

125 Highgrove Street, Reading, RG1 5EJ

REMEDIATION METHOD STATEMENT



Oak and Lime Limited

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P20-060rms

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REPORT ISSUE AND TRACKING

ISSUE	DATE	Written by	Comment
1	22/09/20	Stephen J Fisk BSc FGS	-
		Reviewed and approved by	
		Matt Paddock MSc FGS	

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) was instructed by Oak and Lime Limited; the Client, to prepare a Remediation Options Appraisal and Method Statement (RMS) as Phase 3 of a Site Contamination Assessment for the proposed residential redevelopment of a parcel of land at 125 Highgrove Street, Reading, RG1 5EJ.

The subject site is an L-Shaped parcel of land located some 1km south of Reading town centre within a residential urban area. The site is currently occupied by several units of traditional masonry and concrete construction which are used for vehicle repair and storage. The site is currently surfaced with concrete. Access to the site is gained via Highgrove Street on the southwest corner of the site. The site extends east-west off Highgrove Street and then aligns north-south to the rear of the adjacent residential gardens

The topography of the site and the surrounding areas slopes downwards to the north and west. The site is located within a predominantly residential area with dwellings and gardens in the immediate surroundings and some commercial properties further to the west.

The approximate centre of the site is located at a grid reference 472110, 172282 and the site is indicated to cover an approximate area of 0.14Ha.

Site Location Plans and Aerial Photograph are presented in Appendix A.

1.1 Terms of Reference

- British Standard (BS) 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice.
- British Standard (BS) 8485:2015+A1:2019 Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings.
- British Standard (BS) 5930:1999+A2:2010 Site Investigation Code of Practice.
- British Standard (BS) 8576:2013 Guidance on Investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOC)
- CIRIA C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA 2007.
- CLR7 Assessment of Risks to Human Health from Land Contamination, 2002, DEFRA / Environment Agency (*currently withdrawn*).
- CLR8 Potential Contaminants for the Assessment of Land, 2002, DEFRA / Environment Agency (*currently withdrawn*).
- CLR11 Model Procedures for the Management of Land Contamination, 2010, DEFRA / Environment Agency.
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA.
- GPLC1 Guiding Principles for Land Contamination, 2010, Environment Agency.
- PPG23 (PPS23) Planning and Pollution Control (contaminated land aspects), 2002 (*currently withdrawn*).

- SC030114/R1 Verification of Remediation of Land Contamination Guidance Document, 2010, Environment Agency.

1.2 Overview of Previous Works

A Phase 1 Preliminary Contamination Risk Assessment (PRA) has been carried out for the site by Soil Environmental Services Ltd in May 2017. A Ground Investigation (GI) and Site Contamination Assessment (SCA) has been produced for the site by Paddock Geo Engineering Limited (PGE). The PGE works were undertaken at the site in 2020 and are summarised in the following reports.

- **PRA – SES/AL3D/HS/1#1 dated 19th May 2017 by Paddock Geo Engineering Limited (PGE).**

The preliminary contamination risk assessment has identified complete Contaminant-Pathway-Receptor (CPR) linkages with a maximum **Moderate** risk level from the potential contamination sources risk drivers identified on the site and surrounding area.

The most significant of these potential source drivers is considered to be the risk from the current use of the site as a vehicle repair garages and the former use as a builder's yard. The primary risk is considered to be the spillage and leakage of fuel and oils from damaged vehicles and during repairs/refilling.

A soakaway was also observed on the far north of the site during the site works outline within this report, but not mentioned in the previous PRA. The soakaway was noted to be filled with surface runoff residue potentially containing hydrocarbon derived materials. In addition, the concrete surfacing on site was noted to be in a poor state of repair with cracking observed in some locations. These factors could provide pathways for migration of contamination from surface into the sub-surface.

An additional significant source of contamination in the form of ground gas generation (CO_2 and CH_4) is present due to the former reservoirs and potentially infilled land. Although these features appear to have been infilled some time ago, the source and type of backfill material, if any, is unknown and as such warrant further consideration to confirm the risk posed due to ground gases. In addition, the potential for hydrocarbon contamination on site indicates the potential for ingress and build-up of volatiles and break down components such as CO_2 gas within proposed structures.

In addition to the above the Soil Environmental Services Ltd report state there is a risk of PCBs and mineral oils on site due to the presence of two electricity substations both located over 100m from the site. Given that PCBs are typically insoluble or of low solubility in water (i.e. groundwater) and taking into account the distance from site and the much more significant potential for contamination from the onsite sources, contamination from the substation is not considered to be of concern to the site.

Based upon the age and historical use of the building on site there is the risk for the buildings to include asbestos containing material, especially within fibre cement roof and cladding sheeting, and a related risk of fibres within the near surface soils. Asbestos is also frequently contained in various vehicle parts which are utilised on site. It is recommended that prior to the clearance of the site and the commencement of the demolition works, that an asbestos survey is undertaken of all of the buildings on site to determine the presence of asbestos-containing materials. If present, removal works will need to be undertaken by a specialist contractor prior to the demolition phase.

Given the discussion above, to prevent 'Significant Possibility of Significant Harm' from potential volatile contamination sources to the proposed future residential site users it is recommended that an intrusive soil investigation be undertaken on the site to assess for heavy metals, organics, hydrocarbons and asbestos within the near surface soils and deeper soils should significant surface contamination be identified. If contamination migration is identified, then it may be necessary to carry out detailed risk assessment for the controlled aquifer beneath the site.

Further to this samples should be olfactory and PID screened for the presence of other volatile contaminants and if suspected, detailed testing should be undertaken.

Further to this, should any unexpected contamination be identified during the future development groundworks, then a suitably qualified and experienced Geo-Environmental Engineer should be consulted and if necessary further assessment should be carried out."

- **SCA – P20-060sca – Ground Investigation, including Site Contamination Risk Assessment Report (June 2020), Paddock Geo Engineering Limited (PGE).**

The main fieldworks were carried out on 19th May 2020 and comprised the forming of 6no. boreholes, to assess the ground conditions, and recover samples for laboratory testing.

The boreholes were formed to depths of between 2.00m and 4.00m below ground level (bgl).

Samples were recovered in suitable containers for chemical analysis from the top metre of soils from the general site area. Shallow samples were also screened olfactorily and using headspace analysis and a PID for VOCs.

Made Ground was encountered across the site within all boreholes to between 0.50m and 0.90m depth. The Made Ground deposits comprised a thin surface layer of unreinforced concrete between 0.10m and 0.14m in thickness. Underlying the concrete across the site was generally dark brown and grey variably sandy variably gravelly CLAY with localised pockets of sand and gravel. The gravel fraction comprised predominantly brick and flint with ash / coal locally. An odour was noted within the Made Ground from borehole WS6 on the northern end of the site between 0.10m and 0.90m depth.

Beneath the Made Ground across the site except within boreholes WS6, Boyn Hill Gravel Member deposits were encountered that comprised loose to very dense light brown to brown locally grey slightly clayey variably gravelly SAND / variably sandy GRAVEL and variably sandy variably gravelly CLAY, with the gravel fraction comprising flint.

The Boyn Hill deposits extended beyond the base depth of boreholes WS1 and WS2 at 2m and 3m respectively. Within boreholes WS3 to WS5 they were proven to between 1.40m and 2.10m depth, in the central area of the site where the Gravel Member deposits begin to pinch out and reduce in thickness.

Fine grained London Clay Formation soils were identified beneath the Boyn Hill Gravel Member deposits within boreholes WS3-WS5 and directly beneath the Made Ground within borehole WS6. These soils comprised firm to stiff light brown, orange brown and grey mottled brown silty CLAY with localised sand / gravelly bands. The London Clay Formation soils were proven to a maximum of 4.00m depth.

No significant groundwater strikes were encountered within any of the exploratory points undertaken. Lenses of sand were observed within boreholes WS6 that contained perched water within the sand lenses. The sand layer at the base of the Boyn Hill Gravel Member 1.90-2.10m in WS5 was also noted to be damp but did not lead to a steady groundwater level within the borehole at the time of drilling.

Subsequent monitoring of the groundwater level was carried out within the wells installed in WS1, WS3, WS4 and WS6 and indicated groundwater levels of between 0.50m and 1.87m depth bgl.

A total of 9no. soil samples were sent to an external laboratory to obtain total soil concentrations for a range of priority contaminants.

The conclusions of the intrusive contamination assessment carried out as Phase 2 of a Site Contamination Assessment stated:

“Elevated heavy metal and hydrocarbon priority contaminants were identified in the near surface soils Made Ground beneath the site when compared to the Residential with plant uptake GACs employed.

The elevated levels were identified from samples of Made Ground recovered from boreholes WS1, WS3, WS4 and WS6. Fragments of brick and ash / clinker were observed within the boreholes and the sample from borehole WS6 was noted to be exhibit an odour. Elevated lead, arsenic and various PAH concentration were recorded. In addition, chrysotile asbestos was confirmed within the sample from WS3 at 0.30m depth.

Given this, it is considered that risk reduction or remediation works will be required in proposed open areas of the site to protect the end site users. This would most likely consist of separation of the site users from any contaminated soils through the excavation of soil and importation of clean fill and Topsoil in open and garden areas of the proposed development.

We understand that the site levels on the northern end of the site are to be lowered by up to approximately 1.5mm. As Made Ground was typically only encountered to depths of between 0.50m and 0.90m this proposed lowering of the site level will effectively remediate a large proportion of the site through the entire removal of the source of contamination, with the exception of the proposed garden areas on the far northern end of the site which are proposed to not have their levels reduced.

