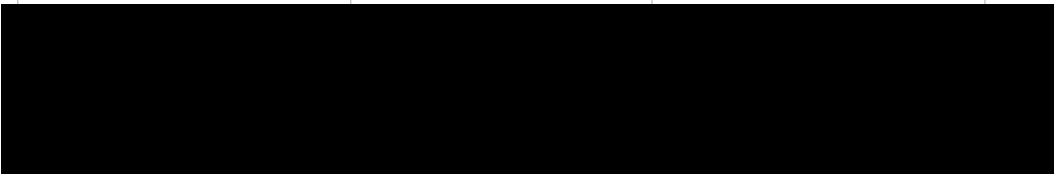


Site Investigation Report

Land to the rear of Fairways & Homefield Winchester Road, Boorley Green, SO32 2DH

On behalf of Doswell Projects Limited

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EXECUTIVE SUMMARY

PROPOSED DEVELOPMENT	At the time of reporting, March 2022, the proposed development was understood to comprise the construction of 9 No. 3 bed houses with private gardens and associated development infrastructure with associated parking.
GEOLOGY	The British Geological Survey Solid and Drift Geology Map for the Boorley Green area (Southampton sheet No. 315) revealed that the site was underlain by bedrock deposits of the Wittering Formation. The Earnley Sand Formation bedrock deposits were recorded 50m north-west of the site. No superficial deposits or areas of Made/Worked Ground were noted within a 250m radius of the site.
HYDROGEOLOGY	A study of the aquifer maps on the DEFRA website revealed the site was underlain by a Secondary A Aquifer comprising the bedrock Wittering Formation. Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. A drain was located on the southern portion of the site cutting across the field to the south of the site. Another drain was noted 300m east of the site and the river Hamble was located 1.00km east of the site. The River Hamble was flowing from north to south. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Wittering Sand Formation. Some amounts of groundwater however may be present at shallower depths within Made ground/ parts of the Wittering Formation. It was considered that groundwater was flowing in a south-easterly direction toward the River Hamble in line with local topography. Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a low probability of fluvial or coastal flooding.
VOLUME CHANGE POTENTIAL	The soils of the Wittering Formation were tested to have medium to high volume change potential in accordance with BRE240 and NHBC Standards Chapter 4.2.
FOUNDATION DESIGN	The allowable bearing capacity was calculated to range between 70 – 80kN/m² at a depth of 1.30m bgl with settlement ranging between 12.72 – 17.22mm. The foundations could be extended down to 2.00m bgl for additional bearing capacity requirements. The allowable bearing capacity was calculated to range between 110 – 130kN/m² at a depth of 2.00m bgl with settlement ranging between 14.82 – 18.12mm. As a conclusion, based on the general picture of the results from all boreholes, allowable bearing capacity of ~80kPa should be used for 1.00m bgl, ~90kPa for 1.30m bgl and ~125kPa for 2.00m bgl.
SUB-SURFACE CONCRETE	According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 could be used for sub-surface concrete in contact with the soils

	beneath the site. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.
CONTAMINATION	Chemical laboratory testing of the Made Ground and Wittering Formation did not reveal any elevated levels of determinands above the guideline levels for a 'Residential With Homegrown Produce' land-use scenario. Given the low levels of determinands noted during the chemical laboratory testing, it was considered that no remediation was required within the soils for the end users of the site. No asbestos has been identified during the testing, however, an Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination. An asbestos survey should be carried out for any existing building prior to work or demolition.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Doswell Projects Limited, on the 1st February 2022, to conduct a Ground Investigation on the site at Land to the rear of Fairways & Homefield Winchester Road, Boorley Green, SO32 2DH. The scope of the investigation was detailed within the fee proposal GW-0499, dated 1st February 2022.

1.2. Aims of the Investigation

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

The investigation was to be undertaken to provide parameters for the design of foundations by means of in-situ and laboratory geotechnical testing undertaken on soil samples recovered from boreholes.

A contamination assessment was to be undertaken following chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified.

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

1.3. Conditions and Limitations

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

This report includes reference to a previous ground investigation, Geo-Environmental (2021). Ground and Water Limited cannot be held reliable for any shortcomings of that report.

2. SITE SETTING

2.1. Site Location

The site comprised a ~3,100m² rectangular-shaped plot of land, orientated in a west to east direction, along the western side of Winchester Road. The site was located in the south-western portion of Boorley Green a village in Hampshire.

The national grid reference for the centre of the site was approximately SU 50655 14284. A site location plan is given within Figure 1. A plan showing the site area is given within Figure 2.

2.2. Site Description

The site was occupied by a number of single storey agricultural barns and sheds. The site was accessible via a single tarmac track from Winchester Road (B3354). The land surrounding the barns consisted of undeveloped agricultural fields with a railway track located 20m to the west of the site.

An aerial view of the site showing an approximate site boundary is given within Figure 3. A topographic plan has been provided in figure 4.

2.3. Proposed Development

At the time of reporting, March 2022, the proposed development was understood to comprise the construction of 9 No. 3 bed houses with private gardens and associated development infrastructure with associated parking.

The proposed development plan can be seen within Figure 5.

2.4. Geology

The British Geological Survey Solid and Drift Geology Map for the Boorley Green area (Southampton sheet No. 315) revealed that the site was underlain by bedrock deposits of the Wittering Formation. The Earnley Sand Formation bedrock deposits were recorded 50m north-west of the site. No superficial deposits or areas of Made/Worked Ground were noted within a 250m radius of the site.

2.4.1. On site Geological Formations

Wittering Formation

The Wittering Formation varies in thickness between 23 and 57m and consists of three main lithologies. The first and most widespread is clay dominated and consists of olive-grey to brownish grey clay with partings of pale grey or greyish green, very fine grained sand or silt. The second comprises wavy to lenticular bedded sand interbedded with clay in approximately equal proportions. The third consists of fine to medium grained glauconitic sands with weathers yellowish brown and includes laminae and flasers of grey silty clay.

2.4.2. Off site Geological Formations

Earnley Sand Formation

The Earnley Sand Formation is fairly uniform throughout the district and comprises mainly green, glauconitic, clayey, silty fine-grained sand and sandy silt. The transition between Earnley Sand and the underlying Wittering Formation is marked by relatively structureless glauconitic sand and laminated and thin-bedded clays and sands of the Wittering Formation.

A BGS borehole (SU51SW123) located ~400m north-east of the site revealed a 0.25m capping of silty clayey Sand Topsoil over a silty Sand of Made Ground to 0.75m bgl. The Bracklesham Beds were recorded from 0.75-11.55m bgl. The Bracklesham Beds consisted of a firm to stiff green, brown silty Clay with lenses of silty fine Sand. A groundwater strike was noted at 3.00m bgl. Standing water was recorded at 3.20m, 4.00m, 4.80m and 6.70m.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary A Aquifer** comprising the bedrock Wittering Formation.

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.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

A drain was located on the southern portion of the site cutting across the field to the south of the site. Another drain was noted 300m east of the site and the river Hamble was located 1.00km east of the site. The River Hamble was flowing from north to south.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Wittering Sand Formation. Some amounts of groundwater however may be present at shallower depths within Made ground / parts of the Wittering Formation. It was considered that groundwater was flowing in a south-easterly direction toward the River Hamble in line with local topography.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a low probability of fluvial or coastal flooding.

2.6. Radon

BRE 211 (2015) Map 4 of the Hampshire, Berkshire and south Oxfordshire area indicated that the site **was not** located within an area where mandatory protection measures against the ingress of radon were likely to be required.

A review of the freely available Public Health England radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of <1% was recorded. The neighbouring 1km grid square to the east was noted to have a maximum radon potential of 1 – 3%. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within a low -risk area associated with unexploded ordnance (UXO), as indicated by having <15 bombs dropped per 1000 acres.

2.7.2. Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed no areas of historical or authorised landfills within a 500m radius of the site.

2.8. Existing Site Investigation

A site investigation preliminary report was undertaken by Geo-Environmental, with their report issued in April 2021. A Desk Study was undertaken by Geo-Environmental, with their report issued in May 2021.

The desk study concluded the following: The sites history generally comprised of agricultural fields from 1868 until 1989 when the site was built upon by a complex of buildings. The surrounding land consisted of agricultural fields and the Boorley Green village. A farm was located to the north of the site from the 1960's. A railway line was present to the west of the site from the earliest mapping entry.

The desk study recorded 6 No. contemporary Trade Directory entries within a 250m radius of the site. Two of these were located on site and were Mechanical Engineers and Joinery Manufacturers. Off site a Gate Manufacturers (19m north-east), Tyre dealers (92m east), Cutting Tools and Machinery (171m north-east) and Machinery- Industrial and Commercial (171m north-east) were recorded.

No Landfill records or waste management facilities were recorded within 1000m of the site. Two records of potentially infilled land were identified within 500m of the site. These records relate to Unknown filled ground 43m south and 101m south-east of the site. The Desk study concluded that these features were raised ground rather than pits/quarries from historical mapping.

Very low to low risk ratings have been classified for the site in regards to Ground gas and vapour risk. This is due to the sites historical use and no other viable potential sources of ground gases being identified. The desk study however does recommend this be reviewed after any intrusive investigation works.

Made Ground was encountered to a depth of 0.30m bgl and Topsoil was recorded to 0.40m bgl. The Made Ground and topsoil was found to overlie the Wittering Formation which consisted of a sandy Clay to depths of >2.10m bgl. Groundwater seepages were recorded in TP3 and TP4A at 1.45m and 1.70m bgl respectively. Soakaway testing undertaken by Geo-Environmental in 5 locations recorded an insufficient fall in head over a >45 hour period and no infiltration rate was calculated.

Geotechnical and environmental information from this site investigation has not been made available to Ground and Water at the time of reporting.

2.9. Preliminary Risk Assessment

A tabulated Conceptual Site Model has been developed as part of reviewing the Desk Study undertaken by Geo Environmental in May 2021 and from internet and resources searches undertaken

by Ground and Water and is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below.

Risk Categories used in the Tabulated CSM	
Negligible	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is no plausible risk. Therefore, there is no need to further assess this potential source of contamination.
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/demolition activities: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Moderate
	- Direct uptake of groundwater - Direct uptake of determinands in the soil	Flora and Fauna Vegetation within soft landscaped areas	Moderate
	- Anthropogenic (man-made) pathways - Vertical and lateral migration in permeable strata - Surface water runoff	Controlled Waters - Secondary A Aquifer (Wittering Formation) - River Hamble	Low
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	Moderate
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(Off-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Moderate
	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Low
Aggressive ground conditions associated with impacted groundwater; - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	Moderate
Ground gases generated by Made Ground including infilled/raised ground features: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low

3. SITE WORKS

Site works were undertaken on the 9th February 2022 and comprised the drilling of the 3No. Windowless Sampler Boreholes (WS1 – WS3) to a depth of 5.45m bgl with Standard Penetration Tests at 1.00m intervals.

A trial hole location plan showing the windowless sampler holes has been provided within Figure 6.

Additional site works were undertaken on the 11th February 2022 and comprised 5No. hand excavated trial pits which were excavated to 0.50m bgl.

A trial hole location plan showing the hand excavated trial pits has been provided within Figure 7.

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

As a further precautionary measure, the positions were hand excavated to 1.20m bgl and scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

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

3.1. Sampling Procedures

Small disturbed samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons.

A selection of samples were despatched for geotechnical testing purposes. A programme of chemical laboratory testing, scheduled by Ground and Water Limited and carried out by ALS Environmental Limited, was undertaken on soils samples recovered from the trial holes.

4. ENCOUNTERED GROUND CONDITIONS

4.1. Soil Conditions

The trial holes were logged by a Ground and Water Limited representative, generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A capping of Made Ground was noted to overlie the bedrock Wittering Formation.

The succession of conditions and description of soils encountered in the trial holes in descending order is tabulated below.

Summary of Strata Encountered (WS1 – WS3)			
Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)
MADE GROUND: A dark brown, grey gravelly clayey sandy SILT. Sand is fine. Gravel is fine to medium sub-angular of brick and flint.	0.00	0.60-0.70	0.60-0.70
WITTERING FORMATION: A mid brown, orange, grey slightly gravelly sandy CLAY/ clayey SAND. The sand was fine, laminated. The gravel was sub-angular, fine to medium of flint.	0.60-0.70	3.00-4.00	2.30 – 3.40
WITTERING FORMATION: Light to dark grey, off white, sandy CLAY. Sand is fine grey laminations of sand.	3.00-4.00	>5.45	>1.45 – >2.45

Summary of Strata Encountered (TP1 – TP5)			
Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)
TOPSOIL: Dark brown slightly gravelly slightly sandy CLAY. Sand is fine. Gravel is fine to medium subangular of flint.	GL	0.20	0.20
MADE GROUND: A dark brown, grey, orange, black slightly gravelly silty Clay. The gravel was sub-angular fine to medium flint, brick, tile and bituminous material.	GL-0.20	>0.50	>0.30->0.50

For details of the composition of the soils encountered at particular points, reference must be made to the individual trial hole logs within Appendix B of this report. A trial hole location plan showing the windowless sampler holes has been provided within Figure 6. A trial hole location plan showing the hand excavated trial pits has been provided within Figure 7.

4.2. Roots Encountered

Fresh roots were proven to 1.00m bgl within WS1-WS3. Fresh roots were recorded to unproven depths of 0.50m bgl in TP1-TP5. The depths of root penetration can be seen tabulated below.

Summary of Root Penetration	
Trial Hole	Fresh Root Depth (m bgl)
WS1	1.00
WS2	1.00
WS3	1.00
TP1	0.50
TP2	0.50
TP3	0.50
TP4	0.50
TP5	0.50

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

4.3. Groundwater Conditions

Groundwater strikes were recorded in WS1 at 0.90m bgl, 1.30m bgl in WS2 and 1.60m bgl in WS3. No groundwater was noted in the hand excavated trial holes. Perched water may be encountered within the excavation of foundation trenches, especially after a period of prolonged rainfall.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

The site investigation was conducted in February 2022, when groundwater levels are in the process of rising to their annual maximum (highest elevation). The long-term groundwater elevation might increase/decrease at some time in the future due to seasonal fluctuation in weather conditions.

4.4. Obstructions

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

5. IN-SITU & LABORATORY GEOTECHNICAL TESTING

5.1. In-Situ Strength Testing

Standard Penetration Tests (SPTs) were undertaken as part of the site investigation. The results of the SPT's have not been amended to consider hammer efficiency, rod lengths and overburden pressure in accordance with Eurocode 7. The test results are presented on the borehole logs within Appendix B.

Windowless Sample Boreholes provide samples of the ground for assessment, but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

The cohesive soils encountered were classified based on the table below.

Undrained Shear Strength from Field Inspection/SPT Results Cohesive Soils (EN ISO 14688-2:2004 & Stroud (1974))		
Classification	Undrained Shear Strength (kPa)	Field Indications
Extremely High	>300	-
Very High	150 – 300	Brittle or very tough
High	75 – 150	Cannot be moulded in the fingers
Medium	40 – 75	Can be moulded in the fingers by strong pressure
Low	20 – 40	Easily moulded in the fingers
Very Low	10 – 20	Exudes between fingers when squeezed in the fist
Extremely Low	<10	-

The granular soils encountered were classified based on the table below.

Correlation Between Normalised SPT Blow Counts (N_1) ₆₀ and Granular Classification.	
Classification	Equivalent SPT Blow Counts (N_1)
Extremely Dense	>58
Very Dense	42 – 58
Dense	25 – 42
Medium	8 – 25
Loose	3 – 8
Very Loose	0 – 3

An interpretation of the in-situ geotechnical testing results is given in the table below.

