	1.10	0.5
Date: 26/06/2018 Time: 08:50 – 11:05 Weather: Dry and Sunny Pressure: 1026mb Pressure from previous 24h: falling from 1027mb	BH1	18.2	15.0	1.2	2.2	0	0	0.0	0.54	0.8
	BH2	NR	NR	NR	NR	NR	NR	NR	NR	NR
	BH4	18.5	0.0	0.0	2.8	0	0	0.0	2.10	1.4
	BH7	16.5	0.0	0.8	3.3	0	0	0.0	1.71	0.6
	BH11	15.2	0.5	0.0	4.7	0	0	0.0	0.87	0.8
	BH201	15.0	0.5	0.0	3.2	0	0	0.0	5.12	2.4
	BH202A	/	/	/	/	/	/	/	Flooded	/
	WS202	0.8	68.0	13.6	14.4	0	0	0.1	Dry	0.1
	WS204	16.4	0.0	0.0	0.0	1	0	0.0	1.44	1.7
	WS205	15.7	0.0	0.0	0.0	0	0	-0.1	1.34	2.0
	WS206	19.9	0.0	0.0	1.3	0	0	0.0	1.10	1.2
Date: 07/09/2018 Time: 11:00 – 12:45 Weather: Dry and Sunny Pressure: 1022mb Pressure from previous 24h: falling from 1026mb	BH1	20.2	0.0	0.0	0.1	0	0	0.0	0.27	/
	BH2	NR	NR	NR	NR	NR	NR	NR	NR	NR
	BH4	18.9	0.0	0.0	0.8	0	0	0.0	2.02	/
	BH7	17.9	0.0	0.2	1.2	0	0	0.0	1.77	/
	BH11	17.3	0.0	0.0	2.5	0	0	0.0	0.75	/
	BH201	17.4	0.0	0.0	0.0	0	0	0.0	4.56	/
	BH202A	/	/	/	/	/	/	/	Flooded	/
	WS202	1.6	57.0	11.4	8.6	0	0	0.2	Dry	/
	WS204	18.1	0.0	0.0	0.1	0	0	0.0	1.85	/
	WS205	19.4	0.0	0.0	0.2	0	0	0.0	1.21	/
	WS206	18.1	0.0	0.0	0.0	0	0	0.0	1.15	/

Monitoring visits were recorded during two periods of falling and two periods of steady atmospheric pressure trends. Steady-state ground gas concentrations recorded were typically the same as the peak gas concentrations recorded. Maximum methane concentration recorded was 14.6 %v/v, the maximum carbon dioxide concentration recorded was 14.4 l/hr and the maximum flow recorded was 4.2 l/hr.

Ground and Water additional monitoring

Ground and Water Limited undertook an additional five monitoring rounds within five new

boreholes to try and further understand the ground gas regime at the site. The construction of the boreholes can be seen in the table below and the location can be seen on Figure 14. No historical boreholes were monitored during this period.

Combined Ground-gas and Groundwater Monitoring Well Construction						
Trial Hole	**Depth of Installation (m bgl)**	**Thickness of slotted piping with gravel filter pack (m)**	**Depth of plain piping with bentonite seal (m bgl)**	**Piping internal diameter (mm)**	**Response Zone (m bgl)**	**Strata Screened**
G&W BH1	5.00	4.00	1.00	50	1.00 – 5.00	MG, Head
G&W BH2	5.00	4.00	1.00	50	1.00 – 5.00	Head
G&W BH3	5.00	4.00	1.00	50	1.00 – 5.00	Head, LCF

in line with CIRIA C665 and BS8485:2015+A1:2019, the table has been highlighted orange. The ground-gas monitoring was undertaken using a GFM435 landfill gas analyser and MiniRAE PID.

Ground-gas Monitoring from Wells (Steady-State Conditions)									
Date	**Trial Hole**	**O_2 (%)**	**CH_4 (%)**	**CO_2 (%)**	**H2S (ppm)**	**CO (ppm)**	**Flow Rate (litre/hr)**	**Groundwater (m bgl)**	**PID (ppm)**
Date: 26/06/2020 Time: 16:00 – 16:30 Weather: Dry and overcast Pressure: 1008mb Pressure from previous 24h: steady	G&W BH1	19.6	0.0	2.1	0	0	0.0	5.03	3.3
	G&W BH2	20.3	0.0	0.0	0	0	0.0	1.33	1.5
	G&W BH3	21.2	0.0	0.0	0	0	0.0	1.07	2.2
	G&W BH4	20.3	0.0	0.0	0	0	0.0	2.30	3.4
	G&W BH5	/	/	/	/	/	/	/	/
Date: 06/07/2020 Time: 08:30 – 09:15 Weather: Dry and Sunny Pressure: 1018mb Pressure from previous 24h: rising from 1017	G&W BH1	20.6	0.0	0.8	0	0	0.0	5.04	2.8
	G&W BH2	18.4	0.0	0.5	0	0	0.0	1.33	1.6
	G&W BH3	20.2	0.0	0.4	0	0	0.0	1.27	2.9
	G&W BH4	20.0	0.0	0.0	0	0	0.0	Dry	2.8
	G&W BH5	20.1	0.0	1.0	0	0	0.0	1.82	4.6
Date: 13/07/2020 Time: 09:40 – 10:45 Weather: Dry and cloudy Pressure: 1023mb Pressure from previous 24h: falling from 1024mb	G&W BH1	17.8	0.0	3.5	0	0	0.0	5.05	1.7
	G&W BH2	16.4	0.0	0.5	0	0	-5.0*	Dry	1.6
	G&W BH3	17.8	0.0	0.0	0	0	1.5*	1.20	3.7
	G&W BH4	19.9	0.0	0.0	0	0	0.0	Dry	3.8
	G&W BH5	19.5	0.0	1.3	0	0	0.0	Dry	5.6
Date: 22/07/2020 Time: 10:00 – 11:15 Weather: Dry and Sunny Pressure: 1026mb Pressure from previous 24h: falling from 1025mb	G&W BH1	19.1	0.0	1.8	0	0	0.4*	5.15	2.8
	G&W BH2	14.5	0.0	0.5	0	0	-2.7*	1.38	2.8
	G&W BH3	16.8	0.0	0.0	0	0	0.0	1.03	6.1
	G&W BH4	19.7	0.0	0.0	0	0	0.0	2.29	5.0
	G&W BH5	20.0	0.0	0.8	0	0	0.0	1.74	6.4
Date: 11/08/2020 Time: 08:30 – 11:00 Weather: Dry and Sunny Pressure: 1012mb Pressure from previous 24h: Falling slightly, then steady. Rising on the 11th.	G&W BH1	19.8	0.0	1.4	0	0	0.0	5.07	-
	G&W BH2	11.7	0.8	0.6	0	0	-1.7	1.28	-
	G&W BH3	17.7	0.2	0.0	0	0	0	1.27	-
	G&W BH4	19.8	0.0	0.0	0	0	0	2.37	-
	G&W BH5	19.4	0.0	1.6	0	0	0	1.92	-

PID readings were not possible on the 11th August 2020 due to a fault with the equipment.

Monitoring visits were undertaken during a variety of atmospheric pressure trends. Steady-state ground gas concentrations recorded were typically the same, or close to, peak gas concentrations

recorded. Flow rates tended to decrease to a steady-state of 0.0 l/hr and therefore, where appropriate, peak flow readings have been recorded within the table, symbolised by the '*'. The maximum methane concentration recorded was 0.8 %v/v, the maximum carbon dioxide concentration recorded was 3.5 %v/v and the maximum flow recorded was 1.5 l/hr.

Soil Derived Data

An additional line of evidence used in ground gas risk assessment is to consider the presence of degradable materials within the soil and whether these are likely to pose a ground gas risk to the site. The degradation of soils is out of the influence of factors that monitoring is dependent on (e.g. atmospheric pressure trends) and therefore should be considered.

Ground and Water Limited undertook a series of laboratory analysis on 33No. soil samples across the site, reported on under GWPR3192/CAR/December2019. Total Organic Carbon (TOC) analysis indicated that the soils across the site ranged between 0.1% and 0.8%, however WS17 at 0.5m recorded a concentration of 2.9%. This sample contained elevated levels of PAHs and therefore is deemed contaminated and is discounted from the assessment.

4.3.2 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	The historical review has indicated that the site was largely unused until mid-1960s where it became the Colt International factory, with little change until 2016. The site is recorded to contain Made Ground (<3.00m bgl) overlying Head deposits of interbedded cohesive and granular soils classified as a Secondary Undifferentiated Aquifer, overlying London Clay Formation (unproductive strata). Sand has been identified within the central zone of the site.	CIRA C665 and BS 8485:2015+A1:2019 recommend that the geological and hydrogeological model is fully understood.	The understanding of the site's geology and hydrogeology is understood both spatially and with depth. **No further action required.**
Monitoring period	The monitoring has been undertaken on a total of twelve occasions over three phases of work between February 2017 and August 2020. Monitoring has been undertaken during variable atmospheric pressure conditions, including periods of falling atmospheric pressure trends.	CIRIA C665 recommends prolonged monitoring over a range of weather conditions.	The monitoring results obtained fulfil the requirements of the UK guidance. **No further monitoring required.**
Gas datasets	Ground gas flow, concentrations and groundwater level have been undertaken in tandem during each visit of the three monitoring regimes.	Borehole flow velocity and borehole gas volume (methane and carbon dioxide) are required for gas flux calculations and ultimately categorisation. This is completed on a borehole by borehole basis in line with the modified Wilson and Card classification, CIRIA C665 (2007) and BS8485:2015+A1:2019.	Complete datasets are available for each borehole, where readings in contradiction of UK guidance (e.g. flooded wells or <0.5m plain pipe) have been removed, and therefore a gas screening value can be calculated. **No further action required.**
Soil Laboratory Analysis	A large dataset of soil analysis (33No. results) have identified TOC concentrations between 0.1 and 0.8%. One value of 2.9% has been removed from the dataset due to false readings caused by PAH contamination.	CL:AIRE RB17 outlines a pragmatic approach to ground gas risk assessment away from the influences that directly affect ground gas. It considers degradable content of soils and should be used on sites with limited source and Made Ground with average thickness <3m and maximum thickness <5m. TOC should be < 4%.	The TOC concentrations are below the limit to use the soil derived approach as an additional line of evidence. **No further action required.**

4.3.3 Risk Assessment

4.3.3.1 Gas Monitoring Data

The three phases of ground gas monitoring have been reviewed and following omissions caused by contradiction of the UK guidance, is deemed suitable for use in the risk assessment. The monitoring highlighted detected methane concentrations of up to 14.6%, carbon dioxide concentrations of up to

14.4 %v/v and the maximum steady-state flow rate recorded was 4.2 l/hr.

Based on the documentation presented in BS 8485:2015+A1:2019 "Code of practice for the characterisation and remediation from ground gas in affected developments", the *hazardous gas flow rate (Q_{hg})* should be calculated for each borehole using the equation below.

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

Where: Q_{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.

The hazardous gas flow rate has been calculated for each borehole, referred to as the Gas Screening Value (GSV) using the worst-case steady-state concentration and flow, from all monitoring to date. The results are presented within the table below. Following the generation of the GSV, a ground gas characteristic situation can be assigned to the borehole. This has also been included within the table below.

Hazardous Gas Flow Rate Assessment							
Trial Hole	CH_4 (%v/v)	CO_2 (%v/v)	Flow Rate (l/hr)	CH_4 GSV (l/hr)	Characteristic Situation	CO_2 GSV (l/hr)	Characteristic Situation
BH1	1.2	2.2	0.3	0.0036	CS1[4]	0.0066	CS1
BH2	0.1	0.7	0.1	0.0001	CS1	0.0007	CS1
BH4	0.2	4.8	0.3	0.0006	CS1	0.0144	CS1
BH5	0.9	0.3	0.2	0.0018	CS1	0.0006	CS1
BH7	5.6	13.3	4.2	0.235	CS2	0.5586	CS2
BH11	0.1	4.7	0.2	0.0002	CS1	0.0094	CS1
BH14	0.1	0.4	0.2	0.0002	CS1	0.0008	CS1
BH201	0.5	3.2	-0.1	0.0005	CS1	0.0032	CS1
BH202A	0.1	0.7	0.1	0.0001	CS1	0.0007	CS1
WS202	14.6	14.4	0.2	0.0292	CS1[4]	0.0288	CS1[4]
WS204	0.1	0.1	-0.1	0.0001	CS1	0.0001	CS1
WS205	0.1	0.2	0.4	0.0004	CS1	0.0008	CS1
WS206	0.0[1]	1.3	0.0[3]	0.0002	CS1	0.0013	CS1
G&W BH1	0.0[1]	3.5	0.4	0.0008	CS1	0.014	CS1
G&W BH2	0.8	0.6	-5.0	0.04	CS1	0.03	CS1
G&W BH3	0.2	0.4	1.5	0.003	CS1	0.006	CS1
G&W BH4	0.2	4.8	0.3	0.0006	CS1	0.0144	CS1
G&W BH5	0.9	0.3	0.2	0.0018	CS1	0.0006	CS1

[1]Where a value of 0.0 %v/v is detected the detection error is to be used of 0.2%v/v for methane.
[2]Where a value of 0.0 %v/v is detected the detection error is to be used of 0.1%v/v for carbon dioxide.
[3]Where a value of 0.0 l/hr is detected the detection error is to be used of 0.1 l/hr.
[4]CS1 typically when <1% methane and <5% carbon dioxide otherwise *consider* an increase to CS2.

Based upon the available ground gas monitoring to date, the risk from ground gas is considered to be **very low (CS1) to low (CS2)**, in accordance with BS8485:2015+A1:2019. The calculated GSVs indicated that the majority of the site fell within a CS1 categorisation, however BH7 fell within CS2, whilst BH1 and WS202 require consideration for a raise to CS2. Carbon monoxide and hydrogen sulphide was not detected at a concentration to warrant further assessment.

It must be noted that during the latest phase of works, the GSV increased where shallower groundwater was encountered, this is especially so for G&W BH2 where water was consistently seen

around 1.2 – 1.3m bgl, just below the level of plain piping, with the depth of the well <2.00m, likely due to silting up. This is likely to locally affect the ground-gas reading in this borehole.

Consideration is required to any GSV that falls into the CS1 category, however the methane concentration is greater than 1% and/or the carbon dioxide concentration is greater than 5%. These locations are typical of sites where the hazardous gas concentration is significant, however marginal flow has been recorded during monitoring. It should be noted that consideration does not indicate that an increase is required. The assessment indicates that three GSVs require consideration; BH1, methane and WS202 for both methane and carbon dioxide.

BH1 recorded concentrations of methane at 0.1, 0.0, 0.1, 0.0, 1.2 and 0.0 %v/v during monitoring. No evidence of contamination was identified within the borehole log, which shows Made Ground to 0.80m bgl overlying clay of the London Clay Formation. Given the limited nature of the Made Ground and the absence of significant flows in the adjacent boreholes, it is considered that **no increase** is necessary within BH1, with respect to methane, thus remaining as CS1 classification.

WS202 requires consideration to increase to CS2 for both methane and carbon dioxide due to respective gas concentrations of 14.6 %v/v and 14.4 %v/v. This borehole was only monitored on four occasions and identified methane concentrations of 1.6, 14.6, 13.6 and 11.4 %v/v. Carbon dioxide was identified at concentrations of 7.4, 7.6, 14.4 and 8.6 %v/v. The borehole log does not identify any source of ground gas, identifying Made Ground overlying Head deposits within the standpipe. At depth, London Clay Formation was observed. The adjacent borehole identified a higher flow rate than recorded within WS202, indicating a higher flow rate may occur. Given the significance of the gas concentrations, an **increase to CS2** is deemed necessary within the borehole for both methane and carbon dioxide.

4.3.3.2 Soil Derived Method

The intrusive investigation revealed a maximum thickness of Made Ground of 3.00m overlying Head deposits of interbedded cohesive and granular soils, in turn overlying London Clay Formation. The soils at the site are considered to be of impermeable to low permeability in nature and pathways for ground gas migration will be restricted or broken. The soils present onsite may act as source of ground gas.

An alternative approach for ground gas risk assessment (CL:AIRE RB17) can be considered utilising measured concentrations from soil parameters that are independent of influencing factors such as atmospheric pressure and groundwater level. Total Organic Carbon (TOC) was tested on 33No, soil samples, with the analysis results ranging between 0.1 and 0.8% with all values recorded under 1% except for the sample from WS17, which was noted to be contaminated with PAHs and therefore providing an elevated TOC value of 2.9%. This should be discounted from the dataset due to its contaminative nature.

Using the soil derived method, it is considered that a TOC value of <1% within soil is unlikely to pose an unacceptable risk from ground gases and the site can be characterised as **Characteristic Situation CS1**. Any value over 4% warrants investigation through ground gas monitoring, which has already been carried out at the site.

4.3.4 Ground Gas Risk Assessment Summary

Two methods of ground gas risk assessment have been applied to the Former Colt International site, comprising ground gas monitoring as well as analysis of soil samples. The historical review indicated that the site was largely unused until mid-1960s where it became the Colt International factory, with

little change until 2016.

The site was recorded to contain Made Ground (<3.00m bgl) overlying Head deposits of interbedded cohesive and granular soils classified as a Secondary Undifferentiated Aquifer, overlying London Clay Formation (unproductive strata). Sand was identified within the central zone of the site, indicating three main zones of geology.

The ground gas monitoring and the derived GSVs have indicated that there is a very low to low risk from ground gas, equating to **Characteristic Situation CS1** to **Characteristic Situation CS2** across the site. Borehole BH7, in the south and WS202, in the west are two locations where CS2 is deemed appropriate. The remainder of the boreholes would classify the site as CS1.

A soil derived approach to ground gas risk assessment has identified soils with a TOC range of 0.1 – 0.8% and not considered to pose an unacceptable ground gas risk at the site. The TOC range identified classifies the site as **Characteristic Situation CS1**.

The zoning of the site can only be considered based on the understanding of the geological model. The site is considered to have three geological zones; west, central and east, associated with the identification of a sand horizon. The understanding of the site's model, as well as all available information, enables a zoning to be created for the site. This is presented within Figure 15.

Three boreholes in the west of the site have identified elevated concentrations of carbon dioxide, close to or above the concentration for consideration of an increase to CS2. Given the similar geology and gas concentrations, a CS2 approach should be considered within the west of the site.

The other location of CS2, BH7, is isolated from boreholes and within the eastern geological zone. All other boreholes in that area did not identify elevated concentrations of ground gases. This borehole is located within an area of public open space and no building and therefore no mitigation is warranted. Should the proposed layout be different to that on the figures discussed, this risk assessment should be revisited.

Boreholes can act as preferential pathways for ground gas and therefore prior to construction, all boreholes should be suitably decommissioned in line with Environment Agency guidance. This usually comprises pumping liquid grout down a tremie pipe to the base of the borehole, raising as the borehole fills.

The gas protection methods are outlined in BS8485:2015+A1:2019 and should be installed in line with CIRIA C735. An example is provided within Section 4.3.5.

4.3.5 Required Remediation

The risk assessment has led to the zoning of the site as shown on Figure 15. The majority of the site is classified as Characteristic Situation 1, with the exception of the south, currently public open space, and the west. Characteristic Situation 2 require ground gas protection measures to be designed in accordance with BS8485:2015+A1:2019 and verified in accordance with CIRIA C735. The buildings within the CS2 zone classify as Type A buildings (High risk) and require a minimum of 3.5 points, in accordance with BS8485:2015+A1:2019. Points must be made up from a combination of two or more of the following types of protection: structural barrier; ventilation measures; and gas resistant membrane.

In total, 13No. plots in the west of the site require ground gas protection and are Plots 01 to 13,

inclusive, according to the proposed plan CIE-MHA-ZZ-ZZ-DR-A-0004-A01 drawn by mh architects. Plots 01 to 05 comprise detached dwellings, 06 to 08 and 11 to 13 comprise terraced housing and 09 to 10 comprise adjoining semi-detected housing. A review of the proposed foundation types (CIE-AKSW-XX-F1-DR-S-2100-C01) indicates that Plots 01, 05 to 12 will comprise piled rafts with Heave Precautions. Plots 02 to 04 will comprise a non-void piled raft. The proposed design of the foundations is shown on Speedeck Foundations Ltd drawing PO92LZ001-GA01.

4.3.5.1 Piled foundation, with a voided underfloor

For the Residential Houses (Building Type A) built using a piled foundation, with a voided underfloor, the 3.5 points can be attributed in numerous ways. The options provided below have taken into account the ground conditions encountered, for example a suspended slab is likely to be adopted given a shallow piled foundation scheme is likely to be used.

Ventilation

- Venting/Dilution;
- Passive sub-floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)

Good to Very good: **1.5** - 2.5 **points**.
In accordance with BS8485: The volume flow-through rate is governed by the size and number of side vents; for small to medium width buildings (up to 15 m wide – considered to be present onsite), the minimum area of side ventilation should be 1500mm2/m run of wall on at least two opposite sides. Where there are multiple internal obstructions to air flow (caused by beams), there should be four or five times the area of the side vents provided in the internal obstructions.

Gas Resistant Membrane
A gas resistant membrane installed and meeting all of the following criteria: (**2 Points**)

- Sufficiently impervious to the gases (methane and carbon dioxide) such as Visqueen Gas Barrier, or similar;
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas;
- Verified by a suitably trained Ground and Water Limited Engineer in accordance with CIRIA C735.

Plots 01 and 05 to 12, inclusive, are designed with a voided underfloor. Assuming that ventilation of good performance is installed (1.5 points) and a fully verified gas resistant membrane is installed (2 points), plots 01 and 05 to 12 will be deemed to have achieved 3.5 points and therefore mitigated the identified risk from ground gases.

4.3.5.2 Piled foundation, without a voided underfloor

For Residential Houses (Building Type A) built using a non-voided piled raft foundations, the 3.5 points can be attributed in numerous ways. The options provided below have taken into account the ground conditions encountered, for example a suspended slab is likely to be adopted given a shallow

piled foundation scheme is likely to be used.

Structural Barrier
A cast in-situ monolithic **well reinforced** slab **(1.5 points).**
Any raft would need to ensure it is suitably reinforced to minimise potential cracking and must have limited penetrations caused by services. This reinforcement should be in accordance with Annex A, Section 2.2.2 of BS8485:2015+A1:2019.

Gas Resistant Membrane
A gas resistant membrane installed and meeting all of the following criteria: (**2 Points**)

- Sufficiently impervious to the gases (methane and carbon dioxide) such as Visqueen Gas Barrier, or similar;
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas;
- Verified by a suitably trained Ground and Water Limited Engineer in accordance with CIRIA C735.

Plots 02 to 04, inclusive, are designed without a voided underfloor and therefore ventilation points are not considered. Assuming that a well reinforced cast in-situ slab with limited penetrations is installed (1.5 points) and a fully verified gas resistant membrane is installed (2 points), plots 02 to 04 will be deemed to have achieved 3.5 points and therefore mitigated the identified risk from ground gases. If the slab cannot be guarantee reinforcement and/or service penetration, ventilation precautions must be considered.

5.0 DEVELOPMENT OF A REMEDIATION STRATEGY

5.1 Remediation Strategy

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

All works associated with construction/remediation will need to take into account the presence of asbestos within the capping of the demolition rubble at the concentrations noted within the report. The Method Statements must ensure that not only site operative/workers are protected from any potential release of asbestos fibres but also that local residents are not affected.

All future maintenance workers/service operatives, working within areas of hardstanding (including beneath the footprint of buildings), will need to take into account the presence of Made Ground potentially containing cement bound and fibrous asbestos within their work Method Statements.

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. In areas of soft landscaping a risk may exist and remediation will be required.

5.2 Remediation Method Statement

At the time of reporting, August 2020, the proposed development will comprise the construction of ~100No. residential houses in the centre and the west of the site, and ~20No. commercial units in the east/south-east, with associated access roads, car parking areas and soft landscaping. It is planned that the plots at the western end of the site will have piled rafts with 225mm heave precautions (shaded red), plots along the northern and eastern boundaries shall have non voided piled raft foundations (shaded yellow), with the remainder of the plots in the centre and south-east corner of the site will have shallow strip foundations. A plan of the proposed development is shown within Figure 4. Details of the raft foundations for the various plots are given in Figures 5 – 9.

It is understood that as part of the site preparation works the site underwent demolition with existing concrete recycled into a 6F2 type materials (crushed concrete/demolition rubble). The site was then levelled, with sub-surface concrete obstructions removed, and a layer of the crushed concrete/demolition rubble (6F2) placed across to a thickness ranging from 50 – 500mm. The thickness at any given point can be seen in Appendix B and a summary of the difference between the existing top of the crushed concrete layer and the proposed finished garden levels is given in the table overpage.

The following remedial methodology should be undertaken **within all proposed private and communal garden areas**:

- Based on the above the remediation strategy for the site was to produce a 600mm clean capping of material within all private and communal garden areas. Including a >50 – 100mm break layer.
- To produce a 300mm clean capping of material within all public open spaces. Including a >50 – 100mm break layer.

The tables below show the reduce dig or fill required to complete such a capping, based on the existing and proposed development levels. Where a fill of less than 0.40m is show, a reduce dig has been requested, ensuring that as a minimum 500mm of Topsoil/Subsoil is present above the 6FW layer.

Summary of Remediation Requirements over the Top of the site (Plots 1 – 25)						
Plot	Top of Crushed Concrete Layer (m AOD)	Proposed finished Garden Level (m AOD)	Difference (m)	Reduced Dig Required (m)	Potential Thickness of Subsoil Required (mm)	Minimum Thickness of Topsoil Required (mm)
1	23.95	23.45	-0.50	1.1	450	150
1	24.00	23.66	-0.34	0.94	450	150
2	24.02	24.14	0.12	0.48	450	150
2	24.02	24.12	0.10	0.50	450	150
3	24.40	24.44	0.04	0.56	450	150
3	24.55	24.46	-0.09	0.69	450	150
4	24.55	24.94	0.39	0.10	350	150
4	24.72	24.67	-0.05	0.65	450	150
5	24.71	24.00	-0.71	1.31	450	150
6	24.73	23.81	-0.92	1.52	450	150
6	24.73	23.97	-0.76	1.36	450	150
7	24.85	24.21	-0.64	1.24	450	150
7	24.85	24.25	-0.60	1.2	450	150
8	25.00	25.14	0.14	0.46	450	150
8	25.00	24.87	-0.13	0.73	450	150
9	25.15	24.76	-0.39	0.99	450	150
9	25.15	25.14	-0.01	0.61	450	150
10	25.55	26.12	0.57	-	420	150
10	25.55	25.86	0.31	0.19	350	150
11	25.35	25.50	0.15	0.45	450	150
12	25.35	25.31	-0.04	0.64	450	150
14 - 25	25.89	25.94	0.05	1.1	450	150

Summary of Remediation Requirements over the Bottom of the Site (Plots 26 – 95)						
Plot	Top of Crushed Concrete Layer (m AOD)	Proposed finished Garden Level (m AOD)	Difference (m)	Reduced Dig Required (m)	Minimum Thickness of Subsoil Required (mm)	Thickness of Topsoil Required (mm)
26 - 27	19.91	21.45	1.54	-	1390	150
26 - 27	19.91	21.01	1.10	-	950	150
28 - 29	19.83	20.76	0.93	-	780	150
28 - 29	19.83	21.13	1.30	-	1150	150
30 - 33	20.14	20.82	0.68	-	530	150
30 - 33	20.11	20.61	0.50	-	350	150
32 - 33	20.19	20.82	0.63	-	480	150
32 - 33	20.22	20.61	0.39	0.10	350	150
34 - 37	19.84	20.51	0.67	-	520	150
34 - 37	19.94	20.10	0.16	0.34	350	150
38 - 41	20.07	20.60	0.53	-	380	150
38 - 41	20.20	20.61	0.41	-	260	150
42 - 45	20.14	20.60	0.46	-	310	150
46 - 49	20.13	20.60	0.47	-	320	150
46 - 49	20.13	20.23	0.10	0.40	350	150
46 - 49	20.19	20.60	0.41	-	260	150
46 - 49	20.23	20.23	0.00	0.50	350	150
50 - 51	20.07	20.60	0.53	-	380	150
52 - 53	20.21	20.60	0.39	0.10	350	150
52 - 53	20.21	20.58	0.37	0.12	320	150

(continued overpage)

(continued from previous page)

Summary of Remediation Requirements over the Bottom of the Site (Plots 26 – 95) (continued)						
Plot	Top of Crushed Concrete Layer (m AOD)	Proposed finished Garden Level (m AOD)	Difference (m)	Reduced Dig Required (m)	Minimum Thickness of Subsoil Required (mm)	Thickness of Topsoil Required (mm)
54 - 57	20.00	20.60	0.60	-	450	150
54 - 57	20.12	20.60	0.48	-	330	150
58	20.15	20.69	0.54	-	290	150
58	20.30	20.69	0.39	0.10	350	150
59 - 61	20.17	20.68	0.51	-	260	150
59 - 61	20.07	20.58	0.51	-	260	150
62 - 65	20.06	20.58	0.52	-	270	150
62 - 65	20.16	20.58	0.42	-	250	150
66 - 67	20.06	20.58	0.52	-	370	150
68 - 70	19.99	20.58	0.59	-	440	150
68 - 70	20.03	20.58	0.55	-	400	150
71 - 73	20.10	20.84	0.74	-	590	150
71 - 73	20.10	20.60	0.50	-	350	150
74 - 75	20.18	20.65	0.47	-	320	150
74 - 75	20.18	20.74	0.56	-	410	150
76 - 95	19.85	20.55	0.70	-	550	150
76 - 95	20.13	20.55	0.42	-	270	150

Full liaison must be made with the statutory authority, prior to the implementation of this method statement and/or the removal of any material from site. All works must be undertaken to meet their full approval.

However, the Subsoil and Topsoil placed in proposed private and communal garden areas 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.

5.3 Remediation and Validation Method Statement

The remediation works outlined above 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.

Plots 1 – 25

- At the top of the site (Plots 1 – 25), the proposed finished levels were generally lower than the existing top of the crushed concrete capping layer. Consequently, the ground levels need to be reduced by an amount equal to the difference plus an additional 600mm. As seen in the table above.

- Should the concrete capping layer remain in the base of the excavation, then the capping layer should be topped with a geotextile membrane and the remainder backfilled with 600mm of certified clean Sub-soil and Topsoil.

- Should the excavation penetrate the concrete capping layer void created then a 100mm

coarse grained anti-capillarity barrier should be placed at the base of the void created topped with a geotextile membrane and the remainder backfilled with 500mm of certified clean Sub-soil and Topsoil. This could be formed by recycling of the existing 6F2.

- The thickness of the Topsoil/Sub-soil should then be independently, measured photographed and verified.

Plots 26 – 95

- At the bottom of the site (Plots 6 – 95), the proposed finished levels were generally higher than the existing top of the crushed concrete capping layer. Consequently, the ground levels need to be raised by an amount equal to the difference plus any additional soil to create a capping of 600mm.

- In localised areas, especially along the south-east edge of the site, bordering with the employment area, a reduce rig is required.

- The concrete capping layer should be topped with a geotextile membrane and the ground levels raised with at least 600mm of certified clean Sub-soil and Topsoil.

- The thickness of the Topsoil/Sub-soil should then be independently, measured photographed and verified.

For areas where a small reduce dig is required:

- Should the concrete capping layer remain in the base of the excavation, then the capping layer should be topped with a geotextile membrane and the remainder backfilled with 600mm of certified clean Sub-soil and Topsoil.