Asbestos fibres (chrysotile - loose fibrous debris) were identified within one sample (WS3 at 0.40m) of the five tested. Subsequent quantification testing was carried out and indicated an asbestos concentration of <0.001%. No fragments of suspected asbestos containing materials was noted within any of the boreholes. It is recommended that prior to the clearance of the site and the commencement of the demolition works, that an asbestos survey is undertaken of all of the buildings on site to determine the presence of asbestos-containing materials.

If present, removal works will need to be undertaken by a specialist contractor prior to the demolition phase. The positive asbestos result appears to be an isolated result and is not deemed representative on the site as a whole. Should significant asbestos materials be proven within the building structure and dependent upon the condition of the asbestos materials encountered, further consideration to asbestos within soils may be warranted.

As no volatile contaminants were identified, remedial works involving removal of Made Ground are only deemed necessary in open areas of the site.

Based upon ground gas monitoring results the site is likely to be classified as 'Amber 2' classification employing the NHBC Traffic light system detailed in CIRIA C665 2007, due to high levels of CO₂.

A Remediation Options Appraisal and Method Statement (RMS) would be required by concerned regulatory parties for any soil and ground gas remediation works on the site.

Notwithstanding the above assessment, if any unexpected or previously unidentified contamination is discovered during the site development works, a suitably qualified and experienced person should be contacted so any further assessment required can be carried out".

1.3 Regulatory Liaison

The Local Planning Authority have not been consulted by PGE for comment. It is understood that the previous PRA and GI/SCA reports have been forwarded to them for comment.

1.4 Current Site Use and Site History

A site walkover survey was carried out as part of the Soil Environmental Services Ltd Phase I reported in May 2017 and at this time the site was being used as a vehicle repair garage services.

The site and the surrounding arear is noted as sloping very gently down to the north and west with trees and vegetation around the site boundaries within residential garden adjacent to the site. The foliage surrounding the site is noted as being in good condition with no chlorosis of evidence of dieback.

The report noted that no visual / olfactory evidence of ground contamination was noted, with "no significant leaks, spillages or staining of the ground were noted"; however the report then states that an oil sheen indicative of hydrocarbon contamination was evidence within rainwater pooled on the surface at the site.

The Phase I report also noted that asbestos was not evident on the buildings on-site.

During the site works for the Phase II SCA undertaken by PGE in May 2020 a soakaway was also observed on the far north of the site during the site works outline within this report, but not mentioned in the previous PRA. The soakaway was noted to be filled with surface runoff residue potentially containing hydrocarbon derived materials. In addition, the concrete

surfacing on site was noted to be in a poor state of repair with cracking observed in some locations.

A historical map regression of the site indicated that the site was undeveloped until sometime between 1931-1958 when glasshouses were observed on site. Structures were developed on site from c.1958 with further structures noted on site and the site labelled as a builder' yard sometime between 1972-1990.

The surrounding area is mapped as residential dwellings from pre-1879 to current. A spring / reservoir is indicated 15m west from 1878-1958 and another reservoir is indicated 143m west mapped from 1879-1912, implying that these features have been infilled or covered / culverted. Electricity substations are indicated to have been developed by 1962 in the surrounding area and remain to the most recent historical maps, 132m southwest and 192m east.

No other information is given on the developments on site or within the surrounding areas.

2.0 PROPOSED DEVELOPMENT

The proposed development comprises the clearance of the structures and redevelopment of the site with eight residential dwellings. Associated new access road, car parking and soft landscaped areas are also included as part of the development.

It is indicated by the Client that to facilitate the required development levels the northern area of the site is to be reduced by some 1.50m below current ground level to reduce the level to a level similar to that of the surrounding gardens, with the exception of the far northern end of the site which is proposed to be rear garden and is to remain as current level.

Existing and Proposed site plans are presented in Appendix A.

3.0 PARTIES AND RESPONSIBILITIES

The parties involved in the design, construction and operation of the remediation are categorised according to their roles as follows:

Current Owner	Oak and Lime Limited
Developer	Oak and Lime Limited
Architects / Designers	AI3d Projects
RQA Supervision	Paddock Geo Engineering Limited (PGE)
Remediation Design	Paddock Geo Engineering Limited (PGE)
Regulators	Reading Borough Council Environment Agency

Analytical Testing Laboratory	I2 Analytical Limited, Watford (UKAS Accredited Testing Laboratory No. 4041)
Waste Haulier	To be confirmed
Waste Disposal Site	To be confirmed
Remediation Contractor	To be confirmed

4.0 RISK MANAGEMENT OPTIONS APPRAISAL

4.1 Introduction

The proposed development (as detailed in Section 2.0) will include the clearance of the structures and redevelopment of the site with eight residential dwellings. Associated new access road, car parking and soft landscaped areas are also included as part of the development.

Levels in the northern area of the site is to be reduced by some 1.50m below current ground level, with the exception of the far northern end of the site which is proposed to be rear garden and is to remain as current level.

The SCA Phase of the site contamination assessment identified the existence of contaminated soils on site, which if left untreated, present an unacceptable risk to human health, and potentially to environmental receptors. It was concluded following the ground investigation that it would be necessary to undertake remedial works and put in place an associated risk management system to facilitate the safe redevelopment of the site. This will ensure that the site is suitable for the proposed end-use as a residential development.

In addition, ground gas monitoring has been undertaken and the site is likely to be classified as 'Amber 2' employing the NHBC Traffic Light System.

4.2 Remedial Objectives

Remedial works are regarded as a form of risk management, the aim of which is to demonstrably break the chain of any potentially unacceptable pollutant linkages that connect contaminant sources to receptors via pathways on site. The aims of the remedial works are:

- To ensure that human health (site end-users including future residents, visitors and ground workers including construction and future maintenance workers) are not exposed to elevated concentrations of hazardous substances on site.
- Ensure that any remedial works overcome any perceived risks or blight associated with the previous use of the site and any potential associated contamination.

4.3 Source, Pathway and Receptor Management

A Source Pathway Receptor Conceptual Model has been produced for the site using the data from the SCA and is presented in Appendix B. There are three potential options to break the pollutant linkages at the site. These options are presented below:

4.3.1 Source Reduction

This involves the reduction, removal, modification or destruction of the contamination source. Applicable techniques include:

- Source removal through excavation and disposal of contaminated soils and any associated contaminated infrastructure.
- In-situ or ex-situ physical, chemical, biological and thermal source reduction methods.

4.3.2 Pathway Management

This involves the prevention of movement of contaminants on route to receptors. Applicable techniques include:

- Removal or destruction of contaminants e.g. bioactive zones.
- Preventing pathways from operating e.g. separation-layer or clean-soil cover layer capping system, stabilisation and slurry walls.

4.3.3 Receptor Protection

This protects the receptor by modifying activities and behaviour to reduce exposure and is not normally classed as remediation, but as risk reduction. It is generally a less favourable method for mitigating the risk from contamination. Applicable techniques include:

- Restricting or changing the land use e.g. change to residential use without gardens.
- Changing the design, layout or the proposed construction e.g. adding hardstanding to problem areas.
- Restricting access of the receptor e.g. fencing or walls.

4.4 Viable Remediation Techniques

As with any proposed remedial works, the size, scale and nature of the site, site characteristics, quantity, type and extent of contaminated material present in soils and groundwater, the time frame, cost / benefit analysis and value and the sustainability of the remedial method must all be considered when exploring remedial options. A Remediation Option Matrix for the site is presented in Appendix C.

A range of remedial technologies exist and have been explored and the methods considered most viable for the site are listed below.

4.4.1 Excavation and Disposal

Excavation and disposal (colloquially known as dig and dump) is the most basic of remedial techniques, but often most effective. Contaminated soils and any associated infrastructure i.e. buried pipework and impacted materials such as concrete bases are removed either in their entirety or to acceptable levels to allow the inclusion of an inert capping layer. Contaminated materials are generally disposed of to landfill void, material recovery or soil treatment facilities.

The drawback of this technique is the potential for spiralling costs due to unknown and potential non-sustainable quantities of material and increased disposal costs.

This method is also generally not considered suitable for deep contamination deeper than 2m bgl due to large volumes which would require disposal and the potential for ground instability from such an excavation.

Due to the shallow Made Ground stratum in boreholes WS1, WS3, WS4 and WS6 that is impacted by elevated lead, arsenic, various PAH compounds and asbestos and the discrete areas of soft landscaping where remediation is required, the excavation and disposal of these soils is considered a viable remedial approach as physically limited quantities of soil will require removal and replacement. In addition, some reduction of levels is already proposed to facilitate the development of the site. This is considered to be a practical, cost effective and environmental-friendly approach.

4.4.2 Cover System

A cover system is generally employed along with Excavation and Disposal of contaminated soils to separate end site users from impacted soils which remain at depth on the site due to their low risk of mobilisation to impact off site receptors. A cover system comprises a cover of clean soil, often imported to the site, with a marker layer at its base often comprising a differing colour soil layer than the host soil and/or a geomembrane barrier to physically limit direct contact with the remaining impacted soils. A 300mm thick topsoil layer is generally included at surface in areas of the site which are proposed to be soft landscaped.

The thickness of the cover system depends on the concentrations of contaminants present on the site and the background concentrations of the contaminants within the cover soils. The depth is calculated using the BRE Cover Systems spreadsheet¹ and has a maximum depth of 600mm.

This is considered to be a suitable approach for the site as an addition to excavation and disposal of the impacted soils.

4.4.3 Soil Stabilisation

Soil stabilisation is achieved by the reaction of contaminants with reagents to promote sorption, precipitation or incorporation into crystal lattices.

This is not deemed viable at the site due to the presence of residential garden areas on site.

4.4.4 Solidification

Solidification is a remediation technology that involves the addition of reagents to a contaminated material to impart physical and dimensional stability to contain contaminants in a solid product and reduce access by external agents (e.g. air and rainfall).