Interpretation of In-situ Geotechnical Testing Results					
Strata	SPT "N" Blow Counts	Equivalent Undrained Shear Strength (Cu) (kPa)	Soil Type		Trial Hole/s
			Granular (Density)	Cohesive (Cu)	
Wittering Formation (Cohesive)	8 – 23	40 – 115	-	Medium-High	WS1/1.00 – 5.45m bgl, WS2/2.00- 5.45m bgl, WS3/2.00-2.45, 4.00-5.45m bgl.
Wittering Formation (Granular)	16	-	Medium Dense	-	WS3/3.00- 3.45m bgl

It must be noted that field measurements of undrained shear strength (Cu) are dependent on a number of variables including disturbance of sample, method of investigation and also the size of specimen or test zone.

5.2. Geotechnical Laboratory Testing

A programme of geotechnical laboratory testing, scheduled by Ground and Water Limited and carried out by an accredited geotechnical testing laboratory was undertaken on samples recovered. Details of the specific tests used in each case are given below.

Standard Methodology for Laboratory Geotechnical Testing		
Test	Standard	Number of Tests
Atterberg Limit Tests	BS1377:2016:Part 2:Clauses 3.2, 4.3 & 5	5
Water Soluble Sulphate and pH Test	BS1377:2018:Part 3:Clause 5	1
BRE Special Digest 1 Tests	BRE Special Digest 1 "Concrete in Aggressive Ground (BRE, 2005).	2

5.2.1. Atterberg Limit Testing

A précis of atterberg limit testing undertaken can be seen tabulated below. The test results are presented within Appendix C.

Atterberg Limit Tests Results Summary							
Stratum	Moisture Content (%)	Passing 425 µm sieve (%)	Modified PI (%)	Soil Class	Consistency Index (Ic)	Volume Change Potential	
						BRE	NHBC
Wittering Formation	20-34	96-99	25.22- 45.55	CL-CH	Stiff	Medium-High	Medium-High
- NP – Non-plastic - BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results) - Soil Classification based on British Soil Classification System. - Consistency Index (Ic) based on BS EN ISO 14688-2:2018.							

5.2.2. Liquidity Limit Analysis

The results of the Atterberg Limit tests were analysed to determine the Liquidity Index of the samples. This gives an indication as to whether the samples recovered showed a moisture deficit and their degree of consolidation. The results are tabulated below.

Liquidity Index Calculations Summary					
Sample	Moisture Content (%)	Plastic Limit (%)	Modified Plasticity Index (%)	Liquidity Index	Result
Wittering Formation (WS1/0.80m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	34	24	44.55	0.22	Overconsolidated
Wittering Formation (WS1/2.00m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	20	17	25.22	0.12	Heavily Overconsolidated
Wittering Formation (WS2/1.00m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	27	20	44.10	0.16	Heavily Overconsolidated
Wittering Formation (WS3/1.50m bgl): <i>Laboratory description</i> – Brown fine to medium gravelly silty sandy CLAY	28	25	43.20	0.07	Heavily Overconsolidated
Wittering Formation (WS3/2.50m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	28	20	31.36	0.25	Overconsolidated

Liquidity Index analyses indicated that there were no potential moisture deficits within the five samples tested.

5.2.3. Liquid Limit Analysis

A comparison of the soil moisture content and the liquid limit can be seen tabulated below.

Moisture Content vs. Liquid Limit				
Sample	Moisture Content (%)	Liquid Limit (%)	40% Liquid Limit (%)	Result
Wittering Formation (WS1/0.80m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	34	69	27.6	MC > 0.4 x LL (No Significant Moisture Deficit)
Wittering Formation (WS1/2.00m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	20	43	17.2	MC > 0.4 x LL (No Significant Moisture Deficit)
Wittering Formation (WS2/1.00m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	27	65	26	MC > 0.4 x LL (No Significant Moisture Deficit)
Wittering Formation (WS3/1.50m bgl): <i>Laboratory description</i> – Brown fine to medium gravelly silty sandy CLAY	28	70	28	MC ≥ 0.4 x LL (No Significant Moisture Deficit)
Wittering Formation (WS3/2.50m bgl): <i>Laboratory description</i> – Brown sandy fine to medium gravelly silty CLAY	28	52	20.8	MC > 0.4 x LL (No Significant Moisture Deficit)

Liquid Limit analyses indicated that there were no potential moisture deficits within the samples tested. The sample from WS3/1.50m was at the boundary, however not lower than the 40% LL. Roots were recorded to 1.00m in WS3.

5.2.4. Water Soluble Sulphate and pH Testing

A tabulated summary of the water soluble sulphate and pH testing can be viewed below. The results of the water-soluble sulphate and pH testing can be viewed within Appendix D.

Summary of Water Soluble Sulphate and pH Test Results		
Stratum	Water Soluble Sulphate (mg/l)	pH
Wittering Formation	21.5	7.2

5.2.5. BRE Special Digest 1 Testing

In accordance with BRE Special Digest 1 'Concrete in Aggressive Ground' (BRE, 2005), samples were scheduled for laboratory analysis to determine parameters for concrete specification. The results of the chemical analysis undertaken are given within Appendix D and a summary is tabulated below.

Summary of BRE Special Digest 1 Testing Results			
Determinand	Unit	Wittering Formation (WS1/1.00m)	Wittering Formation (WS3/2.50m)
pH	-	7.6	7.41
Total Sulphate as SO ₄	%	<0.02	0.0229
Water Soluble Sulphate as SO ₄	mg/l	18.5	78.7
Total Sulphur	%	<0.02	<0.02
Ammonium as NH ₄	mg/l	2.39	1.73
Water Soluble Chloride (2:1)	mg/l	14	14.2
Water Soluble Nitrate (2:1) as NO ₃	mg/l	10.9	0.791
Water Soluble Magnesium	mg/l	14.3	8.51

6. ENGINEERING CONSIDERATIONS

6.1. Soil Characteristics and Foundation Considerations

A summary of the soil characteristics following the intrusive site investigation and laboratory testing and the relevant foundation considerations has been provided below. The following information from the ground investigation was considered pertinent to the design of foundations.

- Made Ground was encountered from ground level within all trial holes, to a proved depth of between 0.60-0.70m bgl in WS1-WS3 and unproven depths of 0.50m bgl in the trial pits. Made Ground may be locally deeper across the site, especially close to former structures/foundations and service runs.

As a result of the inherent variability of Made Ground and potential for degradable materials, it is usually unpredictable in terms of bearing capacity and settlement characteristics. Foundations should, therefore, be taken through any Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.

- Underlying the Made Ground were cohesive soils of the Wittering Formation described as brown, orange, grey slightly gravelly sandy clay. These soils were classified as having medium to high volume change potential in accordance with NHBC Standards Chapter 4.2 and BRE240.

Foundations should be designed in accordance with soils of high volume change potential. Given the presence of cohesive soils at shallow depth, special foundation precautions may be required to prevent possible future shrinkage/swelling of the soils affecting the integrity of the faces of foundations (underfloor void diameter/compressible material/void formers etc). A compressible layer must be provided to accommodate potential seasonal movement, based on NHBC guidance.

- In-situ strength testing classified the Wittering Formation was classified as having medium to high undrained shear strength. The granular bands of the Wittering Formation were recorded to be medium dense. No soft spots were encountered.

The loads of proposed foundations should not exceed the allowable bearing capacity of the soils they are founding upon, nor should >25mm of load-induced settlement occur. If soft spots are encountered, they should be bypassed. Care should be taken not to overdig foundations as this may stress underlying soft spots, should they be present.

The final design of foundations will need to take into account the volume change potential of the soil, the depth of root penetration and/or desiccation and the likely serviceability and settlement requirements of the proposed structure. These parameters for design are discussed in the next section of this report.

- Fresh roots were proven to 1.00m bgl within WS1-WS3. Fresh roots were recorded to unproven depths of 0.50m bgl in TP1-TP5. Roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

Foundations must not be placed within root penetrated and/or desiccated soils with volume

change potential. It is recommended that foundations are taken at least 300mm into non-root penetrated strata if the soils have volume change potential, or into soils of no volume change potential. The influence of trees on or surrounding the site will need to be taken into account in final design (NHBC Standards Chapter 4. 2) (tree rings).

- Groundwater strikes were recorded in WS1 at 0.90m bgl, 1.30m bgl in WS2 and 1.60m bgl in WS3. No groundwater was noted in the hand excavated trial holes. **Perched water may be encountered within the excavation of foundation trenches, especially after a period of prolonged rainfall. Any groundwater or surface water ingress must be prevented from entering foundation trenches. Excavations must be kept dry and either concreted or blinded as soon after excavation as possible. If water were allowed to accumulate on the formation for even a short time the bearing capacity would be reduced, and this could result in increased settlements.**

It was considered likely that the excavation would encounter groundwater or significant perched water within the Topsoil/Made Ground and clayey Sand/ sandy Clay of the Wittering Formation, especially after periods of prolonged rainfall or during winter, therefore dewatering is likely to be required. The excavation of trial trenches should also be considered to determine the practicality of excavation foundation trenches. The advice of a reputable dewatering contractor, familiar with the type of ground and groundwater conditions encountered on this site, should be sought prior to finalising the design of the foundations.

Based on the above, foundations should bypass any Made Ground/Topsoil and soft spots/loose granular soils, before extending 300mm below the proved depth of root penetration. Foundations would therefore be constructed on competent, moisture stable soils of the Wittering Formation. A tabulated summary showing the minimum foundation depth based on each trial hole can be viewed below.

Summary of Minimum Foundation Depths			
Trial Hole	Minimum Foundation Depth (m bgl)	Founding Geological Formation	Reason
WS1	1.30	Cohesive Wittering Formation	Foundations should bypass Made Ground/Topsoil and extend 300mm below the depth of root penetration (1.00m bgl), before founding on competent soils at a moisture stable depth.
WS2	1.30	Cohesive Wittering Formation	Foundations should bypass Made Ground/Topsoil and extend 300mm below the depth of root penetration (1.00m bgl), before founding on competent soils at a moisture stable depth.
WS3	1.30	Cohesive Wittering Formation	Foundations should bypass Made Ground/Topsoil and extend 300mm below the depth of root penetration (1.00m bgl), before founding on competent soils at a moisture stable depth.

6.2. Shallow Foundations

The software uses commonly derived equations for bearing capacity to derive figures based on the ground model formed, using layer weighted averages. The bearing capacities are calculated via several methods (Hansen, Terzaghi, Meyerhof, Vesic, Brinch – Hansen, Meyerhof & Hanna) and the most conservative outputs are selected as proposed bearing capacities.

This calculation process is closely related to the general proposals within BS 8004:2015 Code of Practice for Foundations. The bearing capacities calculated were cross-referenced with proposals included within BS 8004:2015 Code of Practice for Foundations and based on a 5m long by 1m wide foundation and a maximum settlement of 25mm, based on in-situ testing results and inspection of samples recovered.

The undrained cohesion used followed the trend of in-situ testing between test results.

The following allowable bearing capacities and load induced settlements were anticipated for foundations at the minimum depth of 1.00mbgl based on WS1 and 2.00m bgl in WS2 based on the soil profiles. This is based on trial hole records, the results of the in-situ testing, inspection of samples recovered, and referral to BS 8004:2015, Code of Practice for Foundations and based on a 5m long by 1m wide foundation and a maximum settlement of 25mm.

The foundations could be extended down to 2.00m bgl for additional bearing capacity requirements.

Allowable Bearing Capacities Calculated				
Foundation Depth (m bgl)	Foundation Type	Limit State	Serviceability State	
		Allowable Bearing Capacity (kN/m ²)	Load (kN/m ²)	Settlement (mm)
1.00 (WS1)	5.00m long by 0.75m wide strip foundation	77.35	70	12.72
	5.00m long by 1.00m wide strip foundation	78.02	70	13.9
	1.50m square pad foundation	88.77	80	17.22
2.00 (WS2)	5.00m long by 0.75m wide strip foundation	116.5	110	14.82
	5.00m long by 1.00m wide strip foundation	117.51	110	17.89
	1.50m square pad foundation	135.49	130	18.12

As a conclusion, based on the general picture of the results from all boreholes, allowable bearing capacity of ~80kPa should be used for 1.00m bgl, ~90Kpa for 1.30m bgl and ~125kPa for 2.00m bgl.

6.2.1. Additional Comments

A number of comments and recommendations has been provided below.

- It is prudent to avoid having a foundation spanning across materials of different consistency, like clay and gravel, in order to avoid potential differential settlements. If unavoidable, foundations must be reinforced to allow for such potential differential movement. It should be noted that differential settlement may also occur between strip and isolated pad foundations.
- Foundation excavations must be carefully bottomed out and any loose soil or soft spots removed prior to the foundation concrete or blinding being placed. Failure to ensure that foundation excavations are suitably bottomed out could result in additional settlements.
- Inspection of foundation excavations, prior to concreting, must be made by a competent and suitably qualified person to check for soft spots and to check for the presence of roots.
- Foundations must not be cast over foundations of former structures and/or other hard spots.
- Given soils of volume change potential were encountered and Topsoil/Made Ground was noted to be deeper than 0.60m bgl, a suspended slab is required.
- Isolated Pad Foundations must be at least 1.5 times the width of the widest pad apart to keep to the anticipated settlements.

- Final designs for the foundations should be carried out by a suitably qualified Engineer based on the findings of this investigation and with reference to the anticipated loadings, serviceability requirements for the structure and the developments proximity to former, present, and proposed trees. 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.

6.3. Piled Foundations

Given the results of the investigation if dewatering of shallow groundwater cannot be achieved in the case of high rates on site a piled foundation scheme would be necessary due to the high groundwater levels recorded. However, due to the primarily cohesive conditions at shallow depths, rates are not anticipated to be extensive.

The construction of a piled foundation is a specialist job, and the advice of a reputable contractor, familiar with the type of ground and groundwater conditions encountered on this site, should be sought prior to finalising the foundation design, as the actual pile working load will depend on the particular type of pile and method of installation.

6.4. Excavations and Stability

Shallow excavations in the Made Ground and Wittering Formation are likely to be marginally stable at best. Long, deep excavations, through these strata and into the underlying Wittering Formations are likely to become unstable.

Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions should therefore be taken to ensure that such earth faces are adequately supported before excavations are entered by personnel.

6.5. Sub-Surface Concrete Design

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1, 2005, '*Concrete in Aggressive Ground*' considering the pH of the soils. For the classification given below, the "mobile" and "natural" case was adopted given the geology encountered and the residential use of the site.

Made Ground

No samples of the Made Ground were analysed for sulphates and pH.

Wittering Formation

The water-soluble sulphates in the Wittering Formation were noted to be between 18.5-78.7mg/l, with a pH of between 7.2-7.6, from chemical laboratory testing. The total potential sulphate (3x total sulphur) was <0.06%, from chemical laboratory testing.

Therefore, sulphate concentrations measured in 2:1 water/soil extracts taken from the Wittering Formation and total potential sulphate concentrations, fell into Class **DS-1** of the BRE Special Digest 1, 2005, '*Concrete in Aggressive Ground*'. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of **AC-1**.

6.6. Roads and Hardstanding Design

This section provides information relating to the construction of roads and hardstanding, for each strata encountered.

6.6.1. Anticipated CBR Values and Frost Susceptibility

Topsoil

Roads and hardstanding should bypass Topsoil given the likely low strength, high compressibility and general variability.

Made Ground

Roads and hardstanding should not be constructed on Made Ground given its variability in composition and likely low strength/density. Where these cannot be bypassed a CBR value of 1% should be adopted for Made Ground. Given that Made Ground encountered beneath the site comprised a mixture of poorly drained clayey sandy gravel based soils, these deposits are likely to be **frost susceptible**.

Wittering Formation (cohesive)

Roads and hardstanding constructed on the cohesive Undifferentiated River Terrace Deposits should be designed based on a CBR value of 4.0%. This is based on reference to Table C1 of TRL1132 and average construction conditions. Based on wet conditions a CBR of 2.5% should be adopted, with dry conditions a CBR of 4.5% being applicable. These clay-based soils (poorly drained) with plasticity indexes above 20% are likely to be non frost susceptible. However due to the granular content recorded they should be treated as frost susceptible.