- Should the excavation penetrate the concrete capping layer void created then a 100mm coarse grained anti-capillarity barrier should be placed at the base of the void created topped with a geotextile membrane and the remainder backfilled with 500mm of certified clean Sub-soil and Topsoil. This could be formed by recycling of the existing 6F2.

Material to be removed from Site.

- 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.

- Materials to be removed off-site must be classified by carrying out Waste Acceptance Produce (WAP) testing. A registered contractor must undertake the removal of waste.

- 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.

- Consignment notes for the removal of waste must be obtained and kept for inclusion within the final Verification Report.

Imported Materials.

Prior to Importation:

- The proposed source of Subsoil/Topsoil should be identified. Documentation to show that the material is suitable for its intended use should be forwarded to Ground and Water Limited for review.

- On determination of a suitable source importation may commence. The client will need to keep record of and retain all consignment notes for the importation of materials.

Post Importation:

- Additional verification of any imported soil will also need to occur onsite, once received, to validate the accompanying lab certificate. For imported Topsoil any samples taken from the 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 and screened for asbestos.

- Imported chemical results on samples recovered from imported materials to site will be evaluated against ***'Residential with homegrown produce'*** land-use scenario as adopted in previous reports.

- Full liaison must be made with the statutory authority, prior to the implementation of this method statement and/or the removal of any material from site. All works must be undertaken to meet their full approval.

Validation.

- Following completion of all the validation works, outlined above, a report should be submitted to the local authority for approval.

5.4 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.

5.5 Waste Disposal

The excavation of foundations is 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 (WM2) 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.

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.

Asbestos was found during the investigation undertaken in September 2019. Fibres of Amosite asbestos was noted within BH2/0.60m bgl, and Chrysotile asbestos was noted within BH14/0.30m, CP3/0.35m (this location could not be found on trial hole location plans, so it was assumed this was BH3), and HP201/0.50m bgl. Fragments of Chrysotile asbestos in the form of cement and bitumen were also noted in three samples tested; TP206/0.30m bgl, around the eastern portion of the residential area of site, and HP203/0.15m and HP201/0.20m bgl around the north-eastern and south-eastern boundary of site. As the highest quantification of Chrysotile asbestos identified within the samples of the Made Ground was 0.012%, the soils are likely to be classified as **NON-HAZARDOUS.**

Asbestos was detected in one of the sample of the capping of demolition rubble tested. No asbestos was found in the remaining samples analysed. Amosite asbestos (<0.001%) was identified in one of the samples of the demolition rubble tested (TP21). This was below the hazardous waste threshold; therefore, the levels of asbestos noted were **NON-HAZARDOUS.**

Based on a risk phrase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, the Made Ground encountered during works undertaken by Ground and Water Limited during September 2019 was **NON-HAZARDOUS** with the exception of WS16. The samples within WS16 was classed as **HAZARDOUS**, based on the high levels of TPH contamination noted. The results of the assessments are given within Appendix J.

Any potential Hazardous waste would require pre-treatment prior to removal/recycling. This treatment may reduce the overall classification of the waste.

INERT waste classification should be undertaken to determine if the proposed waste confirms to INERT or NON-HAZARDOUS Waste Acceptable Criteria (WAC).

It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM3, 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.

Full WAC Tests and batch leachates were conducted on five samples of Made Ground encountered on-site (WS4/0.50m, WS5/2.00m, WS9/0.30m, WS17/0.80m and WS19/0.50m bgl). All samples fell within the **INERT WASTE** category. The results of the WAC test can be seen in Appendix C.

5.6 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.

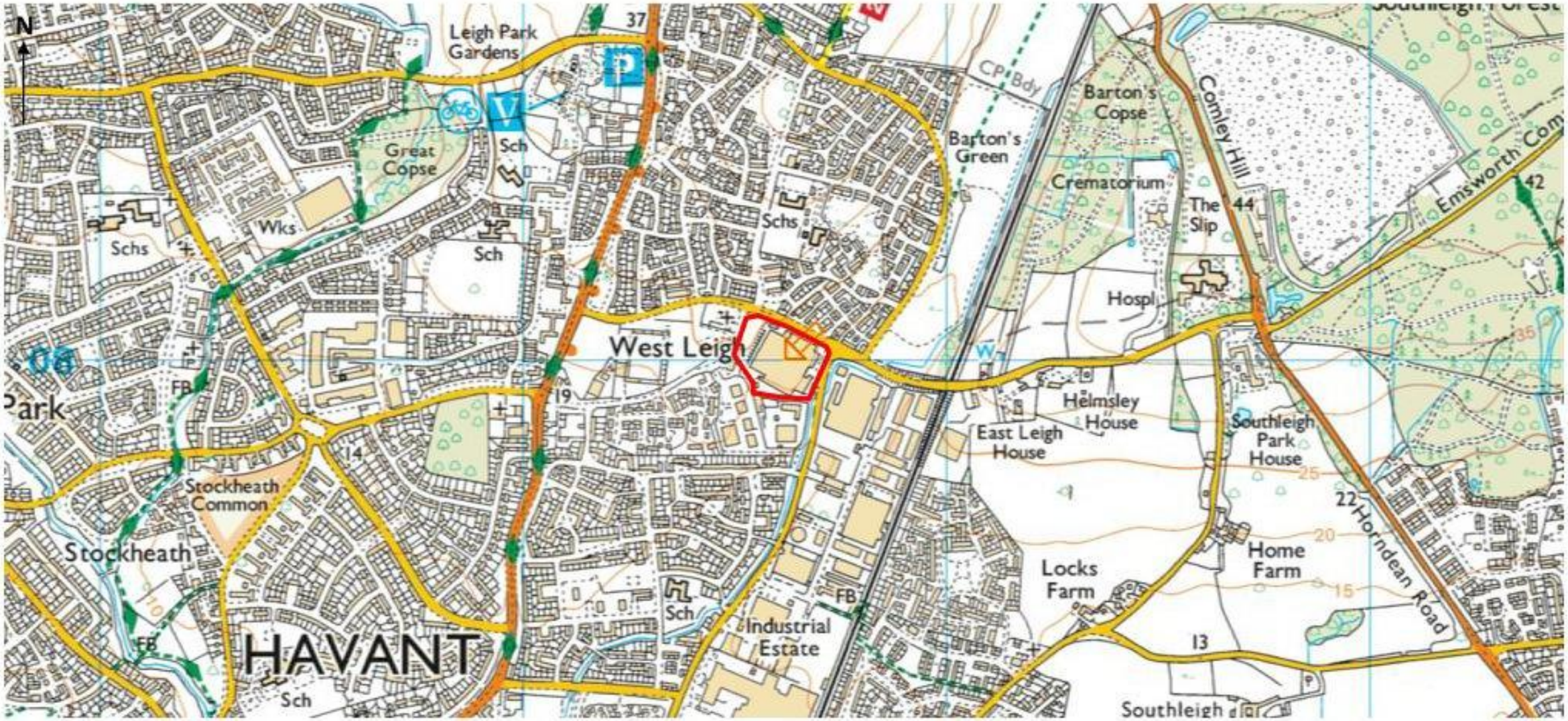
5.7 Duty of Care

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 Asbestos fibres 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.



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ	**Figure 1**
Client: Drew Smith Group	**Date:** August 2020
Site Location Plan	**Ref:** GWPR3724

ground&water



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 2
Client: Drew Smith Group	Date: August 2020	ground&water
Site Development Area	Ref: GWPR3724	



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 3
Client: Drew Smith Group	Date: August 2020	ground&water
Aerial View of the Site	Ref: GWPR3724	

N

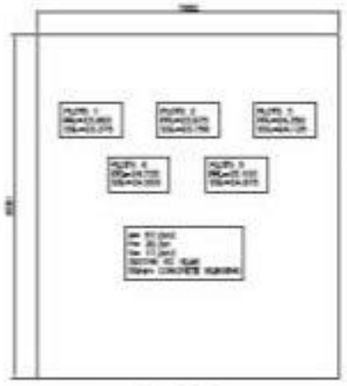


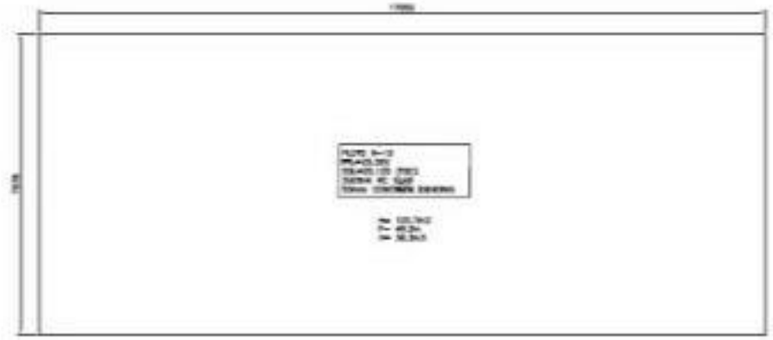
APPROX SITE BOUNDARY

NOT TO SCALE

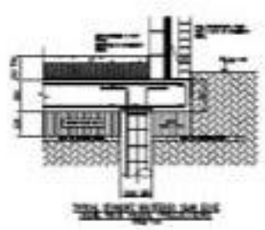
Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 4
Client: Drew Smith Group	Date: August 2020	ground&water
Proposed Development – Plan View	Ref: GWPR3724	

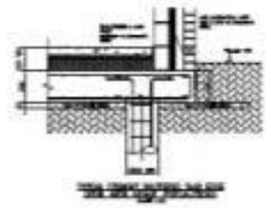
N











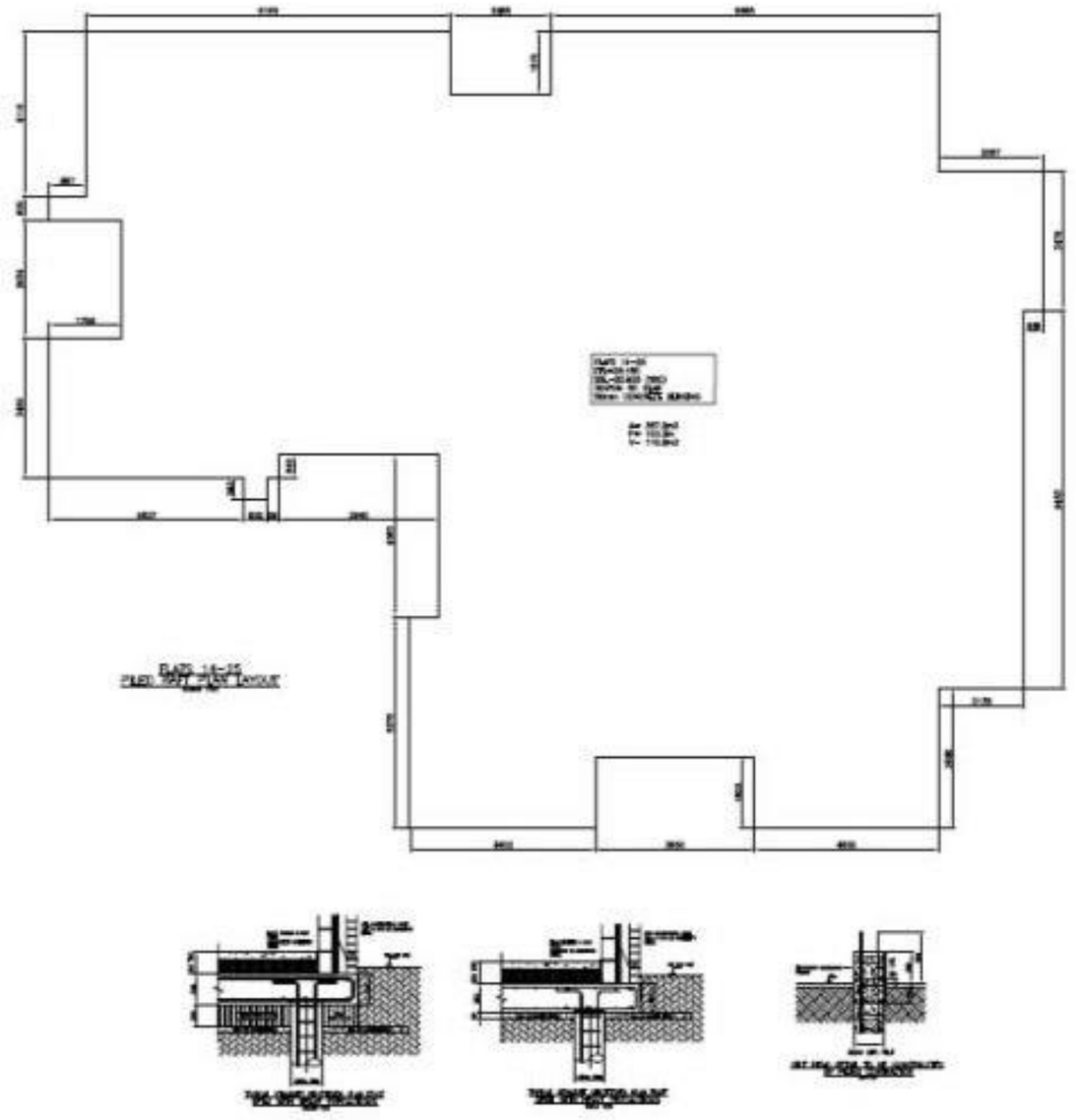


NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 5
Client: Drew Smith Group	Date: August 2020	ground&water
Speedeck Piled Raft Layout – Plots 1 - 13	Ref: GWPR3724	

N

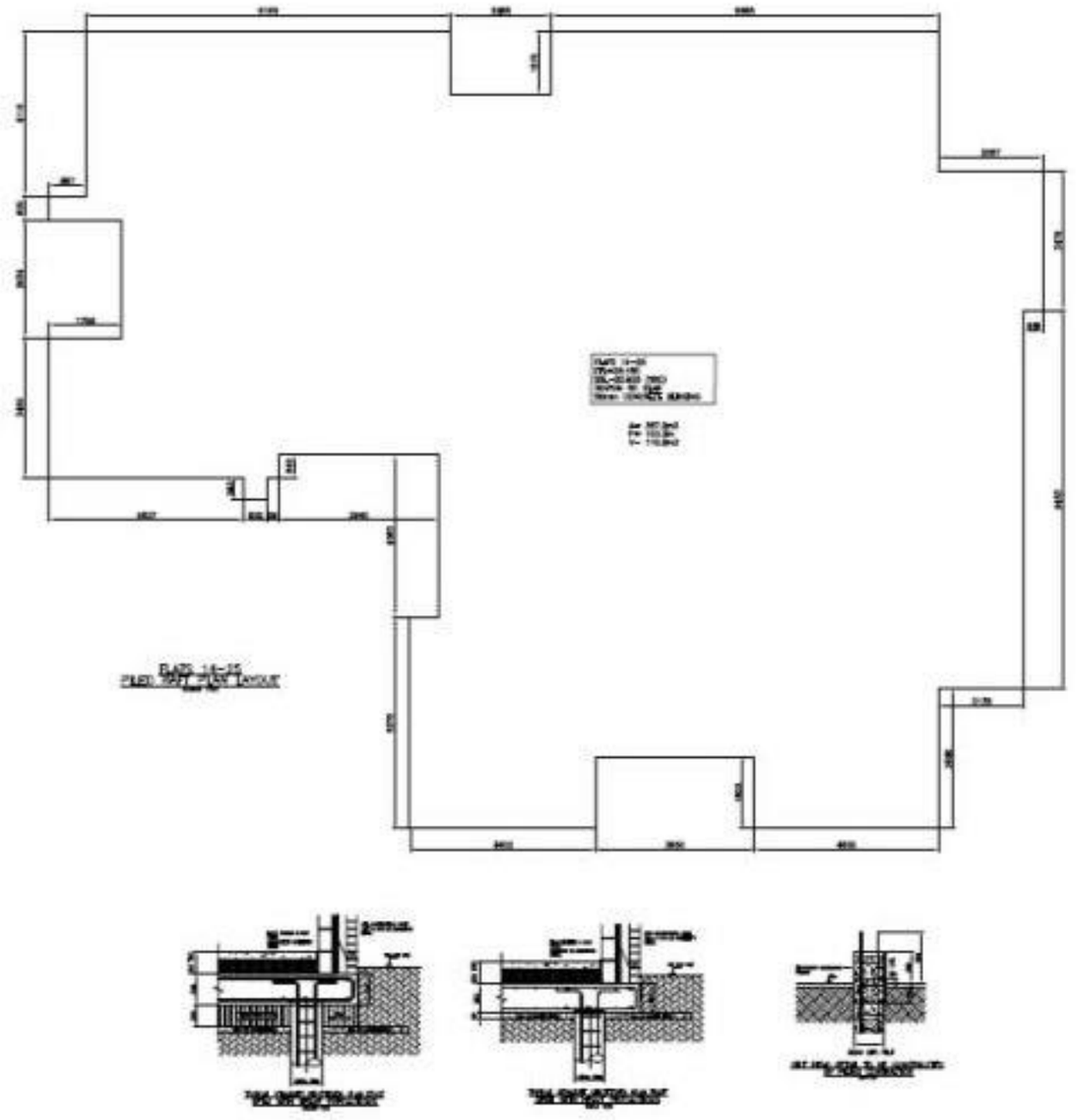


NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 6
Client: Drew Smith Group	Date: August 2020	ground&water
Speedeck Piled Raft Layout – Plots 14 - 25	Ref: GWPR3724	

N

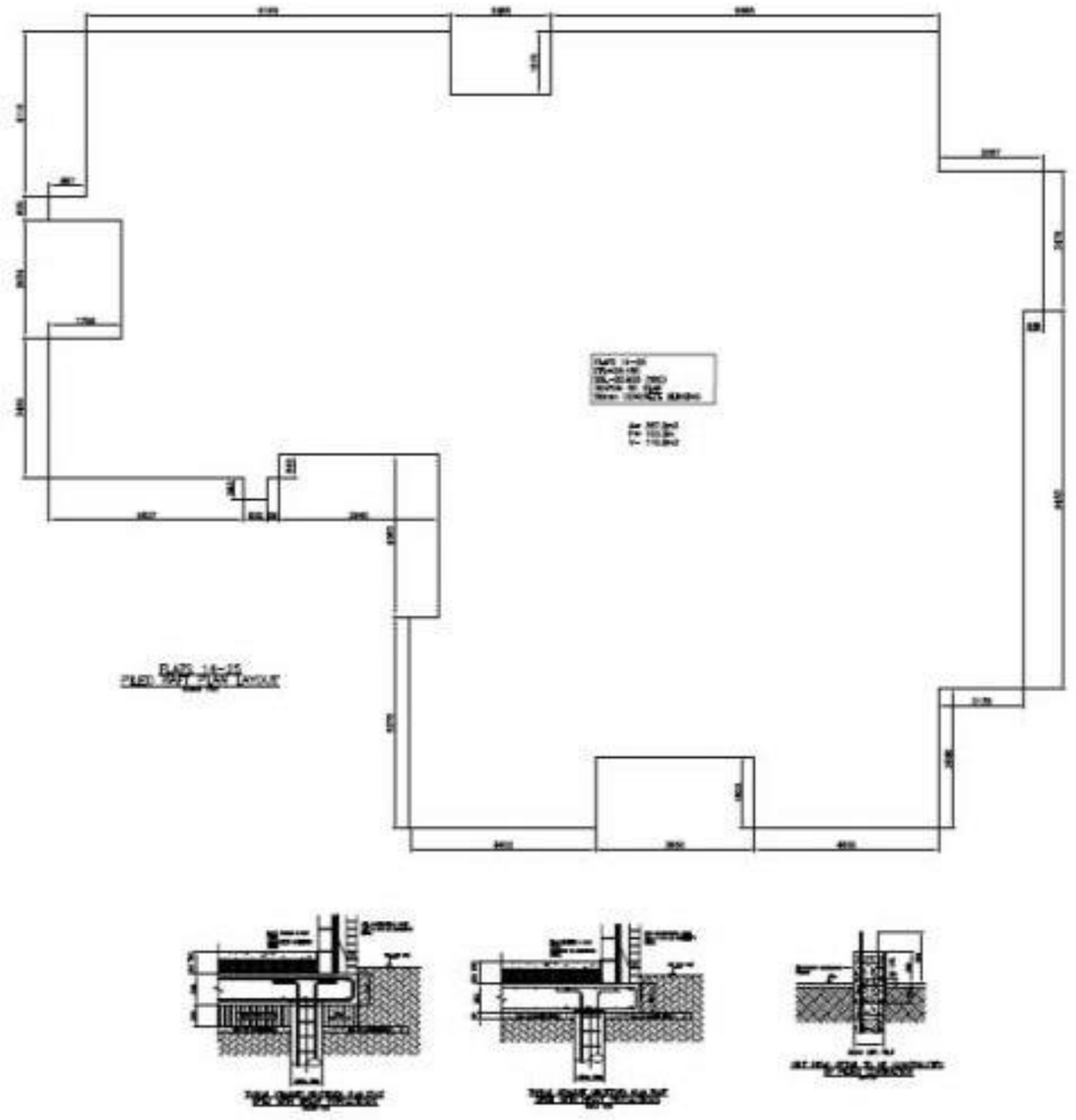


NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ	Figure 7
Client: Drew Smith Group / Date: August 2020	ground&water
Speedeck Piled Raft Layout – Plots 38-49, 65-67 and 74-75 / Ref: GWPR3724	

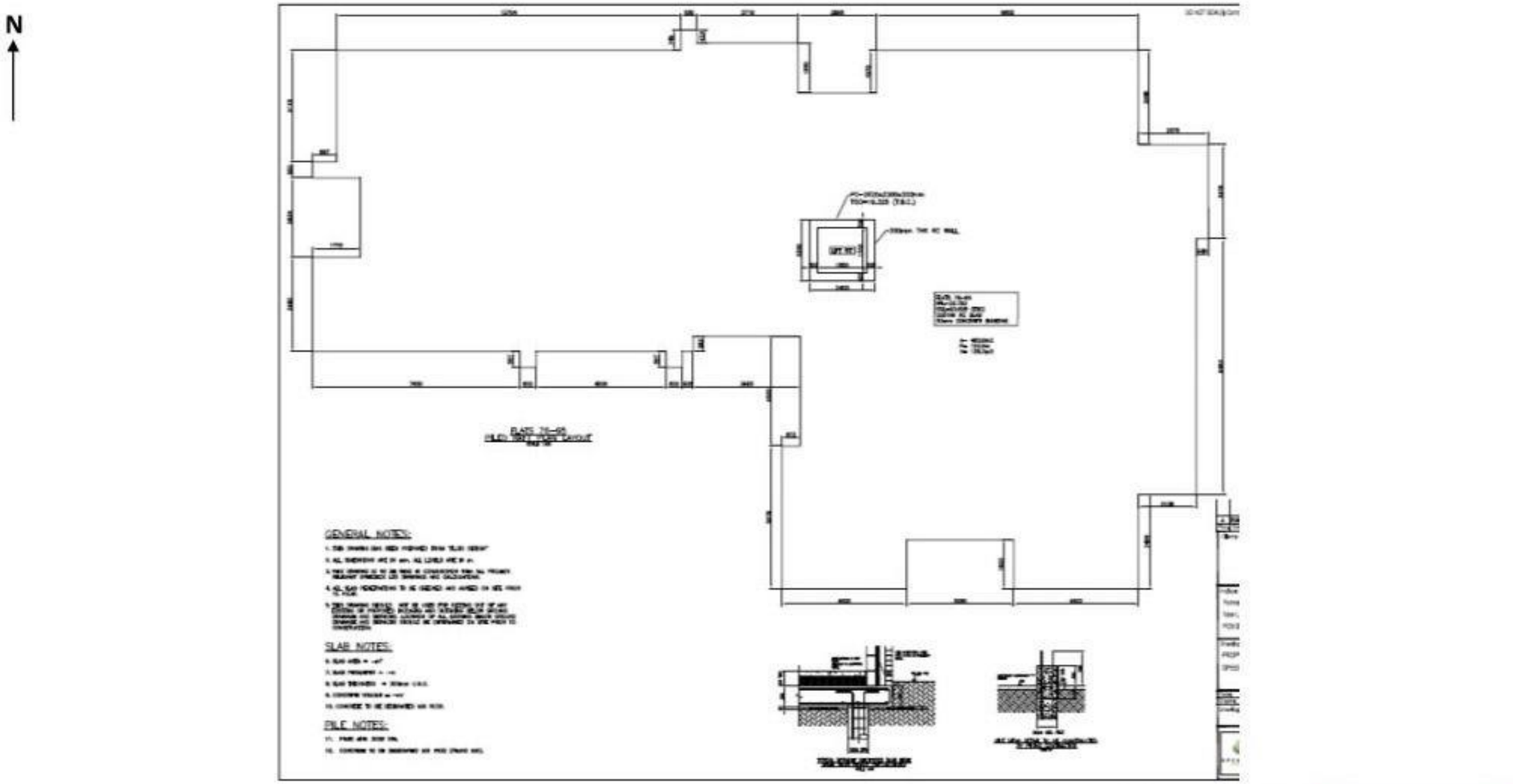
N



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

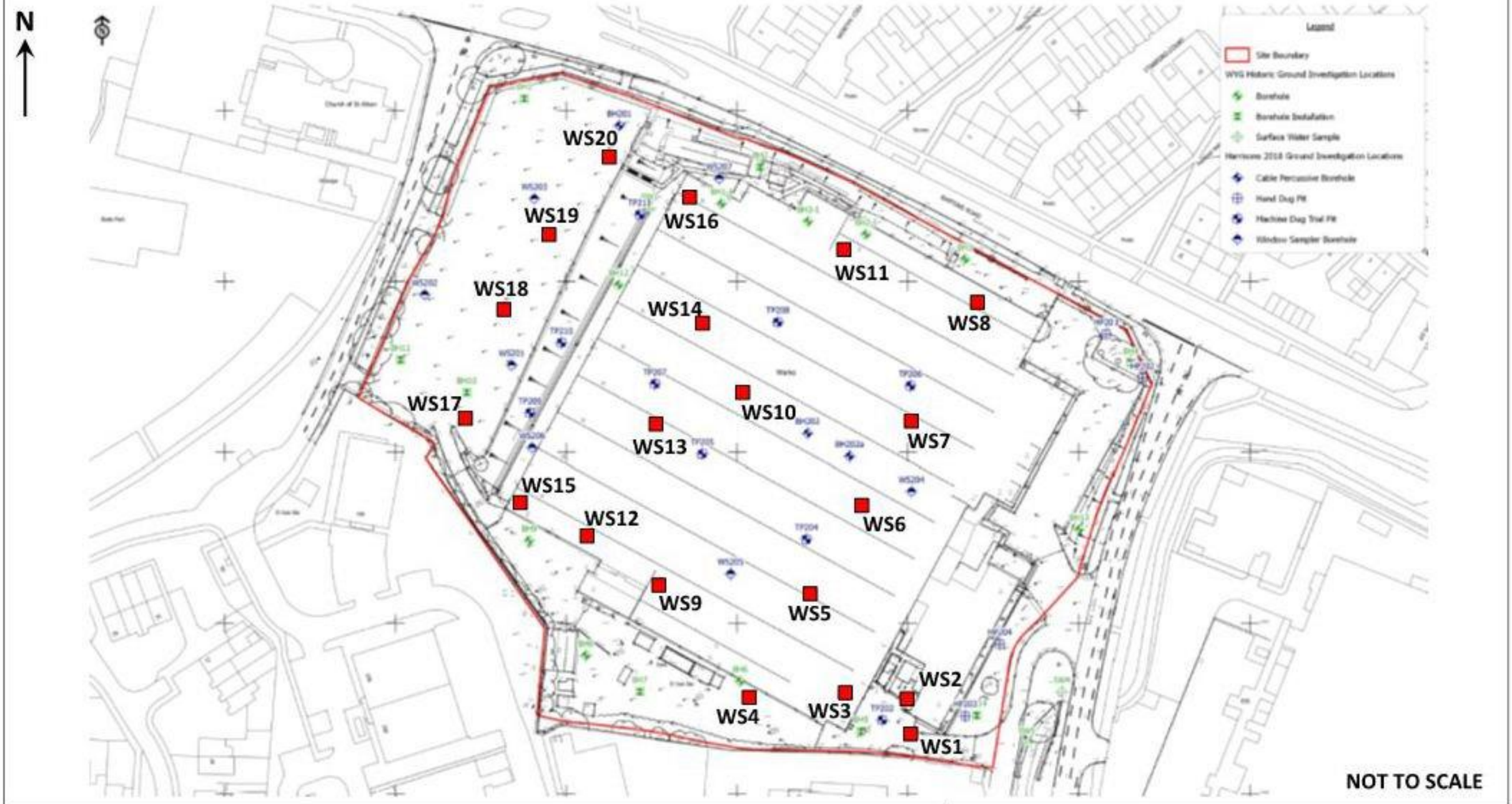
Project: Former Colt International, New Lane, Havant PO9 2LZ	Figure 8
Client: Drew Smith Group / Date: August 2020	ground&water
Speedeck Piled Raft Layout – Plots 68 - 73 / Ref: GWPR3724	



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Former Colt International, New Lane, Havant PO9 2LZ		**Figure 9**
Client: Drew Smith Group	**Date:** August 2020	ground&water
Speedeck Piled Raft Layout – Plots 76 - 94	**Ref:** GWPR3724	



Project: Former Colt International, New Lane, Havant PO9 2LZ		Figure 10
Client: Drew Smith Group	Date: August 2020	ground&water
Trial Hole Location Plan – Phase 4	Ref: GWPR3724	



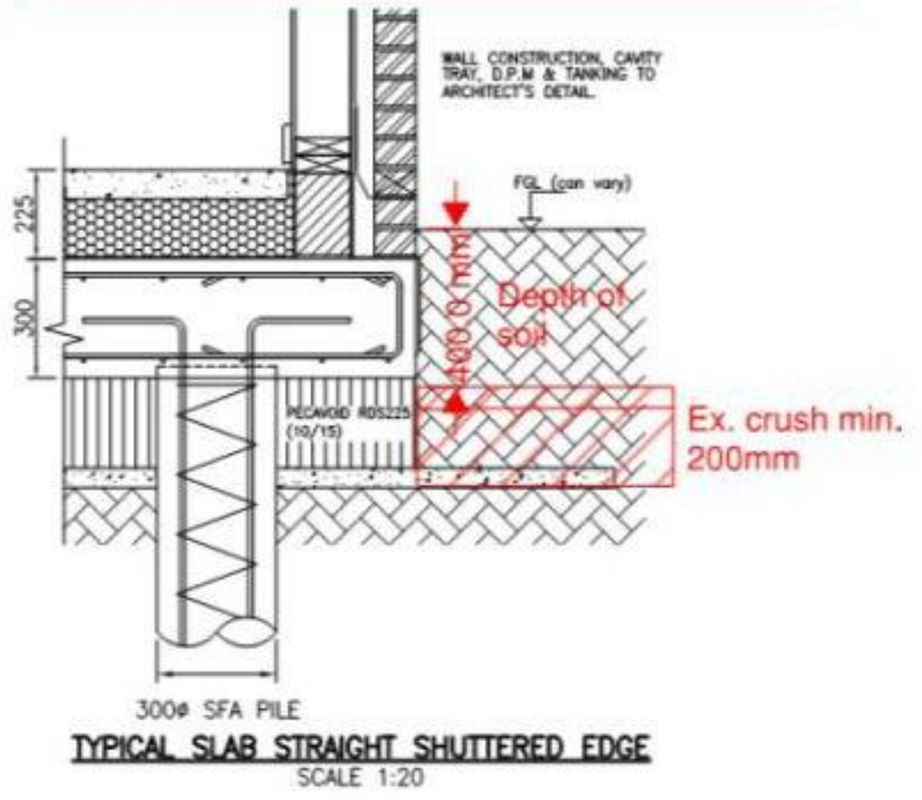
Project: Former Colt International, New Lane, Havant PO9 2LZ	**Figure 11**
Client: Drew Smith Group	**Date:** August 2020
Trial Pit Location Plan – Crushed Concrete/Demolition Rubble	**Ref:** GWPR3724

ground&water

N

Road Construction:
Capping - min. 250mm existing 6f2
Sub Base 150mm type 1
Base Course 100 - AC32
Binder Course 60mm AC20
Surface Course - 30mm AC10

Total 340mm + capping



TYPICAL SLAB STRAIGHT SHUTTERED EDGE
SCALE 1:20

NOT TO SCALE

Project: Former Colt International, New Lane, Havant PO9 2LZ	Figure 12
Client: Drew Smith Group / Date: August 2020	ground&water
Anticipated Garden Construction/Finished Levels / Ref: GWPR3724	

N



20m Borehole Location

15m Borehole Location

APPROX SITE BOUNDARY

NOT TO SCALE

Project: Former Colt International, New Lane, Havant PO9 2LZ	Figure 13
Client: Drew Smith Group / Date: August 2020	ground&water
Cable Percussion Borehole Location Plan / Ref: GWPR3724	



Project: Former Colt International, New Lane, Havant PO9 2LZ	**Figure 14**
Client: Drew Smith Group	**Date:** August 2020
Ground Gas Borehole Location Plan	**Ref:** GWPR3724

ground&water



Project: Former Colt International, New Lane, Havant PO9 2LZ	**Figure 15**
Client: Drew Smith Group	**Date:** August 2020
Ground Gas Remediation Plan	**Ref:** GWPR3724

ground&water

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 consider 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 Former Colt International, New Lane, Havant PO9 2LZ.