This technology is not viable within the proposed residential garden areas or within or close to the residential dwelling building footprint due to potential drainage and possible geotechnical issues.

¹ Based on worst case lead and PAH concentration and:
Cover systems for Land Regeneration: Thickness Design of Cover Systems for Contaminated Land, BRE. 2004.

4.4.5 Chemical Oxidation

In its simplest form, chemical oxidation remediation comprises the introduction of an oxidation agent into the ground or a stockpiled material to allow an oxidation reaction to occur (in soil and groundwater) and convert the contaminants to a lower risk form.

For in-situ treatment, this method requires permeable soils to allow the circulation of treatment chemicals which are generally in an aqueous form. This method is not suitable due to the complexity of the contaminant found i.e. heavy metals / metalloids, PAH and asbestos and likely to be impracticable due to the small size and elongated nature on the site along with the restricted access to the site.

4.4.6 Monitored Natural Attenuation

This method comprises the natural attenuation of contaminants in soil and groundwater through various means such as natural bio-gradation, abiotic oxidation, sorption, volatilisation and dispersion, with monitoring to assess the progress of the attenuation. For this method to be viable, the affected soil must be physically and chemically suitable and demonstrate that natural attenuation is occurring or could have the ability to occur.

Due to the nature of the contaminants present on site this option is not viable.

4.5 Remedial Sustainability

As discussed in Section 4.0, a range of remedial options have been investigated and several factors considered within the option appraisal process including; efficiency and effectiveness of the remedial technique, potential costs, haulage movements on and off-site and potential carbon emissions, other environmental factors, accurate focusing of remedial works, timescales and the general overall benefits.

4.6 Most Viable Remedial Option

It is considered that the most viable remediation method for the site, given the lead, arsenic, PAH and asbestos contamination identified in shallow Made Ground on the site, is source reduction through the excavation and disposal of this material. This will be used in conjunction with a clean cover system where appropriate.

None of the remaining remedial options outlined in Section 4.0 are considered practical or suitable for the site.

5.0 REMEDIATION ACTION REQUIRED

5.1 Introduction

The remedial measures required are detailed in this section of the report and in summary comprise the removal of the shallow Made Ground that are impacted with lead, arsenic, and various PAH, along with localised low levels of asbestos contamination, within proposed soft landscaping areas of the proposed development, to provide a separation between these impacted soils and the end site users, to allow a break of the related S-P-R linkages.

5.2 Remedial Action – Delineation and Removal of heavy metal, PAH and asbestos contaminated Made Ground soils in soft landscaping areas

Elevated concentrations of lead, arsenic, PAH compounds and low levels of asbestos were recorded within the Made Ground soils across the site. The statistical analysis of the testing results indicated that the elevated results were within 'hotspots', however, as samples from four of six sample tested indicated elevated concentrations the delineation of isolated hotspots is not considered feasible. In addition, given the deleterious material such as brick and ash observed within near surface Made Ground soils this is not considered suitable for use as a Topsoil material in open and garden areas of the proposed development.

Therefore, the impacted Made Ground soils will need to be removed from the site where this corresponds with proposed open areas of the proposed development, such as private gardens and soft landscaping, to create a separation of the end site user and the impacted soils.

A minimum of 588mm separation² from the end site users is required given the type and level of contamination identified on the site and calculation undertaken with the BRE Cover Systems spreadsheet. However, the impacted Made Ground stratum was identified to depths of between 0.50m and 0.90m and in addition, levels over some area of the site are to be dropped by up to 1.50m; therefore, the actual depth of excavation and soil removal will necessarily need to be controlled and decided on site by the supervising Remediation Engineer with consideration of the final proposed site levels.

The identified heavy metal, PAH and low level asbestos contamination identified is not deemed volatile, as such, no vapour pathways linkages have been concluded on the S-P-R model and therefore, remediation works are not required where the impacted soils are not accessible on the site, i.e. covered in permanent hardstanding such as building footprints and driveways.

A chemically and geotechnical suitable fill material will need to be used to fill the remediation excavation upon completion, as required by site levels. This can comprise natural soil site groundworks arisings from proven clean areas of the site, the identified Made Ground should not be used for this purpose. A minimum depth of 300mm of Topsoil should be placed at the surface of soft landscaping areas as a growing and drainage medium. Given the lack of suitable Topsoil type material on site this will likely have to be imported from a reputable supplier.

A schematic plan indicating the area of the site which require remediation is presented in Appendix D.

All soils excavated as part of the works on site should be loaded immediately into a haulage vehicle for removal or placed on bunded geo-membrane and covered to prevent the generation of wind-blown dust. The material should be removed off-site once the waste has been classified and a disposal destination selected.

It is recommended that the Client considers the use of a soil treatment facility as oppose to landfill, not only is this a more sustainable approach but also a more cost effective one.

5.3 Remedial Action – Ground Gas Protection Measures

As detailed in Section 1.2, gas protection measures for an *Amber 2* intermediate to high classification will need to be incorporated into the final residential development. The required measures are outlined in the table below.

Advice should be sought from a specialist contractor to enable the design and installation of an appropriate protection system.

The protection measures should comprise:

“Intermediate to high gas regime identified, which requires high-level gas protection measures, comprising a membrane and ventilation sub-floor void to create a permeability contrast to prevent the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414 (Johnson, 2001). Membranes should always be fitted by a specialist contractor. As with Amber 1, ventilation of the sub-floor void should facilitate a minimum of one complete volume change per 24 hours. Certification that these passive protection measures have been installed correctly should be provided.”

The gas membrane should be fitted by a suitably qualified person and the fitment validated by the Remediation Engineer.

5.4 Backfilling of Remediation Excavations

The remediation excavations will require backfilling to facilitate the development. The excavation should be backfilled with clean soils including a clean Topsoil cover layer of at least 300mm at surface as a growing and drainage medium in areas of open soil, such as gardens or soft landscaped areas.

In the first instance it is preferred to use site won soils and Topsoil sourced from the on-site groundworks. However, it is deemed likely that the site does not have sufficient suitable material therefore imported soils will be required.

Any backfill soils must be certified clean before being reused from site or brought to site and it is recommended that Topsoil be imported from a reputable Topsoil supplier.

Topsoil employed should be a good quality growing medium and have been subjected to chemical testing (at the rate of a minimum of two samples per source and one sample per 1,000m³ thereafter).

The imported materials are required to meet the British Standard for Topsoil (BS 3822: 2015) and the PGE In-House total soil contaminant concentration GACs for a residential with plant uptake land-use scenario, which are included in Appendix E.

5.5 Remediation Quantities

It is unclear at the present how much material will need to be excavated and disposed as part of the remediation process. Calculations will be made in due course to enable appropriate cut and fill balance to be maintained at the site.

5.6 Waste Classification

The HazWaste online classification system was employed to assess the waste classification employing the total determinand concentrations within samples of the near surface Made Ground and separately, the near surface natural soils, in relation to groundworks arising disposal. This indicated the Made Ground tested and all of the natural soils tested to have a Non-Hazardous classification with EWC code **17 05 04**.

Further to this, asbestos fibres were identified within one sample of the five tested. The sample from WS3 at 0.40m depth tested positive with the asbestos being identified as chrysotile - loose fibrous debris. Subsequent quantification testing was carried out and indicated an asbestos concentration of <0.001%. As such, based upon the testing to date the Made Ground soils on site is not necessarily considered as asbestos impacted soils as the concentration is below the hazardous waste threshold of 0.1%.

Waste Acceptance Criteria (WAC) testing was also carried out to determine if the soils tested could be disposed of into an inert facility on a composite sample of near surface soils. This indicates that the samples of soils had leachable determinand levels generally below the related guidance levels for disposal into an inert facility on the samples both from shallow Made Ground soils and natural soils at greater depth.

The results of the soil waste classification testing are presented in Appendix F.

On the above basis, it is considered that the natural soils and the Made Ground soils tested would classify as non-hazardous waste and may be suitable for disposal into an inert facility.

All waste classification should be confirmed with the waste receiving facility prior to disposal. The waste receiving facility, especially if not an inert landfill, may also require the total soil priority contaminant concentrations which are also presented in Appendix F.

5.7 Remediation Validation

The remedial works shall be performed under the supervision of a suitably qualified person, who will fill the role of a Remedial Quality Assurance Engineer (RQA) which is required for validation purposes.

During the remedial works and following general site clearance, a watching brief shall be maintained such that should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled, then this can be brought to the attention of the RQA Engineer and these recommendations reviewed.

A Validation Report will be prepared by PGE on completion of the remedial works to confirm the removal and replacement of the contaminated near surface Made Ground soils and replacement with clean imported Topsoil within soft landscaped areas of the proposed development.

The objective of the Verification Report will be to document all aspects of the works undertaken and will include all records collected and maintained by the Client and their appointed construction team / remediation contractor throughout the duration of the project.

The Validation Report will be prepared in accordance with the Environment Agency guidance document Verification of Remediation of Land Contamination (report SC030114/R1 dated 2010).

The Validation Report will describe the site, remediation objectives, remediation technique, verification data, supported by sketches and as-built drawings, figures, photographic records and any additional information that may supplement the report. For the validation of the remediation works detailed records should be maintained of:

- Details of the remediation arisings removed from the site following excavation and disposal destination (licensed facility).

- A photographic record of the works.
- Laboratory testing of imported soils (if applicable).