All formation levels for roads and hardstanding should be proof rolled to highlight any soft areas which should then be dug out and replaced with selected granular material compacted in thin layers to a suitable specification.

6.7. Surface Water Disposal

The proposed development was located on the bedrock deposits of the Wittering Formation, classified as a Secondary A Aquifer. The ground conditions encountered generally comprised a capping of Made Ground overlying cohesive soils of the Wittering Formation. Soakaway testing in accordance with BRE365 could be undertaken to confirm infiltration rates, but these were beyond the scope of this investigation.

Any soakaways should be located sufficiently away from buildings and infrastructure, in order to prevent undermining of foundations.

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary A Aquifer** comprising the bedrock Wittering Formation.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

A drain was located on the southern portion of the site cutting across the field to the south of the site. Another drain was noted 300m east of the site and the river Hamble was located 1.00km east of the site. The River Hamble was flowing from north to south.

Groundwater strikes were recorded in WS1 at 0.90m bgl, 1.30m bgl in WS2 and 1.60m bgl in WS3. No groundwater was noted in the hand excavated trial holes. Perched water may be encountered within the excavation of foundation trenches, especially after a period of prolonged rainfall.

Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources, abstractions and surface water features/watercourses.

The submission of a Sustainable Urban Drainage Scheme (SUDS) is likely to be required for this site due to the proposed development increasing the amounts of hardstanding.

Soakaways are not expected to be a preferable method for disposal of storm water due to the cohesive soils recorded and shallow groundwater/perched water.

7. CONTAMINATION RISK ASSESSMENT

7.1. Results of the Phase I Risk Assessment

The tabulated Conceptual Site Model (CSM) developed by the Ground and Water based on reviewing the Desk Study undertaken by Geo Environmental in May 2021 and from internet and resources searches undertaken by Ground and Water and is reproduced in this section and can be seen below. This version of the CSM has omitted the assigned risk rating and any linkage classified as Negligible. For the complete information please see Section 2.8.

No additional source of contamination, pathway or receptor was identified between the desk study and the ground investigation and as such, it was not necessary to modify the CSM.

Tabulated Conceptual Site Model – Pollutant Linkage Summary-On site sources		
Potential Sources	Potential Absorption Pathways	Potential Receptors
Made Ground from construction/ demolition activities: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works
	- Direct uptake of groundwater - Direct uptake of determinands in the soil	Flora and Fauna Vegetation within soft landscaped areas
	- Anthropogenic (man-made) pathways - Vertical and lateral migration in permeable strata - Surface water runoff	Controlled Waters - Secondary A Aquifer (Wittering Formation); - River Hamble 1.00km east.
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services

Tabulated Conceptual Site Model – Pollutant Linkage Summary-off site sources		
Potential Sources	Potential Absorption Pathways	Potential Receptors
Made Ground from construction/ demolition activities and nearby works: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works
	- Direct uptake of groundwater - Direct uptake of determinands in the soil	Flora and Fauna Vegetation within soft landscaped areas
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If there is a linkage between any given source and receptor, then a quantitative risk assessment is used to assess the significance or impact of the pollutant linkage.

7.2. Sampling Locations

The synopsis for the trial hole locations and their final depth can be seen tabulated below. A trial hole location plan is provided within Figures 6 and 7. The table also indicates whether any locations targeted a source of contamination as well as the proposed end-use. The proposed development can be seen in Figure 5.

Trial Hole Location Synopsis		
Trial Hole/Final Depth	Sampling Strategy	Proposed End-Use
WS1/5.45m	Random	Footprint of Proposed Building

WS2/5.45m	Random	Soft Landscaping
WS3/5.45m	Random	Soft Landscaping
TP1/0.50m	Random	Soft Landscaping
TP2/0.50m	Random	Soft Landscaping
TP3/0.50m	Random	Footprint of Proposed Building
TP4/0.50m	Random	Footprint of Proposed Building
TP5/0.50m	Random	Footprint of proposed road

The investigation area totals approximately 3,100m² and with eight sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 581m² and a radius of approximately 7.67m would be encountered (CLR 4).

Sampling depths were chosen to reflect the receptor of concern (e.g. human health, controlled waters and vegetation) and typically comprised a surface or near surface sample and at approximately 0.5m depth increments thereafter, extending into the underlying natural soils. Any horizon where olfactory or visual evidence of contamination was present was also sampled. The receptors relevant to the sampling depths are tabulated below.

Summary of Receptors per Sample Depth	
Depth	Receptors
Shallow Samples (< 0.75m bgl)	• End Users (Residents/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public • Vegetation within soft landscaped areas (shallow rooted) • Secondary A (Wittering Formation) • Buried Concrete
Moderate Samples (0.75 – 1.50m bgl)	• Construction workers during development • Site operatives during maintenance works • Vegetation within soft landscaped areas (deep rooted) • Secondary A (Wittering Formation) • Buried Concrete • Underground services (water pipes)
Deep Samples (> 1.50m bgl)	• Construction workers during development • Secondary A (Wittering Formation) • Buried Concrete

The depth of the soil samples at each trial hole location can be seen on the trial hole logs within Appendix B.

7.3. Soil Risk Assessment

Chemical laboratory testing, scheduled by Ground and Water Limited, and carried out by ALS Environmental Limited, was undertaken on fifteen samples as tabulated below.

Sample Location Synopsis			
Sample ID	Sampling Strategy	Strata	Proposed End-Use
WS1/0.20m	Shallow Random	Made Ground	Footprint of Proposed Building
WS1/0.50m	Moderate Random	Made Ground	Footprint of Proposed Building
WS2/0.20m	Shallow Random	Made Ground	Soft Landscaping
WS2/0.50m	Moderate Random	Made Ground	Soft Landscaping
WS3/0.20m	Shallow Random	Made Ground	Soft Landscaping

WS3/0.50m	Moderate Random	Made Ground	Soft Landscaping
TP1/0.20m	Shallow Random	Topsoil	Soft Landscaping
TP1/0.50m	Moderate Random	Made Ground	Soft Landscaping
TP2/0.20m	Shallow Random	Made Ground	Soft Landscaping
TP2/0.50m	Moderate Random	Made Ground	Soft Landscaping
TP3/0.20m	Shallow Random	Made Ground	Footprint of Proposed Building
TP3/0.50m	Moderate Random	Made Ground	Footprint of Proposed Building
TP4/0.20m	Shallow Random	Made Ground	Footprint of Proposed Building
TP4/0.50m	Moderate Random	Made Ground	Footprint of Proposed Building
TP5/0.20m	Shallow Random	Made Ground	Footprint of proposed road

The samples were subjected to a combination of analysis that comprised:

- Asbestos screen;
- Semi-metals and heavy metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc;
- 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;
- Speciated TPH including full aliphatic/aromatic split;
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs);

A breakdown of the number of tests undertaken for each determinand is discussed in further sections. The chemical laboratory results are presented in Appendix D.

7.3.1. Soil Assessment Criteria and Results

At the time of reporting, March 2022, the proposed development was understood to comprise the construction of 9No. 3 bed houses with private gardens and associated development infrastructure with associated parking. Proposed site plans are provided as Figure 5.

Based on the proposed development, the results of the chemical laboratory testing were compared to the Generic Assessment Criteria (GAC) for a **'Residential with homegrown produce'** land-use scenario, as this was considered the most appropriate land-use scenario. The derivation of Soil Assessment Criteria used within this report can be seen within Appendix E.

Where a contaminant of concern's GAC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each uncontaminated soil type was used to derive the appropriate GAC for each soil type. A SOM value of 1%, the most conservative value, was utilised.

A summary of the analytical results and the comparison to the determinands adopted screening value are presented in the table below and overleaf.

Soil Contamination Test Results and Screening Values					
Determinand	Number of Samples	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Adopted Screening Value (mg/kg)	Was the adopted screening value exceeded for relevant land-use scenario?
INORGANICS					

Asbestos	13	ND		ND	No
Cyanide (total)	8	< 1	< 1	24	No
Phenols	8	<0.035	<0.035	280	No
METALS					
Arsenic	8	5.1	8.29	37	No
Boron	8	<1	1.01	290	No
Cadmium	8	0.114	0.269	11	No
Chromium (III)	8	8.99	16.6	910	No
Chromium (Hexavalent)	8	<0.6	<0.6	6	No
Copper	8	4.07	16	2,400	No
Lead	8	20.3	133	200	No
Mercury	8	<0.1	<0.1	1.2	No
Nickel	8	5.33	7.81	130	No
Selenium	8	<1	1.59	250	No
Zinc	8	33.3	97.2	3,700	No
TOTAL PETROLEUM HYDROCARBONS (TPHs)					
Aliphatic >C5 - C6	8	<0.01	<0.01	42	No
Aliphatic >C6 - C8	8	<0.01	<0.01	100	No
Aliphatic >C8 - C10	8	<0.01	<0.01	27	No
Aliphatic >C10 - C12	8	<1	<1	130	No
Aliphatic >C12 - C16	8	<1	<1	1,100	No
Aliphatic >C16 - C21	8	<1	<1	65,000	No
Aliphatic >C21 - C35	8	<1	10.6		
Aromatic >C5 - C7	8	<0.01	<0.01	65,000	No
Aromatic >C7 - C8	8	<0.01	<0.01	70	No
Aromatic >C8 - C10	8	<0.01	<0.01	130	No
Aromatic >C10 - C12	8	<1	<1	34	No
Aromatic >C12 - C16	8	<1	<1	74	No
Aromatic >C16 - C21	8	<1	<1	140	No
Aromatic >C21 - C35	8	<1	16.8	260	No
Benzene	8	<0.009	<0.009	0.087	No
Toluene	8	<0.007	<0.007	130	No
Ethylbenzene	8	<0.004	<0.004	47	No
m,p-Xylene	8	<0.01	<0.01	56	No
o-Xylene	8	<0.01	<0.01	60	No
POLYCYCLIC-AROMATIC HYDROCARBONS					
Acenaphthene	8	<0.008	0.0383	210	No
Acenaphthylene	8	<0.012	0.0208	170	No
Anthracene	8	<0.016	0.0876	2,400	No
Benzo(a)anthracene	8	<0.014	0.484	7.2	No
Benzo(a)pyrene	8	<0.015	0.871	2.2	No
Benzo(b)fluoranthene	8	<0.015	0.921	2.6	No
Benzo(ghi)perylene	8	<0.024	0.684	320	No
Benzo(k)fluoranthene	8	<0.014	0.316	77	No
Chrysene	8	<0.01	0.545	15	No
Dibenzo(a,h)anthracene	8	<0.023	0.0967	0.24	No
Fluoranthene	8	<0.017	1.06	280	No
Fluorene	8	<0.01	0.0227	170	No
Indeno(1,2,3-cd)pyrene	8	<0.018	0.689	27	No
Naphthalene	8	<0.009	<0.009	2.3	No
Phenanthrene	8	<0.015	0.276	95	No
Pyrene	8	<0.015	1.03	620	No

MARKER FOR VOLATILE ORGANIC COMPOUND					
Methyl tert-butyl ether (MTBE)	8	< 0.01	< 0.01	49	No
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix D. The soil concentrations were typically compared to the LQM/CIEH Suitable for Use Levels (S4UL) (2014), based upon the assumption of 1% soil organic matter. A screening value for Lead is based on the Category 4 Screening Levels (C4SLs). Where no S4UL or C4SL is available for Cyanide, a SoBRA acute GAC is assigned. Where no S4UL or C4SL is available for MTBE, a CL:AIRE 2010 GAC is assigned. Where exceedances are noted, the trial hole and depth of sample is recorded.					

The proposed development includes areas of soft-landscaping, where shallow rooted vegetation may be exposed to aggressive ground conditions. The previous table compares the results of the laboratory analysis to GAC that is protective of Human Health and therefore different GAC is required for vegetation. The derivation of Soil Assessment Criteria used within this report can be seen within Appendix E.

Soil Contamination Test Results and Screening Value					
Determinand	Number of Samples	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Adopted Screening Value (mg/kg)	Was the adopted screening value exceeded for relevant land-use scenario?
Copper	8	4.07	16	250	No
Zinc	8	33.3	97.2	1,000	No
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix D. The soil concentrations were compared to the ICRL 70/90: <i>Notes on the restoration and aftercare of metalliferous mining sites for pasture and grazing</i> . Where exceedances are noted, the trial hole and depth of sample is recorded.					

7.3.2. Soil Assessment

Chemical laboratory testing of the Made Ground and Wittering Formation did not reveal any elevated levels of determinands above the guideline levels for a 'Residential With Homegrown Produce' land-use scenario.

In addition, the intrusive investigation did not reveal any visual or olfactory evidence to suggest any hydrocarbon-type contamination in the trial holes excavated on the site. The chemical laboratory results have verified that no elevated concentrations of aliphatic/aromatic hydrocarbons (C5-C35) or BTEX compounds are present in the soils underlying the site.

Given the low levels of determinands noted during the chemical laboratory testing, it was considered that no remediation was required within the soils for the end users of the site.

Asbestos

No asbestos has been identified during the testing, however, an **Asbestos Management Strategy** should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination. An asbestos survey should be carried out for any existing building prior to work or demolition.

7.3.3. Water Supply Pipe Risk Assessment

As part of the proposed development it is expected that new water supply pipes will be installed at the site. Water supply pipes have the potential to be exposed to contaminants in the ground that can

lead to unacceptable concentrations within the drinking water. If a risk is identified, specialist pipes that are protective of the drinking water are required.

A pipe selection risk assessment should be submitted to the water supply company as part of the development based on the supplier's assessment criteria. An indication of whether there is likely to be a risk can be seen tabulated below, where the PE pipe thresholds are based on *UKWIR Contaminated Land Assessment Guidance, 2014*.

Pipe Selection Risk Assessment			
Determinand	PE Pipe Threshold (mg/kg)	Laboratory Analysis Range (mg/kg)	Was the Threshold Exceeded?
Total BTEX and MTBE	0.1	LOD	No
Total VOCs	0.5		N/A
Total SVOCs	2		N/A
Phenols	2	<0.035	No
TPH EC5 – EC10 (aliphatics and aromatics)	2	< 0.01	No
TPH EC10 – EC16 (aliphatics and aromatics)	10	< 1	No
TPH EC16 – EC40 (aliphatics and aromatics)	500	19.8	No
Naphthalene	5	< 0.009	No

The results indicate that no determinands were above the threshold for the use of a PE pipe at the site.

7.4. Controlled Waters Risk Assessment

In the UK, the water environment is protected under a number of regulatory regimes, mainly governed by the Environment Agency. The Environment Agency is consulted when there may be a risk to Controlled Waters, or where a pollution incident has occurred historically. The Water Framework Directive is implemented in various guises covering groundwater, surface water and drinking water supply.

The soil samples analysed as part of the risk assessments in section 4.3 have been used to undertake a Level 1 (soils) Controlled Waters risk assessment. At Level 1 (soils), the conceptual site model and the determinand concentrations of the soils are used to indicate whether the concentrations are sufficient to impact the receptor. At this stage, dilution, dispersion and attenuation along the pathway are not considered.

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary A Aquifer** comprising the bedrock Wittering Formation.

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

A drain was located on the southern portion of the site cutting across the field to the south of the site. Another drain was noted 300m east of the site and the river Hamble was located 1.00km east of the site. The River Hamble was flowing from north to south.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Wittering Sand Formation. Some amounts of

groundwater however may be present at shallower depths within Made ground and parts of the Wittering Formation. It was considered that groundwater was flowing in a south-easterly direction toward the River Hamble in line with local topography.

During the site investigation, Made Ground was encountered at a maximum depth of 0.70m bgl in WS1, overlying sandy clay of the Wittering Formation to the base of the boreholes (5.45m bgl). Groundwater strikes were recorded at depths of between 0.90 and 1.60m bgl.