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.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B
Thickness of 6F2 Crushed Concrete/Demolition Rubble Post Demolition

NOTES:

Drainage:
Inspection Covers are lifted where possible and all drainage invert information has been obtained through visual inspection only, with no entry into manholes. Therefore the complete accuracy cannot be guaranteed. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.

Trees:
Every effort has been made to identify and detail all trees on site but where trees are of critical importance we suggest the use of a specialist such as an arborist. Tree spread and heights are indicative.

GPS:
GPS detail is relative to the time and date of survey. GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey. Unless stated otherwise, surveys are Scale factor 1 and Horizontal and Vertical Datums are established from a central site fix and baseline orientation station utilising GNSS correction data.

Survey notes:
Survey specification is linked to the original purpose of the survey commissioned at source and is to be used for this purpose only. Survey is accurate within limitations of site conditions at the time of survey. In areas difficult to survey due to restricted access, lines of sight or dense vegetation, critical dimensions and positions should be verified following suitable clearance.
Survey detail obtained and shown is relative to the plotting scale.

Copyright:
This survey information is Copyright Encompass Surveys Ltd (2009). All rights reserved.

Area of tarmac removed (200mm) and terram laid prior to stone

Survey notes:
This survey drawing is a combination of existing client supplied Topo Surveys undertaken at various stages (see individual title blocks) and Encompass Surveys survey. The survey of the existing areas that have no visible evidence of change have been left in. Please note that Encompass have not verified the existing surveys and a visual check has been made only. Individual survey detail can be identified within the AutoCAD layering schedule and colours.

LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPL
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CRY	PEAR	PAR
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNES	PRS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WAT
LABURNUM	LRN	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPH
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bolt Size / No.of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPA
CRASH BARRIER	CRB
HANDRAIL	HDL
IRON RAILINGS	IRF
LANCH LAP FENCE	LLF
VEHICLE LANKOOS FENCE	MBF
PALTASER FENCE	PAF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
MANBLE TO LIFT	MTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLAGWORD	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM PC	BTPC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION PC	CATV	ROODING EYE	RE
EARTHSHIELPOD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS PC	TSPC
LITTER BIN	BIN	WATER METER	WM
ROAD OUTLET	RO	WATER TAP	Tap
MAINT PLATE	MP		

Level Datum:
Levels are related to existing survey as supplied by the client. Ref: CD Surveys drawing number HS/1808006 August 2018

Grid:
Grid is related to the existing client supplied survey (see above)

Northpoint:
The Northpoint position shown on this drawing has been located as accurately as possible, but is only indicative of true North

ENCOMPASS SURVEYS

Encompass Surveys Ltd
Unit 2
Talisman Business Centre
Duncan Road
Park Gate, Southampton
Hampshire SO31 7GA

Tel: 023 80692062 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Drew Smith		
Survey Location:	Former Colt Site Nico Lane Havant		
Survey type:	Topographical	Scale:	1:200@A0
Drawing ref:	ENC/081119/1GG27C	Date:	Dec 2019
Drawn/QA:	SH/GL	Revision:	See .dwg notes

NOTES:

Drainage:
Inspection Covers are lifted where possible and all drainage invert information has been obtained through visual inspection only, with no entry into manholes. Therefore the complete accuracy cannot be guaranteed. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.

Trees:
Every effort has been made to identify and detail all trees on site but where trees are of critical importance we suggest the use of a specialist such as an arborist. Tree spread and heights are indicative.

GPS:
GPS detail is relative to the time and date of survey. GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey. Unless stated otherwise, surveys are Scale factor 1 and Horizontal and Vertical Datums are established from a central site fix and baseline orientation station utilising GNSS correction data.

Survey notes:
Survey specification is linked to the original purpose of the survey commissioned at source and is to be used for this purpose only. Survey is accurate within limitations of site conditions at the time of survey. In areas difficult to survey due to restricted access, lines of sight or dense vegetation, critical dimensions and positions should be verified following suitable clearance.
Survey detail obtained and shown is relative to the plotting scale.

Copyright:
This survey information is Copyright Encompass Surveys Ltd (2009). All rights reserved.

LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPL
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CRY	PEAR	PAR
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNES	PRS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNAM	LRN	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPN
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bolt Size / No.of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPA
CRASH BARRIER	CRB
HANDRAIL	HDL
IRON RAILINGS	IRF
LANCH LAP FENCE	LLF
VESCELLAMOUS FENCE	MSF
PALTASER FENCE	PAF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
EAVES LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
POWL WATER	TW
SURFACE WATER	SW
SPARKLE TO LIFT	STL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLAGWORKS	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	ROODDING EYE	RE
EARTH/BELPOD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
MAN OUTLET	MO	WATER TAP	Twp
MAINT PLATE	MP		

Survey notes:
This survey drawing is a combination of existing client supplied Topo Surveys undertaken at various stages (see individual title blocks) and Encompass Surveys survey. The survey of the existing areas that have no visible evidence of change have been left in. Please note that Encompass have not verified the existing surveys and a visual check has been made only. Individual survey detail can be identified within the AutoCAD layering schedule and colours.

Level Datum:
Levels are related to existing survey as supplied by the client. Ref.: CD Surveys drawing number HS/1868006 August 2018

Grid:
Grid is related to the existing client supplied survey (see above)

Northpoint:
The Northpoint position shown on this drawing has been located as accurately as possible, but is only indicative of true North

ENCOMPASS SURVEYS

Encompass Surveys Ltd
Unit 2
Tallman Business Centre
Duncan Road
Park Gate, Southampton
Hampshire SO31 7GA

Tel: 023 80692002 Email: info@encompass-surveys.co.uk
Fax: 023 80697135 Website: encompass-surveys.co.uk

Client:	Drew Smith
Survey Location:	Former Colt Site New Lane Havant
Survey type:	Topographical
Scale:	1:200@A0
Drawing ref:	ENC/08111/S1GG7C
Date:	Dec 2019
Drawn/QA:	SH/GL
Revision:	See .dwg notes

APPENDIX C
Chemical Laboratory Testing – Crushed Concrete/Demolition Rubble

4480

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

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-17321

Site Reference:	Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref:	GWPR3192A
Order No:	None Supplied
Sample Receipt Date:	13/12/2019
Sample Scheduled Date:	13/12/2019
Report Issue Number:	1
Reporting Date:	19/12/2019

Authorised by:

Dave Ashworth
Technical Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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

MCERTS UKAS TESTING 4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	**DETS Sample No**	452376	452377	452378	452379	452380

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix [S]	Material Type	N/a	NONE					
Asbestos Type [S]	PLM Result	N/a	ISO17025					
Asbestos Quantification [S]	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	10.5	11.1	10.9	11.0	11.2
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1310	949	374	59	699
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.30	0.95	0.37	0.06	0.70
Organic Matter	%	< 0.1	MCERTS	1.1	1.2	0.7	0.7	1.2
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.6	0.7	0.4	0.4	0.7
Arsenic (As)	mg/kg	< 2	MCERTS	7	6	6	7	8
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	0.4	0.3	0.3	0.4
Chromium (Cr)	mg/kg	< 2	MCERTS	17	13	13	12	16
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	47	11	10	11	12
Lead (Pb)	mg/kg	< 3	MCERTS	117	59	51	59	60
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	8	8	8	10
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	28	23	24	23	27
Zinc (Zn)	mg/kg	< 3	MCERTS	59	51	42	49	46
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°C
Subcontracted analysis (S)

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

4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP6	TP7	TP8	TP9	TP10
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	**DETS Sample No**	452381	452382	452383	452384	452385

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix [S]	Material Type	N/a	NONE					
Asbestos Type [S]	PLM Result	N/a	ISO17025					
Asbestos Quantification [S]	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	11.3	10.9	11.7	10.8	11.1
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	800	764	941	1610	1610
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.80	0.76	0.94	1.61	1.61
Organic Matter	%	< 0.1	MCERTS	0.7	1.2	0.9	1.2	1.1
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.4	0.7	0.5	0.7	0.6
Arsenic (As)	mg/kg	< 2	MCERTS	7	7	7	7	7
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	0.4	0.4	0.4	1
Chromium (Cr)	mg/kg	< 2	MCERTS	15	16	15	15	15
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	47	16	25	12	13
Lead (Pb)	mg/kg	< 3	MCERTS	139	54	80	89	151
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	9	10	9	9
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	29	28	28	27	28
Zinc (Zn)	mg/kg	< 3	MCERTS	51	51	61	166	58
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°C
Subcontracted analysis (S)

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

MCERTS UKAS TESTING 4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP11	TP12	TP13	TP14	TP15
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	**DETS Sample No**	452386	452387	452388	452389	452390

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix [S]	Material Type	N/a	NONE					
Asbestos Type [S]	PLM Result	N/a	ISO17025					
Asbestos Quantification [S]	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	10.7	10.7	10.7	10.8	10.9
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1810	515	1300	1180	1290
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.81	0.52	1.30	1.18	1.29
Organic Matter	%	< 0.1	MCERTS	1.1	0.9	1.1	0.7	1
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.6	0.5	0.7	0.4	0.6
Arsenic (As)	mg/kg	< 2	MCERTS	7	7	7	7	8
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	0.4	0.4	1	0.4
Chromium (Cr)	mg/kg	< 2	MCERTS	16	15	15	16	15
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	13	17	14	15	18
Lead (Pb)	mg/kg	< 3	MCERTS	168	95	125	164	110
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	10	10	10	11	10
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	28	27	30	30	28
Zinc (Zn)	mg/kg	< 3	MCERTS	71	90	60	96	71
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°C
Subcontracted analysis (S)

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

4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP16	TP17	TP18	TP19	TP20
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	**DETS Sample No**	452391	452392	452393	452394	452395

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix [S]	Material Type	N/a	NONE					
Asbestos Type [S]	PLM Result	N/a	ISO17025					
Asbestos Quantification [S]	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	10.5	10.9	10.7	10.4	11.3
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	130	442	1160	968	30
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.13	0.44	1.16	0.97	0.03
Organic Matter	%	< 0.1	MCERTS	0.7	1.2	1.3	1.2	0.7
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.4	0.7	0.8	0.7	0.4
Arsenic (As)	mg/kg	< 2	MCERTS	7	8	8	8	7
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	0.5	0.7	0.4	0.4
Chromium (Cr)	mg/kg	< 2	MCERTS	16	17	17	16	14
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	26	23	17	25	10
Lead (Pb)	mg/kg	< 3	MCERTS	187	173	150	178	61
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	11	10	10	10	8
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	29	29	30	30	25
Zinc (Zn)	mg/kg	< 3	MCERTS	71	99	58	102	36
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°C
Subcontracted analysis (S)

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

MCERTS UKAS TESTING 4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP21	TP22	TP23	TP24	TP25
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	**DETS Sample No**	452396	452397	452398	452399	452400

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	Amosite Present as bundles				
Asbestos Type [S]	PLM Result	N/a	ISO17025	Amosite				
Asbestos Quantification [S]	%	< 0.001	ISO17025	< 0.001				
pH	pH Units	N/a	MCERTS	11.8	11.6	11.7	11.8	11.6
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	13	125	16	48	11
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.01	0.12	0.02	0.05	0.01
Organic Matter	%	< 0.1	MCERTS	0.3	0.3	0.4	0.5	0.5
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.2	0.2	0.3	0.3	0.3
Arsenic (As)	mg/kg	< 2	MCERTS	7	7	7	8	6
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2	0.2	0.2	0.3	0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	15	14	16	15	13
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	10	13	12	14	10
Lead (Pb)	mg/kg	< 3	MCERTS	43	264	49	71	42
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	9	10	10	8
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	28	24	28	29	24
Zinc (Zn)	mg/kg	< 3	MCERTS	31	50	43	44	30
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°C
Subcontracted analysis (S)

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

4480

Soil Analysis Certificate							
DETS Report No: 19-17321	**Date Sampled**	04/12/19	04/12/19			
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TP26	TP27			
Project / Job Ref: GWPR3192A	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.10	0.10			
Reporting Date: 19/12/2019	**DETS Sample No**	452401	452402			

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					
Asbestos Quantification [S]	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	11.9	11.6			
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	15	13			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.01	0.01			
Organic Matter	%	< 0.1	MCERTS	0.6	0.4			
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.3	0.2			
Arsenic (As)	mg/kg	< 2	MCERTS	7	7			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	16	14			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	21	11			
Lead (Pb)	mg/kg	< 3	MCERTS	89	41			
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	9	8			
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			
Vanadium (V)	mg/kg	< 2	NONE	27	27			
Zinc (Zn)	mg/kg	< 3	MCERTS	72	33			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

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

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452376	452377	452378	452379	452380

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.42
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.13
Phenanthrene	mg/kg	< 0.1	MCERTS	0.31	0.18	0.65	0.27	0.55
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.18	< 0.1	0.13
Fluoranthene	mg/kg	< 0.1	MCERTS	1.01	0.86	1.61	1.49	0.69
Pyrene	mg/kg	< 0.1	MCERTS	0.91	0.76	1.40	1.15	0.58
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.64	0.50	0.99	0.92	0.40
Chrysene	mg/kg	< 0.1	MCERTS	0.63	0.49	0.93	0.80	0.42
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.91	0.64	1.28	1.06	0.54
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.31	0.22	0.47	0.35	0.18
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.57	0.41	0.80	0.64	0.33
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.46	0.31	0.61	0.49	0.28
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.40	0.27	0.52	0.40	0.22
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	6.2	4.6	9.4	7.6	4.9

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

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP6	TP7	TP8	TP9	TP10
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452381	452382	452383	452384	452385

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.19	0.51	0.18	0.23	0.31
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.73	1.19	0.68	0.97	1.05
Pyrene	mg/kg	< 0.1	MCERTS	0.76	0.97	0.67	0.85	0.93
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.59	0.63	0.42	0.67	0.60
Chrysene	mg/kg	< 0.1	MCERTS	0.58	0.61	0.37	0.66	0.60
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.97	0.82	0.52	0.97	0.83
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.26	0.27	0.16	0.27	0.21
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.64	0.51	0.33	0.59	0.53
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.50	0.39	0.24	0.45	0.40
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.44	0.32	0.20	0.34	0.34
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.7	6.3	3.8	6	5.8

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

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP11	TP12	TP13	TP14	TP15
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452386	452387	452388	452389	452390

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.25	0.83	0.21	0.32	0.25
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.91	1.08	0.86	1.53	0.99
Pyrene	mg/kg	< 0.1	MCERTS	0.82	0.92	0.80	1.40	0.89
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.57	0.51	0.46	0.74	0.47
Chrysene	mg/kg	< 0.1	MCERTS	0.55	0.54	0.49	0.79	0.59
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.79	0.74	0.68	0.97	0.77
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.24	0.21	0.23	0.31	0.25
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.51	0.46	0.47	0.72	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.38	0.33	0.32	0.46	0.40
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.31	0.29	0.30	0.42	0.37
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.3	6.4	4.8	7.7	5.5

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

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP16	TP17	TP18	TP19	TP20
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452391	452392	452393	452394	452395

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	2.05
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	1.71
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	1.45
Phenanthrene	mg/kg	< 0.1	MCERTS	0.24	0.30	1.57	0.14	15.80
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.43	< 0.1	4.04
Fluoranthene	mg/kg	< 0.1	MCERTS	0.78	1.05	3.43	0.64	15.30
Pyrene	mg/kg	< 0.1	MCERTS	0.92	0.89	2.64	0.60	9.74
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.41	0.66	1.73	0.40	6.41
Chrysene	mg/kg	< 0.1	MCERTS	0.53	0.73	1.50	0.42	6.39
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.61	1	1.99	0.64	7.35
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.18	0.29	0.68	0.20	2.46
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.41	0.68	1.43	0.46	4.97
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.28	0.43	0.88	0.32	3.28
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.15	< 0.1	0.73
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.26	0.40	0.74	0.28	2.48
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.6	6.4	17.2	4.1	84.1

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

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP21	TP22	TP23	TP24	TP25
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452396	452397	452398	452399	452400

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.12	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.79	0.75	0.98	0.78	1.33
Anthracene	mg/kg	< 0.1	MCERTS	0.18	0.18	0.24	0.19	0.32
Fluoranthene	mg/kg	< 0.1	MCERTS	1.25	1.07	1.13	1.07	1.71
Pyrene	mg/kg	< 0.1	MCERTS	1.04	0.75	0.78	0.76	1.17
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.49	0.50	0.44	0.47	0.76
Chrysene	mg/kg	< 0.1	MCERTS	0.47	0.48	0.55	0.50	0.78
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.51	0.61	0.61	0.54	0.93
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.16	0.18	0.21	0.19	0.33
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.35	0.46	0.41	0.38	0.67
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.22	0.30	0.28	0.25	0.44
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.18	0.26	0.24	0.21	0.34
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.6	5.6	6.1	5.3	8.8

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

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

4480

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19			
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP26	TP27			
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.10	0.10			
Reporting Date: 19/12/2019	DETS Sample No	452401	452402			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	0.13	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	0.19	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	0.15	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	1.68	0.54			
Anthracene	mg/kg	< 0.1	MCERTS	0.39	0.13			
Fluoranthene	mg/kg	< 0.1	MCERTS	2.38	0.71			
Pyrene	mg/kg	< 0.1	MCERTS	1.64	0.50			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.92	0.30			
Chrysene	mg/kg	< 0.1	MCERTS	0.92	0.32			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.17	0.37			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.37	0.12			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.78	0.26			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.45	0.16			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.35	0.14			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	11.5	3.6			

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

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

4480

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP3	TP6	TP9	TP12	TP15
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452378	452381	452384	452387	452390

Determinand	Unit	RL	Accreditation					
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	10	< 3	5	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	14	< 3	24	13
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	163	58
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	24	< 21	192	71
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	< 2	3	< 2	4	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	15	11	9	32	14
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	73	29	29	210	56
Aromatic (C5 - C35)	mg/kg	< 21	NONE	89	43	38	246	70
Total >C5 - C35	mg/kg	< 42	NONE	89	67	< 42	439	140

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

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

4480

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP18	TP21	TP24	TP27	
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	
Reporting Date: 19/12/2019	DETS Sample No	452393	452396	452399	452402	

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	14	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	39	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	56	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	109	
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	20	< 3	< 3	< 3	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	39	< 10	< 10	< 10	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	59	< 21	< 21	< 21	
Total >C5 - C35	mg/kg	< 42	NONE	59	< 42	< 42	109	

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

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

4480

Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	04/12/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP3	TP6	TP9	TP12	TP15
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 19/12/2019	DETS Sample No	452378	452381	452384	452387	452390

Determinand	Unit	RL	Accreditation					
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°C

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

4480

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 19-17321	Date Sampled	04/12/19	04/12/19	04/12/19	04/12/19	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TP18	TP21	TP24	TP27	
Project / Job Ref: GWPR3192A	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	0.10	0.10	0.10	0.10	
Reporting Date: 19/12/2019	DETS Sample No	452393	452396	452399	452402	

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°C

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

4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-17321	
Ground & Water Ltd	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	
Project / Job Ref: GWPR3192A	
Order No: None Supplied	
Reporting Date: 19/12/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
452376	TP1	None Supplied	0.10	15.8	Brown gravelly sand with stones and glass
452377	TP2	None Supplied	0.10	15.5	Brown gravelly sand with stones
452378	TP3	None Supplied	0.10	11.4	Brown gravelly sand with stones and brick
452379	TP4	None Supplied	0.10	11.6	Brown gravelly sand with stones
452380	TP5	None Supplied	0.10	13.3	Brown gravelly sand with stones
452381	TP6	None Supplied	0.10	12.3	Brown gravelly sand with stones and glass
452382	TP7	None Supplied	0.10	15.8	Brown gravelly sand with stones and vegetation
452383	TP8	None Supplied	0.10	11.8	Brown gravelly sand with stones and glass
452384	TP9	None Supplied	0.10	14.8	Brown gravelly sand with stones
452385	TP10	None Supplied	0.10	17.1	Brown gravelly sand with stones and brick
452386	TP11	None Supplied	0.10	15.7	Brown gravelly sand with stones and glass
452387	TP12	None Supplied	0.10	13.2	Brown gravelly sand with stones
452388	TP13	None Supplied	0.10	14.7	Brown gravelly sand with stones and brick
452389	TP14	None Supplied	0.10	13.7	Brown gravelly sand with stones
452390	TP15	None Supplied	0.10	13	Brown gravelly sand with stones
452391	TP16	None Supplied	0.10	13	Brown gravelly sand with stones
452392	TP17	None Supplied	0.10	14.2	Brown gravelly sand with stones
452393	TP18	None Supplied	0.10	11.7	Brown gravelly sand with stones and brick
452394	TP19	None Supplied	0.10	14.6	Brown gravelly sand with stones
452395	TP20	None Supplied	0.10	8.1	Brown gravelly sand with stones and brick
452396	TP21	None Supplied	0.10	7.7	Brown gravelly sand with stones
452397	TP22	None Supplied	0.10	11.2	Brown gravelly sand with stones
452398	TP23	None Supplied	0.10	8.3	Brown gravelly sand with stones
452399	TP24	None Supplied	0.10	11.4	Brown gravelly sand with stones
452400	TP25	None Supplied	0.10	9.2	Brown gravelly sand with stones
452401	TP26	None Supplied	0.10	8.7	Brown gravelly sand with stones
452402	TP27	None Supplied	0.10	8	Brown gravelly sand with stones

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

Insufficient Sample [I/S]

Unsuitable Sample [U/S]

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

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-17321
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3192A
Order No: None Supplied
Reporting Date: 19/12/2019

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

4480

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

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-12935

Site Reference:	Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref:	GWPR3192
Order No:	None Supplied
Sample Receipt Date:	10/09/2019
Sample Scheduled Date:	10/09/2019
Report Issue Number:	1
Reporting Date:	17/09/2019

Authorised by:

Dave Ashworth
Technical Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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

4480

Soil Analysis Certificate								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS1	WS1	WS2	WS3	WS4
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.30	2.00	0.50	2.00	1.50
Reporting Date: 17/09/2019	DETS Sample No	433622	433623	433624	433625	433627

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS		8.0		8.0	
Total Cyanide	mg/kg	< 2	NONE		< 2		< 2	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		17		194	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.02		0.19	
Organic Matter	%	< 0.1	MCERTS		0.2		0.8	
Total Organic Carbon (TOC)	%	< 0.1	MCERTS		0.1		0.5	
Arsenic (As)	mg/kg	< 2	MCERTS		< 2		8	
W/S Boron	mg/kg	< 1	NONE		< 1		< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS		< 0.2		< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS		5		26	
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2		< 2	
Copper (Cu)	mg/kg	< 4	MCERTS		< 4		42	
Lead (Pb)	mg/kg	< 3	MCERTS	167	7	321	53	10
Mercury (Hg)	mg/kg	< 1	NONE		< 1		< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS		6		22	
Selenium (Se)	mg/kg	< 3	NONE		< 3		< 3	
Vanadium (V)	mg/kg	< 2	NONE		8		40	
Zinc (Zn)	mg/kg	< 3	MCERTS		11		286	
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2		< 2	

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

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

4480

Soil Analysis Certificate								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS5	WS6	WS7	WS8	WS9
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.50	0.50	0.50	0.30	0.50
Reporting Date: 17/09/2019	DETS Sample No	433629	433630	433631	433632	433634

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
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					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS	55	17	89	9	5
Mercury (Hg)	mg/kg	< 1	NONE					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 3	NONE					
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS					
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)

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

4480

Soil Analysis Certificate								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS11	WS13	WS14	WS15	WS16
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.80	0.50	0.50	1.00	0.50
Reporting Date: 17/09/2019	DETS Sample No	433635	433636	433637	433638	433639

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS					7.9
Total Cyanide	mg/kg	< 2	NONE					< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS					86
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS					0.09
Organic Matter	%	< 0.1	MCERTS					1.3
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					0.8
Arsenic (As)	mg/kg	< 2	MCERTS					3
W/S Boron	mg/kg	< 1	NONE					< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS					14
Chromium (hexavalent)	mg/kg	< 2	NONE					< 2
Copper (Cu)	mg/kg	< 4	MCERTS					< 4
Lead (Pb)	mg/kg	< 3	MCERTS	17	< 3	9	< 3	< 3
Mercury (Hg)	mg/kg	< 1	NONE					< 1
Nickel (Ni)	mg/kg	< 3	MCERTS					7
Selenium (Se)	mg/kg	< 3	NONE					< 3
Vanadium (V)	mg/kg	< 2	NONE					18
Zinc (Zn)	mg/kg	< 3	MCERTS					26
Total Phenols (monohydric)	mg/kg	< 2	NONE					< 2

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

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

4480

Soil Analysis Certificate								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS16	WS16	WS17	WS17	WS18
Project / Job Ref: GWPR3192	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	0.30
Reporting Date: 17/09/2019	DETS Sample No	433640	433641	433642	433643	433645

Determinand	Unit	RL	Accreditation			(n)		(n)
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	6.4			7.7	
Total Cyanide	mg/kg	< 2	NONE	< 2			7	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	89			49	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.09			0.05	
Organic Matter	%	< 0.1	MCERTS	1			5	
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.6			2.9	
Arsenic (As)	mg/kg	< 2	MCERTS	4			16	
W/S Boron	mg/kg	< 1	NONE	< 1			1.9	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2			0.3	
Chromium (Cr)	mg/kg	< 2	MCERTS	11			19	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	< 4			32	
Lead (Pb)	mg/kg	< 3	MCERTS	< 3	< 3	< 3	859	< 3
Mercury (Hg)	mg/kg	< 1	NONE	< 1			< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	10			12	
Selenium (Se)	mg/kg	< 3	NONE	< 3			< 3	
Vanadium (V)	mg/kg	< 2	NONE	14			44	
Zinc (Zn)	mg/kg	< 3	MCERTS	17			99	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			< 2	

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

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

4480

Soil Analysis Certificate							
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS18	WS19	WS19	WS19	WS20
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.00	0.30	0.80	1.00	0.30
Reporting Date: 17/09/2019	DETS Sample No	433646	433647	433649	433650	433651

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
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					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS	274	3	403	444	84
Mercury (Hg)	mg/kg	< 1	NONE					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 3	NONE					
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS					
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)

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

4480

Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS1	WS1	WS2	WS3	WS4		
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.30	2.00	0.50	2.00	1.50		
Reporting Date: 17/09/2019	DETS Sample No	433622	433623	433624	433625	433627		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	20.80	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.76	< 0.1	0.12	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	39.70	< 0.1	2.12	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	34.60	< 0.1	2	0.23	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	213	< 0.1	21	1.04	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	50.70	< 0.1	4.58	0.31	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	258	0.11	29.30	1.37	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	174	< 0.1	19.90	1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	91.80	< 0.1	13.10	0.85	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	88.80	< 0.1	10.20	0.47	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	101	< 0.1	14.60	0.78	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	35	< 0.1	3.88	0.20	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	67.30	< 0.1	9.22	0.48	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	48.50	< 0.1	7.57	0.52	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	8.54	< 0.1	1.54	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	39.50	< 0.1	6.10	0.35	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	1270	< 1.6	145	7.6	< 1.6

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

(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

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

4480

Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS5	WS6	WS7	WS8	WS9		
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	1.50	0.50	0.50	0.30	0.50		
Reporting Date: 17/09/2019	DETS Sample No	433629	433630	433631	433632	433634		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.71	0.32	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.91	0.64	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.76	0.52	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.57	0.46	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.29	0.19	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.54	0.48	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	0.12	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.38	0.29	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.43	0.41	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.28	0.26	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	5.2	3.7	< 1.6	< 1.6

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

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

4480

Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS11	WS13	WS14	WS15	WS16		
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.80	0.50	0.50	1.00	0.50		
Reporting Date: 17/09/2019	DETS Sample No	433635	433636	433637	433638	433639		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	1.57
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.24	< 0.1	< 0.1	0.11	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.18	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.32	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.21	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

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

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

4480

Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS16	WS16	WS17	WS17	WS18
Project / Job Ref: GWPR3192	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	0.30
Reporting Date: 17/09/2019	DETS Sample No	433640	433641	433642	433643	433645

Determinand	Unit	RL	Accreditation			(n)		(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.91	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.25	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.99	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.67	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.74	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.82	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.27	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.45	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.47	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.29	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	6.9	< 1.6

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

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

4480

Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19	02/09/19	02/09/19
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS18	WS19	WS19	WS19	WS20
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.00	0.30	0.80	1.00	0.30
Reporting Date: 17/09/2019	DETS Sample No	433646	433647	433649	433650	433651

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.35	< 0.1	0.19	< 0.1	0.54
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.18
Fluoranthene	mg/kg	< 0.1	MCERTS	0.84	< 0.1	0.45	< 0.1	0.93
Pyrene	mg/kg	< 0.1	MCERTS	0.69	< 0.1	0.36	< 0.1	0.64
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.60	< 0.1	0.40	< 0.1	0.57
Chrysene	mg/kg	< 0.1	MCERTS	0.44	< 0.1	0.14	< 0.1	0.37
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.71	0.25	0.36	< 0.1	0.62
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.21	< 0.1	< 0.1	< 0.1	0.16
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.43	0.14	0.19	< 0.1	0.36
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.48	< 0.1	0.34	< 0.1	0.42
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.31	< 0.1	0.20	< 0.1	0.32
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5.1	< 1.6	2.6	< 1.6	5.1

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

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

4480

Soil Analysis Certificate - TPH CWG Banded							
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS3	WS16	WS16		
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	2.00	0.50	0.80		
Reporting Date: 17/09/2019	DETS Sample No	433625	433639	433640		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	4	76	66		
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	14	437	367		
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	57	1547	1246		
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	39	1165	863		
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	414	273		
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	114	3640	2814		
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	2	7	6		
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	7	48	30		
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	51	356	299		
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	72	382	297		
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	14	120	74		
Aromatic (C5 - C35)	mg/kg	< 21	NONE	146	914	706		
Total >C5 - C35	mg/kg	< 42	NONE	260	4553	3519		