For the validation of the ground gas protection measures, if this is to be incorporated within the PGE validation report detailed records should be provided in line with guidance within BRE 414 and include

- As built drawings showing the protection measures.
- Details of the membrane selected (the supplier should usually be able to provide a data sheet for any such membrane sourced).
- A photographic record of the installation of the membrane works
- Records of inspection of the membrane installation

Copies of the Validation Report will be provided to the concerned regulatory authorities, who will be asked to state whether they are satisfied with the level of detail provided and confirm that it appears to be reasonable given the data presented. Based on the information supplied, they will then make a statement about whether the site is fit for its proposed residential end use to allow discharge of the related planning conditions.

Any substantial change to the remediation objectives will be agreed with the Local Planning Authority, as appropriate, prior to commencement and communicated to all relevant parties.

5.8 Health, Safety and Environmental Requirements

The construction operatives working on this site should take precautions commensurate with the degree of contamination identified in the previous contamination assessment reports produced for the site and detailed within the Construction Phase Health and Safety Plan.

Best practicable environmental protection should always be employed during the remediation and construction works.

Appropriate Health & Safety precautions including the use of signage, site inductions and toolbox talks to raise awareness of the risks on site, regular dampening down of stockpiles and site surfaces to minimise the generation of wind-blown dusts and the covering of stockpiles (where possible) and the use of PPE should be adopted. Respiratory PPE may be required for use by ground workers if suspect asbestos-containing materials are encountered.

Significant groundwater is unlikely to be encountered on site during the remedial works at the proposed depths. However, any groundwater encountered should be left in-situ if possible and if it is necessary to be removed off site, the water must be removed off site by a suitable tanker or treated, such as via the site oil / water interceptor system, prior to discharge.

6.0 REMEDIATION QUALITY ASSURANCE

The site remediation should be considered as a comprehensive process which requires clear and effective management. The Remediation Quality Assurance (RQA) procedures detailed in the Sections above have been included within the Remediation Method Statement to ensure that the objectives are achieved and that:

- The remediation is competent and of a high standard.
- The approach and actions taken are well documented.
- The Client should be confident that the remediation works are suitable for the indicated proposed end site use.



Throughout the site remediation works a suitably qualified and experienced Engineer or Scientist (the RQA Engineer) shall direct the operations for remediation and maintain records of the works carried out whilst supervising all site work. A Validation Report will then be produced and forwarded to the concerned parties.

REFERENCES

Investigation of Potentially Contaminated Sites – Code of Practice, British Standards Institution BS 10175:2001.

Code of Practice for Site Investigations, British Standards Institution BS5930: 1999+A2:2010

Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, R&D Technical Report P5-066/TR, 2000, Environment Agency.

National House-Building Council, NHBC Standards Chapter 4.2 'Building near Trees', 2003

CLR8 Potential Contaminants for the assessment of Land, 2002, DEFRA/Environment Agency.

BRE Special Digest 1 'Concrete in Aggressive Ground', 2001.

Contaminated Land Exposure (CLEA) Model version 1.03 developed by the Environment Agency, Department for Environment, Food and Rural Affairs and the Scottish Environment Protection Agency. 2008

CLR7 Assessment of Risks to Human Health from Land Contamination, 2002, DEFRA/Environment Agency.

CLR8 Potential Contaminants for the assessment of Land, 2002, DEFRA/Environment Agency.

CLR11 Model Procedures for the Management of Land Contamination, 2004, DEFRA/Environment Agency.

Environment Agency guidance document Verification of Remediation of Land Contamination (report SC030114/R1 dated 2010).

Method for Deriving Site-Specific Human Health Criteria for Contaminants in Soil, SNIFFER, 2003.

Technical evaluation of the Intervention Values for Soil/Sediment and Groundwater, RIVM Report 711701 023, National Institute of Public Health and the Environment, 2001.

The Water Supply (Water Quality) Regulations. HMSO. 2000

Code of Practice for Investigation and Mitigation of Possible Petroleum –Based Land Contamination, 1993, Institute of Petroleum, London.

Contaminated Land Management – Ready Reference, J Nathanail, P Bardos and P Nathanail, Land Quality Press, 2002.

BRE Digest 412 'Desiccation in Clay Soils', 1996

Hydrogeological Risk Assessment for Land Contamination Remedial Targets Worksheet, release 3.1 – October 2006

Mobilising Nature's Army: Monitored Natural Attenuation – dealing with pollution using natural processes, Environment Agency. 2004

Remediation Targets Methodology: Hydrogeological Risk Assessment for Land Contamination, Environment Agency. 2006

LFTGN01. Hydrogeological Risk Assessment for landfill and the derivation of groundwater control and trigger levels. Environment Agency 2003

NOTES AND LIMITATIONS

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the proposed plans for the site in the future. If, however, the site is developed for a varying use, then a different interpretation might be appropriate.

The report has been prepared following the guidelines and principles established in the British Standards. It necessarily relies on the co-operation of other organisations and the free availability of information and total access. Where data supplied by the Client, including that from previous site investigations, have been used, it has been assumed that the information is correct. No responsibility can be accepted by PGE for inaccuracies within the data supplied.

No responsibility can, therefore, be accepted for conditions arising from information that was not available to the investigating team because of information being withheld or access being denied.

The scope of this Ground Investigation was discussed and agreed with the Client. No responsibility is accepted for conditions not encountered, which are outside of the agreed scope of work.

This report may suggest an opinion on a possible configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy. Comments on the groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted, however, that groundwater levels might vary due to seasonal or other effects.

It should be noted that this report is based solely on the samples collected in the borehole locations investigated. During the works and following general site clearance, should the sub-soil conditions in other areas of the site appear to be inconsistent with those found in the areas sampled then this geotechnical appraisal and site contamination assessment may need to be reviewed.

This report is prepared and written in the context of the proposals stated in the introduction to this report and it should not be used in a differing context. Furthermore, new information, improved practices and changes in legislation may require an alteration to the report in whole or in part after its submission. Therefore, with any changes in circumstances, or after one year from the date of the report, the report should be referred to Paddock Geo Engineering Limited for re-assessment (and, if necessary, for an estimate for the cost of such).

The copyright of this report and any associated plans and documents prepared by Paddock Geo Engineering Limited is owned by them and should not be reproduced, published or adapted, in whole or part, without their written consent.

The report is provided for the sole use by the Client and is confidential to him/her and his/her professional advisors. No responsibility whatsoever for the contents of this report will be accepted to any other person other than the Client.

APPENDIX A

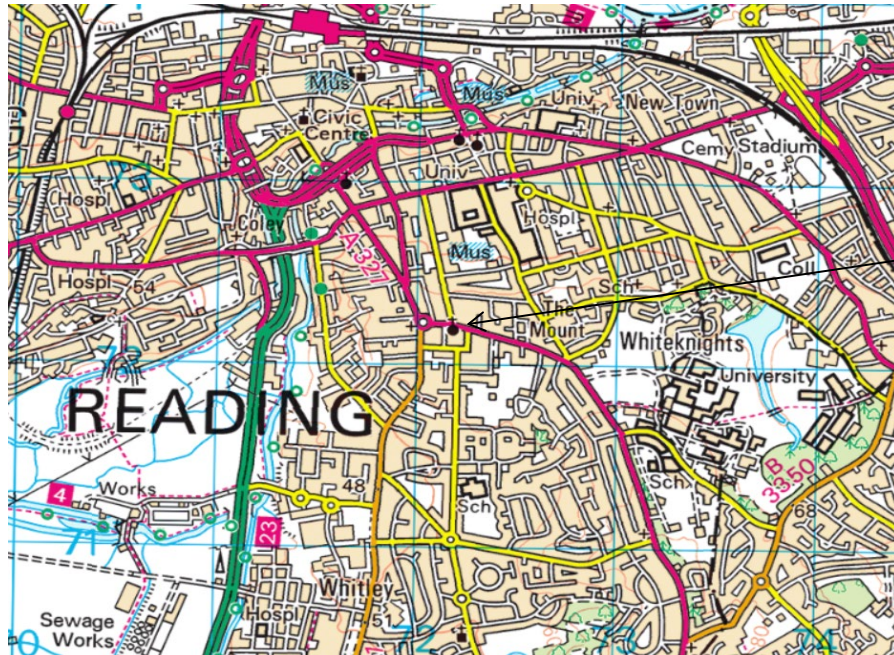
Site Location Plan

Aerial Photograph

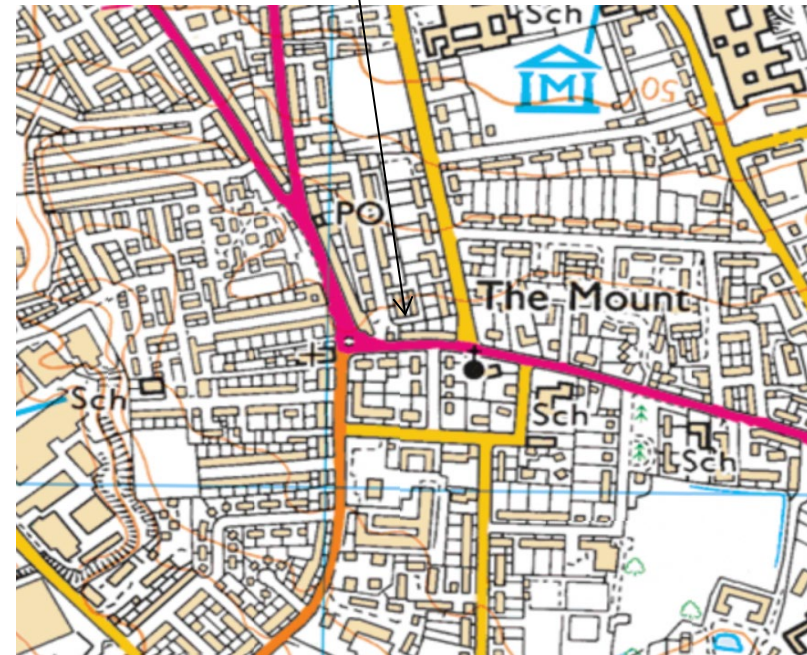
Site Plan

Proposed Development Plan

SITE LOCATION PLAN



Site Location



PADDOCK
GEO ENGINEERING

CLIENT: Oak and Lime Limited
PROJECT No: P20-060
PROJECT TITLE: 125 Highgrove Street, Reading, RG1 5EJ

SITE PLAN



PADDOCK
GEO ENGINEERING

CLIENT: Oak and Lime Limited
PROJECT No: P20-060
PROJECT TITLE: 125 Highgrove Street, Reading, RG1 5EJ

AERIAL PHOTOGRAPH



PADDOCK
GEO ENGINEERING

CLIENT: Oak and Lime Limited
PROJECT No: P20-060
PROJECT TITLE: 125 Highgrove Street, Reading, RG1 5EJ



0 m 50 m 100 m
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Location plan 1:1250



0 m 50 m

Proposed site plan 1:500

General Notes
Do not scale dimensions from this drawing. If in doubt ask! All dimensions should be checked on site.