Comparison between the soil laboratory analysis and the derived Level 1 (soils) target concentrations indicate that Cadmium, Copper, Nickel, Selenium, Zinc and some TPHs were elevated and have the potential to pose a risk to Controlled Waters. It should be noted that a number of determinands at laboratory limit of detection exceed the target concentration for a Level 1 (soils) risk assessment, most notably PAHs. Where a determinand is identified at the laboratory limit of detection, no further assessment is considered necessary.

Although the site was on a secondary A Aquifer, the ground conditions were mostly cohesive. Leachate generation is not considered significant. Considering the ground conditions, the nearest receptor of concern / compliance point will be a drain was noted 300m east of the site and the river Hamble (located 1.00km east of the site). Given the Level 1 risk assessment does not consider dilution, dispersion or attenuation, it is not expected that the soils on-site represent an unacceptable risk to controlled water receptors. No further action is considered necessary.

The findings of this risk assessment should be agreed with the Environment Agency.

7.5. Ground Gas Risk Assessment

A review of freely available information prior to site works, including landfill registers and previous site investigation works and Phase I desk study, did not identify any source of ground gas on-site or within influencing distance of the site that warranted investigation through ground gas monitoring. The only source of ground gases was anticipated to be limited Made Ground and therefore classified as 'Low risk', where the pragmatic approach to ground gas risk assessment presented within the CL:AIRE research bulletin RB17 and included within Annex D of BS8485:2015+A1:2019 can be considered.

7.5.1. Pragmatic Approach

The alternative approach to ground gas risk assessment considers the uncertainty from the measurement of ground gas concentrations and flow rates in monitoring wells for low-risk sites and removes the need for monitoring. Low risk sites typically comprise:

- Natural soils with high carbonate content (e.g. chalk);
- Natural soils that can produce gases (e.g. alluvium, peat etc.);
- Made Ground between 1.00m to 5.00m, with low organic content; and
- Areas of flooded mine workings, unless a building is to be within 20m of shaft or adit.

The method considers the gas generation potential of the soils from data that is not subject to external influences, for example atmospheric pressure can change the recorded flow and concentrations of ground gas during spot monitoring, or a rising groundwater level can displace ground gases in pore spaces. Determination of the characteristic situation is based on the total organic carbon (TOC) of the

soils, coupled with any organic-rich material identified within the borehole logs, such as wood gravels. TOC is easily analysed by the laboratory and can also be calculated by the equation outlined below.

$$\text{Total Organic Carbon (TOC)} = 0.58 \times \text{Soil Organic Matter (SOM)} = 1.33 \times \text{Degradable Organic Carbon (DOC)}$$

As part of the ground investigation works, fifteen samples were submitted to the laboratory for analysis, which identified TOC to vary between 0.444 and 1.55% in the Made Ground. The trial hole logs identified the gravels within the Made Ground to comprise; flint, brick, tile and bituminous material. Made Ground was identified to a maximum depth between >0.50-0.70m bgl.

7.5.2. Data Quality

A review was made of the quality of the available data for the site, which can be viewed in the table below. CIRIA Report C665 (2007), BS 8485:2015+A1:2019 and BS 8576:2013 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 Understanding	UK Practice	Recommendation
Geological and hydro-geological conditions	The CSM identified the site to be located on limited Made Ground (<0.70m), overlying both permeable and impermeable strata of the Wittering Formation. Groundwater has been encountered at shallow depth during drilling.	CIRA C665 & C659, Wilson and Card (1999) and BS 8485 recommend that geology and hydrogeology be fully understood.	The geological and hydrogeological model is understood to a satisfactory standard. No further action required.
Soil Laboratory Analysis	A dataset of soil analysis from 8No. samples have identified a range of TOC concentrations between 0.444% and 1.55%.	CL:AIRE RB17 outlines an approach to ground gas risk assessment away from the influences that directly affect ground gas monitoring. It should typically be used on sites with limited sources identified in the CSM and Made Ground with average thickness <3m and maximum thickness <5m. TOC should be < 4%.	The TOC concentrations are below the limit of 6% in order to use the soil derived approach for the risk assessment. No further action required.

7.5.3. Risk Assessment

The intrusive investigation has revealed a maximum thickness of Made Ground of 0.70m overlying the Wittering Formation comprising cohesive soils. Site has undergone a previous phase of construction and limited degradable material has been identified. The introduction of oxygen to the Made Ground through redevelopment may lead to an initial increase of ground gas generation as degradable material within the soils present on-site may act as source of ground gas. The soils at the site are considered to be of variable permeability (low to high) in nature and pathways for ground gas migration will be present.

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 between 3 and 6 % warrants classification as a Characteristic Situation CS3. Any value over 6% requires investigation through ground gas monitoring. Any site with Made Ground <1.00m in

thickness will have a limited gas generation potential from the organic carbon present and consideration should be given to this thickness within the risk assessment.

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 8No. samples with the analytical results ranging between 0.444 and 1.55%. Furthermore, it is considered that a thickness of <0.80m would not generate sufficient ground gas to pose an unacceptable risk.

Based on the soil derived method outlined and the maximum TOC concentration encountered, the soils from site would warrant classification as **Characteristic Situation CS1**. It should be noted that this only represents the assessment from an on-site source.

7.5.4. Ground Gas Risk Assessment Summary

One method of ground gas risk assessment have been applied to the site, comprising a review of soil derived assessments.

A soil derived approach has identified soils of the Made Ground to 0.70m thick and have a maximum TOC of 1.55%. These concentrations and in line with the guidance of CL:AIRE, was not considered to pose an unacceptable ground gas risk at the site and warrant classification of **Characteristic Situation CS1**.

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.

7.6. Updated Conceptual Site Model

Following completion of Site Investigation, the CSM, inclusive of associated risk, within Section 7.1 of this report was re-evaluated and can be seen overleaf.

For ease of reference and understanding, the risks have been re-assigned within this risk assessment against three possible levels / categories, summarised in the table below.

Risk Categories used in the Tabulated CSM	
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors.
Moderate Risk	Regarding this potential SPR linkage, the site is suitable for the proposed end-use however remediation and/or further investigation is required.
High Risk	Regarding this potential SPR linkage, the site is not suitable for proposed end-use and there is an unacceptable risk to receptors. Urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(On-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/demolition activities: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Low
	- Direct uptake of groundwater - Direct uptake of determinands in the soil	Flora and Fauna Vegetation within soft landscaped areas	Low
	- Anthropogenic (man-made) pathways - Vertical and lateral migration in permeable strata - Surface water runoff	Controlled Waters - Secondary A Aquifer (Wittering Formation) - River Hamble	Low
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	Low
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(Off-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Low
	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Low
Aggressive ground conditions associated with impacted groundwater; - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	Low
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low

7.7. Recommendations and Remediation Strategy

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination. An asbestos survey of existing buildings is required prior to any demolitions / site works.

7.7.1. Water Supply Pipes

The Water Supply pipe risk assessment indicated that the use of PE pipes is appropriate at the site and no further measures are required.

7.7.2. Controlled Waters

It was concluded that there was no risk associated with controlled waters.

7.7.3. Ground Gas and Vapours

Based on risk assessment undertaken, the site warrants classification as **Characteristic Situation CS1**. The risk from vapours was considered to be low due to the very low concentrations of BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE, which are used as marker compounds for Volatile Organic Compounds (VOCs) and the low anticipated risk level.

7.8. Discovery Strategy

There may be areas of contamination that have not been identified during the course of the intrusive investigation. 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.

7.9. Imported Material

It is not envisaged that soils will be brought onto site as part of the development works, however, 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 soil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, prior to placing (ideally) and after placing, to ensure that the future receptors (human health and vegetation) cannot come into contact with compounds that could be detrimental to their health. The compounds that are to be tested for are those given in the Generic Assessment Criteria, which can be viewed in Appendix E of this report.

7.10. Waste Disposal

The excavation of foundations and soils 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 (WM3) document outlines the methodology for classifying wastes. Once classified the waste can be removed to the appropriately licensed facilities, with some waste requiring pre-treatments prior to disposal.

Following the investigation, 10No. were submitted to the analytical laboratory to undergo a suite of testing for contamination testing, as discussed in the previous sections. Sampling depths were chosen to reflect the receptor of concern, human health, and typically comprised a surface or near surface sample and periodically to 1.00m bgl. Any horizon where olfactory or visual evidence of contamination was present was also sampled.

Based on a risk phase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, all soil samples of Made Ground encountered on-site were **NON-HAZARDOUS**. The results of the assessment are given within Appendix F.

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, this method classifies soils as either non-hazardous or hazardous and 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.

In addition to the samples described above, 1No. sample was scheduled to undergo Waste Acceptance Criteria (WAC) testing with single batch leachate. The results indicate that 1No. sample was classified as **inert**. The results can be seen in Appendix D. The locations of these samples can be seen on Figures 6 and 7.

Where contaminated soils are to be removed, they should be placed on an impermeable membrane (visqueen or similar) to ensure that no cross-contamination of soils occurs.

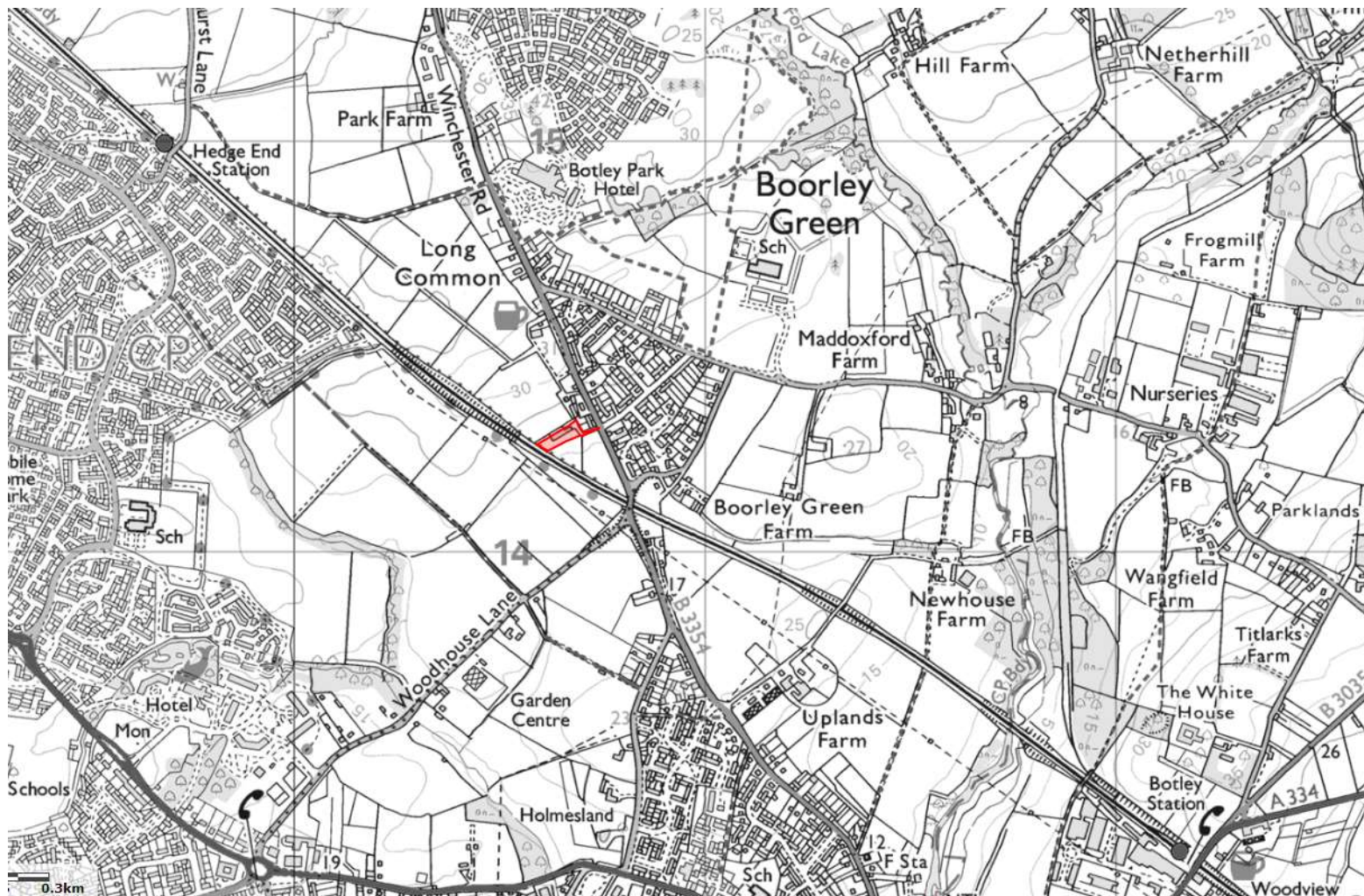
7.11. Duty of Care

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 is 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.

FIGURES



Site Boundary

Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

Doswell Projects Limited

March 2022

Figure 1 – Site Location Plan

GWPR4632





Site Boundary

Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

Doswell Projects Limited

March 2022

Figure 2 – Site Development Area

GWPR4632





◇ Site Boundary

Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

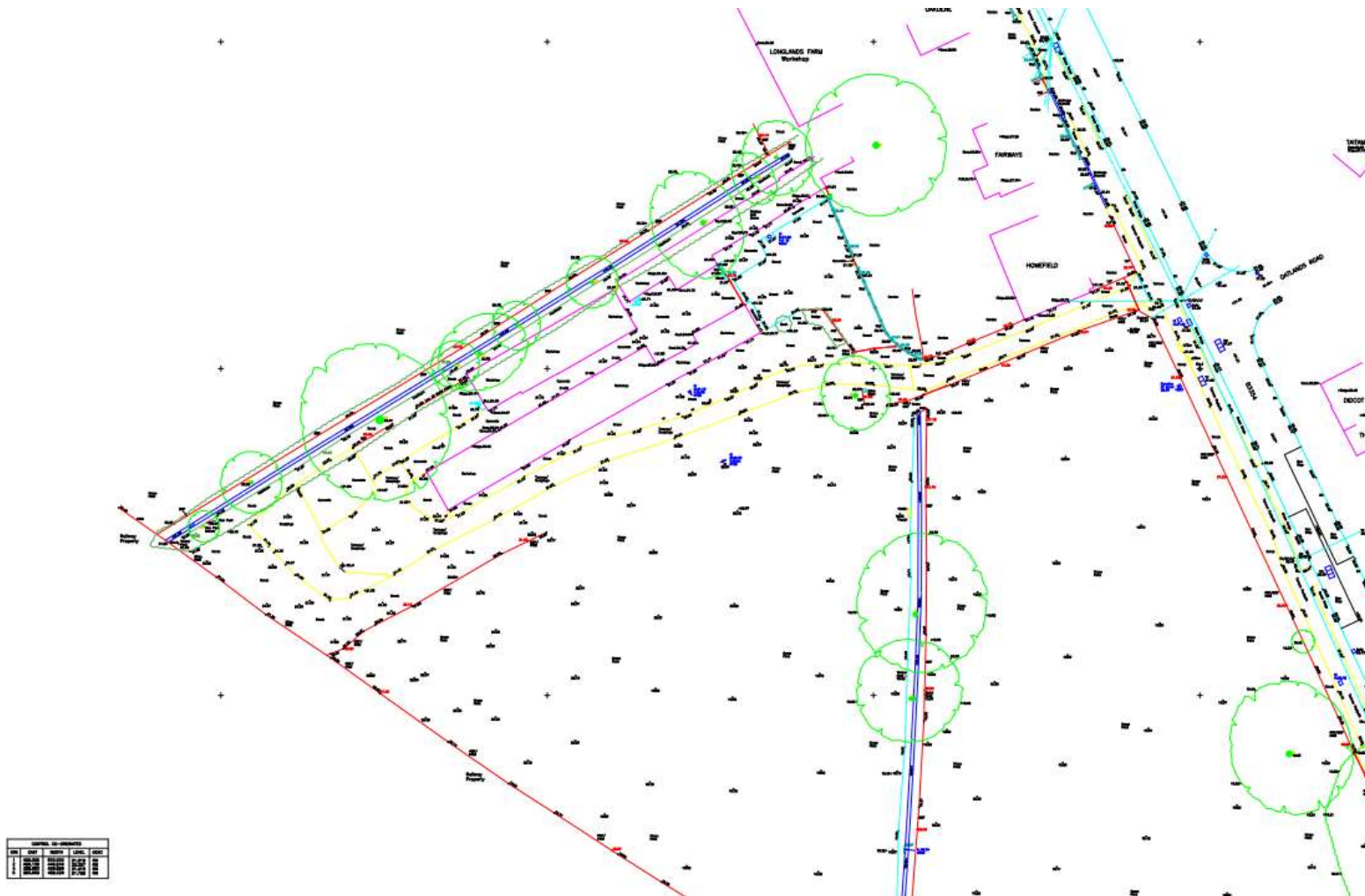
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Figure 3 – Aerial View of the Site