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

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

4480

Soil Analysis Certificate - BTEX / MTBE								
DETS Report No: 19-12935	Date Sampled	02/09/19	02/09/19	02/09/19		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	WS3	WS16	WS16		
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	2.00	0.50	0.80		
Reporting Date: 17/09/2019	DETS Sample No	433625	433639	433640		

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

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

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

4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 19-12935		**Date Sampled**	02/09/19			**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: Former Colt International, New Lane, Havant, PO9 2LZ		**TP / BH No**	WS4					
Project / Job Ref: GWPR3192		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.50					
Reporting Date: 17/09/2019		**DETS Sample No**	433626					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.3			3%	5%	6%
Loss on Ignition	%	< 0.01	1.80			--	--	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	8.7			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8			--	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]			0.007			0.07	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			0.008			0.08	0.5	10	50
Antimony[U]			< 0.0060			< 0.06	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]			7			66	1000	20000	50000
TDS			75			750	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			9.1			90.8	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.11						
Dry Matter (%)			85.5						
Moisture (%)			17						
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 DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 19-12935		**Date Sampled**	02/09/19			**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: Former Colt International, New Lane, Havant, PO9 2LZ		**TP / BH No**	WS9					
Project / Job Ref: GWPR3192		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.30					
Reporting Date: 17/09/2019		**DETS Sample No**	433633					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.1			3%	5%	6%
Loss on Ignition	%	< 0.01	1.90			--	--	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	8.7			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	3.9			--	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]			0.002			0.02	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]			< 0.0060			< 0.06	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			22	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			23			227	1000	20000	50000
TDS			81			810	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			2			20.3	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.10						
Dry Matter (%)			87.1						
Moisture (%)			14.8						
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 DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 19-12935		**Date Sampled**	02/09/19			**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: Former Colt International, New Lane, Havant, PO9 2LZ		**TP / BH No**	WS17					
Project / Job Ref: GWPR3192		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.80					
Reporting Date: 17/09/2019		**DETS Sample No**	433644					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	1			3%	5%	6%
Loss on Ignition	%	< 0.01	3.30			--	--	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	8.2			--	>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]			0.002		0.02	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]			< 0.0060		< 0.06	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]			< 1		< 10	800	15000	25000
Fluoride[U]			< 0.5		< 5	10	150	500
Sulphate[U]			1		11	1000	20000	50000
TDS			66		660	4000	60000	100000
Phenol Index			< 0.01		< 0.1	1	-	-
DOC			6.3		62.5	500	800	1000
Leach Test Information								
Sample Mass (kg)			0.10					
Dry Matter (%)			87.4					
Moisture (%)			14.4					
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 DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 19-12935		**Date Sampled**	02/09/19			**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: Former Colt International, New Lane, Havant, PO9 2LZ		**TP / BH No**	WS19					
Project / Job Ref: GWPR3192		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.50					
Reporting Date: 17/09/2019		**DETS Sample No**	433648					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.2			3%	5%	6%
Loss on Ignition	%	< 0.01	0.60			--	--	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	8.4			--	>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]			< 0.001		< 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]			< 0.0060		< 0.06	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]			< 1		< 10	800	15000	25000
Fluoride[U]			< 0.5		< 5	10	150	500
Sulphate[U]			18		180	1000	20000	50000
TDS			75		750	4000	60000	100000
Phenol Index			< 0.01		< 0.1	1	-	-
DOC			2.1		20.7	500	800	1000
Leach Test Information								
Sample Mass (kg)			0.10					
Dry Matter (%)			90.5					
Moisture (%)			10.4					
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 DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-12935	
Ground & Water Ltd	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	
Project / Job Ref: GWPR3192	
Order No: None Supplied	
Reporting Date: 17/09/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
433622	WS1	None Supplied	0.30	6.3	Brown sandy clay with brick and concrete
433623	WS1	None Supplied	2.00	6.2	Brown sandy clay with stones
433624	WS2	None Supplied	0.50	8	Brown sandy gravel with stones and concrete
433625	WS3	None Supplied	2.00	14.2	Brown loamy sand with stones and brick
433626	WS4	None Supplied	0.50	14.6	Brown loamy sand with stones and brick
433627	WS4	None Supplied	1.50	9	Brown sandy gravel with stones and chalk
433629	WS5	None Supplied	1.50	7.8	Brown sandy clay with stones
433630	WS6	None Supplied	0.50	11.6	Brown loamy sand with chalk and brick
433631	WS7	None Supplied	0.50	15	Brown loamy sand with stones and chalk
433632	WS8	None Supplied	0.30	3.6	Brown sandy gravel with stones and concrete
433633	WS9	None Supplied	0.30	12.9	Brown loamy sand with stones and chalk
433634	WS9	None Supplied	0.50	4.8	Brown loamy sand with stones
433635	WS11	None Supplied	0.80	11.5	Brown sandy clay with stones
433636	WS13	None Supplied	0.50	14.1	Brown sandy clay
433637	WS14	None Supplied	0.50	13.8	Light brown sandy clay
433638	WS15	None Supplied	1.00	4.2	Brown sandy gravel with stones and concrete
433639	WS16	None Supplied	0.50	17.2	Brown sand
433640	WS16	None Supplied	0.80	18.2	Brown sand
433641	WS16	None Supplied	1.00	18.7	Brown sand
433642	WS17	None Supplied	0.30	19.1	White chalk
433643	WS17	None Supplied	0.50	19.4	Black loamy sand with stones
433644	WS17	None Supplied	0.80	12.6	Brown sandy clay with stones
433645	WS18	None Supplied	0.30	18.6	White chalk
433646	WS18	None Supplied	1.00	20	Black loamy sand with stones
433647	WS19	None Supplied	0.30	19.4	White chalk
433648	WS19	None Supplied	0.50	9.5	Brown sandy gravel with stones
433649	WS19	None Supplied	0.80	19.5	Brown sandy gravel with brick and concrete
433650	WS19	None Supplied	1.00	25	Brown loamy sand with stones and concrete
433651	WS20	None Supplied	0.30	14.3	Brown loamy sand with stones

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

Insufficient Sample I/S

Unsuitable Sample U/S

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

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-12935
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3192
Order No: None Supplied
Reporting Date: 17/09/2019

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

4480

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

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-14076

Site Reference:	Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref:	GWPR3192
Order No:	None Supplied
Sample Receipt Date:	01/10/2019
Sample Scheduled Date:	01/10/2019
Report Issue Number:	1
Reporting Date:	07/10/2019

Authorised by:

Dave Ashworth
Technical Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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

4480

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 19-14076	**Date Sampled**	02/09/19				**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: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	WS5						
Project / Job Ref: GWPR3192	**Additional Refs**	None Supplied						
Order No: None Supplied	**Depth (m)**	2.00						
Reporting Date: 07/10/2019	**DETS Sample No**	438747						

Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	< 0.1			3%	5%	6%
Loss on Ignition	%	< 0.01	0.47			--	--	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	8.4			--	>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]	< 0.001			< 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]	< 0.0060			< 0.06	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]	3			30	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	7			71	1000	20000	50000
TDS	59			590	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	5.4			53.5	500	800	1000

Leach Test Information						
Sample Mass (kg)	0.10					
Dry Matter (%)	94.1					
Moisture (%)	6.2					
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 DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-14076	
Ground & Water Ltd	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	
Project / Job Ref: GWPR3192	
Order No: None Supplied	
Reporting Date: 07/10/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 438747	WS5	None Supplied	2.00	5.8	Light brown sandy gravel with stones

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

DETS 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

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-14076
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3192
Order No: None Supplied
Reporting Date: 07/10/2019

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

4480

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

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-15113

Site Reference:	Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref:	GWPR3192
Order No:	None Supplied
Sample Receipt Date:	24/10/2019
Sample Scheduled Date:	24/10/2019
Report Issue Number:	1
Reporting Date:	30/10/2019

Authorised by:

Dave Ashworth
Technical Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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

UKAS TESTING
4480

Core Analysis Certificate - Speciated PAHs						
DETS Report No: 19-15113	**Date Sampled**	21/10/19	21/10/19	21/10/19	21/10/19	
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	TM1	TM2	TM3	TM4	
Project / Job Ref: GWPR3192	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 30/10/2019	**DETS Sample No**	443576	443578	443580	443582	

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	
Naphthalene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Acenaphthylene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Acenaphthene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Fluorene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Phenanthrene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Anthracene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Fluoranthene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Pyrene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Benzo(a)anthracene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Chrysene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Benzo(b)fluoranthene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Benzo(k)fluoranthene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Benzo(a)pyrene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Indeno(1,2,3-cd)pyrene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Dibenz(a,h)anthracene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Benzo(ghi)perylene	mg/kg	< 2	ISO17025	< 2	< 2	< 2	< 2	
Coronene	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Total Oily Waste PAHs	mg/kg	< 16	NONE	< 16	< 16	< 16	< 16	
Total Dutch 10 PAHs	mg/kg	< 20	NONE	< 20	< 20	< 20	< 20	
Total EPA-16 PAHs	mg/kg	< 32	NONE	< 32	< 32	< 32	< 32	
Total WAC-17 PAHs	mg/kg	< 34	ISO17025	< 34	< 34	< 34	< 34	

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

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

4480

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 19-15113	Date Sampled	21/10/19	21/10/19	21/10/19	21/10/19	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TM1	TM2	TM3	TM4	
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 30/10/2019	DETS Sample No	443576	443578	443580	443582	

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	
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	40	8	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	16	19	110	28	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	555	790	215	721	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	571	809	365	757	
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	15	< 2	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	13	35	54	8	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	343	598	204	410	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	355	633	272	418	
Total >C5 - C35	mg/kg	< 42	NONE	926	1442	637	1175	

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

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

4480

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 19-15113	Date Sampled	21/10/19	21/10/19	21/10/19	21/10/19	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TM1	TM2	TM3	TM4	
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 30/10/2019	DETS Sample No	443576	443578	443580	443582	

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	
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°C
(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

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

Leachate Analysis Certificate - BS EN 12457:2 (10:1 Single Stage)						
DETS Report No: 19-15113	Date Sampled	21/10/19	21/10/19	21/10/19	21/10/19	
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	TM1	TM2	TM3	TM4	
Project / Job Ref: GWPR3192	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 30/10/2019	DETS Sample No	443577	443579	443581	443583	

Determinand	Unit	RL	Accreditation					
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	

Subcontracted analysis (S)

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

4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-15113	
Ground & Water Ltd	
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	
Project / Job Ref: GWPR3192	
Order No: None Supplied	
Reporting Date: 30/10/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
443576	TM1	None Supplied	None Supplied	1.2	Black tar
443578	TM2	None Supplied	None Supplied	< 0.1	Black tar
443580	TM3	None Supplied	None Supplied	1	Black tar
443582	TM4	None Supplied	None Supplied	0.5	Black tar

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

Insufficient Sample [IS]

Unsuitable Sample [US]

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

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-15113
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3192
Order No: None Supplied
Reporting Date: 30/10/2019

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

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

UKAS TESTING
4480

Wate Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-15113
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3192
Order No: None Supplied
Reporting Date: 30/10/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

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.	

Cont'd Overleaf:

Cont'd from previous page:

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	130	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.

Cont'd Overleaf:

Cont'd from previous page:

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

Cont'd Overleaf:

Cont'd from previous page:

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 (%)

Cont'd Overleaf:

Cont'd from previous page:

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

Cont'd Overleaf:

Cont'd from previous page:

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 [r] (76.4) [sol]	4,900[r]	1,200[r](76.4) [sol]
	2.5% SOM	5.60	5.6	10	460 [r](183) [sol]	4,900[r]	1,900[r](183) [sol]
	6.0% SOM	13	13	24	1,100[r](432) [sol]	4,900[r]	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.

Cont'd Overleaf:

Cont'd from previous page:

LQM/CIEH Suitable 4 Use Levels (cont.)

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

Cont'd Overleaf:
Cont'd from previous page:

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

Cont'd Overleaf:

Cont'd from previous page:

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]

Cont'd Overleaf:

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^{vap}
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^{vap}	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

Cont'd Overleaf:

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

Cont'd Overleaf:

Cont'd from previous page:

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

Cont'd Overleaf:

Cont'd from previous page:

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*

Cont'd Overleaf:

Cont'd from previous page:

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

Cont'd Overleaf:

Cont'd from previous page:

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*

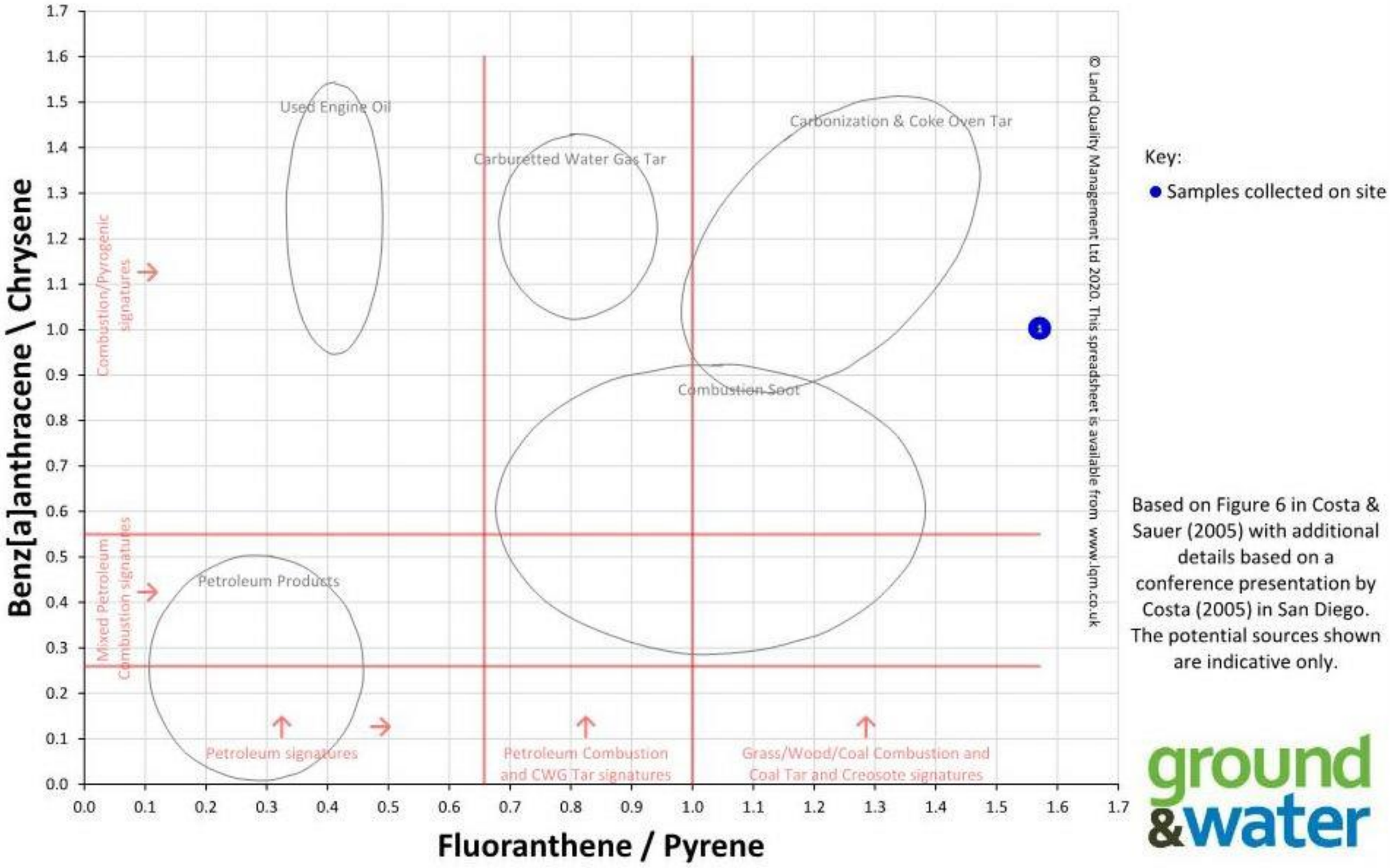
Cont'd Overleaf:

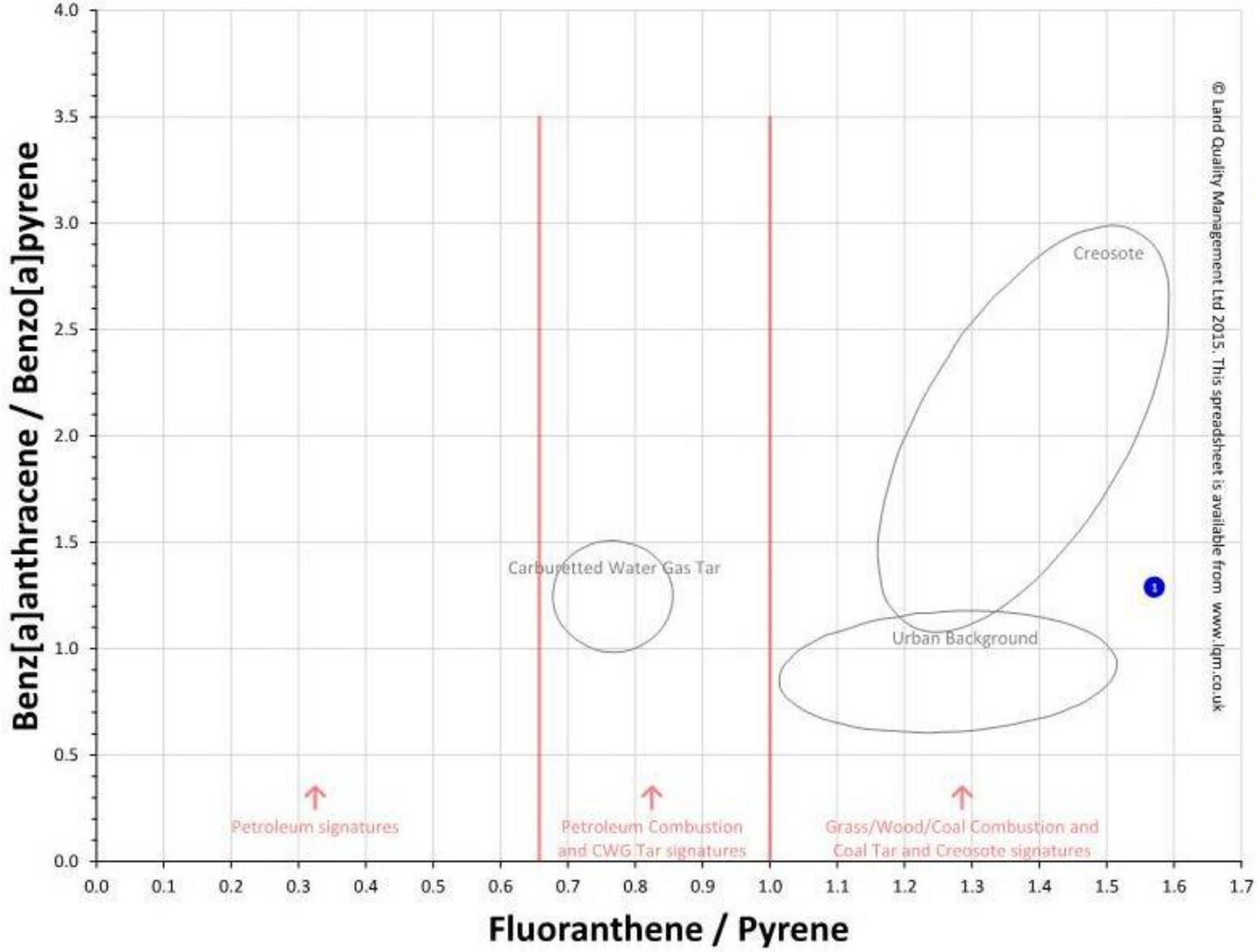
Cont'd from previous page:

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
LQM PAH Profiling Tool


Benz[a]anthracene \ Chrysene
Fluoranthene / Pyrene
Used Engine Oil
Carburetted Water Gas Tar
Carbonization & Coke Oven Tar
Combustion Soot
Petroleum Products
Combustion/Pyrogenic signatures
Mixed Petroleum Combustion signatures
Petroleum signatures
Petroleum Combustion and CWG Tar signatures
Grass/Wood/Coal Combustion and Coal Tar and Creosote signatures
1
© Land Quality Management Ltd 2020. This spreadsheet is available from www.lqm.co.uk
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

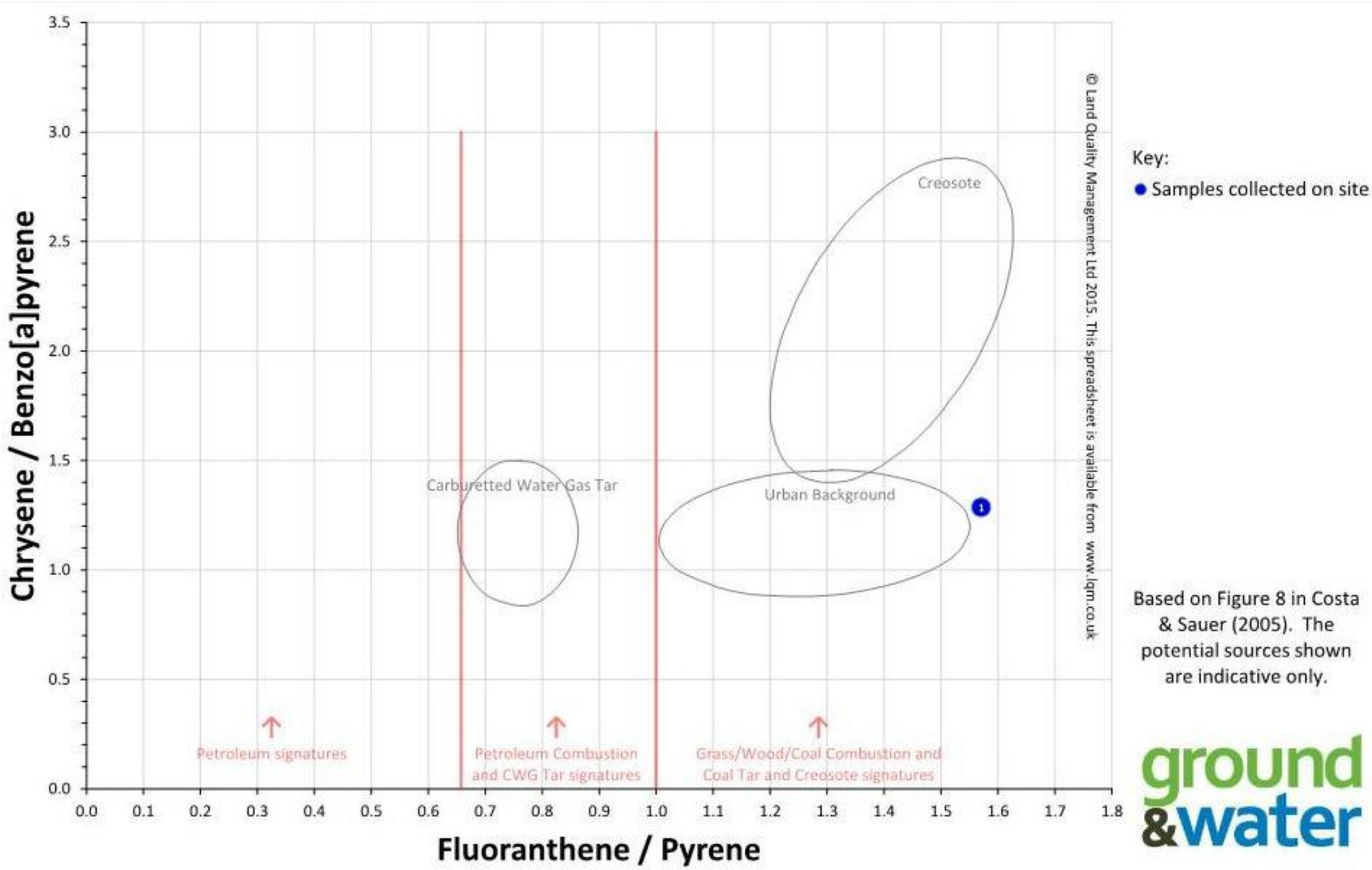


Key:

- Samples collected on site

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

ground &water



Based on Figure 8 in Costa & Sauer (2005). The potential sources shown are indicative only.

ground &water

APPENDIX F
CLAIRE Statistical Analysis

Client/client ref	Drew Smith Group
Project ref	Former Colt International, New Lane, Havant PO9 2LZ
Site ref	GWPR3514
Data description	
Contaminant(s)	Lead, Benzo(b)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene
Test scenario	Planning: is true mean lower than critical concentration (μ < Cc)?
Date	27 February 2020
User details	Francis Williams

Statistics calculator (version 1)

soil & groundwater

Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE, 2008)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

ESI Ltd (ESI) do not promise that the spreadsheet will provide any particular facilities or functions. The user must ensure that the spreadsheet meets their needs and they remain solely responsible for the competent use of the spreadsheet. Users are entirely responsible for the consequences of any use of the spreadsheet. ESI do not provide any warranty about the fitness for purpose or performance of any part of the spreadsheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the spreadsheet will be uninterrupted or error free. The user should carry out all necessary virus checks prior to installing on their computing system.

© ESI Ltd. 2008

Go to summary

Data sheet

Project details

Easting	Northing	Sample ID	Lead	B(b)F	B(a)P	D(ah)A													
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg								
472647	107919	TP1	117	0.91	0.57	<0.1													
472647	107919	TP2	59	0.64	0.41	<0.1													
472647	107926	TP3	51	1.28	0.8	<0.1													
472631	107927	TP4	59	1.06	0.64	<0.1													
472602	107928	TP5	60	0.54	0.33	<0.1													
472613	107960	TP6	139	0.97	0.64	<0.1													
472625	107988	TP7	54	0.82	0.51	<0.1													
472640	108014	TP8	80	0.52	0.33	<0.1													
472659	108046	TP9	89	0.97	0.59	<0.1													
472576	107962	TP10	151	0.83	0.53	<0.1													
472631	108061	TP11	168	0.79	0.51	<0.1													
472577	108008	TP12	85	0.74	0.46	<0.1													
472594	108038	TP13	125	0.68	0.47	<0.1													
472537	107986	TP14	164	0.97	0.72	<0.1													
472587	108076	TP15	110	0.77	0.56	<0.1													
472587	108076	TP16	187	0.61	0.41	<0.1													
472587	108076	TP17	173	1	0.68	<0.1													
472519	108010	TP18	150	1.99	1.43	<0.1													
472519	108010	TP19	178	0.64	0.46	<0.1													
472533	108042	TP20	61	7.35	4.87	0.73													
472533	108042	TP21	43	0.51	0.35	<0.1													
472545	108069	TP22	264	0.61	0.46	<0.1													
472545	108069	TP23	49	0.61	0.41	<0.1													
472545	108069	TP24	71	0.64	0.38	<0.1													
472555	108089	TP25	42	0.93	0.67	<0.1													
472555	108096	TP26	68	1.17	0.37	<0.1													
472625	108009	TP27	41	0.78	0.26	<0.1													
472667	107925																		
472667	107925																		
472678	107946																		
472678	107946																		
472537	108028																		
472597	108047																		
472539	108081																		
472648	107996																		
472597	107957																		
472542	108002																		
472596	108081																		
472709	108035																		
472709	108035																		
472641	107923																		
472613	107986																		
472585	108025																		
472640	108028																		
472576	108027																		
472603	108048																		
472543	108016																		
472553	108038																		
472579	108071																		
472603	108010																		
472717	108025																		
472636	108094																		
472599	107934																		
472599	107934																		
472540	107973																		
472540	107973																		

472537	108103	
472537	108103	
472502	108031	
472502	108031	
472570	107827	
472570	107827	
		s_68
		s_69
		s_70
		s_71
		s_72
		s_73
		s_74
		s_75
		s_76
		s_77
		s_78
		s_79
		s_80
		s_81
		s_82
		s_83
		s_84
		s_85
		s_86
		s_87
		s_88
		s_89
		s_90
		s_91
		s_92
		s_93
		s_94
		s_95
		s_96
		s_97
		s_98
		s_99
		s_100
		s_101
		s_102
		s_103
		s_104
		s_105
		s_106
		s_107
		s_108
		s_109
		s_110
		s_111
		s_112
		s_113
		s_114
		s_115
		s_116
		s_117
		s_118
		s_119
		s_120

		s_121																	
		s_122																	
		s_123																	
		s_124																	
		s_125																	
		s_126																	
		s_127																	
		s_128																	
		s_129																	
		s_130																	
		s_131																	
		s_132																	
		s_133																	
		s_134																	
		s_135																	
		s_136																	
		s_137																	
		s_138																	
		s_139																	
		s_140																	
		s_141																	
		s_142																	
		s_143																	
		s_144																	
		s_145																	
		s_146																	
		s_147																	
		s_148																	
		s_149																	
		s_150																	
		s_151																	
		s_152																	
		s_153																	
		s_154																	
		s_155																	
		s_156																	
		s_157																	
		s_158																	
		s_159																	
		s_160																	
		s_161																	
		s_162																	
		s_163																	
		s_164																	
		s_165																	
		s_166																	
		s_167																	
		s_168																	
		s_169																	
		s_170																	
		s_171																	
		s_172																	
		s_173																	
		s_174																	
		s_175																	
		s_176																	
		s_177																	
		s_178																	
		s_179																	
		s_180																	
		s_181																	
		s_182																	
		s_183																	
		s_184																	

		s_185																
		s_186																
		s_187																
		s_188																
		s_189																
		s_190																
		s_191																
		s_192																
		s_193																
		s_194																
		s_195																
		s_196																
		s_197																
		s_198																
		s_199																
		s_200																









Client/client ref: Drew Smith Group
Project ref: Former Colt International, New Lane, Havant PO9 2LZ
Site ref: GWPR3514
Data description:
Contaminant(s): Lead, Benzo(b)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene
Test scenario: Planning
Date: 27 February 2020

	Lead (mg/kg)	B(b)F (mg/kg)	B(a)P (mg/kg)	D(ah)A (mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
Critical concentration, C_c	**210**	**2.6**	**2.2**	**0.24**	~~15~~	~~2.6~~	~~2.2~~	~~27~~	~~0.24~~	
Notes										
Sample size, n	27	27	27	27	0	0	0	0	0	0
Sample mean, $\overline{x}$	106.259259	1.08259259	0.70074074	0.07518519	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s	57.6391911	1.28946797	0.88172875	0.13086606						
Number of non-detects	0	0	0	**26**						
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	Yes	Yes	Yes	Yes						
Distribution	Non-normal	Non-normal	Non-normal	Non-normal						
Statistical approach	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:	Planning: is true mean lower than critical concentration ($\mu < Cc$)?				**Evidence level required:**		95%	Use Normal distribution to test for outliers		
t statistic, t_0 (or k_0)	-9.352190599	-6.114677048	-8.835347214	-6.544117647						
Upper confidence limit (on true mean concentration, μ)	154.611076	2.16428922	1.44039697	0.18496486						
Evidence level	**99%**	**97%**	**99%**	**98%**						
Base decision on:	evidence level	evidence level	evidence level	evidence level						
Result	**$\mu < Cc$**	**$\mu < Cc$**	**$\mu < Cc$**	**$\mu < Cc$**						
Select dataset	○ Y	○ Y	○ Y	◉ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y

Back to data | Go to outlier test | Go to normality test | Show individual summary