This drawing is to be read in conjunction with all relevant other drawings, detailed specifications, Engineer's drawings, detail sheets and calculations. Assumptions have been made on some of the detail to existing fabric. Any discrepancies or differences to be reported back by the main contractor upon opening up.

Materials and workmanship
Any building work to be carried out with proper materials and in a workmanlike manner in accordance with regulation 7 of the Building Regulations. The builder may show compliance with regulation 7 in a number of ways including the appropriate use of a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC) as amended by the CE Marking Directive (93/68/EEC)1 or a product complying with an appropriate technical specification (as defined in those Directives), a British Standard or an alternative national technical specification of any state which is a contracting party to the European Economic Area which in use is equivalent, or a product covered by a national or European certificate issued by a European Technical Approval issuing body, and the conditions of use are in accordance with the terms of the certificate.

1	New scheme.	09/06/2017
0		01/11/2016
No.	Revisions	Date

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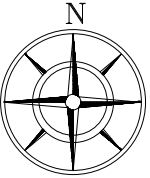
Unit 1 - The Hall
High Street,
Tetsworth,
Oxfordshire
OX9 7AB
01844 281715

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Project Name and Address
Proposed development.
Highgrove Yard.
125 Highgrove St.
Reading. RG1 5EJ
Berkshire.
Drawing Title
Location & site plan
Turning circles

Drawing No.	285/100	Scale	Rev
Date drawn	01 Nov. '16	As noted	2

2300N

172300N



- KEY TO SURVEYED ITEMS:
- CL = CEILING LEVEL
 - GSL = GENERAL SOFFIT LEVEL
 - SCL = SUSPENDED CEILING LEVEL
 - BL = BEAM LEVEL
 - BSL = BEAM SOFFIT LEVEL
 - FCSL = FIRE PROTECTION CLADDING SOFFIT LEVEL
 - DL = DOOR LEVEL
 - DSL = DOOR SOFFIT LEVEL
 - PTL = PIPE TOP LEVEL
 - RWP = RAIN WATER PIPE
 - SVP = SOIL & VENT PIPE
 - PSL = PIPE SOFFIT LEVEL
 - MSL = MISCELLANEOUS SOFFIT LEVEL
 - ESL = EXTERNAL SOFFIT LEVEL
 - ISL = INTERNAL SOFFIT LEVEL
 - TL = TOP LEVEL
 - BTOP = TOP OF BUSHES LEVEL
 - HTOP = TOP OF HEDGE LEVEL
 - FTOP = TOP OF FENCE LEVEL
 - WTOP = TOP OF WALL LEVEL
 - TTOP = TREE TOP LEVEL
 - RL = ROOF LEVEL
 - HEAD = TOP OF WINDOW OR APERTURE
 - SILL = BOTTOM OF WINDOW OR APERTURE
 - RFL = RAISED FLOOR LEVEL
 - FL = FLOOR LEVEL
 - GL = GROUND LEVEL
 - KL = KERB LEVEL
 - DKL = DROP KERB LEVEL
 - PH = FIRE HYDRANT
 - BT = BRITISH TELECOM
 - MH = MANHOLE
 - CUL = CULVERT LEVEL
 - INV = INVERT LEVEL
 - SV = STOP VALVE
 - DN = DRAIN
 - SP = SIGN POST
 - SB = SIGN BOARD
 - LP = LAMP POST
 - PM = PARKING METER
 - TLT = TRAFFIC LIGHT
 - BOL = BOLLARD
 - = LINE OF WALL
 - = HIDDEN WALL LINE
 - = OVERHEAD LINE OF STRUCTURE
 - = ROOFING LINE
 - = LINE OF METAL CLADDING
 - = OVERHEAD LINE OF METAL CLADDING
 - = LINE OF PARTITION OR STUD WALL
 - = OVERHEAD LINE OF PARTITION OR STUD WALL
 - = HIDDEN LINE OF PARTITION OR STUD WALL
 - = LINE OF FIRE PROTECTION CLADDING
 - = OVERHEAD LINE OF FIRE PROTECTION CLADDING
 - = LINE OF PARTITION WITH GLASS
 - = WINDOW LINE
 - = OVERHEAD WINDOW LINE
 - = HIDDEN WINDOW LINE
 - = LINE OF BARRIER
 - = LINE OF TIMBER
 - = OVERHEAD LINE OF TIMBER (UPPER)
 - = OVERHEAD LINE OF TIMBER (LOWER)
 - = HIDDEN LINE OF TIMBER (UPPER, LOWER)
 - = LINE OF BEAM
 - = LINE OF STEEL
 - = CEILING LINE
 - = HIDDEN CEILING LINE
 - = SUSPENDED CEILING LINE
 - = FLOOR LINE
 - = CHANGE OF SURFACE TYPE
 - = MANHOLE COVER
 - = LIGHTING
 - = DRAIN
 - = FURNISHINGS
 - = VENTILATION
 - = PLANT EQUIPMENT
 - = OVERHEAD PLANT EQUIPMENT (OH)
 - = HEATING
 - = PIPE
 - = HIDDEN PIPE
 - = DOOR
 - = OVERHEAD DOOR MECHANISM
 - = ROAD
 - = FOOTPATH EDGE
 - = ROAD MARKINGS
 - = DETAIL BREAK
 - = TREE
 - = TOP OF BANK
 - = BOTTOM OF BANK

NOTE:
SURVEYED TO OS GRID & DATUM
LINEWORK SHOULD BE TREATED AS GENERIC
DOORS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY
PERIMETER WALLS HAVE AN ESTIMATED LINE SHOWN ON THE
NEIGHBOURS SIDE
WALL LINES ARE EXTENDED TO INCLUDE DOOR FRAMES
WALL LINES ABOVE DOOR FRAMES ARE OMITTED
DOOR APERTURES AND SOFFIT LEVELS EXCLUDE DOOR STOPS
WINDOW MULLIONS ARE OMITTED
GLAZING LINES ARE OMITTED
SILLS SKIRTINGS DOOR STOPS & ARCHITRAVE DETAILS ARE OMITTED
DETAILS ABOVE AREAS OF CEILING ARE OMITTED
PLANT EQUIPMENT LINES SHOULD BE TREATED AS INDICATIVE
PIPEWORK LINES ARE INDICATIVE
FLOOR DETAILS UNDER AREAS OF RAISED FLOOR ARE OMITTED
FURNISHINGS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY
HIDDEN LINES ARE SHOWN ABOVE OVERHEAD DETAIL AND WHERE
DETAIL PASSES BEYOND THE FOOTPRINT OF A ROOM

LOCATION
READING
125 HIGHGROVE STREET

TITLE
SITE PLAN
EXISTING LEVELS

SCALE 1:250 (A1)	DRAWING No RD04517
DATE 03.05.17	
DRAWN AB	REVISED * SURVEYED AB

Drawings produced by
C.H.Surveys Ltd.
11, Chandos Road, Staines
Middlesex TW18 3AT
Telephone (mobi) 0719601 293724
Facsimile 0719601 455953
Email: clive@chs-surveys.co.uk

0 1 2 3 4 5 10
METRES

67.2m+

472100E

A327 CHRISTCHURCH ROAD

68.0m+

472200E

HIGHGROVE STREET

KENDRICK ROAD

Surgery
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General Notes
Do not scale dimensions from this drawing. If in doubt ask! All dimensions should be checked on site.

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0 m 5 m 10 m

Proposed site plan Ground Floor scale 1:200



3	Rooflights added on units 6, 7 & 8.	24/08/2017
2	Units 5 & 6 updated.	17/08/2017
1	New layout	01/08/2017
0		26/05/2017

No. Revisions Date

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High Street,
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OX9 7AB
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Project Name and Address

Proposed development.

Highgrove Yard.

125 Highgrove St.

Reading, RG1 5EJ

Berkshire.