GWPR4632





Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

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Figure 4 – Client Provide Topographical Plan

GWPR4632





Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

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Figure 5 – Client Provide site Development Plan

GWPR4632





Site boundary

WS1-WS3

Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

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Figure 6 – Trial Hole Location Plan

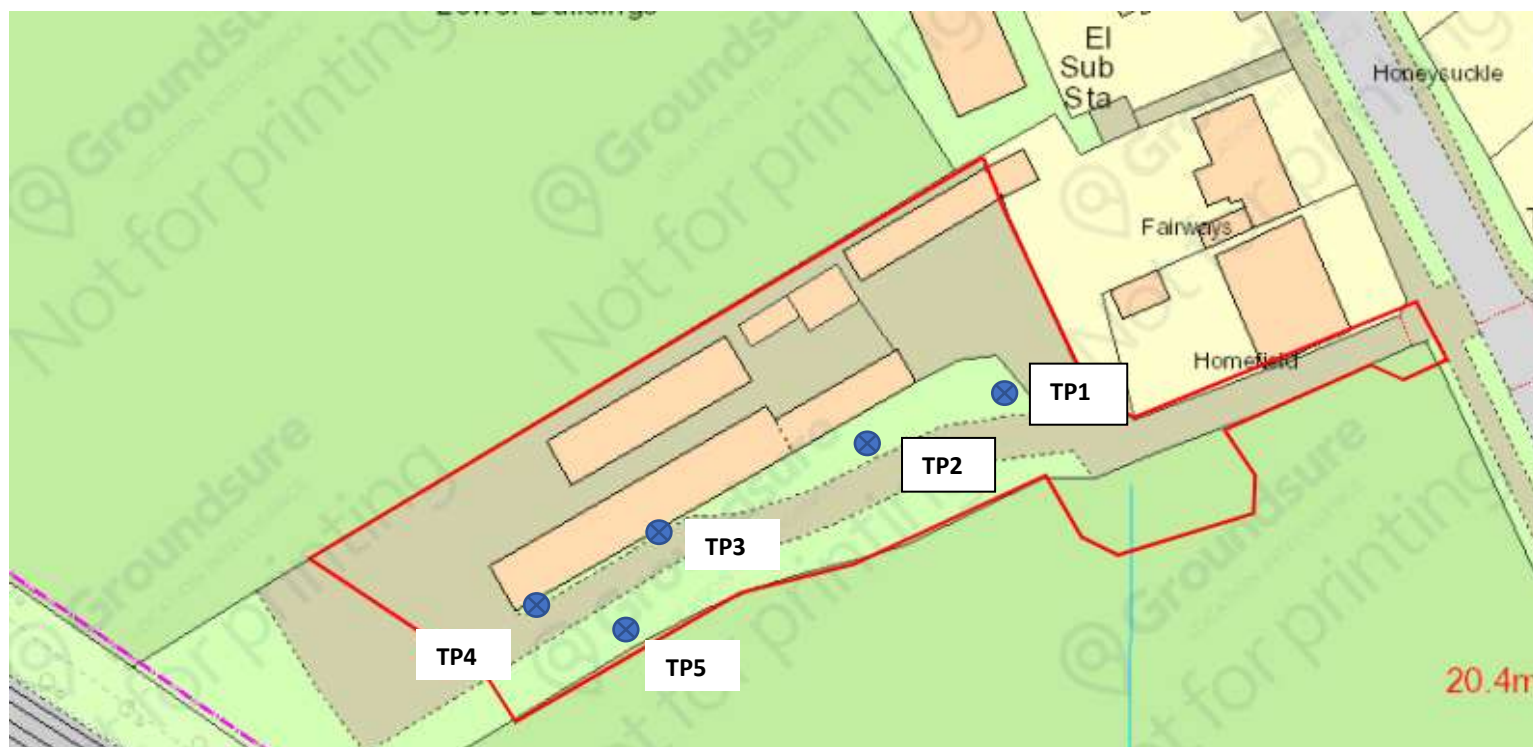
GWPR4632





 Site boundary

 TP1-TP5



Land to the rear of Fairways & Homefield Winchester road, Boorley Green, SO32 2DH

Doswell Projects Limited

March 2022

Figure 7 – Trial Hole Location Plan

GWPR4632



APPENDIX A: Conditions and Limitations

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

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

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

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

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

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

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

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more

common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to Land to the rear of Fairways & Homefield Winchester Road, Boorley Green, SO32 2DH.

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.

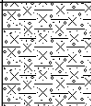
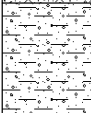
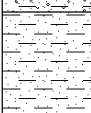
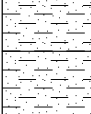
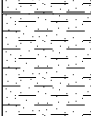
APPENDIX B:

Trial Hole Logs



Percussion Drilling Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 09/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Drilling Equipment:	
Borehole Number WS1	Hole Type WS	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20	D	N=8 (0,0/2,2,2,2)	0.70		MADE GROUND: Grey, brown slightly gravelly sandy clayey SILT. Sand is fine. Gravel is fine to coarse sub-angular of flint. (90%) and brick (10%).	1		
		0.50	D							
		0.80	D							
		1.00	D							
		1.00	SPT							
		1.50	D	N=16 (0,3/4,3,4,5)	1.50			Orange, grey, brown, sandy CLAY. Sand is fine laminations of orange, grey sand. (WITTERING FORMATION).	2	
		2.00	D							
		2.00	SPT							
		2.50	D							
		3.00	D							
		3.00	SPT	N=11 (3,2/2,3,3,3)	3.00				Orange, grey, brown, purple, sandy CLAY. Sand is fine laminations of orange, grey sand. (WITTERING FORMATION).	3
		3.50	D							
		4.00	D							
		4.00	SPT							
		4.50	D							
4.50	D	N=19 (3,4/4,5,5,5)	4.50		Dark grey, off white sandy CLAY/ clayey SAND with rare selenite crystals. Sand is fine. (WITTERING FORMATION).	4				
4.00	D									
4.00	SPT									
4.50	D									
5.00	D									
5.00	SPT	N=19 (2,3/4,5,5,5)	5.45			Dark grey, off white slightly gravelly sandy CLAY/ clayey SAND with rare selenite crystals. Sand is fine. Gravel is fine to medium sub-angular of sandstone. (WITTERING FORMATION).	5			
5.00	D									
5.00	SPT									
		End of Borehole at 5.450m						6		
								7		
								8		
								9		
								10		

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded at 0.90m bgl.
Roots recorded to 1.00m bgl.





Percussion Drilling Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 09/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Drilling Equipment:	
Borehole Number WS2	Hole Type WS	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.60			MADE GROUND: Dark brown grey, gravelly clayey SILT. Gravel is fine to medium sub-angular of brick 20% and flint (80%).	1
		0.50	D						
		0.80	D						
		1.00	D						
		1.50	D	1.50			Mid grey, brown, slightly gravelly sandy CLAY. Sand is fine. Gravel is fine to medium of flint. (WITTERING FORMATION).	2	
		2.00	D						
		2.00	SPT		N=12 (2,2/2,2,3,5)				
		2.50	D						
		3.00	D	3.50			Orange, grey, brown, sandy CLAY. Sand is fine laminations of orange, grey sand. (WITTERING FORMATION).	3	
		3.00	SPT		N=14 (2,2/3,3,4,4)				
		3.50	D						
		4.00	D						
		4.00	SPT	5.45			Dark grey, off white sandy CLAY. Sand is fine. Grey laminations of sand. (wittering formation).	4	
		4.50	D						
		5.00	D						
		5.00	SPT		N=17 (3,3/4,4,4,5)				
		End of Borehole at 5.450m							
								6	
								7	
								8	
								9	
								10	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

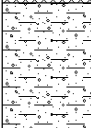
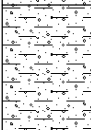
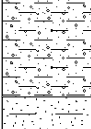
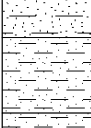
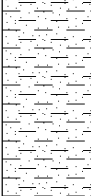
Groundwater recorded at 1.30m bgl.
Roots recorded to 1.00m bgl.





Percussion Drilling Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 09/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Drilling Equipment:	
Borehole Number WS3	Hole Type WS	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.60			MADE GROUND: Dark brown gravelly clayey SILT. Gravel is fine to medium sub-angular of brick (25%) and flint (75%).	1
		0.50	D						
		0.80	D						
		1.00	D						
		1.50	D	N=12 (2,2/2,3,3,4)	1.50			Mid brown, orange, grey, slightly gravelly sandy CLAY. Sand is fine. Gravel is fine sub-angular of flint. (WITTERING FORMATION).	2
		2.00	D						
		2.00	SPT						
		2.50	D	N=16 (2,3/3,4,4,5)	3.00			Orange, grey, slightly gravelly sandy CLAY. Gravel is fine sub-angular of flint. Sand is fine. (WITTERING FORMATION).	3
		3.00	D						
		3.00	SPT						
		3.50	D	N=22 (4,3/5,5,6,6)	3.50			Grey, green, orange, brown, clayey SAND. Sand is fine. Sand is grey laminated. (WITTERING FORMATION).	4
		4.00	D						
		4.00	SPT						
		4.50	D	N=23 (4,4/5,6,6,6)	4.00			Orange, grey, slightly gravelly sandy CLAY. Gravel is fine sub-angular of flint. Sand is fine. (WITTERING FORMATION).	4
		5.00	D						
		5.00	SPT						
					5.45			Light to dark grey off white sandy CLAY. Sand is fine grey and laminated. (WITTERING FORMATION).	5
								End of Borehole at 5.450m	6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks Groundwater recorded at 1.60m bgl. Roots recorded to 1.00m bgl.										
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Trial Pit Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 11/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Equipment:	
Location Number TP1	Location Type TP	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.20			TOPSOIL: Dark brown slightly gravelly slightly sandy CLAY. Sand is fine. Gravel is fine to medium sub-angular of flint.	
		0.50	D		0.50			MADE GROUND: Dark brown, slightly gravelly slightly sandy CLAY. Sand is fine. Gravel is fine to medium sub-angular of brick (10%), bituminous material (10%) flint (80%).	
								End of Borehole at 0.500m	
									1
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 0.50m bgl.





Trial Pit Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 11/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Equipment:	
Location Number TP2	Location Type TP	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.25			MADE GROUND: Dark brown, grey, slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-angular of brick (10%) and flint (90%).	1
		0.50	D		0.50			MADE GROUND: Mottled dark, grey, brown, orange, slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-angular of brick (10%), bituminous material (90%). End of Borehole at 0.500m	
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks No Groundwater recorded. Roots recorded to 0.50m bgl.							
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Trial Pit Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 11/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Equipment:	
Location Number TP3	Location Type TP	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.25			MADE GROUND: Dark grey, brown, slightly gravelly silty CLAY. Gravel is fine to medium sub-angular to sub-round of brick (5%), bituminous material (20%) and flint (75%).	1
		0.50	D		0.50			MADE GROUND: Light to mid grey and brown, slightly gravelly silty CLAY. Gravel is fine to medium sub-angular of flint (60%) and bituminous material (40%). End of Borehole at 0.500m	
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks	
No Groundwater recorded. Roots recorded to 0.50m bgl.	

Trial Pit Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road
--

Client: Doswell Projects Limited

Date: 11/02/2022

Location: Boorley Green, SO32 2DH

Contractor: Ground and Water

Project No. : GWPR4632

Crew Name:

Equipment:

Location Number
TP4

Location Type
TP

Level

Logged By

Scale
1:25

Page Number
Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.25			MADE GROUND: Mid brown, grey slightly gravelly silty CLAY. Gravel is sub-angular fine to medium of concrete (10%), tile (10%) and flint (80%).	1
		0.50	D				MADE GROUND: Grey, brown, black slightly gravelly silty CLAY. Gravel is fine to medium sub-angular of flint (65%) and bituminous material (35%).		
		End of Borehole at 0.500m							
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 0.50m bgl.





Trial Pit Log

Project Name: Land to the rear of Fairways & Homefield Winchester Road		Client: Doswell Projects Limited		Date: 11/02/2022	
Location: Boorley Green, SO32 2DH		Contractor: Ground and Water			
Project No. : GWPR4632		Crew Name:		Equipment:	
Location Number TP5	Location Type TP	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.20			MADE GROUND: Dark brown grey, gravelly silty CLAY. Gravel is fine to medium of flint. Organic matter including tree roots and bark.	
		0.50	D		0.50			MADE GROUND: Dark grey, dark brown, gravelly silty CLAY. Gravel is fine to coarse sub-angular of flint (80%) and bituminous material (20%).	
								End of Borehole at 0.500m	
									1
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 0.50m bgl.



APPENDIX C:

Geotechnical Laboratory Testing



Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 58099

Client Ref: **GWPR4632**

Report Date: **17-02-2022**

Client PO: **GWPR4632**

Client **Ground and Water Limited**
Unit 2, The Long Barn,
Norton Farm,
Selbourne Road,
Alton,
Hampshire
GU34 3NB

Contract Title: **Land to the rear of Fairways & Homefield Winchester Road, Boorley Green, SO32 4JH**
For the attention of: **Alex Stratford**

Date Received: **14-02-2022**

Date Completed: **17-02-2022**

Test Description	Qty
Samples Received - @ Non Accredited Test	6
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	5
1 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.4 & 5.3 - * UKAS	5
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

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.