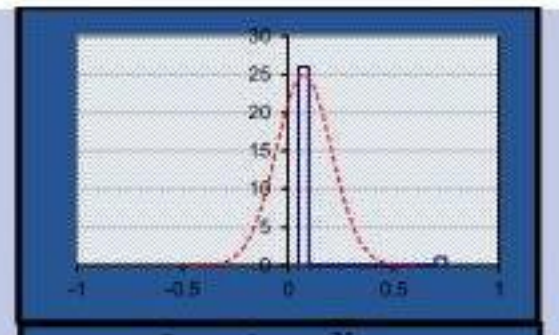
Client/client ref: Drew Smith Group
Project ref: Former Colt International, New Lane, Havant PO9 2LZ
Site ref: GWPR3514
Data description:
Contaminant(s): Lead, Benzo(b)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene
Test scenario: Planning
Date: 27 February 2020

Critical concentration, C_c							
Notes							
Sample size, n	0	0	0	0	0	0	0
Sample mean, $\overline{x}$	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s							
Number of non-detects							
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?							
Distribution							
Statistical approach	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:							
t statistic, t_0 (or k_0)							
Upper confidence limit (on true mean concentration, μ)							
Evidence level							
Base decision on:							
Result							
Select dataset	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y

Back to data

Sample ID	Include?	D(ah)A	Outliers	
TP1	Y	0.05		
TP2	Y	0.05		
TP3	Y	0.05		
TP4	Y	0.05		
TP5	Y	0.05		
TP6	Y	0.05		
TP7	Y	0.05		
TP8	Y	0.05		
TP9	Y	0.05		
TP10	Y	0.05		
TP11	Y	0.05		
TP12	Y	0.05		
TP13	Y	0.05		
TP14	Y	0.05		
TP15	Y	0.05		
TP16	Y	0.05		
TP17	Y	0.05		
TP18	Y	0.05		
TP19	Y	0.05		
TP20	Y	0.73	Outlier	
TP21	Y	0.05		
TP22	Y	0.05		
TP23	Y	0.05		
TP24	Y	0.05		
TP25	Y	0.05		
TP26	Y	0.05		
TP27	Y	0.05		
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			
	Y			



Sample mean,
0.075

Standard deviation, s
0.131

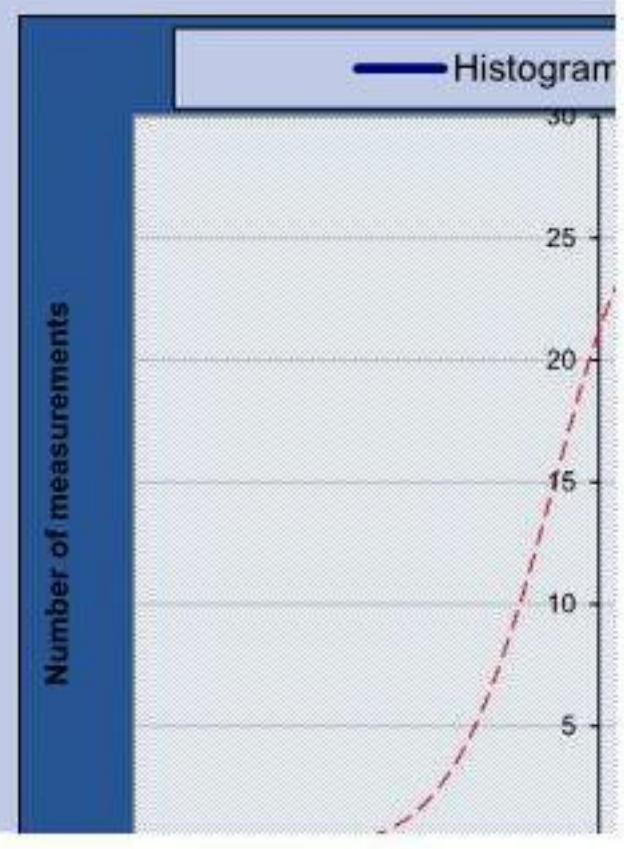
Sample size, n
27

Maxiumum
0.730

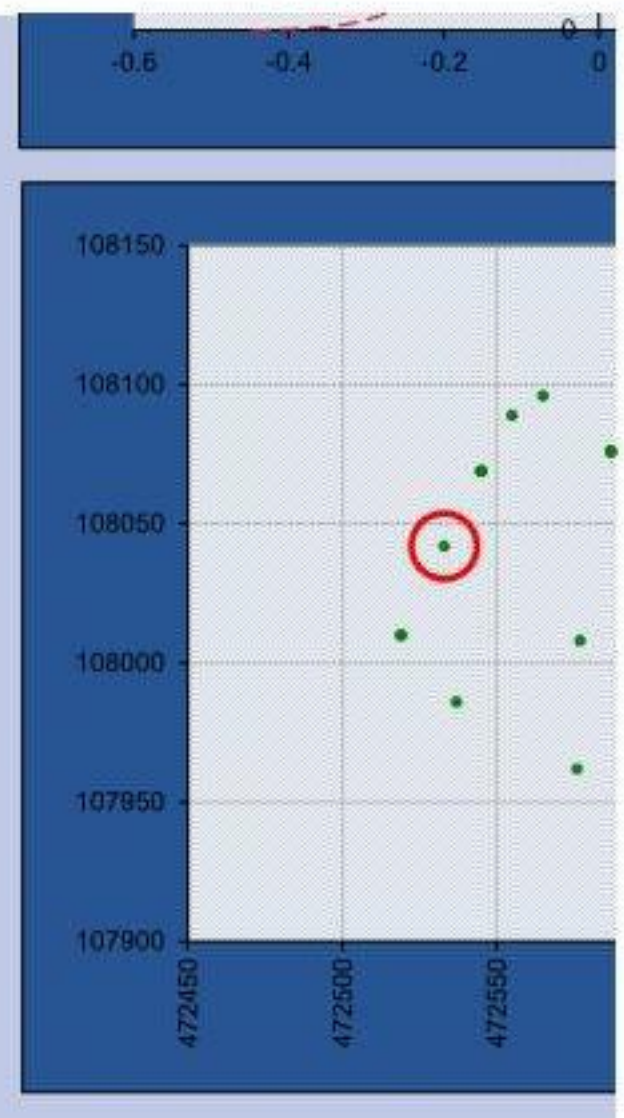
Test Applicability
Applicable

Level of Significance,
5%

Tn = 5.004
Tcrit = 2.698



	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
s_68	☑ Y			
s_69	☑ Y			
s_70	☑ Y			
s_71	☑ Y			
s_72	☑ Y			
s_73	☑ Y			
s_74	☑ Y			
s_75	☑ Y			
s_76	☑ Y			
s_77	☑ Y			
s_78	☑ Y			
s_79	☑ Y			
s_80	☑ Y			
s_81	☑ Y			
s_82	☑ Y			
s_83	☑ Y			
s_84	☑ Y			
s_85	☑ Y			
s_86	☑ Y			
s_87	☑ Y			
s_88	☑ Y			
s_89	☑ Y			
s_90	☑ Y			
s_91	☑ Y			
s_92	☑ Y			
s_93	☑ Y			
s_94	☑ Y			
s_95	☑ Y			



s_96	☑ Y				
s_97	☑ Y				
s_98	☑ Y				
s_99	☑ Y				
s_100	☑ Y				
s_101	☑ Y				
s_102	☑ Y				
s_103	☑ Y				
s_104	☑ Y				
s_105	☑ Y				
s_106	☑ Y				
s_107	☑ Y				
s_108	☑ Y				
s_109	☑ Y				
s_110	☑ Y				
s_111	☑ Y				
s_112	☑ Y				
s_113	☑ Y				
s_114	☑ Y				
s_115	☑ Y				
s_116	☑ Y				
s_117	☑ Y				
s_118	☑ Y				
s_119	☑ Y				
s_120	☑ Y				
s_121	☑ Y				
s_122	☑ Y				
s_123	☑ Y				
s_124	☑ Y				
s_125	☑ Y				
s_126	☑ Y				
s_127	☑ Y				
s_128	☑ Y				
s_129	☑ Y				
s_130	☑ Y				
s_131	☑ Y				
s_132	☑ Y				
s_133	☑ Y				
s_134	☑ Y				
s_135	☑ Y				
s_136	☑ Y				
s_137	☑ Y				
s_138	☑ Y				
s_139	☑ Y				
s_140	☑ Y				
s_141	☑ Y				
s_142	☑ Y				
s_143	☑ Y				
s_144	☑ Y				
s_145	☑ Y				
s_146	☑ Y				

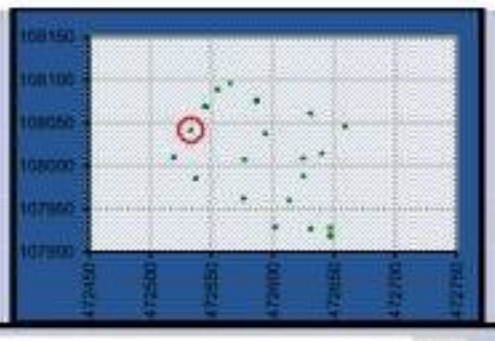
s_147	☑ Y				
s_148	☑ Y				
s_149	☑ Y				
s_150	☑ Y				
s_151	☑ Y				
s_152	☑ Y				
s_153	☑ Y				
s_154	☑ Y				
s_155	☑ Y				
s_156	☑ Y				
s_157	☑ Y				
s_158	☑ Y				
s_159	☑ Y				
s_160	☑ Y				
s_161	☑ Y				
s_162	☑ Y				
s_163	☑ Y				
s_164	☑ Y				
s_165	☑ Y				
s_166	☑ Y				
s_167	☑ Y				
s_168	☑ Y				
s_169	☑ Y				
s_170	☑ Y				
s_171	☑ Y				
s_172	☑ Y				
s_173	☑ Y				
s_174	☑ Y				
s_175	☑ Y				
s_176	☑ Y				
s_177	☑ Y				
s_178	☑ Y				
s_179	☑ Y				
s_180	☑ Y				
s_181	☑ Y				
s_182	☑ Y				
s_183	☑ Y				
s_184	☑ Y				
s_185	☑ Y				
s_186	☑ Y				
s_187	☑ Y				
s_188	☑ Y				
s_189	☑ Y				
s_190	☑ Y				
s_191	☑ Y				
s_192	☑ Y				
s_193	☑ Y				
s_194	☑ Y				
s_195	☑ Y				
s_196	☑ Y				
s_197	☑ Y				

s_198	☑ Y			
s_199	☑ Y			
s_200	☑ Y			

Outliers?

YES

(None selected)



Dataset: D(ah)A (mg/kg)

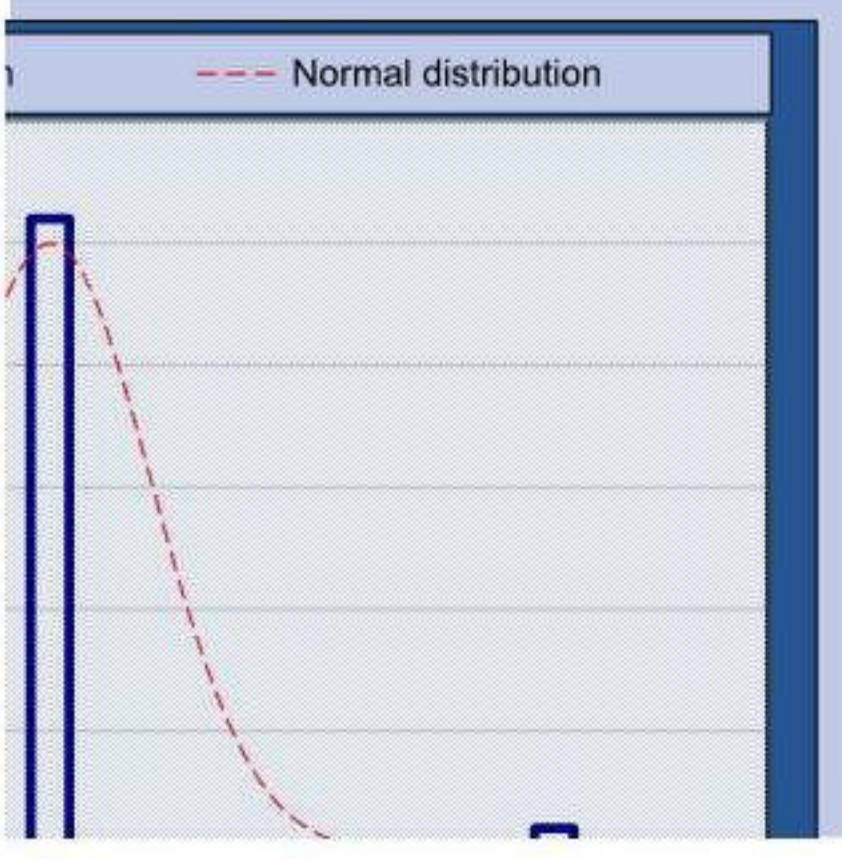
U Normal distribution to test for outliers

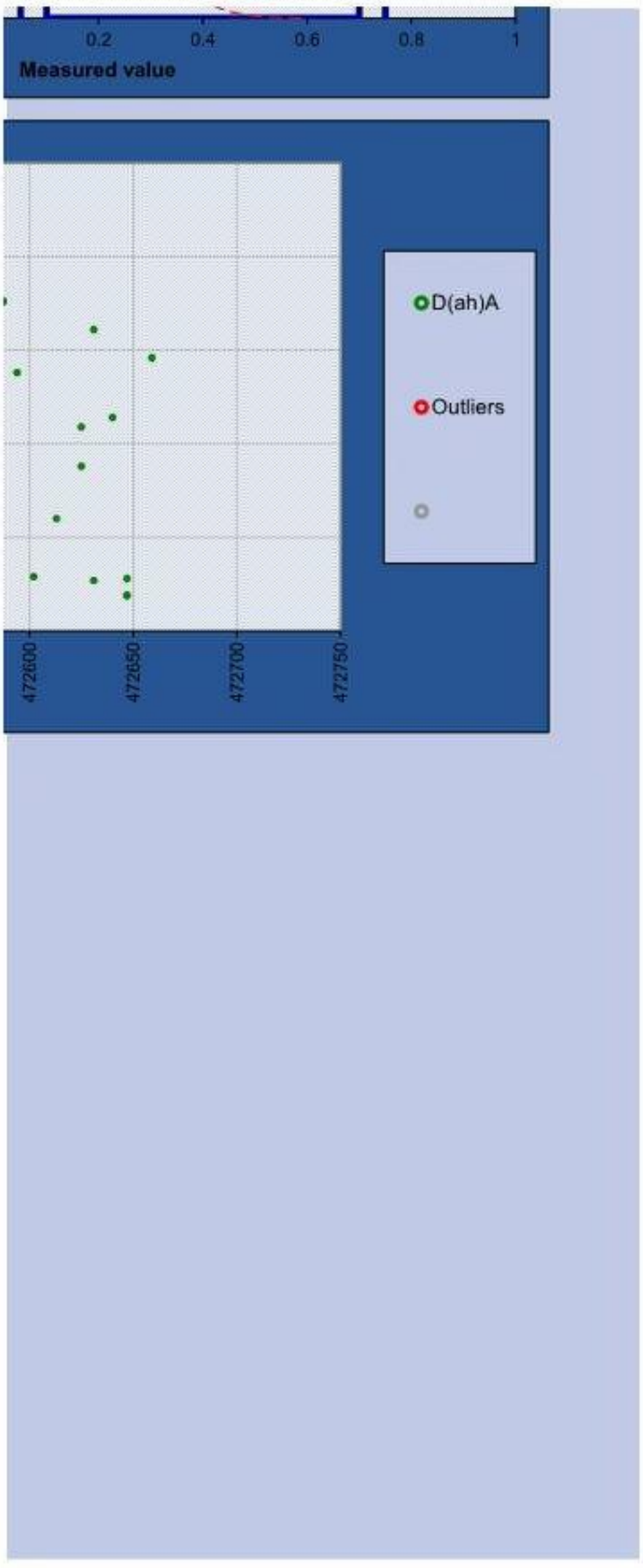
Exclude identified

Show individual summary

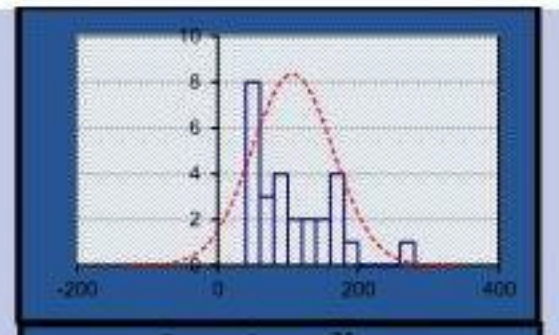
Back to summary

Back to data




0.2
0.4
0.6
0.8
1
Measured value
D(ah)A
Outliers
4726000
4726500
4727000
4727500

Sample ID	Include?	Lead	Outliers
TP1	Y	117	
TP2	Y	59	
TP3	Y	51	
TP4	Y	59	
TP5	Y	60	
TP6	Y	139	
TP7	Y	54	
TP8	Y	80	
TP9	Y	89	
TP10	Y	151	
TP11	Y	168	
TP12	Y	95	
TP13	Y	125	
TP14	Y	164	
TP15	Y	110	
TP16	Y	187	
TP17	Y	173	
TP18	Y	150	
TP19	Y	178	
TP20	Y	61	
TP21	Y	43	
TP22	Y	264	Outlier
TP23	Y	49	
TP24	Y	71	
TP25	Y	42	
TP26	Y	89	
TP27	Y	41	
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		



Sample mean,
106.259

Standard deviation, s
57.639

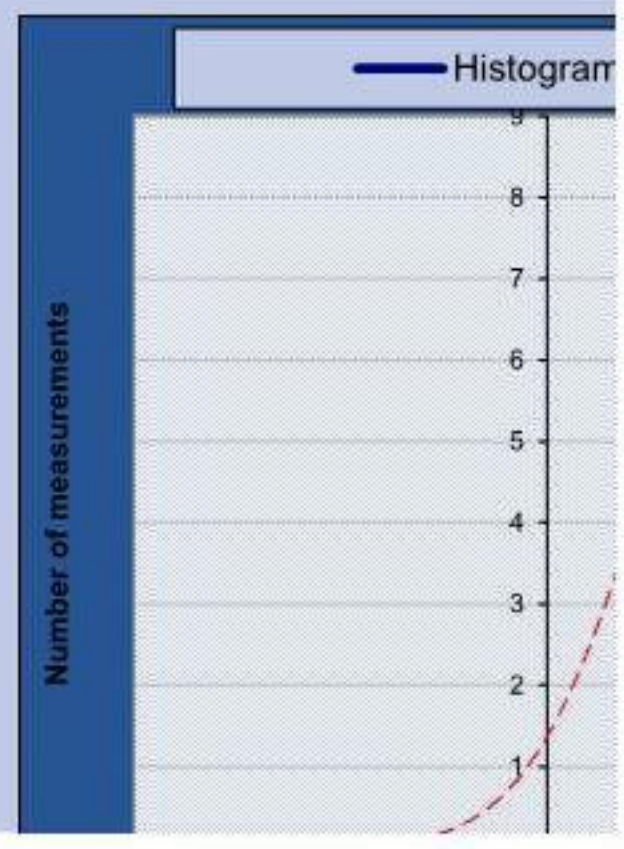
Sample size, n
27

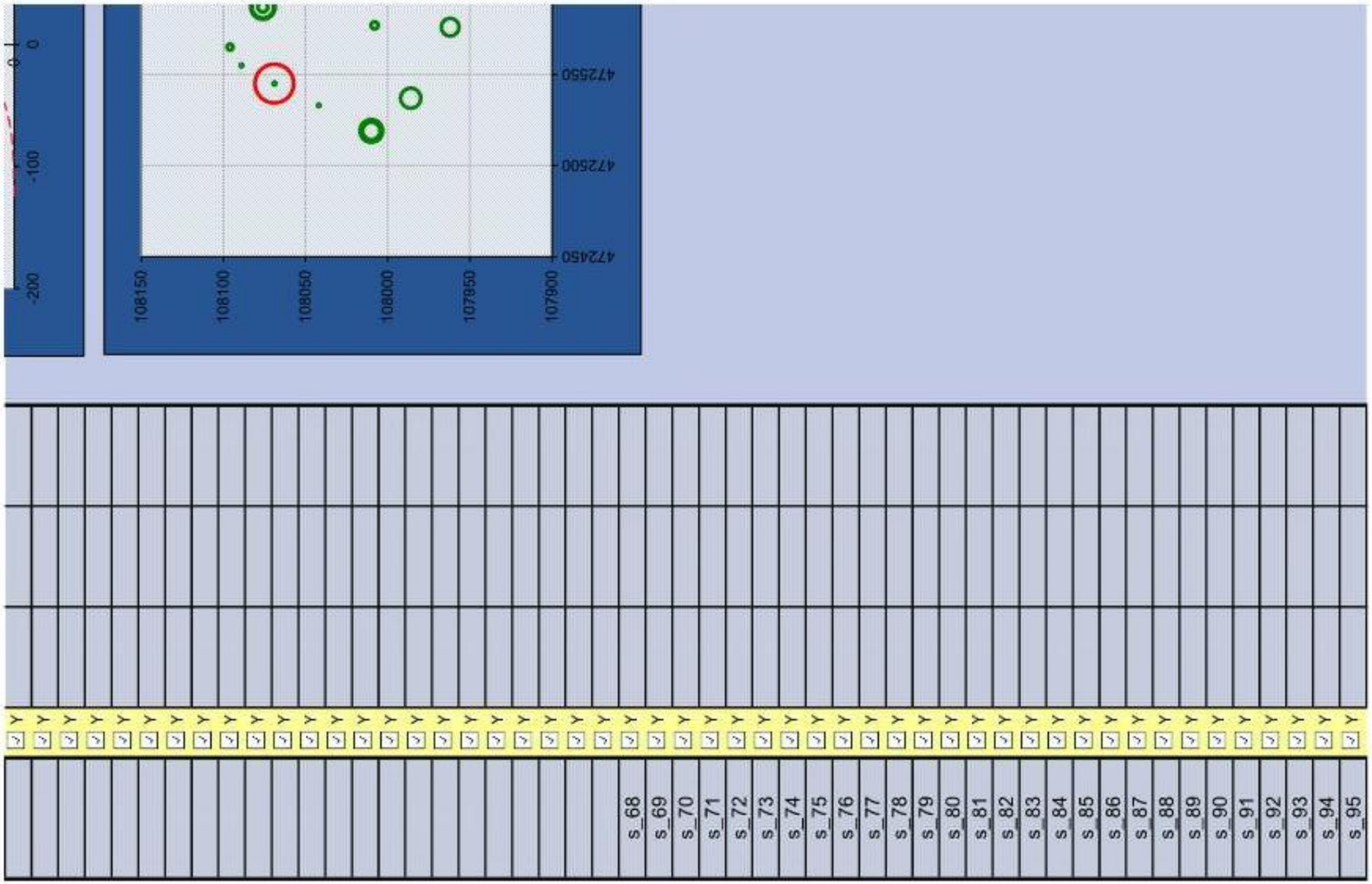
Maxiumum
264.000

Test Applicability
Applicable

Level of Significance,
5%

Tn = 2.737
Tcrit = 2.698




0
-100
-200
108150
108100
108050
108000
107950
107900
472550
472500
472450
s_68
s_69
s_70
s_71
s_72
s_73
s_74
s_75
s_76
s_77
s_78
s_79
s_80
s_81
s_82
s_83
s_84
s_85
s_86
s_87
s_88
s_89
s_90
s_91
s_92
s_93
s_94
s_95

s_96	☑ Y				
s_97	☑ Y				
s_98	☑ Y				
s_99	☑ Y				
s_100	☑ Y				
s_101	☑ Y				
s_102	☑ Y				
s_103	☑ Y				
s_104	☑ Y				
s_105	☑ Y				
s_106	☑ Y				
s_107	☑ Y				
s_108	☑ Y				
s_109	☑ Y				
s_110	☑ Y				
s_111	☑ Y				
s_112	☑ Y				
s_113	☑ Y				
s_114	☑ Y				
s_115	☑ Y				
s_116	☑ Y				
s_117	☑ Y				
s_118	☑ Y				
s_119	☑ Y				
s_120	☑ Y				
s_121	☑ Y				
s_122	☑ Y				
s_123	☑ Y				
s_124	☑ Y				
s_125	☑ Y				
s_126	☑ Y				
s_127	☑ Y				
s_128	☑ Y				
s_129	☑ Y				
s_130	☑ Y				
s_131	☑ Y				
s_132	☑ Y				
s_133	☑ Y				
s_134	☑ Y				
s_135	☑ Y				
s_136	☑ Y				
s_137	☑ Y				
s_138	☑ Y				
s_139	☑ Y				
s_140	☑ Y				
s_141	☑ Y				
s_142	☑ Y				
s_143	☑ Y				
s_144	☑ Y				
s_145	☑ Y				
s_146	☑ Y				

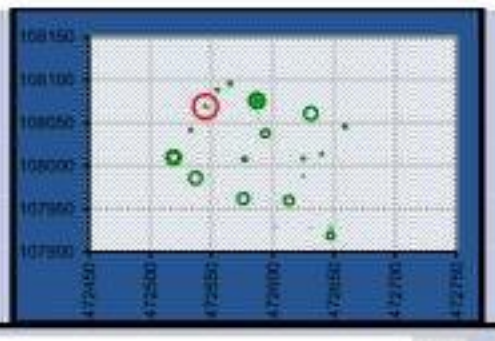
s_147	☑ Y				
s_148	☑ Y				
s_149	☑ Y				
s_150	☑ Y				
s_151	☑ Y				
s_152	☑ Y				
s_153	☑ Y				
s_154	☑ Y				
s_155	☑ Y				
s_156	☑ Y				
s_157	☑ Y				
s_158	☑ Y				
s_159	☑ Y				
s_160	☑ Y				
s_161	☑ Y				
s_162	☑ Y				
s_163	☑ Y				
s_164	☑ Y				
s_165	☑ Y				
s_166	☑ Y				
s_167	☑ Y				
s_168	☑ Y				
s_169	☑ Y				
s_170	☑ Y				
s_171	☑ Y				
s_172	☑ Y				
s_173	☑ Y				
s_174	☑ Y				
s_175	☑ Y				
s_176	☑ Y				
s_177	☑ Y				
s_178	☑ Y				
s_179	☑ Y				
s_180	☑ Y				
s_181	☑ Y				
s_182	☑ Y				
s_183	☑ Y				
s_184	☑ Y				
s_185	☑ Y				
s_186	☑ Y				
s_187	☑ Y				
s_188	☑ Y				
s_189	☑ Y				
s_190	☑ Y				
s_191	☑ Y				
s_192	☑ Y				
s_193	☑ Y				
s_194	☑ Y				
s_195	☑ Y				
s_196	☑ Y				
s_197	☑ Y				

s_198	☑ Y			
s_199	☑ Y			
s_200	☑ Y			

Outliers?

YES

(None selected)



Dataset: Lead (mg/kg)

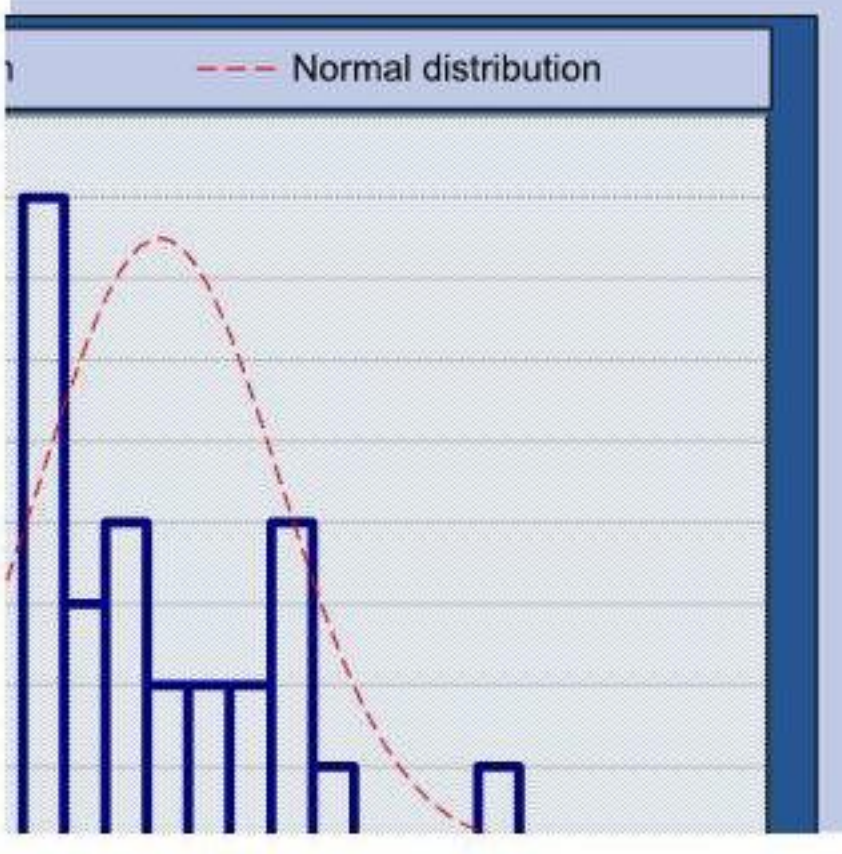
U Normal distribution to test for outliers

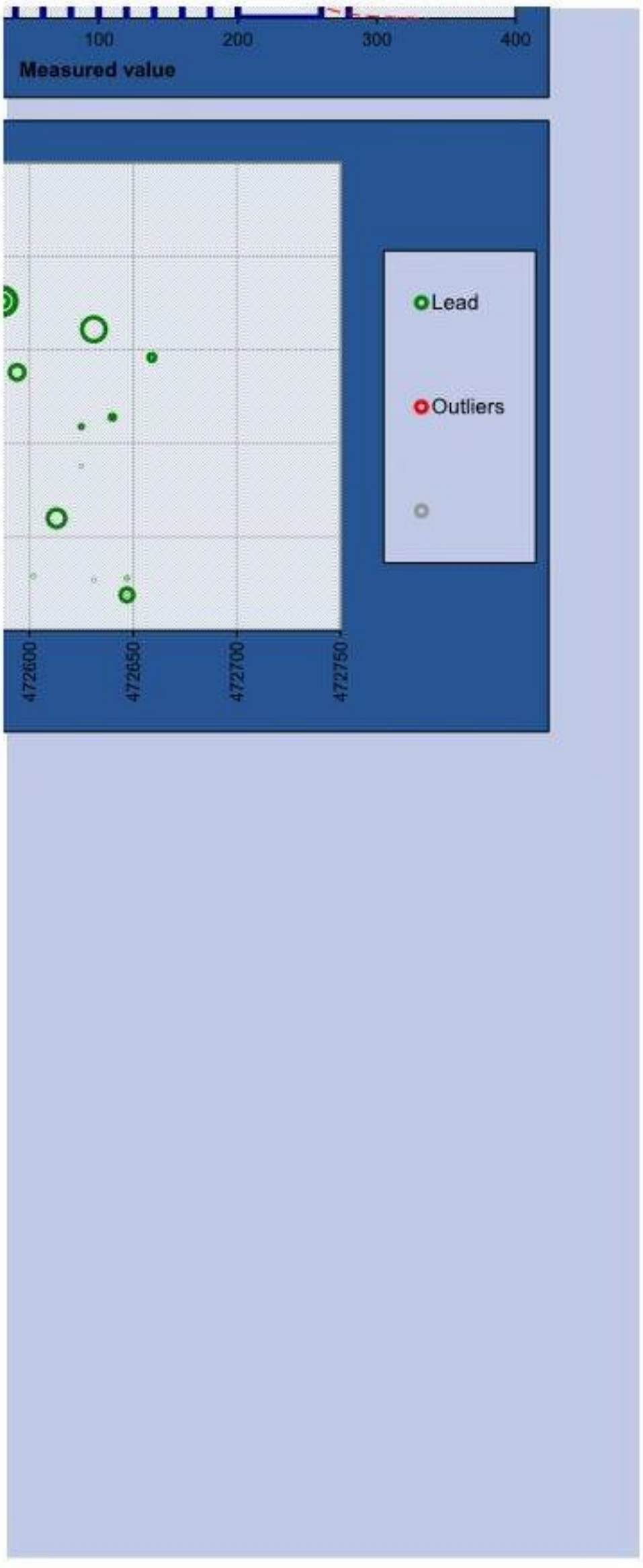
Exclude identified

Show individual summary

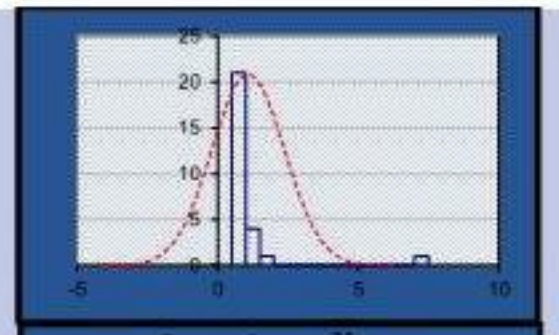
Back to summary

Back to data




100
200
300
400
Measured value
Lead
Outliers
4726000
4726500
4727000
4727500

Sample ID	Include?	B(b)F	Outliers
TP1	Y	0.91	
TP2	Y	0.64	
TP3	Y	1.28	
TP4	Y	1.06	
TP5	Y	0.54	
TP6	Y	0.97	
TP7	Y	0.82	
TP8	Y	0.52	
TP9	Y	0.97	
TP10	Y	0.83	
TP11	Y	0.79	
TP12	Y	0.74	
TP13	Y	0.68	
TP14	Y	0.97	
TP15	Y	0.77	
TP16	Y	0.61	
TP17	Y	1	
TP18	Y	1.99	
TP19	Y	0.64	
TP20	Y	7.35	Outlier
TP21	Y	0.51	
TP22	Y	0.61	
TP23	Y	0.61	
TP24	Y	0.54	
TP25	Y	0.93	
TP26	Y	1.17	
TP27	Y	0.78	
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		