Drawing Title

Proposed Site Plan

Ground Floor

Drawing No. 285/111
Date drawn 01 Nov. '16
Scale 1:200
Rev. 3

APPENDIX B

Source-Pathway-Receptor Ground Model

Potential On-Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Elevated concentrations of lead, arsenic and PAH identified within the near surface Made Ground soils Chrysotile Asbestos identified with WS3 at 0.40m. Quantification testing indicated <0.001%. Elevated ground gases.	Dermal/Direct Contact	Current site users (Disused Farm buildings)	N	
	Direct Ingestion		N	
	Direct Inhalation		N	
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		N	
	Vapour Migration		N	
	Gas Migration		N	
	Dermal/Direct Contact	Future site users (Residential with plant uptake)	Y	Low
	Direct Ingestion		Y	Low
	Direct Inhalation		Y	Low
	Inhalation of Radon Gas		N	
	Inhalation of Wind Blown Dust		Y	Low
	Vapour Migration		Y	Moderate - Odours only
	Ground Gas Migration		Y	Moderate
	Direct Contact	Services	Y	Low
	Migration of Contaminants – Non-Aqueous Phased		Y	Low
	Migration of Contaminants – Aqueous Phased		Y	Low
	Migration of Contaminants – Non-Aqueous Phased	Adjacent Properties	N	
	Migration of Contaminants – Aqueous Phased		N	
	Vapour Migration		N	
	Inhalation of Wind Blown Dust	Ecological Impacts	N	
	Migration of Contaminants – Non-Aqueous Phased		N	
	Migration of Contaminants – Aqueous Phased		N	
	Migration of Contaminants from site – Non-Aqueous Phased	Controlled groundwater	N	
	Migration of Contaminants from site – Aqueous Phased		N	
	Migration of Contaminants – Non-Aqueous Phased	Surface Waters	N	
	Migration of Contaminants – Aqueous Phased		N	

APPENDIX C

Remediation Options Matrix

Remediation Option Applicability Matrix: Organic Substances

Remediation Option	Applicable Media	Applicable Substances						
		VOCs	Halogenated hydrocarbons	Non-halogenated hydrocarbons	PAHs	PCBs	Dioxins + Furans	Pesticides + herbicides
Civil Engineering Methods								
Containment - Cover systems	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Containment - Hydraulic barriers	W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Containment - In-ground barriers	S, W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Excavation and Disposal	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Biological Methods								
Natural Attenuation	W	Yes	Yes	Yes	Yes	No	No	Yes
Biopiles	S	Yes	No	Yes	Yes	No	No	Yes
Bioventing	S	Yes	Yes	Yes	Yes	No	No	No
Biosparging	S, W	Yes	Yes	Yes	Yes	No	No	Yes
Landfarming	S	Yes	No	Yes	Yes	No	No	Yes
Slurry phase biotreatment	S	Yes	Yes	Yes	Yes	No	?	Yes
Windrow turning	S	Yes	No	Yes	Yes	No	No	Yes
Chemical Methods								
Chemical oxidation	S, W	Yes	Yes	Yes	Yes	No	No	Yes
Chemical dehalogenation	S	Yes	Yes	Yes	No	No	Yes	No
Soil flushing	S	Yes	Yes	Yes	Yes	No	No	No
Solvent extraction	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surface amendments	S	No	No	No	No	No	No	No
Physical Methods								
Dual Phase SVE	S, W	Yes	Yes	Yes	No	No	No	No
Air sparging	W	Yes	Yes	Yes	No	No	No	No
Soil vapour extraction (SVE)	S	Yes	Yes	Yes	No	No	No	No
Permeable reactive barriers (PRBs)	W	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Soil washing	S	No	Yes	Yes	Yes	Yes	No	Yes
Stabilisation and Solidification Methods								
Hydraulic binders (e.g., cement)	S	No	No	?	Yes	Yes	Yes	?
Vitrification	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thermal Methods								
Incineration	S	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thermal desorption	S	Yes	Yes	Yes	Yes	Yes	No	Yes

Yes	Most Suitable Method
Yes	Potentially applicable
No	Not applicable
?	A pre-treatment step may be necessary prior to the method being suitable
S	Soils, made ground and sediments
W	Groundwater and surface water

Remediation Option Applicability Matrix: Inorganic Substances

Remediation Option	Applicable Media	Applicable Substances				
		Heavy metals	Non-metals	Asbestos	Cyanides	Explosives
Civil Engineering Methods						
Containment - Cover systems	S	Yes	Yes	Yes	Yes	Yes
Containment - Hydraulic barriers	W	Yes	Yes	Yes	Yes	Yes
Containment - In-ground barriers	S, W	Yes	Yes	Yes	Yes	Yes
Excavation and Disposal	S	Yes	Yes	Yes	Yes	Yes
Biological Methods						
Natural Attenuation	W	Yes	Yes	No	No	Yes
Biopiles	S	No	No	No	No	Yes
Bioventing	S	No	No	No	No	No
Biosparging	S, W	No	No	No	No	No
Landfarming	S	No	No	No	No	Yes
Slurry phase biotreatment	S	No	No	No	Yes	Yes
Windrow turning	S	No	No	No	No	Yes
Chemical Methods						
Chemical oxidation	S, W	No	Yes	No	No	No
Chemical dehalogenation	S	No	No	No	No	No
Soil flushing	S	Yes	No	No	No	No
Solvent extraction	S	No	No	No	No	Yes
Surface amendments	S	Yes	Yes	No	No	No
Physical Methods						
Dual Phase SVE	S, W	No	Yes	No	No	No
Air sparging	W	No	No	No	No	No
Soil vapour extraction (SVE)	S	Yes	No	No	No	No
Permeable reactive barriers (PRBs)	W	No	No	No	No	Yes
Soil washing	S	Yes	Yes	No	No	No
Stabilisation and Solidification Methods						
Hydraulic binders (e.g., cement)	S	Yes	Yes	Yes	?	No
Vitrification	S	Yes	Yes	Yes	Yes	Yes
Thermal Methods						
Incineration	S	Yes	Yes	Yes	Yes	Yes
Thermal desorption	S	Yes	No	No	Yes	No

Yes	Most Suitable Method
Yes	Potentially applicable
No	Not applicable
?	A pre-treatment step may be necessary prior to the method being suitable
S	Soils, made ground and sediments
W	Groundwater and surface water

APPENDIX D
Remediation Plan

Remediation Plan

125 Highgrove Street,
Reading,
RG1 5EJ.

Oak and Lime Limited

September 2020



 Window Sampling Locations

 Window Sampling Locations with monitoring standpipe installed

 Approximate outline of soft landscaping areas for stripping of Made Ground and replacement with Clean Cover System

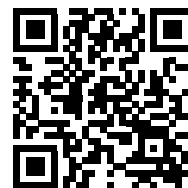
Not to scale.
All positions are approximate.
Based on plan provided by client.

APPENDIX E

Soil Waste Classification Data

PGE In-House GACs

Waste Classification Report



LF65K-UK8C9-9DRQ9

Job name

125 Highgrove Street, Reading, RG1 5EJ

Description/Comments

Project

P20-060

Site

125 Highgrove Street, Reading, RG1 5EJ

Related Documents

#	Name	Description
None		

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Matthew Paddock

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HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	-
Advanced Hazardous Waste Classification	-

Report

Created by: Matthew Paddock
Created date: 03 Jun 2020 09:33 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1	0.4	Non Hazardous		3
2	WS1[2]	0.9	Non Hazardous		5
3	WS2	0.8	Non Hazardous		7
4	WS3	0.4	Non Hazardous		9
5	WS3[2]	0.9	Non Hazardous		11
6	WS4	0.4	Non Hazardous		13
7	WS5	0.4	Non Hazardous		15
8	WS6	0.3	Non Hazardous		17
9	WS6[2]	0.9	Non Hazardous		20

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Classification of sample: WS1

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

Sample details

Sample Name:	WS1	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.4 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				27	mg/kg	1.32	35.649	mg/kg	0.00356 %		
		033-003-00-0	215-481-4	1327-53-3									
2		beryllium { beryllium oxide }				1.4	mg/kg	2.775	3.885	mg/kg	0.000389 %		
		004-003-00-8	215-133-1	1304-56-9									
3		boron { diboron trioxide; boric oxide }				1	mg/kg	3.22	3.22	mg/kg	0.000322 %		
		005-008-00-8	215-125-8	1303-86-2									
4		cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.343	mg/kg	0.0000343 %		
		048-002-00-0	215-146-2	1306-19-0									
5		chromium in chromium(III) compounds {  chromium(III) oxide (worst case) }				20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
			215-160-9	1308-38-9									
6		copper { dicopper oxide; copper (I) oxide }				76	mg/kg	1.126	85.568	mg/kg	0.00856 %		
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead chromate }			1	490	mg/kg	1.56	764.309	mg/kg	0.049 %		
		082-004-00-2	231-846-0	7758-97-6									
8		mercury { mercury dichloride }				1.1	mg/kg	1.353	1.489	mg/kg	0.000149 %		
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel chromate }				23	mg/kg	2.976	68.454	mg/kg	0.00685 %		
		028-035-00-7	238-766-5	14721-18-7									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.554	mg/kg	0.000255 %		
		034-002-00-8											
11		zinc { zinc chromate }				250	mg/kg	2.774	693.537	mg/kg	0.0694 %		
		024-007-00-3	236-878-9	13530-65-9									
12		TPH (C6 to C40) petroleum group				54	mg/kg		54	mg/kg	0.0054 %		
				TPH									
13		pH				8.4	pH		8.4	pH	8.4 pH		
				PH									
14		naphthalene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-052-00-2	202-049-5	91-20-3									
15		acenaphthylene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
			205-917-1	208-96-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		1.6 mg/kg		1.6 mg/kg	0.00016 %		
19	anthracene	204-371-1	120-12-7		0.34 mg/kg		0.34 mg/kg	0.000034 %		
20	fluoranthene	205-912-4	206-44-0		6.4 mg/kg		6.4 mg/kg	0.00064 %		
21	pyrene	204-927-3	129-00-0		5.9 mg/kg		5.9 mg/kg	0.00059 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		4.2 mg/kg		4.2 mg/kg	0.00042 %		
23	chrysene	601-048-00-0	205-923-4		3.2 mg/kg		3.2 mg/kg	0.00032 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		5.6 mg/kg		5.6 mg/kg	0.00056 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		2.5 mg/kg		2.5 mg/kg	0.00025 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		4.3 mg/kg		4.3 mg/kg	0.00043 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		2.6 mg/kg		2.6 mg/kg	0.00026 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.71 mg/kg		0.71 mg/kg	0.000071 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		2.9 mg/kg		2.9 mg/kg	0.00029 %		
Total:								0.151 %		