Approved Signatories:

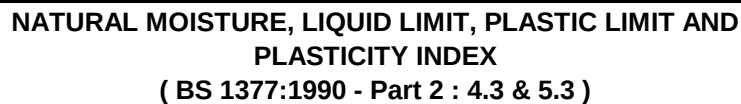
Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)

Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk



Contract Number

58099

Site Name

Land to the rear of Fairways & Homefield Winchester Road, Boorley Green, SO32 2DH

Date Tested

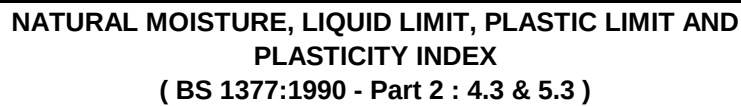
15/02/2022

DESCRIPTIONS

[illegible]

Operators	Checked	17/02/2022	Richard John (Advanced Testing Manager)
Jason Smith	Approved	17/02/2022	Paul Evans (Quality/Technical Manager)





APPENDIX D:

Chemical

Laboratory Testing



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	21 February 2022
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	220211-95
Your Reference:	Winchester Road, Boorley Green
Location:	Hampshire, SO32 2DH
Report No:	634308
Order Number:	GWPR4632

We received 9 samples on Friday February 11, 2022 and 9 of these samples were scheduled for analysis which was completed on Monday February 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

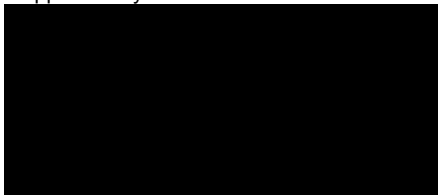
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95 **Report Number:** 634308 **Superseded Report:**
Client Ref.: Winchester Road, Boorley Green **Location:** Hampshire, SO32 2DH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25803736	WS1		0.20 - 0.20	09/02/2022
25803750	WS1		0.50 - 0.50	09/02/2022
25803757	WS1		1.00 - 1.00	09/02/2022
25803759	WS2		0.20 - 0.20	09/02/2022
25803767	WS2		0.50 - 0.50	09/02/2022
25803770	WS2		1.50 - 1.50	09/02/2022
25803772	WS3		0.20 - 0.20	09/02/2022
25803783	WS3		0.50 - 0.50	09/02/2022
25803788	WS3		2.50 - 2.50	09/02/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95

Report Number: 634308

Superseded Report:

Client Ref.: Winchester Road, Boorley Green

Location: Hampshire, SO32 2DH

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	25803783	25803772	25803770	25803767	25803759	25803757	25803750	25803736
						WS3	WS3	WS2	WS2	WS2	WS1	WS1	WS1
Sample Type						60g VOC (ALE215)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)
						S	S	S	S	S	S	S	S
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6											
Loss on Ignition in soils	All	NDPs: 0 Tests: 1											
Magnesium (BRE)	All	NDPs: 0 Tests: 2											
Mercury Dissolved	All	NDPs: 0 Tests: 1											
Metals in solid samples by OES	All	NDPs: 0 Tests: 6											
NO3, NO2 and TON by KONE (s)	All	NDPs: 0 Tests: 2											
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 1											
PAH by GCMS	All	NDPs: 0 Tests: 6											
PCBs by GCMS	All	NDPs: 0 Tests: 1											
pH	All	NDPs: 0 Tests: 9											
Phenols by HPLC (S)	All	NDPs: 0 Tests: 6											
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1											
Sample description	All	NDPs: 0 Tests: 9											
Total Dissolved Solids	All	NDPs: 0 Tests: 1											
Total Organic Carbon	All	NDPs: 0 Tests: 6											



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95

Report Number: 634308

Superseded Report:

Client Ref.: Winchester Road, Boorley Green

Location: Hampshire, SO32 2DH

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type										
						60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)
25803783	WS3		0.50 - 0.50	60g VOC (ALE215)	S										
25803772	WS3		0.20 - 0.20	60g VOC (ALE215)	S										
25803770	WS2		1.50 - 1.50	1kg TUB with Handle (ALE260)	S										
25803767	WS2		0.50 - 0.50	250g Amber Jar (ALE210)	S										
25803759	WS2		0.20 - 0.20	1kg TUB with Handle (ALE260)	S										
25803757	WS1		1.00 - 1.00	250g Amber Jar (ALE210)	S										
25803750	WS1		0.50 - 0.50	1kg TUB with Handle (ALE260)	S										
25803736	WS1		0.20 - 0.20	60g VOC (ALE215)	S										
						1kg Cardboard Container	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	60g VOC (ALE215)
						S	S	S	S	S	S	S	S	S	S
Total Sulphate	All	NDPs: 0 Tests: 2													
Total Sulphur	All	NDPs: 0 Tests: 2													
TPH CWG GC (S)	All	NDPs: 0 Tests: 5													
VOC MS (S)	All	NDPs: 0 Tests: 5													

25603788	WS3		2.50 - 2.50	1kg TUB with Handle (ALE260)	S	X	X			
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CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
25803736	WS1	0.20 - 0.20	Dark Brown	Loamy Sand	Stones	Vegetation
25803750	WS1	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	Vegetation
25803757	WS1	1.00 - 1.00	Light Brown	Sandy Clay	None	Stones
25803759	WS2	0.20 - 0.20	Dark Brown	Loamy Sand	Stones	Vegetation
25803767	WS2	0.50 - 0.50	Dark Brown	Silt Loam	Stones	Vegetation
25803770	WS2	1.50 - 1.50	Grey	Silt Loam	Stones	Vegetation
25803772	WS3	0.20 - 0.20	Dark Brown	Loamy Sand	Crushed Brick	Stones
25803783	WS3	0.50 - 0.50	Dark Brown	Loamy Sand	Crushed Brick	Tile/Insulation Board
25803788	WS3	2.50 - 2.50	Light Brown	Silty Clay Loam	None	Stones

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Results Legend			Customer Sample Ref.		WS1	WS1	WS1	WS2	WS2	WS2
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.20 - 0.20 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803736	0.50 - 0.50 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803750	1.00 - 1.00 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803757	0.20 - 0.20 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803759	0.50 - 0.50 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803767	1.50 - 1.50 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803770
Component	LOD/Units	Method								
Moisture Content Ratio (% of as received sample)	%	PM024	11	12	25	21	19	27		
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 M	<0.01 M		<0.01 M	<0.01 M			
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 M	<0.01 M		<0.01 M	<0.01 M			
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 M	<0.015 M		<0.015 M	<0.015 M			
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 M	<0.035 M		<0.035 M	<0.035 M			
Organic Carbon, Total	<0.2 %	TM132	0.444 M	0.472 M		1.55 M	1.15 M			
Sulphur, Total	<0.02 %	TM132			<0.02					
Soil Organic Matter (SOM)	<0.35 %	TM132	0.765 #	0.814 #		2.67 #	1.98 #			
pH	1 pH Units	TM133	7.59 M	7.39 M	7.6 M	7.66 M	7.26 M	7.2 M		
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #		<0.6 #	<0.6 #			
Cyanide, Total	<1 mg/kg	TM153	<1 M	<1 M		<1 M	<1 M			
Arsenic	<0.6 mg/kg	TM181	5.52 M	6.24 M		6.4 M	7.21 M			
Cadmium	<0.02 mg/kg	TM181	0.114 M	0.187 M		0.178 M	0.127 M			
Chromium	<0.9 mg/kg	TM181	9.16 M	9.65 M		11.3 M	9.95 M			
Copper	<1.4 mg/kg	TM181	4.07 M	5.83 M		15.5 M	13.9 M			
Lead	<0.7 mg/kg	TM181	20.3 M	21.9 M		44.1 M	133 M			
Mercury	<0.1 mg/kg	TM181	<0.1 M	<0.1 M		<0.1 M	<0.1 M			
Nickel	<0.2 mg/kg	TM181	6.72 M	7.15 M		6.52 M	5.47 M			
Selenium	<1 mg/kg	TM181	1.59 #	1.52 #		<1 #	<1 #			
Vanadium	<0.2 mg/kg	TM181	23 #	24.3 #		27.7 #	26.3 #			
Zinc	<1.9 mg/kg	TM181	36.8 M	37 M		97.2 M	59.3 M			
Sulphate, acid soluble (total)	<0.02 %	TM221			<0.02					
Boron, water soluble	<1 mg/kg	TM222	<1 M	<1 M		1.01 M	<1 M			
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243	0.0231 M	0.0299 M		<0.004 M	0.0404 M	0.0215 M		
Soluble Sulphate 2:1 extract as SO4 BRE	<0.004 g/l	TM243			0.0185 M					
Chloride 2:1 water/soil extract BRE	<0.0025 g/l	TM243			0.014 M					
Nitrate as NO3, 2:1 water soluble (BRE)	<0.0003 g/l	TM243			0.0109					
Ammoniacal N as NH4 in 2:1 extract BRE	<0.0003 g/l	TM248			0.00239					
Magnesium (BRE)	<0.008 g/l	TM282			0.0143					



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Results Legend			Customer Sample Ref.			WS3			WS3			WS3					
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference			0.20 - 0.20 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803772			0.50 - 0.50 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803783			2.50 - 2.50 Soil/Solid (S) 09/02/2022 11/02/2022 220211-95 25803788					
Component	LOD/Units	Method															
Moisture Content Ratio (% of as received sample)	%	PM024	15			14			28								
Loss on ignition	<0.7 %	TM018	4.65														
Phenol	<0.01 mg/kg	TM062 (S)	<0.01			<0.01											
Cresols	<0.01 mg/kg	TM062 (S)	<0.01			<0.01											
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015			<0.015											
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035			<0.035											
Organic Carbon, Total	<0.2 %	TM132	1.38			1.34											
Sulphur, Total	<0.02 %	TM132							<0.02								
Soil Organic Matter (SOM)	<0.35 %	TM132	2.38			2.31											
pH	1 pH Units	TM133	8.45			8.17			7.41								
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6			<0.6											
Cyanide, Total	<1 mg/kg	TM153	<1			<1											
PCB congener 28	<0.003 mg/kg	TM168	<0.003														
PCB congener 52	<0.003 mg/kg	TM168	<0.003														
PCB congener 101	<0.003 mg/kg	TM168	<0.003														
PCB congener 118	<0.003 mg/kg	TM168	<0.003														
PCB congener 138	<0.003 mg/kg	TM168	<0.003														
PCB congener 153	<0.003 mg/kg	TM168	<0.003														
PCB congener 180	<0.003 mg/kg	TM168	<0.003														
Sum of detected PCB 7 Congeners	<0.021 mg/kg	TM168	<0.021														
Arsenic	<0.6 mg/kg	TM181	5.65			6.53											
Cadmium	<0.02 mg/kg	TM181	0.219			0.269											
Chromium	<0.9 mg/kg	TM181	10.2			8.99											
Copper	<1.4 mg/kg	TM181	16			15.1											
Lead	<0.7 mg/kg	TM181	38.5			43.2											
Mercury	<0.1 mg/kg	TM181	<0.1			<0.1											
Nickel	<0.2 mg/kg	TM181	6.05			5.33											
Selenium	<1 mg/kg	TM181	<1			<1											
Vanadium	<0.2 mg/kg	TM181	21.5			18											
Zinc	<1.9 mg/kg	TM181	52.4			69.4											
ANC @ pH 4	<0.03 mol/kg	TM182	0.062														
ANC @ pH 6	<0.03 mol/kg	TM182	<0.03														
Sulphate, acid soluble (total)	<0.02 %	TM221							0.0229								



CERTIFICATE OF ANALYSIS

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SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Results Legend			Customer Sample Ref.	WS3	WS3	WS3			
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component		LOD/Units	Method						
Boron, water soluble		<1 mg/kg	TM222	<1	M	<1	M		
Water Soluble Sulphate as SO4 2:1 Extract		<0.004 g/l	TM243	<0.004	M	<0.004	M		
Soluble Sulphate 2:1 extract as SO4 BRE		<0.004 g/l	TM243			0.0787	M		
Chloride 2:1 water/soil extract BRE		<0.0025 g/l	TM243			0.0142	M		
Nitrate as NO3, 2:1 water soluble (BRE)		<0.0003 g/l	TM243			0.000791			
Ammoniacal N as NH4 in 2:1 extract BRE		<0.0003 g/l	TM248			0.00173			
Magnesium (BRE)		<0.008 g/l	TM282			0.00851			
PAH Total 17 (inc Coronene) Moisture Corrected		<10 mg/kg	TM410	<10					
Coronene		<0.2 mg/kg	TM410	<0.2					
EPH Surrogate % recovery**		%	TM415	104					
Mineral Oil >C10-C40 (EH_2D_AL)		<5 mg/kg	TM415	11.8					



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERIS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*%\$@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS1 0.20 - 0.20 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803736 TM048	18/02/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS1 0.50 - 0.50 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803750 TM048	18/02/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS2 0.20 - 0.20 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803759 TM048	18/02/2022	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS2 0.50 - 0.50 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803767 TM048	18/02/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS3 0.20 - 0.20 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803772 TM048	18/02/2022	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	WS3 0.50 - 0.50 SOLID 09/02/2022 00:00:00 11/02/2022 05:00:00 220211-95 25803783 TM048	18/02/2022	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference

Mass Sample taken (kg) 0.109

Mass of dry sample (kg) 0.090

Particle Size <4mm >95%

Site Location

Hampshire, SO32 2DH

Natural Moisture Content (%) 20.9

Dry Matter Content (%) 82.7

Case

SDG 220211-95

Lab Sample Number(s) 25803772

Sampled Date 09-Feb-2022

Customer Sample Ref. WS3

Depth (m) 0.20 - 0.20

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis

Result

Total Organic Carbon (%) 1.38

Loss on Ignition (%) 4.65

Sum of BTEX (mg/kg) <0.04

Sum of 7 PCBs (mg/kg) <0.021

Mineral Oil (mg/kg) (EH_2D_AL) 11.8

PAH Sum of 17 (mg/kg) <10

pH (pH Units) 8.45

ANC to pH 6 (mol/kg) <0.03

ANC to pH 4 (mol/kg) 0.062

Eluate Analysis

C₂

Concⁿ in 10:1 eluate (mg/l)

A₂

10:1 concⁿ leached (mg/kg)Limit values for compliance leaching test
using BS EN 12457-3 at L/S 10 l/kg

	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00149	<0.0005	0.0149	<0.005	0.5	2	25
Barium	0.0818	<0.0002	0.818	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00104	<0.0003	0.0104	<0.003	2	50	100
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000596	<0.0004	0.00596	<0.004	0.4	10	40
Lead	0.000966	<0.0002	0.00966	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.0127	<0.001	0.127	<0.01	4	50	200
Chloride	3	<2	30	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	115	<5	1150	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	9.99	<3	99.9	<30	500	800	1000

Leach Test Information

Date Prepared 12-Feb-2022
pH (pH Units) 8.07
Conductivity (µS/cm) 159.00
Temperature (°C) 19.20
Volume Leachant (Litres) 0.882

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

21/02/2022 09:43:08

09:42:37 21/02/2022



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid Extractable Sulphate in Soils by ICP OES
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:Soil) by ICP OES.
TM243		Mixed Anions In Soils By Kone
TM248	In-House Method	Determination of Ammonium BRE (2:1 Extract) on solids
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM282		Extraction of Magnesium by BRE Method
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Analysis of Petroleum Hydrocarbons in Environmental Media.	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220211-95
Client Ref.: Winchester Road, Boorley Green

Report Number: 634308
Location: Hampshire, SO32 2DH

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	25803736	25803750	25803757	25803759	25803767	25803770	25803772	25803783	25803788
	WS1	WS1	WS1	WS2	WS2	WS2	WS3	WS3	WS3
	0.20 - 0.20	0.50 - 0.50	1.00 - 1.00	0.20 - 0.20	0.50 - 0.50	1.50 - 1.50	0.20 - 0.20	0.50 - 0.50	2.50 - 2.50
	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Ammoniacal N as NH4 in 2:1 extract			18-Feb-2022						18-Feb-2022
ANC at pH4 and ANC at pH 6							17-Feb-2022		
Anions by Kone (soil)	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022	17-Feb-2022
Anions by Kone (w)							16-Feb-2022		
Asbestos ID in Solid Samples	18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022	
Boron Water Soluble	17-Feb-2022	16-Feb-2022		17-Feb-2022	16-Feb-2022		16-Feb-2022	16-Feb-2022	
CEN 10:1 Leachate (1 Stage)							12-Feb-2022		
CEN Readings							17-Feb-2022		
Coronene							15-Feb-2022		
Cyanide Comp/Free/Total/Thiocyanate	18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022	
Dissolved Metals by ICP-MS							15-Feb-2022		
Dissolved Organic/Inorganic Carbon							21-Feb-2022		
EPH by GCxGC-FID							16-Feb-2022		
EPH CWG GC (S)	15-Feb-2022	15-Feb-2022		16-Feb-2022			15-Feb-2022	15-Feb-2022	
Fluoride							17-Feb-2022		
GRO by GC-FID (S)	18-Feb-2022	18-Feb-2022		18-Feb-2022			18-Feb-2022	18-Feb-2022	
Hexavalent Chromium (s)	16-Feb-2022	16-Feb-2022		18-Feb-2022	16-Feb-2022		16-Feb-2022	16-Feb-2022	
Loss on Ignition in soils							17-Feb-2022		
Magnesium (BRE)			17-Feb-2022						17-Feb-2022
Mercury Dissolved							16-Feb-2022		
Metals in solid samples by OES	17-Feb-2022	18-Feb-2022		17-Feb-2022	17-Feb-2022		18-Feb-2022	17-Feb-2022	
Moisture at 105C							12-Feb-2022		
NO3, NO2 and TON by KONE (s)			17-Feb-2022						17-Feb-2022
PAH 16 & 17 Calc							15-Feb-2022		
PAH by GCMS	15-Feb-2022	15-Feb-2022		15-Feb-2022	15-Feb-2022		15-Feb-2022	15-Feb-2022	
PCBs by GCMS							15-Feb-2022		
pH	16-Feb-2022	16-Feb-2022	15-Feb-2022	16-Feb-2022	16-Feb-2022	15-Feb-2022	16-Feb-2022	16-Feb-2022	15-Feb-2022
Phenols by HPLC (S)	17-Feb-2022	18-Feb-2022		17-Feb-2022	17-Feb-2022		18-Feb-2022	17-Feb-2022	
Phenols by HPLC (W)							17-Feb-2022		
Sample description	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022
Total Dissolved Solids							16-Feb-2022		
Total Organic Carbon	18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022		18-Feb-2022	18-Feb-2022	
Total Sulphate			17-Feb-2022						17-Feb-2022
Total Sulphur			17-Feb-2022						17-Feb-2022
TPH CWG GC (S)	18-Feb-2022	18-Feb-2022		18-Feb-2022			18-Feb-2022	18-Feb-2022	
VOC MS (S)	17-Feb-2022	17-Feb-2022		17-Feb-2022			17-Feb-2022	17-Feb-2022	