Sample mean,
1.083

Standard deviation, s
1.289

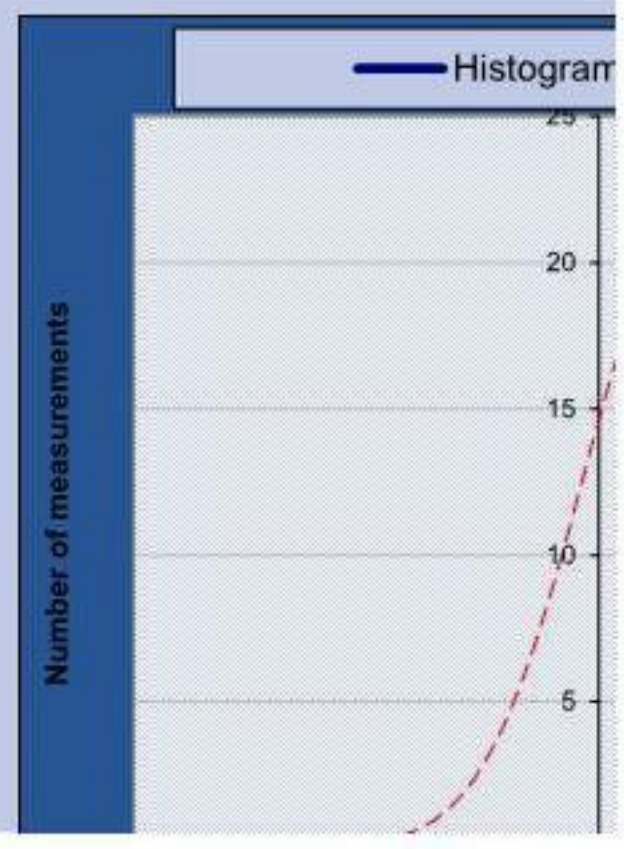
Sample size, n
27

Maxiumum
7.350

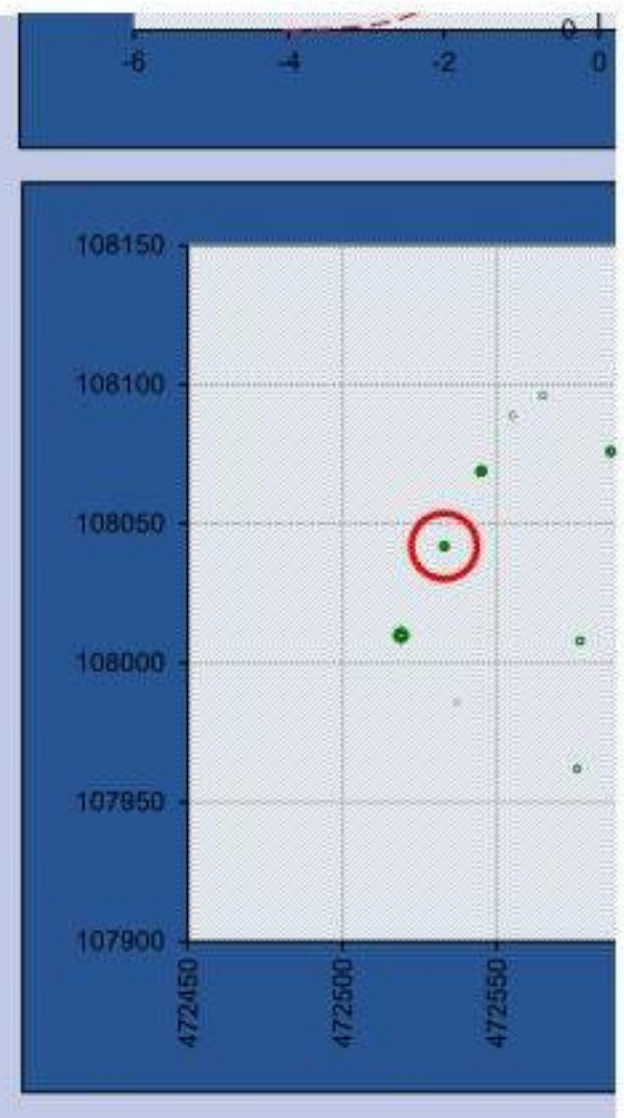
Test Applicability
Applicable

Level of Significance,
5%

Tn = 4.860
Tcrit = 2.698



	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
	☑ Y			
s_68	☑ Y			
s_69	☑ Y			
s_70	☑ Y			
s_71	☑ Y			
s_72	☑ Y			
s_73	☑ Y			
s_74	☑ Y			
s_75	☑ Y			
s_76	☑ Y			
s_77	☑ Y			
s_78	☑ Y			
s_79	☑ Y			
s_80	☑ Y			
s_81	☑ Y			
s_82	☑ Y			
s_83	☑ Y			
s_84	☑ Y			
s_85	☑ Y			
s_86	☑ Y			
s_87	☑ Y			
s_88	☑ Y			
s_89	☑ Y			
s_90	☑ Y			
s_91	☑ Y			
s_92	☑ Y			
s_93	☑ Y			
s_94	☑ Y			
s_95	☑ Y			



s_96	☑ Y				
s_97	☑ Y				
s_98	☑ Y				
s_99	☑ Y				
s_100	☑ Y				
s_101	☑ Y				
s_102	☑ Y				
s_103	☑ Y				
s_104	☑ Y				
s_105	☑ Y				
s_106	☑ Y				
s_107	☑ Y				
s_108	☑ Y				
s_109	☑ Y				
s_110	☑ Y				
s_111	☑ Y				
s_112	☑ Y				
s_113	☑ Y				
s_114	☑ Y				
s_115	☑ Y				
s_116	☑ Y				
s_117	☑ Y				
s_118	☑ Y				
s_119	☑ Y				
s_120	☑ Y				
s_121	☑ Y				
s_122	☑ Y				
s_123	☑ Y				
s_124	☑ Y				
s_125	☑ Y				
s_126	☑ Y				
s_127	☑ Y				
s_128	☑ Y				
s_129	☑ Y				
s_130	☑ Y				
s_131	☑ Y				
s_132	☑ Y				
s_133	☑ Y				
s_134	☑ Y				
s_135	☑ Y				
s_136	☑ Y				
s_137	☑ Y				
s_138	☑ Y				
s_139	☑ Y				
s_140	☑ Y				
s_141	☑ Y				
s_142	☑ Y				
s_143	☑ Y				
s_144	☑ Y				
s_145	☑ Y				
s_146	☑ Y				

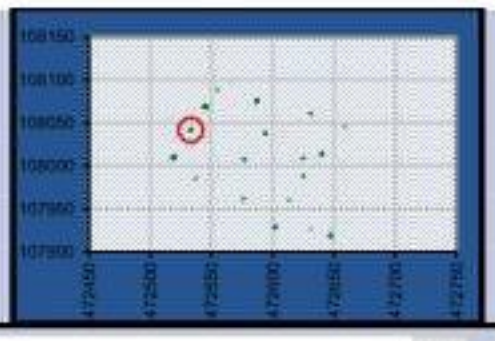
s_147	☑ Y				
s_148	☑ Y				
s_149	☑ Y				
s_150	☑ Y				
s_151	☑ Y				
s_152	☑ Y				
s_153	☑ Y				
s_154	☑ Y				
s_155	☑ Y				
s_156	☑ Y				
s_157	☑ Y				
s_158	☑ Y				
s_159	☑ Y				
s_160	☑ Y				
s_161	☑ Y				
s_162	☑ Y				
s_163	☑ Y				
s_164	☑ Y				
s_165	☑ Y				
s_166	☑ Y				
s_167	☑ Y				
s_168	☑ Y				
s_169	☑ Y				
s_170	☑ Y				
s_171	☑ Y				
s_172	☑ Y				
s_173	☑ Y				
s_174	☑ Y				
s_175	☑ Y				
s_176	☑ Y				
s_177	☑ Y				
s_178	☑ Y				
s_179	☑ Y				
s_180	☑ Y				
s_181	☑ Y				
s_182	☑ Y				
s_183	☑ Y				
s_184	☑ Y				
s_185	☑ Y				
s_186	☑ Y				
s_187	☑ Y				
s_188	☑ Y				
s_189	☑ Y				
s_190	☑ Y				
s_191	☑ Y				
s_192	☑ Y				
s_193	☑ Y				
s_194	☑ Y				
s_195	☑ Y				
s_196	☑ Y				
s_197	☑ Y				

s_198	☑ Y			
s_199	☑ Y			
s_200	☑ Y			

Outliers?

YES

(None selected)



Dataset: B(b)F (mg/kg)

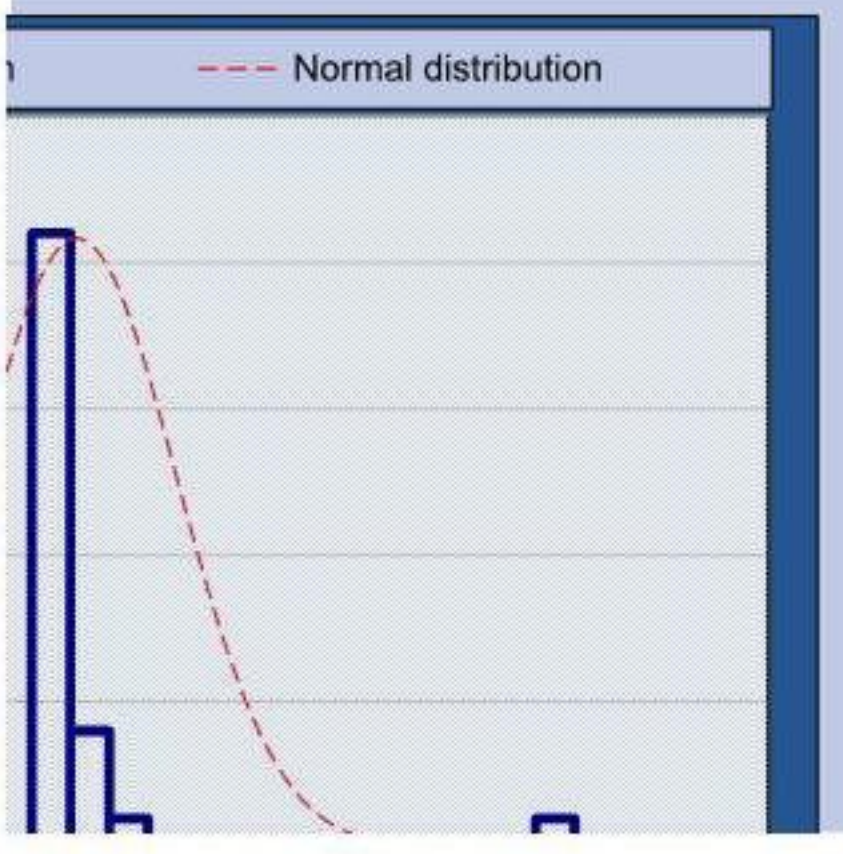
U Normal distribution to test for outliers

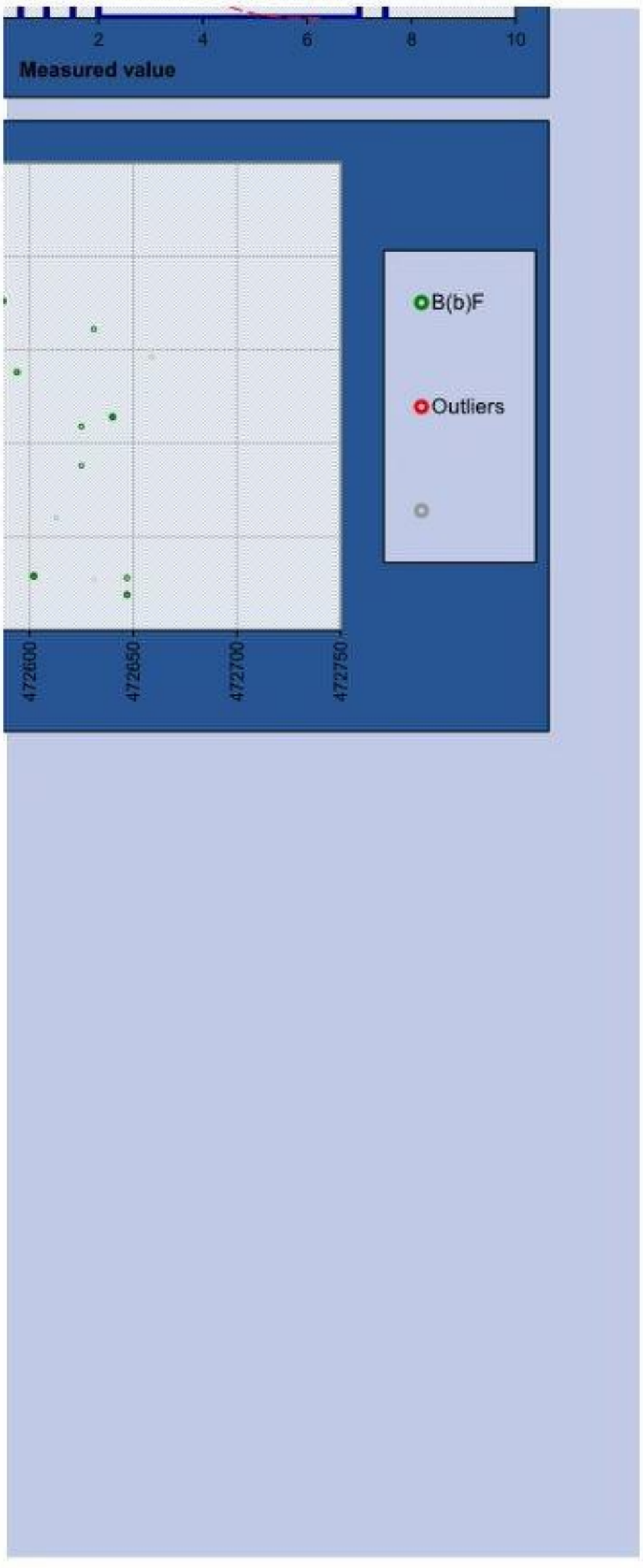
Exclude identified

Show individual summary

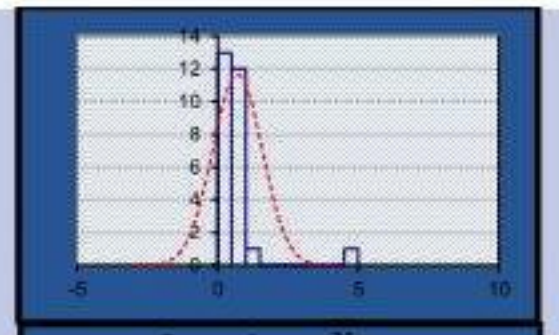
Back to summary

Back to data




2
4
6
8
10
Measured value
B(b)F
Outliers
4726600
4726650
4726700
4726750

Sample ID	Include?	B(a)P	Outliers
TP1	Y	0.57	
TP2	Y	0.41	
TP3	Y	0.8	
TP4	Y	0.64	
TP5	Y	0.33	
TP6	Y	0.64	
TP7	Y	0.51	
TP8	Y	0.33	
TP9	Y	0.59	
TP10	Y	0.53	
TP11	Y	0.51	
TP12	Y	0.46	
TP13	Y	0.47	
TP14	Y	0.72	
TP15	Y	0.56	
TP16	Y	0.41	
TP17	Y	0.68	
TP18	Y	1.43	
TP19	Y	0.46	
TP20	Y	4.97	Outlier
TP21	Y	0.35	
TP22	Y	0.46	
TP23	Y	0.41	
TP24	Y	0.38	
TP25	Y	0.67	
TP26	Y	0.37	
TP27	Y	0.26	
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		
	Y		



Sample mean,

0.701

Standard deviation, s

0.882

Sample size, n

27

Maxiumum

4.970

Test Applicability

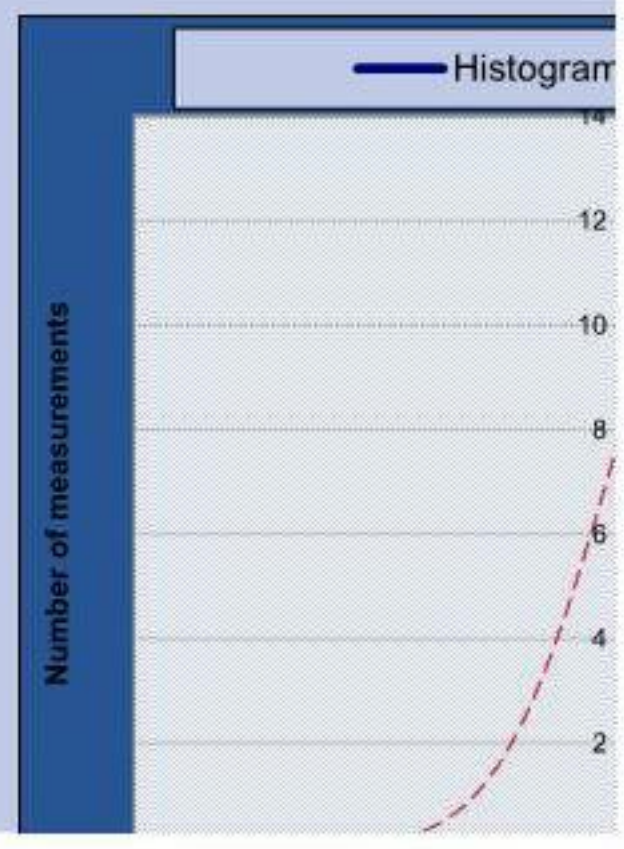
Applicable

Level of Significance,

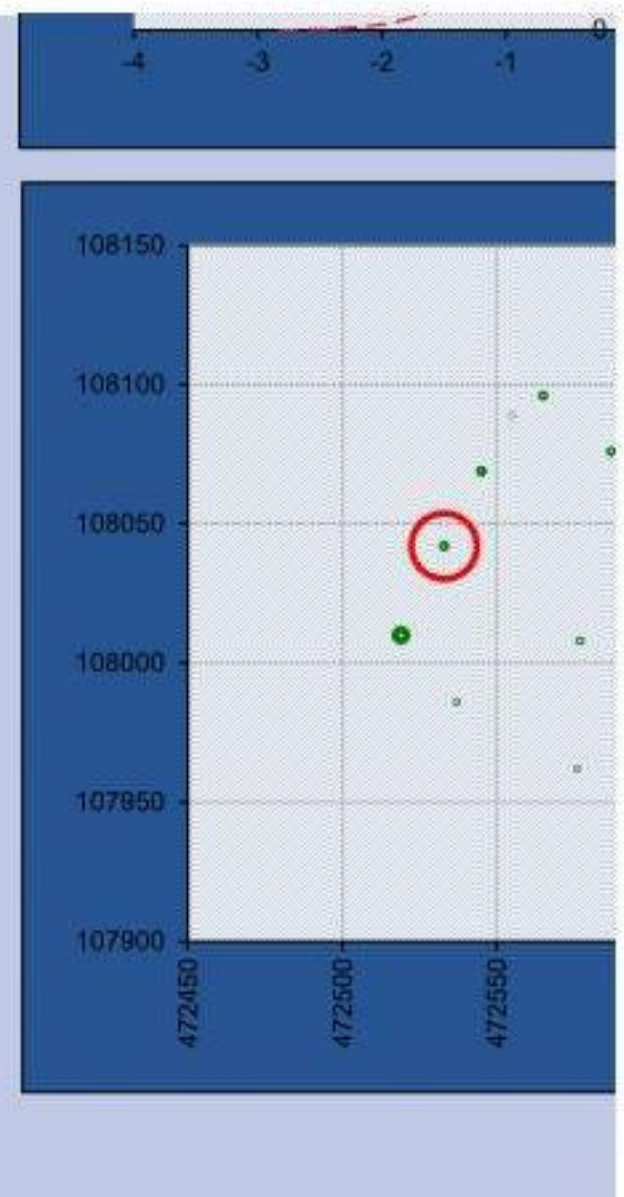
5%

Tn = 4.842

Tcrit = 2.698



	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
	☑	Y			
s_68	☑	Y			
s_69	☑	Y			
s_70	☑	Y			
s_71	☑	Y			
s_72	☑	Y			
s_73	☑	Y			
s_74	☑	Y			
s_75	☑	Y			
s_76	☑	Y			
s_77	☑	Y			
s_78	☑	Y			
s_79	☑	Y			
s_80	☑	Y			
s_81	☑	Y			
s_82	☑	Y			
s_83	☑	Y			
s_84	☑	Y			
s_85	☑	Y			
s_86	☑	Y			
s_87	☑	Y			
s_88	☑	Y			
s_89	☑	Y			
s_90	☑	Y			
s_91	☑	Y			
s_92	☑	Y			
s_93	☑	Y			
s_94	☑	Y			
s_95	☑	Y			



s_96	☑ Y				
s_97	☑ Y				
s_98	☑ Y				
s_99	☑ Y				
s_100	☑ Y				
s_101	☑ Y				
s_102	☑ Y				
s_103	☑ Y				
s_104	☑ Y				
s_105	☑ Y				
s_106	☑ Y				
s_107	☑ Y				
s_108	☑ Y				
s_109	☑ Y				
s_110	☑ Y				
s_111	☑ Y				
s_112	☑ Y				
s_113	☑ Y				
s_114	☑ Y				
s_115	☑ Y				
s_116	☑ Y				
s_117	☑ Y				
s_118	☑ Y				
s_119	☑ Y				
s_120	☑ Y				
s_121	☑ Y				
s_122	☑ Y				
s_123	☑ Y				
s_124	☑ Y				
s_125	☑ Y				
s_126	☑ Y				
s_127	☑ Y				
s_128	☑ Y				
s_129	☑ Y				
s_130	☑ Y				
s_131	☑ Y				
s_132	☑ Y				
s_133	☑ Y				
s_134	☑ Y				
s_135	☑ Y				
s_136	☑ Y				
s_137	☑ Y				
s_138	☑ Y				
s_139	☑ Y				
s_140	☑ Y				
s_141	☑ Y				
s_142	☑ Y				
s_143	☑ Y				
s_144	☑ Y				
s_145	☑ Y				
s_146	☑ Y				

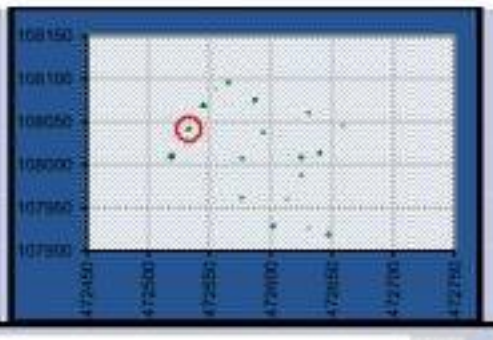
s_147	☑ Y				
s_148	☑ Y				
s_149	☑ Y				
s_150	☑ Y				
s_151	☑ Y				
s_152	☑ Y				
s_153	☑ Y				
s_154	☑ Y				
s_155	☑ Y				
s_156	☑ Y				
s_157	☑ Y				
s_158	☑ Y				
s_159	☑ Y				
s_160	☑ Y				
s_161	☑ Y				
s_162	☑ Y				
s_163	☑ Y				
s_164	☑ Y				
s_165	☑ Y				
s_166	☑ Y				
s_167	☑ Y				
s_168	☑ Y				
s_169	☑ Y				
s_170	☑ Y				
s_171	☑ Y				
s_172	☑ Y				
s_173	☑ Y				
s_174	☑ Y				
s_175	☑ Y				
s_176	☑ Y				
s_177	☑ Y				
s_178	☑ Y				
s_179	☑ Y				
s_180	☑ Y				
s_181	☑ Y				
s_182	☑ Y				
s_183	☑ Y				
s_184	☑ Y				
s_185	☑ Y				
s_186	☑ Y				
s_187	☑ Y				
s_188	☑ Y				
s_189	☑ Y				
s_190	☑ Y				
s_191	☑ Y				
s_192	☑ Y				
s_193	☑ Y				
s_194	☑ Y				
s_195	☑ Y				
s_196	☑ Y				
s_197	☑ Y				

s_198	☑ Y			
s_199	☑ Y			
s_200	☑ Y			

Outliers?

YES

(None selected)



Dataset: B(a)P (mg/kg)

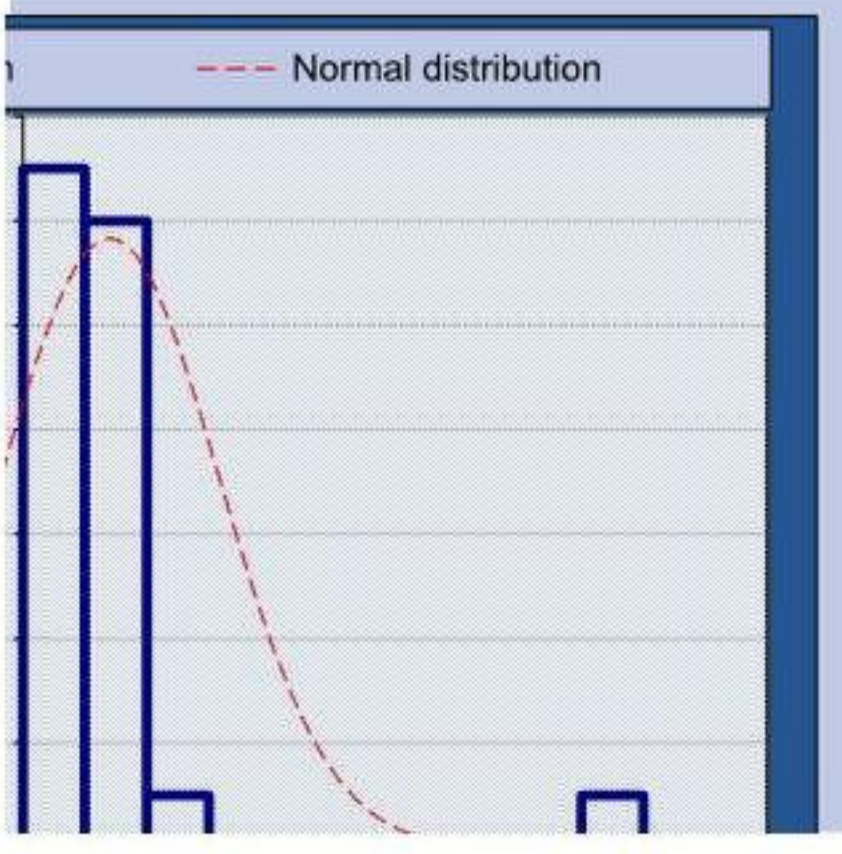
U Normal distribution to test for outliers

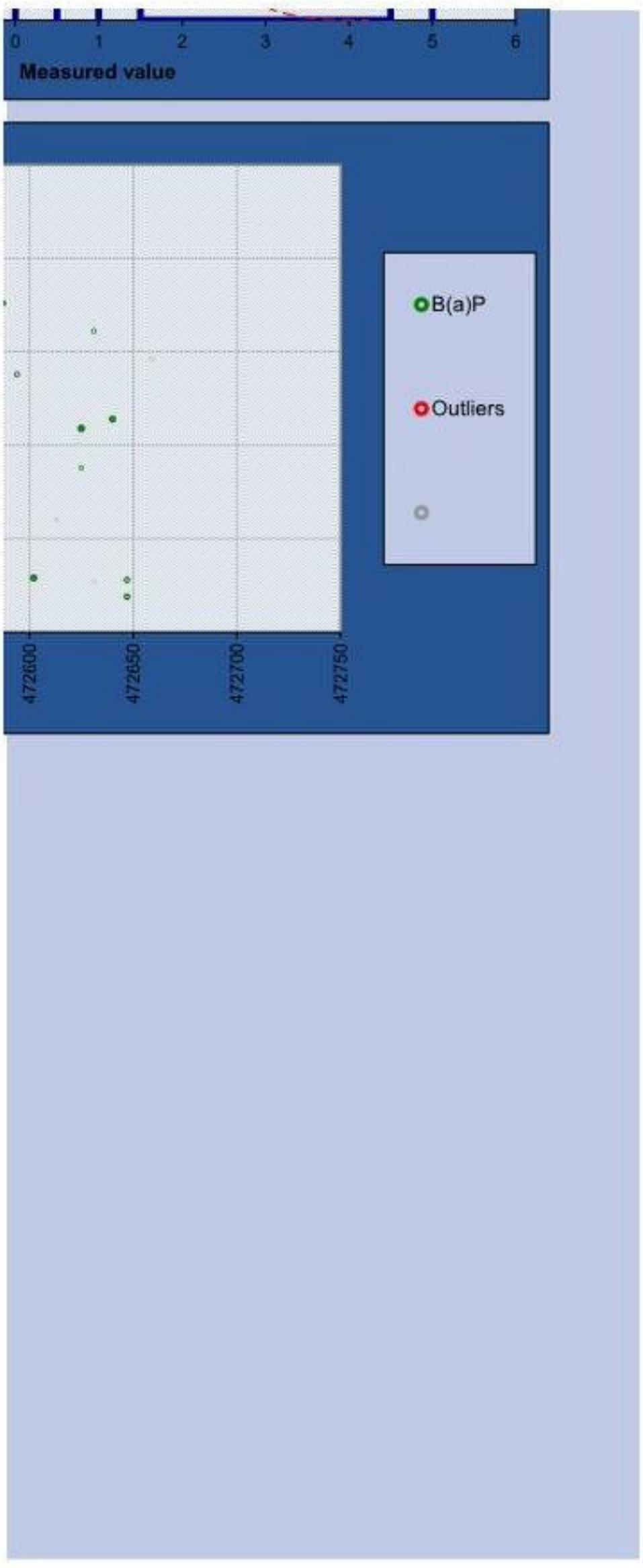
Exclude identified

Show individual summary

Back to summary

Back to data



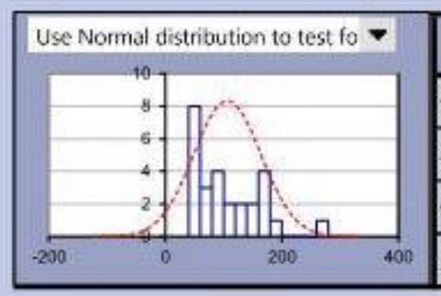

0
1
2
3
4
5
6
Measured value
B(a)P
Outliers
4726600
4726650
4726700
4726750

Test Results

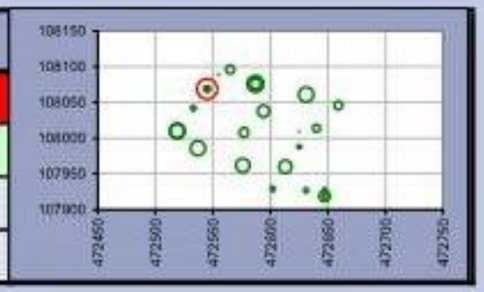
Client/client ref: Drew Smith Gro Site ref: GWPR3514
Project ref: Former Colt Internati Data description:

Date: 27-Feb-2020
User details: Francis Williams

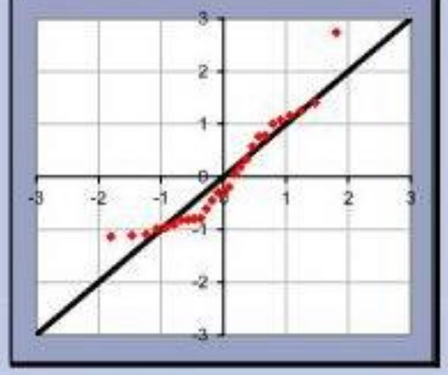
Dataset	Lead (mg/kg)
Sample mean, $\bar{n}$, (mg/kg)	106.26
Sample standard deviation, s	57.639
Sample size, n	27
Critical concentration, Cc (mg/kg)	210



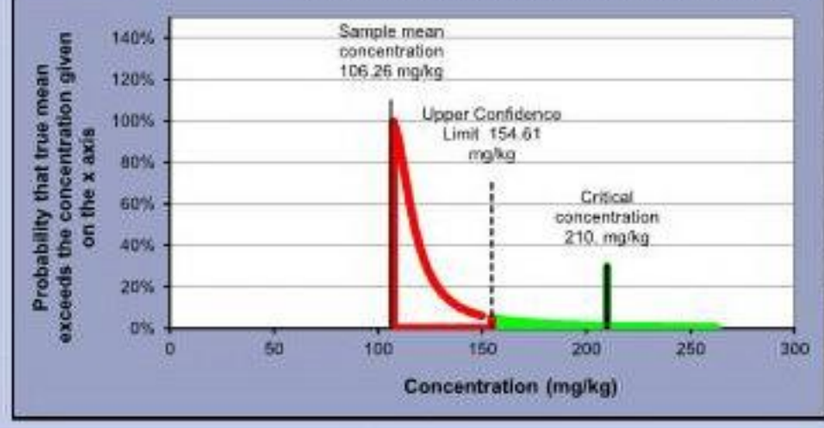
Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	0



Normality test	
Significance lev	5%
Non-normal distribution	
Use:	Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**99%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

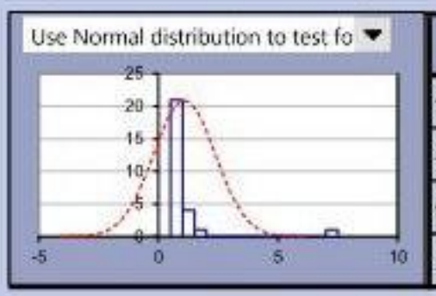
Back to data | Back to summary | Go to outlier test | Go to normality test

Test Results

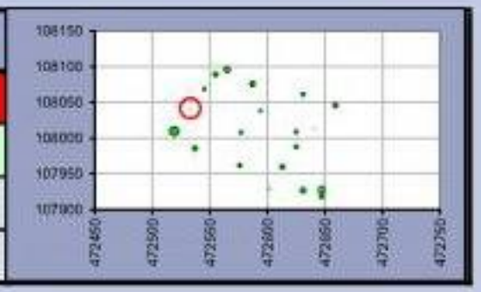
Client/client ref: Drew Smith Gro Site ref: GWPR3514
Project ref: Former Colt Internati Data description:

Date: 27-Feb-2020
User details: Francis Williams

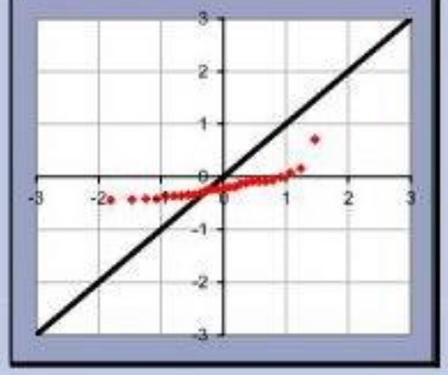
Dataset	B(b)F (mg/kg)
Sample mean, $\bar{n}$, (mg/kg)	1.0826
Sample standard deviation, s	1.2895
Sample size, n	27
Critical concentration, Cc (mg/kg)	2.6



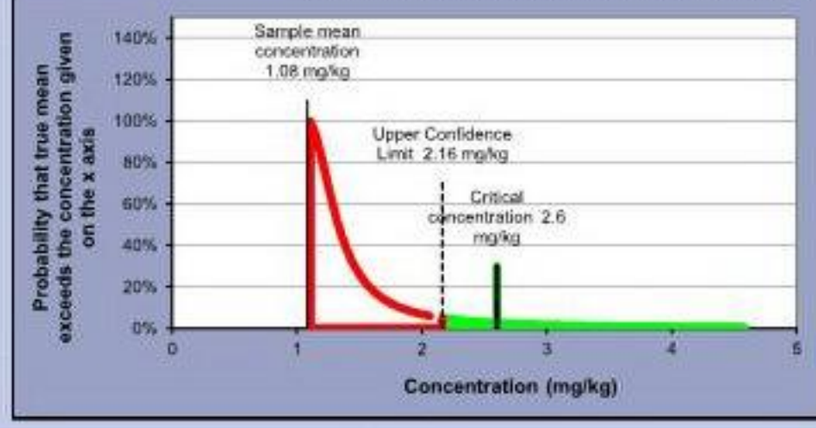
Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	0



Normality test	
Significance lev	5%
Non-normal distribution	
Use:	Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**97%**
Base decision on:	evidence level
Evidence level required:	95%
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

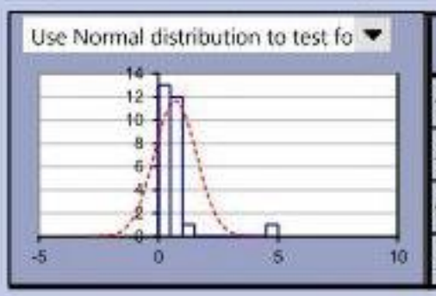
Back to data | Back to summary | Go to outlier test | Go to normality test

Test Results

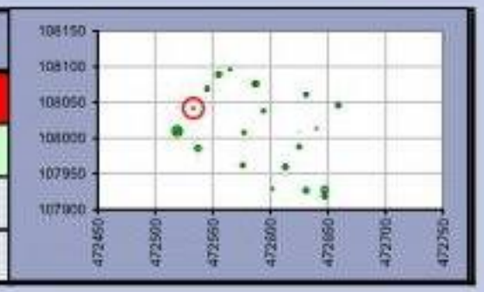
Client/client ref: Drew Smith Gro Site ref: GWPR3514
Project ref: Former Colt Internati Data description:

Date: 27-Feb-2020
User details: Francis Williams

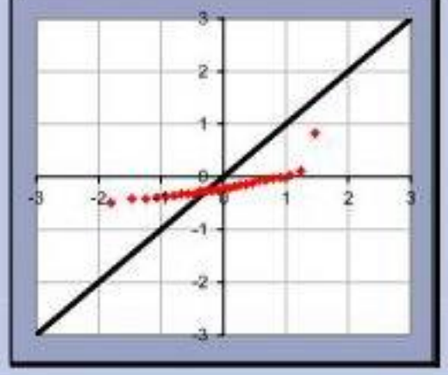
Dataset: B(a)P (mg/kg)	
Sample mean, $\bar{n}$, (mg/kg)	0.7007
Sample standard deviation, s	0.8817
Sample size, n	27
Critical concentration, Cc (mg/kg)	2.2



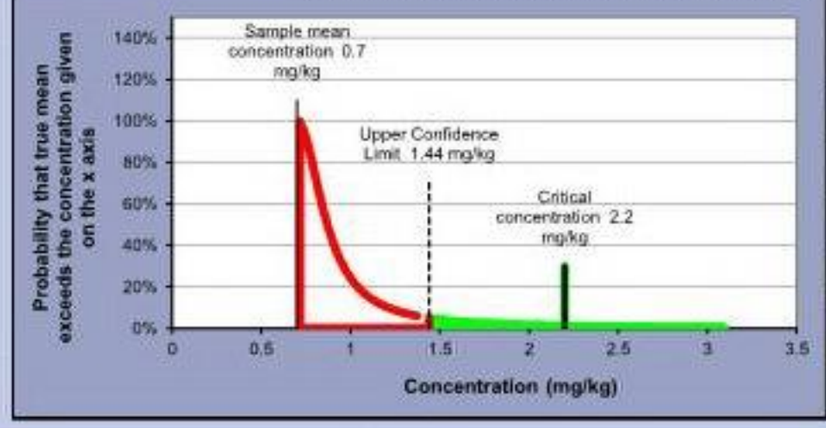
Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	0



Normality test	
Significance lev	5%
Non-normal distribution	
Use:	Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	99%
Base decision on:	evidence level
Evidence level required:	95%
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

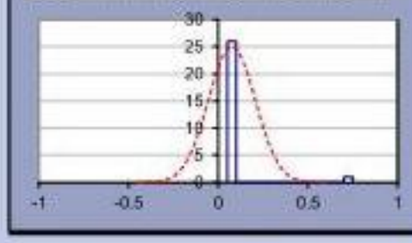
Test Results

Client/client ref: Drew Smith Gro Site ref: GWPR3514
Project ref: Former Colt Internati Data description:

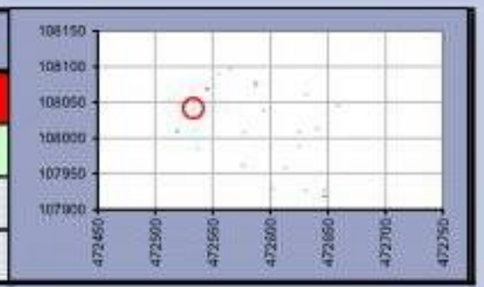
Date: 27-Feb-2020
User details: Francis Williams

Dataset	D(ah)A (mg/kg)
Sample mean, $\bar{n}$, (mg/kg)	0.0752
Sample standard deviation, s	0.1309
Sample size, n	27
Critical concentration, Cc (mg/kg)	0.24

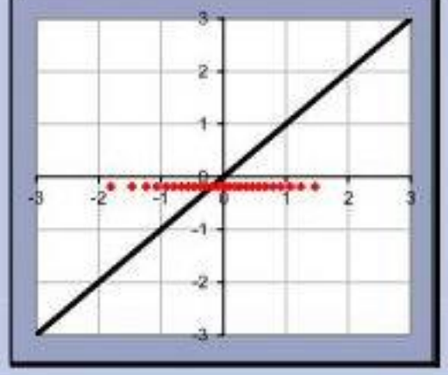
Use Normal distribution to test fo



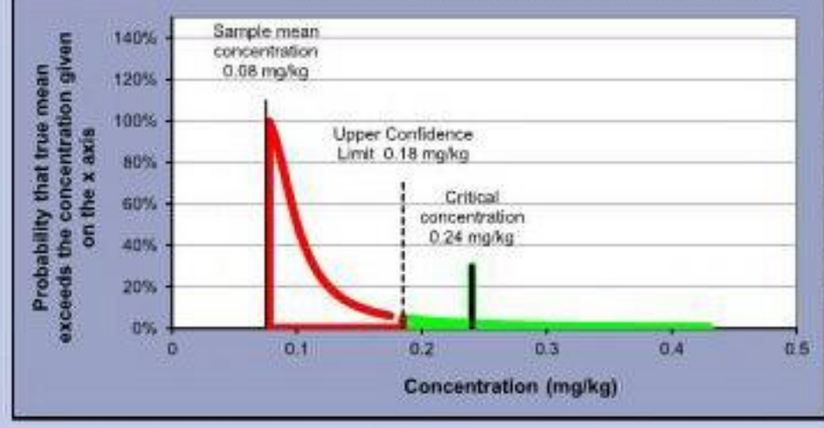
Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	26



Normality test	
Significance lev	5%
Non-normal distribution	
Use:	Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	98%
Base decision on:	evidence level
Evidence level required:	95%
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

APPENDIX G
Asbestos Risk Assessment

ground&water

CIRIA733 Asbestos Risk Assessment

Site information	Job Number	GWPR3192								
	Trial Hole				TP21					
	Depth (m bgl)				0.1					
Asbestos Type Considerations	Abestos type	Chrysotile			Amosite			Crocidolite		
	Kasbestos	1.3			1.7			2.0		
	Soil Concentration (Quantification Result in %)				0.001					
Soil Type Considerations	Soil Type	Sand	Sandy Clay	Clay	Sand	Sandy Clay	Clay	Sand	Sandy Clay	Clay
	Ksoil	2.9	1.7	0.93	2.9	1.7	0.93	2.9	1.7	0.93
	Enter the relevant from the above				2.9					
Constants	Koverall	1.6			1.6			1.6		
	Dust Concentration (mg/m3)	0.1			0.1			0.1		
	Dry Conditions Exposure (hrs)	750			750			750		
	Occupation hours in a year	1920			1920			1920		
Calculation Results	fibre/ml per mg/m3				0.0031					
	fibre/ml				0.00031					
	fibre/ml.hr				0.231					
	fibre/ml.year				0.000120					
Mesothelioma Accumulated Risk	Age (exposure commences)	0			0			0		
	Risk persists for (Years)	60			60			60		
	Cummulative Age Adjustment Factor	16.8			16.8			16.8		
	fibre/ml.year (cumulative)				0.00202					
Lung Cancer Accumulated Risk	Risk persists for (Years)	60			60			60		
	fibre/ml.year (cumulative)				0.00144					

BACKGROUND

This asbestos risk assessment has been undertaken in accordance with the guidance within CIRIA733.

The fibre concentration within the airborne soil dust (in fibres/ml per mg/m3) was calculated based on the results of Addison et al 1988 and the CIRIA Masterclass presentation "Estimating cumulative exposure to airborne asbestos from asbestos in soil" by Alan Jones.

The airborne concentration of soil dust (0.1mg/m3) was based on ambient urban dust levels and ART modelling.

The dry conditions exposure (750hrs) was based upon regional meteorological data suggesting 150hrs of dry conditions per year, when applied over a 5-year segment this equates to 750hours.

The occupational hours per year (1920hrs) is based on a 40-hour working week and 48 working weeks in a year.

A worst-case exposure scenario has been considered for residents, groundworkers or generally end-users. This was based on the risk persisting for a period of 60 years, accumulated in 5-year increments. As the risk of mesothelioma is age dependent, this considered the exposure commencing at age 0 with the relevant age adjustment factor applied for each 5-year increment.

Based on the above considerations, the following equations have been used:

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

Fibre/ml per mg/m3 x Dust Concentration = fibre/ml

(f/ml x Dry Conditions Exposure (hrs)) = fibre/ml.hr

Fibre/ml.hr ÷ occupational hours per year = fibre/ml.year

Mesothelioma: fibre/ml.year x 16.8 (cumulative age adjustment factor for 60 years)

Lung Cancer: fibre/ml.year x 12 (60 years in 5-year increments)

APPENDIX H
Cable Percussion Borehole Logs

Percussion Drilling Log

Project Name: Former Colt International		Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ		Contractor:	
Project No. : GWPR3514		Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		RJT	1:50	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D		0.40			MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to sub-rounded, slate, brick, flint, and concrete. Occasional fragments of metal, glass and plastic.
		0.50	D					MADE GROUND: Brown and orangish brown sandy gravelly silty clay. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to rounded, flint.
		1.00	D		1.60			
		2.00	D					HEAD DEPOSITS: Orangish brown and brown gravelly silty CLAY. Gravel is fine to coarse, sub-angular to rounded, flint.
		2.00	SPT	N=16 (2,2/2,4,4,6)				
		3.00	D					
		3.00	SPT	50 (10,12/50 for 250mm)				
		4.00	D					
		4.00	SPT	N=33 (4,5/7,9,9,8)				
		5.00	D					
		5.00	SPT	N=31 (4,6/7,8,8.8)				
		6.00	D					
		6.50	SPT	N=32 (5,6/8,7,8,9)				
		7.00	D					
		8.00	D					
		8.00	SPT	N=29 (4,5/6,7,8,8)				
		9.00	D					
		9.50	SPT	N=30 (5,5/7,7,8,8)				
		10.00	D					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater was noted at 11.50m bgl one hour after drilling.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	CP		RJT	1:50	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					10.70			
		11.00	D					LONDON CLAY FORMATION: Dark grey silty CLAY. Fine selenite throughout. Shell fragments from 12.00m bgl.
		11.00	SPT	N=31 (4,5/7,8,8,8)				
		12.00	D					
		12.50	SPT	N=33 (4,5/7,8,9,9)				
		13.00	D					
		14.00	D					
		14.50	SPT	N=38 (5,6/8,10,9,11)				
		15.00	D		15.00			End of Borehole at 15.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater was noted at 11.50m bgl one hour after drilling.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		RJT	1:50	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to sub-rounded, slate, brick, flint, and concrete.
		0.50	D		0.50			MADE GROUND: Orangish brown and grey sandy gravelly clay. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to sub-rounded, brick (20%), concrete (20%), flint (60%).
		1.00	D		0.80			HEAD DEPOSITS: Orangish brown slightly gravelly silty clayey SAND. Sand is fine to medium grained. Gravel is fine to coarse, sub-angular to rounded, flint.
		1.50	SPT	N=24 (3,9/5,6,6,7)				HEAD DEPOSITS: Orangish brown slightly clayey silty SAND. Sand is fine to medium grained. Occasional fine to coarse, sub-rounded to rounded, flint.
		2.00	D					
		2.50	SPT	N=31 (4,9/8,7,7,9)				
		3.00	D					
		3.50	SPT	N=30 (4,5/7,8,8,7)				
		4.00	D					
		4.50	SPT	N=22 (3,9/5,6,6,5)				
		5.00	D		5.00			LONDON CLAY FORMATION: Orangish brown and grey silty sandy CLAY. Sand is fine to medium grained.
		6.00	D		6.00			LONDON CLAY FORMATION: Dark grey silty CLAY. Fine selenite noted. Small shell fragments from 8.00m bgl.
		6.00	SPT	N=24 (3,4/5,6,6,7)				
		7.00	D					
		7.50	SPT	N=25 (3,5/5,6,7,7)				
	▼	8.00	D					
		9.00	D					
		9.00	SPT	N=28 (4,6/6,7,7,8)				
		10.00	D					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater seepage at 8.00m bgl.

AGS

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH2	CP		RJT	1:50	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.50	SPT	N=30 (9,5/7,7,8,8)				
		11.00	D					
		12.00	D					
		12.00	SPT	N=37 (5,5/8,9,9,11)				
		13.00	D					
		13.50	SPT	N=37 (13 for 27mm/7,9,10,11)				
		14.00	D					
		15.00	D					
		15.00	SPT	N=48 (7,8/10,11,13,14)				
		16.00	D					
		16.50	SPT	N=50 (8,9/50 for 267mm)				
		17.00	D					
		18.00	D		18.00			LONDON CLAY FORMATION: Dark grey and brown sandy CLAY. Sand is fine to coarse grained.
		18.00	SPT	N=50 (7,9/50 for 251mm)				
		19.00	D					
		19.50	SPT	N=50 (9,8/50 for 254mm)				
		20.00	D		20.00			End of Borehole at 20.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater seepage at 8.00m bgl.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH3	CP		RJT	1:50	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to sub-rounded, slate, brick, flint, and concrete.
		0.50	D					
		1.00	D		1.00			HEAD DEPOSITS: Brown to orangish brown and grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to rounded, flint.
		1.20	SPT	N=9 (2,1/2,2,3,2)				
		2.00	D					
		2.00	SPT	N=7 (2,2/1,2,2,2)				
		3.00	D		3.00			LONDON CLAY FORMATION: Dark grey slightly sandy silty CLAY. Sand is fine grained. Selenite noted from 3.00m bgl. Shell fragments noted from 9.00m bgl.
		3.00	SPT	N=11 (2,3/3,2,3,3)				
		4.00	D					
		4.00	SPT	N=12 (3,3/2,3,4,3)				
		5.00	D					
		5.00	SPT	N=14 (3,4/3,3,4,4)				
		6.00	D					
		6.50	SPT	N=14 (3,3/4,3,3,4)				
		7.00	D					
		8.00	D					
		8.00	SPT	N=18 (4,3/5,4,4,5)				
		9.00	D					
		9.50	SPT	N=21 (4,5/6,5,5,5)				
		10.00	D					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. No groundwater encountered.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH3	CP		RJT	1:50	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00	D					
		11.00	SPT	N=29 (5,6/7,7,8,7)				
		12.00	D					
		12.50	SPT	N=28 (7,8/7,6,7,8)				
		13.00	D					
		14.00	D					
		14.00	SPT	N=44 (10,10/10,12,10,12)				
		15.00	D					
		15.50	SPT	N=46 (10,10/11,11,12,12)				
		16.00	D					
		17.00	D					
		17.00	SPT	N=48 (10,12/12,11,12,13)				
		18.00	D					
		18.00	SPT	82 (10,15/82 for 225mm)				
					18.45			End of Borehole at 18.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. No groundwater encountered.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH4	CP		RJT	1:50	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		1.00	D		1.00			MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to sub-rounded, slate, brick, flint, and concrete. Occasional fragments of metal, glass and plastic.
		1.20	SPT	N=8 (2,3/2,2,2,2)				HEAD DEPOSITS: Orangish brown sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse, angular to sub-rounded, flint and claystone.
		2.00	D		2.00			LONDON CLAY FORMATION: Greenish grey sandy CLAY. Sand is fine to medium grained.
		2.00	SPT	N=9 (2,1/2,3,2,2)				
		3.00	D					
		3.00	SPT	N=12 (3,3/4,3,2,3)				
		4.00	D					
		4.00	SPT	N=14 (3,4/3,4,4,3)				
		5.00	D		5.00			LONDON CLAY FORMATION: Orangish brown and grey silty sandy CLAY. Sand is fine to medium grained.
		5.00	SPT	N=14 (4,3/3,4,3,4)				
		6.00	D		6.00			LONDON CLAY FORMATION: Dark grey silty CLAY. Small shell fragments from 9.00m bgl and fine selenite crystals from 10.00m bgl.
		6.50	SPT	N=17 (4,4/4,4,4,5)				
		7.00	D					
		8.00	D					
		8.00	SPT	N=18 (5,4/4,5,4,5)				
		9.00	D					
		9.50	SPT	N=22 (5,6/5,5,5,7)				
		10.00	D					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater encountered at 12.50m, 13.20m and 13.80m bgl.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH4	CP		RJT	1:50	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00	D					
		11.00	SPT	N=28 (7,8/7,7,6,8)				
		12.00	D					
	▼	12.50	SPT	N=39 (8,8/10,8,10,11)				
	▼	13.00	D					
	▼							
		14.00	D					
		14.00	SPT	N=45 (10,11/11,12,10,12)				
		15.00	D					
		15.00	SPT	N=50 (10,12/50 for 285mm)				
					15.45			End of Borehole at 15.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater encountered at 12.50m, 13.20m and 13.80m bgl.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH5	CP		RJT	1:50	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.20			TOPSOIL: (Drillers Description).
								MADE GROUND: Orangish brown and grey sandy gravelly clay. Sand is fine to coarse grained. Gravel is fine to coarse, angular to sub-rounded, glass (1%), brick (19%) and flint (80%).
		1.00	D		1.00			HEAD DEPOSITS: Orangish brown and grey sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse, sub-angular to rounded, flint. Notably soft at 3.00m bgl.
		1.20	SPT	N=9 (2,1/2,3,2,2)				
		2.00	D					
		2.00	SPT	N=11 (2,3/3,2,3,3)				
	▼	3.00	D					
		3.00	SPT	N=11 (3,4/3,3,2,3)				
		4.00	D					
		4.00	SPT	N=15 (3,3/4,4,4,3)				
					4.50			LONDON CLAY FORMATION: Dark grey silty CLAY. Very fine selenite crystals from 5.00m bgl.
		5.00	D					
		5.00	SPT	N=15 (3,4/3,4,4,4)				
		6.00	D					
		6.50	SPT	N=17 (4,5/4,5,4,4)				
		7.00	D					
		8.00	D					
		8.00	SPT	N=15 (4,5/4,4,3,4)				
		9.00	D					
		9.50	SPT	N=23 (4,4/5,6,5,7)				
		10.00	D					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater encountered at 3.00m bgl.

Percussion Drilling Log

Project Name: Former Colt International	Client: Drew Smith Group	Date: 21/01/2020
Location: New Lane, Havant PO9 2LZ	Contractor:	
Project No. : GWPR3514	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH5	CP		RJT	1:50	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00	D					
		11.00	SPT	N=29 (5,5/6,7,8,8)				
		12.00	D					
		12.50	SPT	N=30 (5,6/7,7,8,8)				
		13.00	D					
		14.00	D					
		14.00	SPT	N=45 (8,10/10,10,12,13)				
		15.00	D					
					15.45			End of Borehole at 15.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted. Groundwater encountered at 3.00m bgl.

APPENDIX I
Chemical Laboratory Testing – Groundwater

4480

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

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 20-02880

Site Reference:	Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref:	GWPR3514
Order No:	None Supplied
Sample Receipt Date:	04/03/2020
Sample Scheduled Date:	04/03/2020
Report Issue Number:	1
Reporting Date:	10/03/2020

Authorised by:

Ela Mysiara
Quality Manager

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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

UKAS TESTING
4480

Water Analysis Certificate						
DETS Report No: 20-02880	**Date Sampled**	26/02/20	26/02/20	26/02/20	26/02/20	26/02/20
Ground & Water Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	**TP / BH No**	BH1	BH2	BH3	BH4	BH5
Project / Job Ref: GWPR3514	**Additional Refs**	GW	GW	GW	GW	GW
Order No: None Supplied	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 10/03/2020	**DETS Sample No**	466776	466777	466778	466779	466780

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.0	7.7	9.9	11.9	7.6
Total Cyanide	ug/l	< 5	NONE	< 5	< 5	10	17	< 5
Sulphate as SO_4	mg/l	< 1	ISO17025	518	85	67	16	104
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	6	< 5	< 5
Boron (dissolved)	ug/l	< 5	ISO17025	24	63	115	7	165
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	17	< 5
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20	< 20	< 20	< 20
Copper (dissolved)	ug/l	< 5	ISO17025	15	11	8	42	8
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	ug/l	< 5	ISO17025	14	< 5	< 5	15	< 5
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	29	14	< 5
Zinc (dissolved)	ug/l	< 2	ISO17025	22	20	16	14	16
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	< 10	19	44	< 10

Subcontracted analysis [SC]
Insufficient sample [I/S]
Unsuitable Sample [U/S]

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

Water Analysis Certificate - Speciated PAH						
DETS Report No: 20-02880	Date Sampled	26/02/20	26/02/20	26/02/20	26/02/20	26/02/20
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	BH1	BH2	BH3	BH4	BH5
Project / Job Ref: GWPR3514	Additional Refs	GW	GW	GW	GW	GW
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 10/03/2020	DETS Sample No	466776	466777	466778	466779	466780

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.13	< 0.01	< 0.01
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.08	0.45	< 0.01
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.05	0.16	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.09	0.45	< 0.01
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.02	0.11	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.05	0.19	< 0.01
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.03	0.12	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.45	1.51	< 0.01

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

Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 20-02880	Date Sampled	26/02/20	26/02/20	26/02/20	26/02/20	26/02/20
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	BH1	BH2	BH3	BH4	BH5
Project / Job Ref: GWPR3514	Additional Refs	GW	GW	GW	GW	GW
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 10/03/2020	DETS Sample No	466776	466777	466778	466779	466780

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	< 70
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	< 70
Total >C5 - C35	ug/l	< 140	NONE	< 140	< 140	< 140	< 140	< 140

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

UKAS TESTING
4480

Water Analysis Certificate - BTEX / MTBE							
DETS Report No: 20-02880	Date Sampled	26/02/20	26/02/20	26/02/20	26/02/20	26/02/20
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	BH1	BH2	BH3	BH4	BH5
Project / Job Ref: GWPR3514	Additional Refs	GW	GW	GW	GW	GW
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 10/03/2020	DETS Sample No	466776	466777	466778	466779	466780

Determinand	Unit	RL	Accreditation					
Benzene	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	< 1
Toluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
o-xylene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10

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

UKAS TESTING
4480

Water Analysis Certificate - Volatile Organic Compounds (VOC)							
DETS Report No: 20-02880	Date Sampled	26/02/20	26/02/20	26/02/20		
Ground & Water Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ	TP / BH No	BH1	BH4	BH5		
Project / Job Ref: GWPR3514	Additional Refs	GW	GW	GW		
Order No: None Supplied	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 10/03/2020	DETS Sample No	466776	466779	466780		

Determinand	Unit	RL	Accreditation				
Dichlorodifluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Vinyl Chloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Chloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Chloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Bromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Trichlorofluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	
trans-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1-Dichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
cis-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
2,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Chloroform	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Bromochloromethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	
1,1,1-Trichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Carbon Tetrachloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,2-Dichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	
Benzene	ug/l	< 1	ISO17025	< 1	< 1	< 1	
1,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Trichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Bromodichloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Dibromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
TAME	ug/l	< 5	ISO17025	< 5	< 5	< 5	
cis-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Toluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
trans-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1,2-Trichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	
1,3-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Tetrachloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Dibromochloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,2-Dibromoethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Chlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1,1,2-Tetrachloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Ethyl Benzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
m,p-Xylene	ug/l	< 10	ISO17025	< 10	< 10	< 10	
o-Xylene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Styrene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Bromoform	ug/l	< 10	ISO17025	< 10	< 10	< 10	
Isopropylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,1,2,2-Tetrachloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	
1,2,3-Trichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	
n-Propylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
Bromobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
2-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,3,5-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
4-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
tert-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,2,4-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
sec-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
p-Isopropyltoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,3-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,4-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
n-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
1,2-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	
,2-Dibromo-3-chloropropane	ug/l	< 10	ISO17025	< 10	< 10	< 10	
Hexachlorobutadiene	ug/l	< 5	ISO17025	< 5	< 5	< 5	

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

UKAS TESTING
4480

Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-02880
Ground & Water Ltd
Site Reference: Former Colt International, New Lane, Havant, PO9 2LZ
Project / Job Ref: GWPR3514
Order No: None Supplied
Reporting Date: 10/03/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