Key

- User supplied data
- 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0054%)

Classification of sample: WS1[2]

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

Sample details

Sample Name:	LoW Code:
WS1[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.9 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				6.5 mg/kg	1.32	8.582 mg/kg	0.000858 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				0.39 mg/kg	2.775	1.082 mg/kg	0.000108 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				0.6 mg/kg	3.22	1.932 mg/kg	0.000193 %			
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				13 mg/kg	1.462	19 mg/kg	0.0019 %			
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				2.7 mg/kg	1.126	3.04 mg/kg	0.000304 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	14 mg/kg	1.56	21.837 mg/kg	0.0014 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				0.3 mg/kg	1.353	0.406 mg/kg	0.0000406 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				9.9 mg/kg	2.976	29.465 mg/kg	0.00295 %			
	028-035-00-7	238-766-5	14721-18-7								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.554	2.554 mg/kg	0.000255 %			
	034-002-00-8										
11	zinc { zinc chromate }				21 mg/kg	2.774	58.257 mg/kg	0.00583 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %			
			TPH								
13	pH				8.4 pH		8.4 pH	8.4 pH			
			PH								
14	naphthalene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
	601-052-00-2	202-049-5	91-20-3								
15	acenaphthylene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
		205-917-1	208-96-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
21	pyrene	204-927-3	129-00-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
23	chrysene	601-048-00-0	205-923-4		0.05 mg/kg		0.05 mg/kg	0.000005 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.05 mg/kg		0.05 mg/kg	0.000005 %		
Total:								0.0149 %		

Key

- User supplied data
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 - Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS2

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

Sample details

Sample Name:	WS2	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.8 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
1		arsenic { arsenic trioxide }				7	mg/kg	1.32	9.242	mg/kg	0.000924 %			
		033-003-00-0	215-481-4	1327-53-3										
2		beryllium { beryllium oxide }				0.37	mg/kg	2.775	1.027	mg/kg	0.000103 %			
		004-003-00-8	215-133-1	1304-56-9										
3		boron { diboron trioxide; boric oxide }				0.8	mg/kg	3.22	2.576	mg/kg	0.000258 %			
		005-008-00-8	215-125-8	1303-86-2										
4		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %			
		048-002-00-0	215-146-2	1306-19-0										
5		chromium in chromium(III) compounds {  chromium(III) oxide (worst case) }				13	mg/kg	1.462	19	mg/kg	0.0019 %			
			215-160-9	1308-38-9										
6		copper { dicopper oxide; copper (I) oxide }				6	mg/kg	1.126	6.755	mg/kg	0.000676 %			
		029-002-00-X	215-270-7	1317-39-1										
7		lead { lead chromate }			1	51	mg/kg	1.56	79.551	mg/kg	0.0051 %			
		082-004-00-2	231-846-0	7758-97-6										
8		mercury { mercury dichloride }				0.3	mg/kg	1.353	0.406	mg/kg	0.0000406 %			
		080-010-00-X	231-299-8	7487-94-7										
9		nickel { nickel chromate }				11	mg/kg	2.976	32.739	mg/kg	0.00327 %			
		028-035-00-7	238-766-5	14721-18-7										
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.554	mg/kg	0.000255 %			
		034-002-00-8												
11		zinc { zinc chromate }				24	mg/kg	2.774	66.58	mg/kg	0.00666 %			
		024-007-00-3	236-878-9	13530-65-9										
12		TPH (C6 to C40) petroleum group				19	mg/kg		19	mg/kg	0.0019 %			
				TPH										
13		pH				8.1	pH		8.1	pH	8.1 pH			
				PH										
14		naphthalene				0.05	mg/kg		0.05	mg/kg	0.000005 %			
		601-052-00-2	202-049-5	91-20-3										
15		acenaphthylene				0.05	mg/kg		0.05	mg/kg	0.000005 %			
			205-917-1	208-96-8										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		1.1 mg/kg		1.1 mg/kg	0.00011 %		
21	pyrene	204-927-3	129-00-0		0.89 mg/kg		0.89 mg/kg	0.000089 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.42 mg/kg		0.42 mg/kg	0.000042 %		
23	chrysene	601-048-00-0	205-923-4		0.51 mg/kg		0.51 mg/kg	0.000051 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.6 mg/kg		0.6 mg/kg	0.00006 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.26 mg/kg		0.26 mg/kg	0.000026 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.39 mg/kg		0.39 mg/kg	0.000039 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.25 mg/kg		0.25 mg/kg	0.000025 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.25 mg/kg		0.25 mg/kg	0.000025 %		
Total:								0.0216 %		

Key

- User supplied data
 - 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0019%)

Classification of sample: WS3

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

Sample details

Sample Name:	LoW Code:	
WS3	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.4 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				13 mg/kg	1.32	17.164 mg/kg	0.00172 %		
	033-003-00-0	215-481-4	1327-53-3							
2	beryllium { beryllium oxide }				0.66 mg/kg	2.775	1.832 mg/kg	0.000183 %		
	004-003-00-8	215-133-1	1304-56-9							
3	boron { diboron trioxide; boric oxide }				1.5 mg/kg	3.22	4.83 mg/kg	0.000483 %		
	005-008-00-8	215-125-8	1303-86-2							
4	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
	048-002-00-0	215-146-2	1306-19-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				31 mg/kg	1.126	34.903 mg/kg	0.00349 %		
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead chromate }			1	890 mg/kg	1.56	1388.235 mg/kg	0.089 %		
	082-004-00-2	231-846-0	7758-97-6							
8	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.812 mg/kg	0.0000812 %		
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel chromate }				18 mg/kg	2.976	53.573 mg/kg	0.00536 %		
	028-035-00-7	238-766-5	14721-18-7							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.554	2.554 mg/kg	0.000255 %		
	034-002-00-8									
11	zinc { zinc chromate }				150 mg/kg	2.774	416.122 mg/kg	0.0416 %		
	024-007-00-3	236-878-9	13530-65-9							
12	TPH (C6 to C40) petroleum group				550 mg/kg		550 mg/kg	0.055 %		
			TPH							
13	pH				8 pH		8 pH	8pH		
			PH							
14	naphthalene				0.46 mg/kg		0.46 mg/kg	0.000046 %		
	601-052-00-2	202-049-5	91-20-3							
15	acenaphthylene				1.4 mg/kg		1.4 mg/kg	0.00014 %		
		205-917-1	208-96-8							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.25 mg/kg		0.25 mg/kg	0.000025 %		
17	fluorene	201-695-5	86-73-7		0.47 mg/kg		0.47 mg/kg	0.000047 %		
18	phenanthrene	201-581-5	85-01-8		8.2 mg/kg		8.2 mg/kg	0.00082 %		
19	anthracene	204-371-1	120-12-7		2 mg/kg		2 mg/kg	0.0002 %		
20	fluoranthene	205-912-4	206-44-0		29 mg/kg		29 mg/kg	0.0029 %		
21	pyrene	204-927-3	129-00-0		27 mg/kg		27 mg/kg	0.0027 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		20 mg/kg		20 mg/kg	0.002 %		
23	chrysene	601-048-00-0	205-923-4		14 mg/kg		14 mg/kg	0.0014 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		23 mg/kg		23 mg/kg	0.0023 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		8.7 mg/kg		8.7 mg/kg	0.00087 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		18 mg/kg		18 mg/kg	0.0018 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		9.4 mg/kg		9.4 mg/kg	0.00094 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		2.7 mg/kg		2.7 mg/kg	0.00027 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		10 mg/kg		10 mg/kg	0.001 %		
Total:								0.217 %		

Key

- User supplied data
 - 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.055%)

Classification of sample: WS3[2]

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

Sample details

Sample Name:	LoW Code:	
WS3[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.9 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	15.844 mg/kg	0.00158 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				0.43 mg/kg	2.775	1.193 mg/kg	0.000119 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				1.1 mg/kg	3.22	3.542 mg/kg	0.000354 %			
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17 mg/kg	1.462	24.846 mg/kg	0.00248 %			
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				1 mg/kg	1.126	1.126 mg/kg	0.000113 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	11 mg/kg	1.56	17.158 mg/kg	0.0011 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				0.3 mg/kg	1.353	0.406 mg/kg	0.0000406 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				9.9 mg/kg	2.976	29.465 mg/kg	0.00295 %			
	028-035-00-7	238-766-5	14721-18-7								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.554	2.554 mg/kg	0.000255 %			
	034-002-00-8										
11	zinc { zinc chromate }				12 mg/kg	2.774	33.29 mg/kg	0.00333 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %			
			TPH								
13	pH				7.9 pH		7.9 pH	7.9 pH			
			PH								
14	naphthalene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
	601-052-00-2	202-049-5	91-20-3								
15	acenaphthylene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
		205-917-1	208-96-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
21	pyrene	204-927-3	129-00-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
23	chrysene	601-048-00-0	205-923-4		0.05 mg/kg		0.05 mg/kg	0.000005 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.05 mg/kg		0.05 mg/kg	0.000005 %		
Total:								0.0134 %		