CERTIFICATE OF ANALYSIS

SDG:	220211-95	Client Reference:	Winchester Road, Boorley	Report Number:	634308
Location:	Hampshire, SO32 2DH	Order Number:	GWPR4632	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	23 February 2022
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	220216-156
Your Reference:	Winchester Road, Boorley Green
Location:	Hampshire, SO32 2DH
Report No:	634748
Order Number:	GWPR4632

We received 9 samples on Wednesday February 16, 2022 and 9 of these samples were scheduled for analysis which was completed on Wednesday February 23, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

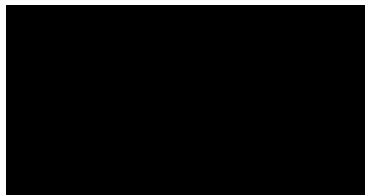
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220216-156
Client Ref.: Winchester Road, Boorley Green

Report Number: 634748
Location: Hampshire, SO32 2DH

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25831698	TP1		0.20 - 0.20	11/02/2022
25831700	TP1		0.50 - 0.50	11/02/2022
25831704	TP2		0.20 - 0.20	11/02/2022
25831706	TP2		0.50 - 0.50	11/02/2022
25831710	TP3		0.20 - 0.20	11/02/2022
25831722	TP3		0.50 - 0.50	11/02/2022
25831714	TP4		0.20 - 0.20	11/02/2022
25831716	TP4		0.50 - 0.50	11/02/2022
25831720	TP5		0.20 - 0.20	11/02/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220216-156

Report Number: 634748

Superseded Report:

Client Ref.: Winchester Road, Boorley Green

Location: Hampshire, SO32 2DH

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

			25631698		25631700	25631704		25631706		25631710	25631722	25631714		25631716	25631720
						TP2		TP2		TP3	TP3	TP4		TP4	TP5
			0.20 - 0.20		0.50 - 0.50	0.20 - 0.20		0.50 - 0.50		0.20 - 0.20	0.50 - 0.50	0.20 - 0.20		0.50 - 0.50	0.20 - 0.20
			Handle (ALE260)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)
			S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (soil)	All	NDPs: 0 Tests: 2			X			X							
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 7	X	X		X	X				X	X			X
Boron Water Soluble	All	NDPs: 0 Tests: 2			X			X							
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 2			X			X							
EPH CWG GC (S)	All	NDPs: 0 Tests: 3						X		X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3							X		X				X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 2			X			X							
Metals in solid samples by OES	All	NDPs: 0 Tests: 2			X			X							
PAH by GCMS	All	NDPs: 0 Tests: 2			X			X							
pH	All	NDPs: 0 Tests: 2			X			X							
Phenols by HPLC (S)	All	NDPs: 0 Tests: 2			X			X							
Sample description	All	NDPs: 0 Tests: 4			X			X		X			X		
Total Organic Carbon	All	NDPs: 0 Tests: 2			X			X							
TPH CWG GC (S)	All	NDPs: 0 Tests: 3						X		X			X		
VOC MS (S)	All	NDPs: 0 Tests: 3							X		X				X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220216-156
Client Ref.: Winchester Road, Boorley Green

Report Number: 634748
Location: Hampshire, SO32 2DH

Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
25831700	TP1	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	Vegetation
25831706	TP2	0.50 - 0.50	Light Brown	Sandy Clay Loam	Stones	None
25831710	TP3	0.20 - 0.20	Dark Brown	Loamy Sand	Vegetation	Plastic
25831716	TP4	0.50 - 0.50	Dark Brown	Sandy Clay	Vegetation	Stones

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220216-156
Client Ref.: Winchester Road, Boorley Green

Report Number: 634748
Location: Hampshire, SO32 2DH

Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERES accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*\$@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP1 0.20 - 0.20 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831698 TM048	23/02/2022	Joanne Furnivall	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP1 0.50 - 0.50 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831700 TM048	22/02/2022	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP2 0.20 - 0.20 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831704 TM048	22/02/2022	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP2 0.50 - 0.50 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831706 TM048	22/02/2022	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP3 0.50 - 0.50 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831722 TM048	23/02/2022	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP4 0.20 - 0.20 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831714 TM048	23/02/2022	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP5 0.20 - 0.20 SOLID 11/02/2022 00:00:00 16/02/2022 05:00:00 220216-156 25831720 TM048	22/02/2022	Paul Poynton	N/A	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

SDG: 220216-156
Client Ref.: Winchester Road, Boorley Green**Report Number:** 634748
Location: Hampshire, SO32 2DH**Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:Soil) by ICP OES.
TM243		Mixed Anions In Soils By Kone
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220216-156
Client Ref.: Winchester Road, Boorley Green

Report Number: 634748
Location: Hampshire, SO32 2DH

Superseded Report:

Test Completion Dates

Lab Sample No(s)	25831698	25831700	25831704	25831706	25831710	25831722	25831714	25831716	25831720
Customer Sample Ref.	TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP4	TP5
AGS Ref.									
Depth	0.20 - 0.20	0.50 - 0.50	0.20 - 0.20	0.50 - 0.50	0.20 - 0.20	0.50 - 0.50	0.20 - 0.20	0.50 - 0.50	0.20 - 0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)		21-Feb-2022		21-Feb-2022					
Asbestos ID in Solid Samples	23-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022		23-Feb-2022	23-Feb-2022		22-Feb-2022
Boron Water Soluble		21-Feb-2022		21-Feb-2022					
Cyanide Comp/Free/Total/Thiocyanate		22-Feb-2022		22-Feb-2022					
EPH CWG GC (S)				21-Feb-2022	21-Feb-2022			22-Feb-2022	
GRO by GC-FID (S)				22-Feb-2022	22-Feb-2022			22-Feb-2022	
Hexavalent Chromium (s)		19-Feb-2022		19-Feb-2022					
Metals in solid samples by OES		22-Feb-2022		22-Feb-2022					
PAH by GCMS		19-Feb-2022		22-Feb-2022					
pH		22-Feb-2022		22-Feb-2022					
Phenols by HPLC (S)		21-Feb-2022		21-Feb-2022					
Sample description		17-Feb-2022		17-Feb-2022	17-Feb-2022			19-Feb-2022	
Total Organic Carbon		22-Feb-2022		22-Feb-2022					
TPH CWG GC (S)				22-Feb-2022	22-Feb-2022			22-Feb-2022	
VOC MS (S)				22-Feb-2022	22-Feb-2022			22-Feb-2022	



CERTIFICATE OF ANALYSIS

SDG:	220216-156	Client Reference:	Winchester Road, Boorley	Report Number:	634748
Location:	Hampshire, SO32 2DH	Order Number:	GWPR4632	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX E:

Soil

Assessment

Ground and Water Limited

Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

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; and
- 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.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. 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)).

1.1.2. 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.

1.1.3. 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).

2. 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

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (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 S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

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.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

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

2.2.1. 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.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visits 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.

3. 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.

4. 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, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

- Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
- Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

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

- | |
|---|
| <ul style="list-style-type: none">▪ Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.▪ Developing more accurate parameters using site data. |
|---|

7. Phytotoxicity

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

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

8. 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.

CL:AIRE published guidance in 2020, *Guidance in comparing soil contamination data with a critical concentration*, superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

- Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
- The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
- The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
- The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
- The sample locations are all taken from one population (i.e. the same material);
- Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
- The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

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.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
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	220
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	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values	
Copper	250mg/kg
Zinc	1000mg/kg
Notes: Phytotoxicity Recommendations – ICRL 70/90 <i>Restoration of metalliferous mining areas</i> 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.	

CL:AIRE Soil Generic Assessment Criteria				
Determinand	Residential (mg/kg)	Residential without plant uptake (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	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

SOM = Soil Organic Matter Content (%)

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

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 (1150) sol	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	760 (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

SOM = Soil Organic Matter Content (%)

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.

9.3.3. Total Petroleum Hydrocarbons – Aromatic

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 (%)							
^{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.							

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Acenaphthene	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
Acenaphthylene	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)fluoranthene	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)fluoranthene	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	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Fluoranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	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
Naphthalene	1.0% SOM	2.30	2.6	4.10	190 (76.4) ^{sol}	4,900	1,200(76.4) ^{sol}
	2.5% SOM	5.60	5.6	10	460 (183) ^{sol}	4,900	1,900(183) ^{sol}
	6.0% SOM	13	13	24	1,100 (432) ^{sol}	4,900	3,000
Phenanthrene	1.0% SOM	95	1,300(183) ^{sol}	15	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
SOM = Soil Organic Matter Content (%)							
^{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.							

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
<i>Chloroalkanes & alkenes</i>							
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
<i>Explosives</i>							
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

^{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.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
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
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}
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}
^{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.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Chlorobenzenes (cont.)							
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,- Tetrachlorobenzene	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,- Tetrachlorobenzene	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
Pentachlorobenzene	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
Phenols & Chlorophenols							
BTEX	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
^{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.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		RwHP (mg/kg)	RwoHP (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-Chloronaphthalene	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*
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*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)
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
<i>Cis</i> 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
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- <i>n</i> -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- <i>n</i> -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 <i>tert</i> -butyl ether (MTBE)	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*
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*
<i>Trans</i> 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*

*soil concentration above saturation limit

APPENDIX F:

Hazard Waste Assessment

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



7U4KV-SWPRT-KTMLK

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

GWPR4632

Description/Comments

Project

GWPR4632

Site

Land to the rear of Fairways and Homefield, Winchester Road, Boorley Green SO32 2DH

Classified by

Name:

Emily Murray

Date:

28 Feb 2022 11:11 GMT

Telephone:

0333 600 1221

Company:

Ground and Water

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

-

Course

Hazardous Waste Classification

Date

-

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP1-110222-0.50-0.50		Non Hazardous		2
2	TP2-110222-0.50-0.50		Non Hazardous		4
3	TP3-110222-0.20-0.20		Non Hazardous		7
4	TP4-110222-0.50-0.50		Non Hazardous		8
5	WS1-090222-0.20-0.20		Non Hazardous		9
6	WS1-090222-0.50-0.50		Non Hazardous		12
7	WS2-090222-0.20-0.20		Non Hazardous		15
8	WS2-090222-0.50-0.50		Non Hazardous		18
9	WS3-090222-0.20-0.20		Non Hazardous		20
10	WS3-090222-0.50-0.50		Non Hazardous		23

Related documents

#	Name	Description
1	220211-95_220216-156.hwol	.hwol file used to create the Job
2	Ground and Water V2 PA	waste stream template used to create this Job

Report

Created by: Emily Murray

Created date: 28 Feb 2022 11:11 GMT

Appendices

	Page
Appendix A: Classifier defined and non GB MCL determinands	26
Appendix B: Rationale for selection of metal species	27
Appendix C: Version	28

Classification of sample: TP1-110222-0.50-0.50

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

Sample details

Sample name:	LoW Code:
TP1-110222-0.50-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
15% (no correction)	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 Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7.04 pH		7.04	pH	7.04 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 }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
3	arsenic { arsenic trioxide }				5.1 mg/kg	1.32	6.734	mg/kg	0.000673 %		
	033-003-00-0	215-481-4	1327-53-3								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	0.16 mg/kg	1.285	0.206	mg/kg	0.000016 %		
	048-010-00-4	215-147-8	1306-23-6								
6	copper { dicopper oxide; copper (I) oxide }				13.6 mg/kg	1.126	15.312	mg/kg	0.00153 %		
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	48.2 mg/kg	1.56	75.183	mg/kg	0.00482 %		
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				5.57 mg/kg	1.579	8.798	mg/kg	0.00088 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				22 mg/kg	1.785	39.274	mg/kg	0.00393 %		
	023-001-00-8	215-239-8	1314-62-1								
12	zinc { zinc chromate }				33.3 mg/kg	2.774	92.379	mg/kg	0.00924 %		
	024-007-00-3	236-878-9	13530-65-9								
13	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
14	naphthalene				<0.009 mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
18	phenanthrene	201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
20	fluoranthene	205-912-4	206-44-0		<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		<LOD
21	pyrene	204-927-3	129-00-0		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
22	benzo[a]anthracene	601-033-00-9	200-280-6		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
23	chrysene	601-048-00-0	205-923-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
30	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
31	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		12.6 mg/kg	1.462	18.416 mg/kg	0.00184 %		
Total:								0.0248 %		

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
- ND** Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP2-110222-0.50-0.50

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

Sample details

Sample name:	LoW Code:
TP2-110222-0.50-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
20% (no correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

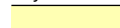
Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				8.06 pH		8.06	pH	8.06 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 }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
3	arsenic { arsenic trioxide }				8.29 mg/kg	1.32	10.945	mg/kg	0.00109 %		
	033-003-00-0	215-481-4	1327-53-3								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	0.198 mg/kg	1.285	0.254	mg/kg	0.0000198 %		
	048-010-00-4	215-147-8	1306-23-6								
6	copper { dicopper oxide; copper (I) oxide }				12.7 mg/kg	1.126	14.299	mg/kg	0.00143 %		
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	34.6 mg/kg	1.56	53.97	mg/kg	0.00346 %		
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				7.81 mg/kg	1.579	12.336	mg/kg	0.00123 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				29.5 mg/kg	1.785	52.663	mg/kg	0.00527 %		
	023-001-00-8	215-239-8	1314-62-1								
12	zinc { zinc chromate }				53.8 mg/kg	2.774	149.249	mg/kg	0.0149 %		
	024-007-00-3	236-878-9	13530-65-9								
13	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
14	naphthalene				<0.009 mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
18	phenanthrene	201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
20	fluoranthene	205-912-4	206-44-0		0.0478 mg/kg		0.0478 mg/kg	0.00000478 %		
21	pyrene	204-927-3	129-00-0		0.0422 mg/kg		0.0422 mg/kg	0.00000422 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.0284 mg/kg		0.0284 mg/kg	0.00000284 %		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.0409 mg/kg		0.0409 mg/kg	0.00000409 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.0672 mg/kg		0.0672 mg/kg	0.00000672 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.0218 mg/kg		0.0218 mg/kg	0.00000218 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.0371 mg/kg		0.0371 mg/kg	0.00000371 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.04 mg/kg		0.04 mg/kg	0.000004 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		0.0419 mg/kg		0.0419 mg/kg	0.00000419 %		
30	benzene	601-020-00-8	200-753-7	71-43-2	<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
31	toluene	601-021-00-3	203-625-9	108-88-3	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
33	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]	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16.6 mg/kg	1.462	24.262 mg/kg	0.00243 %		
Total:								0.0317 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP3-110222-0.20-0.20