APPENDIX J
Waste Hazard Assessment

ground&water
geotechnical and environmental consultants

HazWasteOnline™

Waste Classification Report

Y3KH9-4G7SQ-TD4NJ

Job name

GWPR3192

Description/Comments

Project

Former Colt International, New Lane, Havant PO9 2LZ

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

Ground and Water V2 PA

Classified by

Name:
James Dalziel
Date:
25 Nov 2019 11:20 GMT
Telephone:
0333 600 1221

Company:
Ground and Water
2 The Long Barn
Norton Farm, Selborne Road
Alton
GU34 3NB

Report

Created by: James Dalziel
Created date: 25 Nov 2019 11:20 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1	0.30	Non Hazardous		3
2	WS1[2]	2.00	Non Hazardous		5
3	WS2	0.50	Non Hazardous		7
4	WS3	2.00	Non Hazardous		9
5	WS4	1.50	Non Hazardous		12
6	WS5	1.50	Non Hazardous		14
7	WS6	0.50	Non Hazardous		16
8	WS7	0.50	Non Hazardous		18
9	WS8	0.30	Non Hazardous		20
10	WS9	0.50	Non Hazardous		22
11	WS11	0.80	Non Hazardous		24
12	WS13	0.50	Non Hazardous		26

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
13	WS14	0.50	Non Hazardous		28
14	WS15	1.00	Non Hazardous		30
15	WS16	0.50	Hazardous	HP 7, HP 11	32
16	WS16[2]	0.80	Hazardous	HP 7, HP 11	35
17	WS16[3]	1.00	Non Hazardous		38
18	WS17	0.30	Non Hazardous		40
19	WS17[2]	0.50	Non Hazardous		42
20	WS18	0.30	Non Hazardous		44
21	WS18[2]	1.00	Non Hazardous		46
22	WS19	0.30	Non Hazardous		48
23	WS19[2]	0.80	Non Hazardous		50
24	WS19[3]	1.00	Non Hazardous		52
25	WS20	0.30	Non Hazardous		54

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	56
Appendix B: Rationale for selection of metal species	57
Appendix C: Version	58

Classification of sample: WS1

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS1
Sample Depth:
0.30 m
Moisture content:
6.3%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.3% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	167	mg/kg	1.56	260.489	mg/kg	0.0167 %		
2		naphthalene	601-052-00-2	202-049-5	91-20-3		20.8	mg/kg		20.8	mg/kg	0.00208 %		
3		acenaphthylene		205-917-1	208-96-8		0.76	mg/kg		0.76	mg/kg	0.000076 %		
4		acenaphthene		201-469-6	83-32-9		39.7	mg/kg		39.7	mg/kg	0.00397 %		
5		fluorene		201-695-5	86-73-7		34.6	mg/kg		34.6	mg/kg	0.00346 %		
6		phenanthrene		201-581-5	85-01-8		213	mg/kg		213	mg/kg	0.0213 %		
7		anthracene		204-371-1	120-12-7		50.7	mg/kg		50.7	mg/kg	0.00507 %		
8		fluoranthene		205-912-4	206-44-0		258	mg/kg		258	mg/kg	0.0258 %		
9		pyrene		204-927-3	129-00-0		174	mg/kg		174	mg/kg	0.0174 %		
10		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		91.8	mg/kg		91.8	mg/kg	0.00918 %		
11		chrysene	601-048-00-0	205-923-4	218-01-9		88.8	mg/kg		88.8	mg/kg	0.00888 %		
12		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		101	mg/kg		101	mg/kg	0.0101 %		
13		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		35	mg/kg		35	mg/kg	0.0035 %		
14		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		67.3	mg/kg		67.3	mg/kg	0.00673 %		
15		indeno[123-cd]pyrene		205-893-2	193-39-5		48.5	mg/kg		48.5	mg/kg	0.00485 %		
16		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		8.54	mg/kg		8.54	mg/kg	0.000854 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	◦	benzo[ghi]perylene				39.5	mg/kg		39.5	mg/kg	0.00395 %		
			205-883-8	191-24-2									
										Total:	0.144 %		

Key

	User supplied data
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS1[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS1[2]
Sample Depth:
2.00 m
Moisture content:
6.2%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.2% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	pH PH		8 pH		8 pH	8pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2 mg/kg	1.884	<3.768 mg/kg	<0.000377 %		<LOD
3	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		<2 mg/kg	1.32	<2.641 mg/kg	<0.000264 %		<LOD
4	boron { boron tribromide/trichloride/trifluoride (combined) } 10294-33-4, 10294-34-5, 7637-07-2		<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
5	cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
6	Chromium (III) Sulphate 10101-53-8		5 mg/kg		5 mg/kg	0.0005 %		
7	chromium { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		<4 mg/kg	1.126	<4.504 mg/kg	<0.00045 %		<LOD
9	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	7 mg/kg	1.56	10.919 mg/kg	0.0007 %		
10	mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		6 mg/kg	1.579	9.477 mg/kg	0.000948 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<3 mg/kg	2.554	<7.661 mg/kg	<0.000766 %		<LOD

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
13		vanadium { divanadium pentaoxide; vanadium pentoxide }		8	mg/kg	1.785	14.281	mg/kg	0.00143 %		
		023-001-00-8 / 215-239-8 / 1314-62-1									
14		zinc { zinc chromate }		11	mg/kg	2.774	30.516	mg/kg	0.00305 %		
		024-007-00-3									
15		phenol		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		604-001-00-2 / 203-632-7 / 108-95-2									
16		naphthalene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3									
17		acenaphthylene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1 / 208-96-8									
18		acenaphthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6 / 83-32-9									
19		fluorene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5 / 86-73-7									
20		phenanthrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-581-5 / 85-01-8									
21		anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-371-1 / 120-12-7									
22		fluoranthene		0.11	mg/kg		0.11	mg/kg	0.000011 %		
		205-912-4 / 206-44-0									
23		pyrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-927-3 / 129-00-0									
24		benzo[a]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9 / 200-280-6 / 56-55-3									
25		chrysene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0 / 205-923-4 / 218-01-9									
26		benzo[b]fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4 / 205-911-9 / 205-99-2									
27		benzo[k]fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5 / 205-916-6 / 207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-032-00-3 / 200-028-5 / 50-32-8									
29		indeno[123-cd]pyrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-893-2 / 193-39-5									
30		dibenz[a,h]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3									
31		benzo[ghi]perylene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-883-8 / 191-24-2									
								Total:	0.0107 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS2
Sample Depth:
0.50 m
Moisture content:
8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	321 mg/kg	1.56	500.701 mg/kg	0.0321 %		
2	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
3	acenaphthylene		205-917-1	208-96-8		0.12 mg/kg		0.12 mg/kg	0.000012 %		
4	acenaphthene		201-469-6	83-32-9		2.12 mg/kg		2.12 mg/kg	0.000212 %		
5	fluorene		201-695-5	86-73-7		2 mg/kg		2 mg/kg	0.0002 %		
6	phenanthrene		201-581-5	85-01-8		21 mg/kg		21 mg/kg	0.0021 %		
7	anthracene		204-371-1	120-12-7		4.58 mg/kg		4.58 mg/kg	0.000458 %		
8	fluoranthene		205-912-4	206-44-0		29.3 mg/kg		29.3 mg/kg	0.00293 %		
9	pyrene		204-927-3	129-00-0		19.9 mg/kg		19.9 mg/kg	0.00199 %		
10	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		13.1 mg/kg		13.1 mg/kg	0.00131 %		
11	chrysene	601-048-00-0	205-923-4	218-01-9		10.2 mg/kg		10.2 mg/kg	0.00102 %		
12	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		14.6 mg/kg		14.6 mg/kg	0.00146 %		
13	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		3.88 mg/kg		3.88 mg/kg	0.000388 %		
14	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		9.22 mg/kg		9.22 mg/kg	0.000922 %		
15	indeno[123-cd]pyrene		205-893-2	193-39-5		7.57 mg/kg		7.57 mg/kg	0.000757 %		
16	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		1.54 mg/kg		1.54 mg/kg	0.000154 %		

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	●	benzo[ghi]perylene				6.1 mg/kg		6.1 mg/kg	0.00061 %		
			205-883-8	191-24-2							
								Total:	0.0466 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS3
Sample Depth:
2.00 m
Moisture content:
14.2%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.2% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	pH PH		8 pH		8 pH	8pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2 mg/kg	1.884	<3.768 mg/kg	<0.000377 %		<LOD
3	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8 mg/kg	1.32	10.563 mg/kg	0.00106 %		
4	boron { boron tribromide/trichloride/trifluoride (combined) } 10294-33-4, 10294-34-5, 7637-07-2		<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
5	cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
6	Chromium (III) Sulphate 10101-53-8		26 mg/kg		26 mg/kg	0.0026 %		
7	chromium { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		42 mg/kg	1.126	47.287 mg/kg	0.00473 %		
9	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	53 mg/kg	1.56	82.67 mg/kg	0.0053 %		
10	mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		22 mg/kg	1.579	34.749 mg/kg	0.00347 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<3 mg/kg	2.554	<7.661 mg/kg	<0.000766 %		<LOD

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
13		vanadium { divanadium pentaoxide; vanadium pentoxide } 023-001-00-8 / 215-239-8 / 1314-62-1		40	mg/kg	1.785	71.407	mg/kg	0.00714 %		
14		zinc { zinc chromate } 024-007-00-3		286	mg/kg	2.774	793.406	mg/kg	0.0793 %		
15		phenol 604-001-00-2 / 203-632-7 / 108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
16		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
18		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
19		fluorene 201-695-5 / 86-73-7		0.23	mg/kg		0.23	mg/kg	0.000023 %		
20		phenanthrene 201-581-5 / 85-01-8		1.04	mg/kg		1.04	mg/kg	0.000104 %		
21		anthracene 204-371-1 / 120-12-7		0.31	mg/kg		0.31	mg/kg	0.000031 %		
22		fluoranthene 205-912-4 / 206-44-0		1.37	mg/kg		1.37	mg/kg	0.000137 %		
23		pyrene 204-927-3 / 129-00-0		1	mg/kg		1	mg/kg	0.0001 %		
24		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.85	mg/kg		0.85	mg/kg	0.000085 %		
25		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		0.47	mg/kg		0.47	mg/kg	0.000047 %		
26		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.78	mg/kg		0.78	mg/kg	0.000078 %		
27		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.2	mg/kg		0.2	mg/kg	0.00002 %		
28		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.48	mg/kg		0.48	mg/kg	0.000048 %		
29		indeno[123-cd]pyrene 205-893-2 / 193-39-5		0.52	mg/kg		0.52	mg/kg	0.000052 %		
30		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31		benzo[ghi]perylene 205-883-8 / 191-24-2		0.35	mg/kg		0.35	mg/kg	0.000035 %		
32		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
33		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
34		ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
35		xylene 601-022-00-9 / 202-422-2 [1], 203-396-5 [2], 203-576-3 [3], 215-535-7 [4] / 95-47-6 [1], 106-42-3 [2], 108-38-3 [3], 1330-20-7 [4]		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
36		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] 601-022-00-9 / 202-422-2 [1], 203-396-5 [2], 203-576-3 [3], 215-535-7 [4] / 95-47-6 [1], 106-42-3 [2], 108-38-3 [3], 1330-20-7 [4]		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
37		diesel petroleum group 68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9		254	mg/kg		254	mg/kg	0.0254 %		
38		TPH (C6 to C40) petroleum group TPH		260	mg/kg		260	mg/kg	0.026 %		
								Total:	0.16 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Heavy-end hydrocarbons not flammable at given concentrations.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

diesel petroleum group: (conc.: 0.0254%)
TPH (C6 to C40) petroleum group: (conc.: 0.026%)

Classification of sample: WS4

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS4
Sample Depth:
1.50 m
Moisture content:
9%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		lead { lead chromate }	1	10 mg/kg	1.56	15.598 mg/kg	0.001 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
2		naphthalene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
3		acenaphthylene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1 / 208-96-8							
4		acenaphthene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6 / 83-32-9							
5		fluorene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5 / 86-73-7							
6		phenanthrene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5 / 85-01-8							
7		anthracene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1 / 120-12-7							
8		fluoranthene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4 / 206-44-0							
9		pyrene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3 / 129-00-0							
10		benzo[a]anthracene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-033-00-9 / 200-280-6 / 56-55-3							
11		chrysene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-048-00-0 / 205-923-4 / 218-01-9							
12		benzo[b]fluoranthene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-034-00-4 / 205-911-9 / 205-99-2							
13		benzo[k]fluoranthene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-036-00-5 / 205-916-6 / 207-08-9							
14		benzo[a]pyrene; benzo[def]chrysene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-032-00-3 / 200-028-5 / 50-32-8							
15		indeno[123-cd]pyrene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2 / 193-39-5							
16		dibenz[a,h]anthracene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3							

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	○	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00116 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
○	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS5

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS5
Sample Depth:
1.50 m
Moisture content:
7.8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.8% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	55	mg/kg	1.56	85.79	mg/kg	0.0055 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	◦	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.00566 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS6

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS6
Sample Depth:
0.50 m
Moisture content:
11.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.6% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate }	1	17	mg/kg	1.56	26.517	mg/kg	0.0017 %		
		082-004-00-2 / 231-846-0 / 7758-97-6									
2		naphthalene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3									
3		acenaphthylene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1 / 208-96-8									
4		acenaphthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6 / 83-32-9									
5		fluorene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5 / 86-73-7									
6		phenanthrene		0.71	mg/kg		0.71	mg/kg	0.000071 %		
		201-581-5 / 85-01-8									
7		anthracene		0.17	mg/kg		0.17	mg/kg	0.000017 %		
		204-371-1 / 120-12-7									
8		fluoranthene		0.91	mg/kg		0.91	mg/kg	0.000091 %		
		205-912-4 / 206-44-0									
9		pyrene		0.76	mg/kg		0.76	mg/kg	0.000076 %		
		204-927-3 / 129-00-0									
10		benzo[a]anthracene		0.57	mg/kg		0.57	mg/kg	0.000057 %		
		601-033-00-9 / 200-280-6 / 56-55-3									
11		chrysene		0.29	mg/kg		0.29	mg/kg	0.000029 %		
		601-048-00-0 / 205-923-4 / 218-01-9									
12		benzo[b]fluoranthene		0.54	mg/kg		0.54	mg/kg	0.000054 %		
		601-034-00-4 / 205-911-9 / 205-99-2									
13		benzo[k]fluoranthene		0.15	mg/kg		0.15	mg/kg	0.000015 %		
		601-036-00-5 / 205-916-6 / 207-08-9									
14		benzo[a]pyrene; benzo[def]chrysene		0.38	mg/kg		0.38	mg/kg	0.000038 %		
		601-032-00-3 / 200-028-5 / 50-32-8									
15		indeno[123-cd]pyrene		0.43	mg/kg		0.43	mg/kg	0.000043 %		
		205-893-2 / 193-39-5									
16		dibenz[a,h]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				0.28 mg/kg		0.28 mg/kg	0.000028 %		
			205-883-8	191-24-2							
								Total:	0.00227 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS7

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS7
Sample Depth:
0.50 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	89	mg/kg	1.56	138.824	mg/kg	0.0089 %		
2	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6	phenanthrene		201-581-5	85-01-8		0.32	mg/kg		0.32	mg/kg	0.000032 %		
7	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8	fluoranthene		205-912-4	206-44-0		0.64	mg/kg		0.64	mg/kg	0.000064 %		
9	pyrene		204-927-3	129-00-0		0.52	mg/kg		0.52	mg/kg	0.000052 %		
10	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.46	mg/kg		0.46	mg/kg	0.000046 %		
11	chrysene	601-048-00-0	205-923-4	218-01-9		0.19	mg/kg		0.19	mg/kg	0.000019 %		
12	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.48	mg/kg		0.48	mg/kg	0.000048 %		
13	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.12	mg/kg		0.12	mg/kg	0.000012 %		
14	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.29	mg/kg		0.29	mg/kg	0.000029 %		
15	indeno[123-cd]pyrene		205-893-2	193-39-5		0.41	mg/kg		0.41	mg/kg	0.000041 %		
16	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				0.26 mg/kg		0.26 mg/kg	0.000026 %		
			205-883-8	191-24-2							
								Total:	0.00933 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS8

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS8
Sample Depth:
0.30 m
Moisture content:
3.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 3.6% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	9	mg/kg	1.56	14.038	mg/kg	0.0009 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	◦	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.00106 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS9

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS9
Sample Depth:
0.50 m
Moisture content:
4.8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 4.8% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate }	1	5	mg/kg	1.56	7.799	mg/kg	0.0005 %		
		082-004-00-2 / 231-846-0 / 7758-97-6									
2		naphthalene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3									
3		acenaphthylene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1 / 208-96-8									
4		acenaphthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6 / 83-32-9									
5		fluorene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5 / 86-73-7									
6		phenanthrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-581-5 / 85-01-8									
7		anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-371-1 / 120-12-7									
8		fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-912-4 / 206-44-0									
9		pyrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-927-3 / 129-00-0									
10		benzo[a]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9 / 200-280-6 / 56-55-3									
11		chrysene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0 / 205-923-4 / 218-01-9									
12		benzo[b]fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4 / 205-911-9 / 205-99-2									
13		benzo[k]fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5 / 205-916-6 / 207-08-9									
14		benzo[a]pyrene; benzo[def]chrysene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-032-00-3 / 200-028-5 / 50-32-8									
15		indeno[123-cd]pyrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-893-2 / 193-39-5									
16		dibenz[a,h]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00066 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS11

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS11
Sample Depth:
0.80 m
Moisture content:
11.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.5% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate }	1	17	mg/kg	1.56	26.517	mg/kg	0.0017 %		
		082-004-00-2 / 231-846-0 / 7758-97-6									
2		naphthalene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3									
3		acenaphthylene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1 / 208-96-8									
4		acenaphthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6 / 83-32-9									
5		fluorene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5 / 86-73-7									
6		phenanthrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-581-5 / 85-01-8									
7		anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-371-1 / 120-12-7									
8		fluoranthene		0.24	mg/kg		0.24	mg/kg	0.000024 %		
		205-912-4 / 206-44-0									
9		pyrene		0.18	mg/kg		0.18	mg/kg	0.000018 %		
		204-927-3 / 129-00-0									
10		benzo[a]anthracene		0.32	mg/kg		0.32	mg/kg	0.000032 %		
		601-033-00-9 / 200-280-6 / 56-55-3									
11		chrysene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0 / 205-923-4 / 218-01-9									
12		benzo[b]fluoranthene		0.21	mg/kg		0.21	mg/kg	0.000021 %		
		601-034-00-4 / 205-911-9 / 205-99-2									
13		benzo[k]fluoranthene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5 / 205-916-6 / 207-08-9									
14		benzo[a]pyrene; benzo[def]chrysene		0.14	mg/kg		0.14	mg/kg	0.000014 %		
		601-032-00-3 / 200-028-5 / 50-32-8									
15		indeno[123-cd]pyrene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-893-2 / 193-39-5									
16		dibenz[a,h]anthracene		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00192 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS13

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS13
Sample Depth:
0.50 m
Moisture content:
14.1%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.1% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00046 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS14

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS14
Sample Depth:
0.50 m
Moisture content:
13.8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.8% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	9	mg/kg	1.56	14.038	mg/kg	0.0009 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	◦	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.00106 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS15

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS15
Sample Depth:
1.00 m
Moisture content:
4.2%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 4.2% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		0.11	mg/kg		0.11	mg/kg	0.000011 %		
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00046 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS16

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
WS16		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 03 * (Soil and stones containing hazardous substances)
Moisture content:			
17.2% (no correction)			

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.455%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.455%)

Determinands

Moisture content: 17.2% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		pH PH		7.9	pH		7.9	pH	7.9 pH		
2		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
3		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		3	mg/kg	1.32	3.961	mg/kg	0.000396 %		
4		boron { boron tribromide/trichloride/trifluoride (combined) } 10294-33-4, 10294-34-5, 7637-07-2		<1	mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
5		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
6	Chromium (III) Sulphate			10101-53-8		14	mg/kg		14	mg/kg	0.0014 %		
7	chromium { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2	mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		<4	mg/kg	1.126	<4.504	mg/kg	<0.00045 %		<LOD
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
11	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		7	mg/kg	1.579	11.056	mg/kg	0.00111 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		18	mg/kg	1.785	32.133	mg/kg	0.00321 %		
14	zinc { zinc chromate }	024-007-00-3				26	mg/kg	2.774	72.128	mg/kg	0.00721 %		
15	phenol	604-001-00-2	203-632-7	108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
16	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
18	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
19	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20	phenanthrene		201-581-5	85-01-8		1.57	mg/kg		1.57	mg/kg	0.000157 %		
21	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
22	fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
23	pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32	benzene	601-020-00-8	200-753-7	71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
33	toluene	601-021-00-3	203-625-9	108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
34		ethylbenzene				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
35		xylene				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
36		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
37		diesel petroleum group				4471	mg/kg		4471	mg/kg	0.447 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9									
38		TPH (C6 to C40) petroleum group				4553	mg/kg		4553	mg/kg	0.455 %		
				TPH									
										Total:	0.921 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Heavy-end hydrocarbons not flammable at given concentrations.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

diesel petroleum group: (conc.: 0.447%)
TPH (C6 to C40) petroleum group: (conc.: 0.455%)

Classification of sample: WS16[2]

⚠ **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS16[2]
Sample Depth:
0.80 m
Moisture content:
18.2%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.352%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.352%)

Determinands

Moisture content: 18.2% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.4	pH		6.4	pH	6.4 pH		
2	cyanides { ° salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		**<LOD**
3	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4	mg/kg	1.32	5.281	mg/kg	0.000528 %		
4	boron { ° boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		<1	mg/kg	13.43	<13.43	mg/kg	<0.00134 %		**<LOD**
5	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		**<LOD**

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
6		Chromium (III) Sulphate / / 10101-53-8		11	mg/kg		11	mg/kg	0.0011 %		
7		chromium { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<2	mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
8		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		<4	mg/kg	1.126	<4.504	mg/kg	<0.00045 %		<LOD
9		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
10		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
11		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		10	mg/kg	1.579	15.795	mg/kg	0.00158 %		
12		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8 / /		<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
13		vanadium { divanadium pentaoxide; vanadium pentoxide } 023-001-00-8 / 215-239-8 / 1314-62-1		14	mg/kg	1.785	24.993	mg/kg	0.0025 %		
14		zinc { zinc chromate } 024-007-00-3 / /		17	mg/kg	2.774	47.16	mg/kg	0.00472 %		
15		phenol 604-001-00-2 / 203-632-7 / 108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
16		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17		acenaphthylene / 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
18		acenaphthene / 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
19		fluorene / 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20		phenanthrene / 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
21		anthracene / 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
22		fluoranthene / 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
23		pyrene / 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29		indeno[123-cd]pyrene / 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31		benzo[ghi]perylene / 205-883-8 / 191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
33		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
34	◦	ethylbenzene				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
35		xylene				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
36		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
37	◦	diesel petroleum group				3448	mg/kg		3448	mg/kg	0.345 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9									
38	◦	TPH (C6 to C40) petroleum group				3519	mg/kg		3519	mg/kg	0.352 %		
				TPH									
										Total:	0.713 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Heavy-end hydrocarbons not flammable at given concentrations.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

diesel petroleum group: (conc.: 0.345%)
TPH (C6 to C40) petroleum group: (conc.: 0.352%)

Classification of sample: WS16[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS16[3]
Sample Depth:
1.00 m
Moisture content:
18.7%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.7% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00046 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS17

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS17
Sample Depth:
0.30 m
Moisture content:
19.1%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.1% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3 mg/kg	1.56	<4.679 mg/kg	<0.0003 %		<LOD
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17	◦	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.00046 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS17[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS17[2]
Sample Depth:
0.50 m
Moisture content:
19.4%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.4% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.7	pH		7.7	pH	7.7 pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				7	mg/kg	1.884	13.188	mg/kg	0.00132 %		
3	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	21.125	mg/kg	0.00211 %		
4	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1.9	mg/kg	13.43	25.517	mg/kg	0.00255 %		
5	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3	mg/kg	1.285	0.386	mg/kg	0.00003 %		
6	Chromium (III) Sulphate			10101-53-8		19	mg/kg		19	mg/kg	0.0019 %		
7	chromium { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2	mg/kg	1.923	<3.846	mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		32	mg/kg	1.126	36.028	mg/kg	0.0036 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	859	mg/kg	1.56	1339.881	mg/kg	0.0859 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-6	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
11	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		12	mg/kg	1.579	18.954	mg/kg	0.0019 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		vanadium { divanadium pentaoxide; vanadium pentoxide }				44	mg/kg	1.785	78.548	mg/kg	0.00785 %		
		023-001-00-8	215-239-8	1314-62-1									
14		zinc { zinc chromate }				99	mg/kg	2.774	274.641	mg/kg	0.0275 %		
		024-007-00-3											
15		phenol				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
16		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
18		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
19		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
20		phenanthrene				0.91	mg/kg		0.91	mg/kg	0.000091 %		
			201-581-5	85-01-8									
21		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
22		fluoranthene				1.25	mg/kg		1.25	mg/kg	0.000125 %		
			205-912-4	206-44-0									
23		pyrene				0.99	mg/kg		0.99	mg/kg	0.000099 %		
			204-927-3	129-00-0									
24		benzo[a]anthracene				0.67	mg/kg		0.67	mg/kg	0.000067 %		
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				0.74	mg/kg		0.74	mg/kg	0.000074 %		
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				0.82	mg/kg		0.82	mg/kg	0.000082 %		
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				0.45	mg/kg		0.45	mg/kg	0.000045 %		
		601-032-00-3	200-028-5	50-32-8									
29		indeno[123-cd]pyrene				0.47	mg/kg		0.47	mg/kg	0.000047 %		
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31		benzo[ghi]perylene				0.29	mg/kg		0.29	mg/kg	0.000029 %		
			205-883-8	191-24-2									
										Total:	0.137 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS18

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS18
Sample Depth:
0.30 m
Moisture content:
18.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.6% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	<3	mg/kg	1.56	<4.679	mg/kg	<0.0003 %		<LOD
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00046 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS18[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS18[2]
Sample Depth:
1.00 m
Moisture content:
20%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	274	mg/kg	1.56	427.389	mg/kg	0.0274 %		
2	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6	phenanthrene		201-581-5	85-01-8		0.35	mg/kg		0.35	mg/kg	0.000035 %		
7	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8	fluoranthene		205-912-4	206-44-0		0.84	mg/kg		0.84	mg/kg	0.000084 %		
9	pyrene		204-927-3	129-00-0		0.69	mg/kg		0.69	mg/kg	0.000069 %		
10	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.6	mg/kg		0.6	mg/kg	0.00006 %		
11	chrysene	601-048-00-0	205-923-4	218-01-9		0.44	mg/kg		0.44	mg/kg	0.000044 %		
12	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.71	mg/kg		0.71	mg/kg	0.000071 %		
13	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.21	mg/kg		0.21	mg/kg	0.000021 %		
14	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.43	mg/kg		0.43	mg/kg	0.000043 %		
15	indeno[123-cd]pyrene		205-893-2	193-39-5		0.48	mg/kg		0.48	mg/kg	0.000048 %		
16	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				0.31 mg/kg		0.31 mg/kg	0.000031 %		
			205-883-8	191-24-2							
								Total:	0.028 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19
Sample Depth:
0.30 m
Moisture content:
19.4%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.4% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	3	mg/kg	1.56	4.679	mg/kg	0.0003 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.25	mg/kg		0.25	mg/kg	0.000025 %		
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.14	mg/kg		0.14	mg/kg	0.000014 %		
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	○	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.00047 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
○	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19[2]
Sample Depth:
0.80 m
Moisture content:
19.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.5% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	403	mg/kg	1.56	628.606	mg/kg	0.0403 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		0.19	mg/kg		0.19	mg/kg	0.000019 %		
7		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		0.45	mg/kg		0.45	mg/kg	0.000045 %		
9		pyrene 204-927-3 / 129-00-0		0.36	mg/kg		0.36	mg/kg	0.000036 %		
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.4	mg/kg		0.4	mg/kg	0.00004 %		
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		0.14	mg/kg		0.14	mg/kg	0.000014 %		
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.36	mg/kg		0.36	mg/kg	0.000036 %		
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.19	mg/kg		0.19	mg/kg	0.000019 %		
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		0.34	mg/kg		0.34	mg/kg	0.000034 %		
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
			205-883-8	191-24-2							
								Total:	0.0406 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19[3]
Sample Depth:
1.00 m
Moisture content:
25%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 25% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	444 mg/kg	1.56	692.558 mg/kg	0.0444 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7		anthracene 204-371-1 / 120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
8		fluoranthene 205-912-4 / 206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9		pyrene 204-927-3 / 129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
								Total:	0.0446 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS20
Sample Depth:
0.30 m
Moisture content:
14.3%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.3% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	84	mg/kg	1.56	131.024	mg/kg	0.0084 %		
2		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
5		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
6		phenanthrene 201-581-5 / 85-01-8		0.54	mg/kg		0.54	mg/kg	0.000054 %		
7		anthracene 204-371-1 / 120-12-7		0.18	mg/kg		0.18	mg/kg	0.000018 %		
8		fluoranthene 205-912-4 / 206-44-0		0.93	mg/kg		0.93	mg/kg	0.000093 %		
9		pyrene 204-927-3 / 129-00-0		0.64	mg/kg		0.64	mg/kg	0.000064 %		
10		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.57	mg/kg		0.57	mg/kg	0.000057 %		
11		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		0.37	mg/kg		0.37	mg/kg	0.000037 %		
12		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.62	mg/kg		0.62	mg/kg	0.000062 %		
13		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.16	mg/kg		0.16	mg/kg	0.000016 %		
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.36	mg/kg		0.36	mg/kg	0.000036 %		
15		indeno[123-cd]pyrene 205-893-2 / 193-39-5		0.42	mg/kg		0.42	mg/kg	0.000042 %		
16		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
17	◦	benzo[ghi]perylene				0.32 mg/kg		0.32 mg/kg	0.000032 %		
			205-883-8	191-24-2							
								Total:	0.00896 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
◦	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s)/Risk Phrase(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

boron tribromide/trichloride/trifluoride (combined) (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Conversion factor: 13.43
Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride
Data source: N/A
Data source date: 06 Aug 2015
Hazard Statements: Skin Corr. 1B H314 , Skin Corr. 1A H314 , Acute Tox. 2 H300 , Acute Tox. 2 H330 , EUH014

Chromium (III) Sulphate (CAS Number: 10101-53-8)

Description/Comments:
Data source: 10101-53-8
Data source date: 24 Jun 2015
Hazard Statements: None.

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

diesel petroleum group (CAS Number: 68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Carc. 2 H351 , Acute Tox. 4 H332 , Skin Irrit. 2 H315 , Flam. Liq. 3 H226

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

Appendix B: Rationale for selection of metal species

lead {lead chromate}

Worst case species based on risk phrases

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

arsenic {arsenic trioxide}

Worst case species based on risk phrases

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on risk phrases

cadmium {cadmium sulfide}

Worst case species based on risk phrases

chromium {chromium(VI) oxide}

Worst case species based on risk phrases

copper {dicopper oxide; copper (I) oxide}

Most likely common species

mercury {mercury dichloride}

Worst case species based on risk phrases

nickel {nickel dihydroxide}

Worst case species based on risk phrases

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on risk phrases

vanadium {divanadium pentaoxide; vanadium pentoxide}

most common form

zinc {zinc chromate}

Worst case species based on risk phrases

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.316.4053.8153 (12 Nov 2019)
HazWasteOnline Database: 2019.316.4053.8153 (12 Nov 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010