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

Sample details

Sample name:	LoW Code:
TP3-110222-0.20-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19% (no correction)	

Hazard properties

None identified

Determinands

Moisture content: **19% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	benzene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	toluene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
3	ethylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
4	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<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]							
5	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
Total:								5.0e-06 %		

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)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: TP4-110222-0.50-0.50



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

Sample details

Sample name:	LoW Code:
TP4-110222-0.50-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
13%	Entry:
(no correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: **13% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	benzene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	toluene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
3	ethylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
4	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<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]							
5	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
Total:								5.0e-06 %		

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)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS1-090222-0.20-0.20

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

Sample details

Sample name:	LoW Code:
WS1-090222-0.20-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11% (no correction)	

Hazard properties

None identified

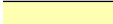
Determinands

Moisture content: **11% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				7.59 pH		7.59 pH	7.59 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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	arsenic { arsenic trioxide }				5.52 mg/kg	1.32	7.288 mg/kg	0.000729 %		
	033-003-00-0	215-481-4	1327-53-3							
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2							
5	cadmium { cadmium sulfide }			1	0.114 mg/kg	1.285	0.147 mg/kg	0.0000114 %		
	048-010-00-4	215-147-8	1306-23-6							
6	copper { dicopper oxide; copper (I) oxide }				4.07 mg/kg	1.126	4.582 mg/kg	0.000458 %		
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead chromate }			1	20.3 mg/kg	1.56	31.664 mg/kg	0.00203 %		
	082-004-00-2	231-846-0	7758-97-6							
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				6.72 mg/kg	1.579	10.614 mg/kg	0.00106 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.59 mg/kg	1.405	2.234 mg/kg	0.000223 %		
	034-002-00-8									
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				23 mg/kg	1.785	41.059 mg/kg	0.00411 %		
	023-001-00-8	215-239-8	1314-62-1							
12	zinc { zinc chromate }				36.8 mg/kg	2.774	102.089 mg/kg	0.0102 %		
	024-007-00-3	236-878-9	13530-65-9							
13	phenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
14	naphthalene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
18	phenanthrene	201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %			<LOD
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %			<LOD
20	fluoranthene	205-912-4	206-44-0		0.0216 mg/kg		0.0216 mg/kg	0.00000216 %			
21	pyrene	204-927-3	129-00-0		0.017 mg/kg		0.017 mg/kg	0.0000017 %			
22	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %			<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.0136 mg/kg		0.0136 mg/kg	0.00000136 %			
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.0173 mg/kg		0.0173 mg/kg	0.00000173 %			
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %			<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %			<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %			<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %			<LOD
30	benzene	601-020-00-8	200-753-7	71-43-2	<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %			<LOD
31	toluene	601-021-00-3	203-625-9	108-88-3	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %			<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
33	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]	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %			<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
36	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		9.16 mg/kg	1.462	13.388 mg/kg	0.00134 %			
Total:									0.0219 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS1-090222-0.50-0.50

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

Sample details

Sample name:	LoW Code:
WS1-090222-0.50-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
12% (no correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

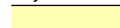
Determinands

Moisture content: **12% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7.39 pH		7.39	pH	7.39 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 }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
3	arsenic { arsenic trioxide }				6.24 mg/kg	1.32	8.239	mg/kg	0.000824 %		
	033-003-00-0	215-481-4	1327-53-3								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	0.187 mg/kg	1.285	0.24	mg/kg	0.0000187 %		
	048-010-00-4	215-147-8	1306-23-6								
6	copper { dicopper oxide; copper (I) oxide }				5.83 mg/kg	1.126	6.564	mg/kg	0.000656 %		
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	21.9 mg/kg	1.56	34.16	mg/kg	0.00219 %		
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				7.15 mg/kg	1.579	11.293	mg/kg	0.00113 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				1.52 mg/kg	1.405	2.136	mg/kg	0.000214 %		
	034-002-00-8										
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				24.3 mg/kg	1.785	43.38	mg/kg	0.00434 %		
	023-001-00-8	215-239-8	1314-62-1								
12	zinc { zinc chromate }				37 mg/kg	2.774	102.643	mg/kg	0.0103 %		
	024-007-00-3	236-878-9	13530-65-9								
13	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
14	naphthalene				<0.009 mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
18	phenanthrene	201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
20	fluoranthene	205-912-4	206-44-0		<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		<LOD
21	pyrene	204-927-3	129-00-0		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
22	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
30	benzene	601-020-00-8	200-753-7	71-43-2	<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
31	toluene	601-021-00-3	203-625-9	108-88-3	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
33	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]	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		9.65 mg/kg	1.462	14.104 mg/kg	0.00141 %		
Total:								0.0227 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS2-090222-0.20-0.20

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

Sample details

Sample name:	LoW Code:
WS2-090222-0.20-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
21% (no correction)	

Hazard properties

None identified

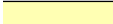
Determinands

Moisture content: 21% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				7.66 pH		7.66 pH	7.66 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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	arsenic { arsenic trioxide }				6.4 mg/kg	1.32	8.45 mg/kg	0.000845 %		
	033-003-00-0	215-481-4	1327-53-3							
4	boron { boron tribromide/trichloride/trifluoride (combined) }				1.01 mg/kg	13.43	13.564 mg/kg	0.00136 %		
			10294-33-4, 10294-34-5, 7637-07-2							
5	cadmium { cadmium sulfide }			1	0.178 mg/kg	1.285	0.229 mg/kg	0.0000178 %		
	048-010-00-4	215-147-8	1306-23-6							
6	copper { dicopper oxide; copper (I) oxide }				15.5 mg/kg	1.126	17.451 mg/kg	0.00175 %		
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead chromate }			1	44.1 mg/kg	1.56	68.788 mg/kg	0.00441 %		
	082-004-00-2	231-846-0	7758-97-6							
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				6.52 mg/kg	1.579	10.298 mg/kg	0.00103 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				27.7 mg/kg	1.785	49.45 mg/kg	0.00494 %		
	023-001-00-8	215-239-8	1314-62-1							
12	zinc { zinc chromate }				97.2 mg/kg	2.774	269.647 mg/kg	0.027 %		
	024-007-00-3	236-878-9	13530-65-9							
13	phenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
14	naphthalene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.0205 mg/kg		0.0205 mg/kg	0.00000205 %			
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %			<LOD
20	fluoranthene	205-912-4	206-44-0		0.0749 mg/kg		0.0749 mg/kg	0.00000749 %			
21	pyrene	204-927-3	129-00-0		0.0631 mg/kg		0.0631 mg/kg	0.00000631 %			
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.0399 mg/kg		0.0399 mg/kg	0.00000399 %			
23	chrysene	601-048-00-0	205-923-4		0.0401 mg/kg		0.0401 mg/kg	0.00000401 %			
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.0669 mg/kg		0.0669 mg/kg	0.00000669 %			
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.0251 mg/kg		0.0251 mg/kg	0.00000251 %			
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.0436 mg/kg		0.0436 mg/kg	0.00000436 %			
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.0403 mg/kg		0.0403 mg/kg	0.00000403 %			
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		0.0382 mg/kg		0.0382 mg/kg	0.00000382 %			
30	benzene	601-020-00-8	200-753-7		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %			<LOD
31	toluene	601-021-00-3	203-625-9		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %			<LOD
32	ethylbenzene	601-023-00-4	202-849-4		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
33	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]		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %			<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
36	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		11.3 mg/kg	1.462	16.516 mg/kg	0.00165 %			
Total:									0.0435 %		

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
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: WS2-090222-0.50-0.50

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

Sample details

Sample name:	LoW Code:
WS2-090222-0.50-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
19% (no correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7.26 pH		7.26	pH	7.26 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 }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
3	arsenic { arsenic trioxide }				7.21 mg/kg	1.32	9.52	mg/kg	0.000952 %		
	033-003-00-0	215-481-4	1327-53-3								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	0.127 mg/kg	1.285	0.163	mg/kg	0.0000127 %		
	048-010-00-4	215-147-8	1306-23-6								
6	copper { dicopper oxide; copper (I) oxide }				13.9 mg/kg	1.126	15.65	mg/kg	0.00156 %		
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	133 mg/kg	1.56	207.455	mg/kg	0.0133 %		
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				5.47 mg/kg	1.579	8.64	mg/kg	0.000864 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				26.3 mg/kg	1.785	46.95	mg/kg	0.0047 %		
	023-001-00-8	215-239-8	1314-62-1								
12	zinc { zinc chromate }				59.3 mg/kg	2.774	164.507	mg/kg	0.0165 %		
	024-007-00-3	236-878-9	13530-65-9								
13	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
14	naphthalene				<0.009 mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthylene	205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
16	acenaphthene	201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
17	fluorene	201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
18	phenanthrene	201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
19	anthracene	204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
20	fluoranthene	205-912-4	206-44-0		<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		<LOD
21	pyrene	204-927-3	129-00-0		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
22	benzo[a]anthracene	601-033-00-9	200-280-6		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
23	chrysene	601-048-00-0	205-923-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.0195 mg/kg		0.0195 mg/kg	0.00000195 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
30	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
31	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		9.95 mg/kg	1.462	14.542 mg/kg	0.00145 %		
Total:								0.0411 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3-090222-0.20-0.20

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

Sample details

Sample name:	LoW Code:
WS3-090222-0.20-0.20	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
15% (no correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

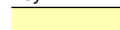
Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				8.45 pH		8.45	pH	8.45 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 }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
3	arsenic { arsenic trioxide }				5.65 mg/kg	1.32	7.46	mg/kg	0.000746 %		
	033-003-00-0	215-481-4	1327-53-3								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	0.219 mg/kg	1.285	0.281	mg/kg	0.0000219 %		
	048-010-00-4	215-147-8	1306-23-6								
6	copper { dicopper oxide; copper (I) oxide }				16 mg/kg	1.126	18.014	mg/kg	0.0018 %		
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	38.5 mg/kg	1.56	60.053	mg/kg	0.00385 %		
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				6.05 mg/kg	1.579	9.556	mg/kg	0.000956 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				21.5 mg/kg	1.785	38.381	mg/kg	0.00384 %		
	023-001-00-8	215-239-8	1314-62-1								
12	zinc { zinc chromate }				52.4 mg/kg	2.774	145.365	mg/kg	0.0145 %		
	024-007-00-3	236-878-9	13530-65-9								
13	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
14	naphthalene				<0.009 mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	acenaphthylene	205-917-1	208-96-8		0.0208 mg/kg		0.0208 mg/kg	0.00000208 %		
16	acenaphthene	201-469-6	83-32-9		0.0383 mg/kg		0.0383 mg/kg	0.00000383 %		
17	fluorene	201-695-5	86-73-7		0.0227 mg/kg		0.0227 mg/kg	0.00000227 %		
18	phenanthrene	201-581-5	85-01-8		0.276 mg/kg		0.276 mg/kg	0.0000276 %		
19	anthracene	204-371-1	120-12-7		0.0876 mg/kg		0.0876 mg/kg	0.00000876 %		
20	fluoranthene	205-912-4	206-44-0		1.06 mg/kg		1.06 mg/kg	0.000106 %		
21	pyrene	204-927-3	129-00-0		1.03 mg/kg		1.03 mg/kg	0.000103 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.484 mg/kg		0.484 mg/kg	0.0000484 %		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.545 mg/kg		0.545 mg/kg	0.0000545 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.921 mg/kg		0.921 mg/kg	0.0000921 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.316 mg/kg		0.316 mg/kg	0.0000316 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.871 mg/kg		0.871 mg/kg	0.0000871 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.689 mg/kg		0.689 mg/kg	0.0000689 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.0967 mg/kg		0.0967 mg/kg	0.00000967 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.684 mg/kg		0.684 mg/kg	0.0000684 %		
30	benzene	601-020-00-8	200-753-7	71-43-2	<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
31	toluene	601-021-00-3	203-625-9	108-88-3	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
33	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]	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36	coronene	205-881-7	191-07-1		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
37	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		<LOD
38	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		10.2 mg/kg	1.462	14.908 mg/kg	0.00149 %		
Total:								0.0298 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3-090222-0.50-0.50

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

Sample details

Sample name:	LoW Code:
WS3-090222-0.50-0.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14% (no correction)	

Hazard properties

None identified

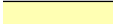
Determinands

Moisture content: 14% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		8.17 pH		8.17 pH	8.17 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 }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	arsenic { arsenic trioxide }				6.53 mg/kg	1.32	8.622 mg/kg	0.000862 %		
	033-003-00-0	215-481-4	1327-53-3							
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
			10294-33-4, 10294-34-5, 7637-07-2							
5	cadmium { cadmium sulfide }			1	0.269 mg/kg	1.285	0.346 mg/kg	0.0000269 %		
	048-010-00-4	215-147-8	1306-23-6							
6	copper { dicopper oxide; copper (I) oxide }				15.1 mg/kg	1.126	17.001 mg/kg	0.0017 %		
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead chromate }			1	43.2 mg/kg	1.56	67.384 mg/kg	0.00432 %		
	082-004-00-2	231-846-0	7758-97-6							
8	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				5.33 mg/kg	1.579	8.419 mg/kg	0.000842 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	vanadium { divanadium pentaoxide; vanadium pentoxide }				18 mg/kg	1.785	32.133 mg/kg	0.00321 %		
	023-001-00-8	215-239-8	1314-62-1							
12	zinc { zinc chromate }				69.4 mg/kg	2.774	192.526 mg/kg	0.0193 %		
	024-007-00-3	236-878-9	13530-65-9							
13	phenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
14	naphthalene				<0.045 mg/kg		<0.045 mg/kg	<0.0000045 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	acenaphthylene	205-917-1	208-96-8		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		<0.075 mg/kg		<0.075 mg/kg	<0.0000075 %			<LOD
19	anthracene	204-371-1	120-12-7		<0.08 mg/kg		<0.08 mg/kg	<0.000008 %			<LOD
20	fluoranthene	205-912-4	206-44-0		0.213 mg/kg		0.213 mg/kg	0.0000213 %			
21	pyrene	204-927-3	129-00-0		0.19 mg/kg		0.19 mg/kg	0.000019 %			
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.0962 mg/kg		0.0962 mg/kg	0.00000962 %			
23	chrysene	601-048-00-0	205-923-4		0.13 mg/kg		0.13 mg/kg	0.000013 %			
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.257 mg/kg		0.257 mg/kg	0.0000257 %			
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.0849 mg/kg		0.0849 mg/kg	0.00000849 %			
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.215 mg/kg		0.215 mg/kg	0.0000215 %			
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.243 mg/kg		0.243 mg/kg	0.0000243 %			
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.115 mg/kg		<0.115 mg/kg	<0.0000115 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		0.248 mg/kg		0.248 mg/kg	0.0000248 %			
30	benzene	601-020-00-8	200-753-7		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %			<LOD
31	toluene	601-021-00-3	203-625-9		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %			<LOD
32	ethylbenzene	601-023-00-4	202-849-4		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %			<LOD
33	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]		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
34	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %			<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
36	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		8.99 mg/kg	1.462	13.139 mg/kg	0.00131 %			
Total:									0.0336 %		

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
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

■ 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

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - 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)

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: EUH014 , Acute Tox. 2; H330 , Acute Tox. 2; H300 , Skin Corr. 1A; H314 , Skin Corr. 1B; H314

■ 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: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

■ 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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

■ 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 Acute 1; H400 , Aquatic Chronic 1; H410

■ 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: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ 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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ 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: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ 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: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **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 Acute 1; H400 , Aquatic Chronic 1; H410

▪ **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

▪ **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.

Data source: <http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en>

Data source date: 16 Jun 2014

Hazard Statements: STOT SE 2; H371

▪ **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4

Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal species

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

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead chromate}

Worst case species based on risk phrases

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

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

worst case

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2022.25.4995.9469 (25 Jan 2022)

HazWasteOnline Database: 2022.25.4995.9469 (25 Jan 2022)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

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 Waste 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

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021