Key

- User supplied data
 - 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS4

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

Sample details

Sample Name:	WS4	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.4 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	15.844 mg/kg	0.00158 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				0.59 mg/kg	2.775	1.637 mg/kg	0.000164 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				0.9 mg/kg	3.22	2.898 mg/kg	0.00029 %			
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17 mg/kg	1.462	24.846 mg/kg	0.00248 %			
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				22 mg/kg	1.126	24.77 mg/kg	0.00248 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	250 mg/kg	1.56	389.954 mg/kg	0.025 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.812 mg/kg	0.0000812 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				11 mg/kg	2.976	32.739 mg/kg	0.00327 %			
	028-035-00-7	238-766-5	14721-18-7								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.554	2.554 mg/kg	0.000255 %			
	034-002-00-8										
11	zinc { zinc chromate }				90 mg/kg	2.774	249.673 mg/kg	0.025 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %			
			TPH								
13	pH				7.5 pH		7.5 pH	7.5 pH			
			PH								
14	naphthalene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
	601-052-00-2	202-049-5	91-20-3								
15	acenaphthylene				0.05 mg/kg		0.05 mg/kg	0.000005 %			
		205-917-1	208-96-8								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		0.88 mg/kg		0.88 mg/kg	0.000088 %		
21	pyrene	204-927-3	129-00-0		0.8 mg/kg		0.8 mg/kg	0.00008 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.54 mg/kg		0.54 mg/kg	0.000054 %		
23	chrysene	601-048-00-0	205-923-4		0.68 mg/kg		0.68 mg/kg	0.000068 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.65 mg/kg		0.65 mg/kg	0.000065 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.47 mg/kg		0.47 mg/kg	0.000047 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.53 mg/kg		0.53 mg/kg	0.000053 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.24 mg/kg		0.24 mg/kg	0.000024 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.33 mg/kg		0.33 mg/kg	0.000033 %		
Total:								0.0621 %		

Key

- User supplied data
 - 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS5

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

Sample details

Sample Name:	WS5	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.4 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
1		arsenic { arsenic trioxide }				18	mg/kg	1.32	23.766	mg/kg	0.00238 %			
		033-003-00-0	215-481-4	1327-53-3										
2		beryllium { beryllium oxide }				0.56	mg/kg	2.775	1.554	mg/kg	0.000155 %			
		004-003-00-8	215-133-1	1304-56-9										
3		boron { diboron trioxide; boric oxide }				1.9	mg/kg	3.22	6.118	mg/kg	0.000612 %			
		005-008-00-8	215-125-8	1303-86-2										
4		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.228	mg/kg	0.0000228 %			
		048-002-00-0	215-146-2	1306-19-0										
5		chromium in chromium(III) compounds {  chromium(III) oxide (worst case) }				15	mg/kg	1.462	21.923	mg/kg	0.00219 %			
			215-160-9	1308-38-9										
6		copper { dicopper oxide; copper (I) oxide }				18	mg/kg	1.126	20.266	mg/kg	0.00203 %			
		029-002-00-X	215-270-7	1317-39-1										
7		lead { lead chromate }			1	120	mg/kg	1.56	187.178	mg/kg	0.012 %			
		082-004-00-2	231-846-0	7758-97-6										
8		mercury { mercury dichloride }				0.8	mg/kg	1.353	1.083	mg/kg	0.000108 %			
		080-010-00-X	231-299-8	7487-94-7										
9		nickel { nickel chromate }				11	mg/kg	2.976	32.739	mg/kg	0.00327 %			
		028-035-00-7	238-766-5	14721-18-7										
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.554	mg/kg	0.000255 %			
		034-002-00-8												
11		zinc { zinc chromate }				36	mg/kg	2.774	99.869	mg/kg	0.00999 %			
		024-007-00-3	236-878-9	13530-65-9										
12		TPH (C6 to C40) petroleum group				10	mg/kg		10	mg/kg	0.001 %			
				TPH										
13		pH				8.2	pH		8.2	pH	8.2 pH			
				PH										
14		naphthalene				0.05	mg/kg		0.05	mg/kg	0.000005 %			
		601-052-00-2	202-049-5	91-20-3										
15		acenaphthylene				0.05	mg/kg		0.05	mg/kg	0.000005 %			
			205-917-1	208-96-8										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
21	pyrene	204-927-3	129-00-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
23	chrysene	601-048-00-0	205-923-4		0.05 mg/kg		0.05 mg/kg	0.000005 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.05 mg/kg		0.05 mg/kg	0.000005 %		
Total:								0.0341 %		

Key

- User supplied data
 - 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
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Classification of sample: WS6

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

Sample details

Sample Name:	WS6	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.3 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				73 mg/kg	1.32	96.384 mg/kg	0.00964 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				0.82 mg/kg	2.775	2.276 mg/kg	0.000228 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				1.1 mg/kg	3.22	3.542 mg/kg	0.000354 %			
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				21 mg/kg	1.462	30.693 mg/kg	0.00307 %			
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				11 mg/kg	1.126	12.385 mg/kg	0.00124 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	260 mg/kg	1.56	405.552 mg/kg	0.026 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				0.4 mg/kg	1.353	0.541 mg/kg	0.0000541 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				28 mg/kg	2.976	83.335 mg/kg	0.00833 %			
	028-035-00-7	238-766-5	14721-18-7								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1 mg/kg	2.554	2.554 mg/kg	0.000255 %			
	034-002-00-8										
11	zinc { zinc chromate }				180 mg/kg	2.774	499.346 mg/kg	0.0499 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %			
			TPH								
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1 mg/kg		1 mg/kg	0.0001 %			
	603-181-00-X	216-653-1	1634-04-4								
14	benzene				1 mg/kg		1 mg/kg	0.0001 %			
	601-020-00-8	200-753-7	71-43-2								
15	toluene				1 mg/kg		1 mg/kg	0.0001 %			
	601-021-00-3	203-625-9	108-88-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	ethylbenzene				1 mg/kg		1 mg/kg	0.0001 %		
	601-023-00-4	202-849-4	100-41-4							
17	xylene				1 mg/kg		1 mg/kg	0.0001 %		
	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]							
18	pH				8 pH		8 pH	8pH		
			PH							
19	naphthalene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
	601-052-00-2	202-049-5	91-20-3							
20	acenaphthylene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		205-917-1	208-96-8							
21	acenaphthene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		201-469-6	83-32-9							
22	fluorene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		201-695-5	86-73-7							
23	phenanthrene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		201-581-5	85-01-8							
24	anthracene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		204-371-1	120-12-7							
25	fluoranthene				0.64 mg/kg		0.64 mg/kg	0.000064 %		
		205-912-4	206-44-0							
26	pyrene				0.62 mg/kg		0.62 mg/kg	0.000062 %		
		204-927-3	129-00-0							
27	benzo[a]anthracene				0.35 mg/kg		0.35 mg/kg	0.000035 %		
	601-033-00-9	200-280-6	56-55-3							
28	chrysene				0.43 mg/kg		0.43 mg/kg	0.000043 %		
	601-048-00-0	205-923-4	218-01-9							
29	benzo[b]fluoranthene				0.43 mg/kg		0.43 mg/kg	0.000043 %		
	601-034-00-4	205-911-9	205-99-2							
30	benzo[k]fluoranthene				0.34 mg/kg		0.34 mg/kg	0.000034 %		
	601-036-00-5	205-916-6	207-08-9							
31	benzo[a]pyrene; benzo[def]chrysene				0.36 mg/kg		0.36 mg/kg	0.000036 %		
	601-032-00-3	200-028-5	50-32-8							
32	indeno[123-cd]pyrene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		205-893-2	193-39-5							
33	dibenz[a,h]anthracene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
	601-041-00-2	200-181-8	53-70-3							
34	benzo[ghi]perylene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		205-883-8	191-24-2							
Total:								0.101 %		

Key

- User supplied data
- 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

CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.0001%)

benzene: (conc.: 0.0001%)
toluene: (conc.: 0.0001%)
ethylbenzene: (conc.: 0.0001%)

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)
xylene: (conc.: 0.0001%)

Classification of sample: WS6[2]

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

Sample details

Sample Name:	WS6[2]	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.9 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	11 mg/kg	1.32	14.524	mg/kg	0.00145 %		
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	1.1 mg/kg	2.775	3.053	mg/kg	0.000305 %		
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2	1.3 mg/kg	3.22	4.186	mg/kg	0.000419 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.2 mg/kg	1.142	0.228	mg/kg	0.0000228 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		45 mg/kg	1.462	65.77	mg/kg	0.00658 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	13 mg/kg	1.126	14.637	mg/kg	0.00146 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	14 mg/kg	1.56	21.837	mg/kg	0.0014 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	0.3 mg/kg	1.353	0.406	mg/kg	0.0000406 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	27 mg/kg	2.976	80.359	mg/kg	0.00804 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			1 mg/kg	2.554	2.554	mg/kg	0.000255 %		
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	55 mg/kg	2.774	152.578	mg/kg	0.0153 %		
12	TPH (C6 to C40) petroleum group		TPH		10 mg/kg		10	mg/kg	0.001 %		
13	pH		PH		8 pH		8	pH	8pH		
14	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05 mg/kg		0.05	mg/kg	0.000005 %		
15	acenaphthylene		205-917-1	208-96-8	0.05 mg/kg		0.05	mg/kg	0.000005 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
17	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
18	phenanthrene	201-581-5	85-01-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
20	fluoranthene	205-912-4	206-44-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
21	pyrene	204-927-3	129-00-0		0.05 mg/kg		0.05 mg/kg	0.000005 %		
22	benzo[a]anthracene	601-033-00-9	200-280-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
23	chrysene	601-048-00-0	205-923-4		0.05 mg/kg		0.05 mg/kg	0.000005 %		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.05 mg/kg		0.05 mg/kg	0.000005 %		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.05 mg/kg		0.05 mg/kg	0.000005 %		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.05 mg/kg		0.05 mg/kg	0.000005 %		
Total:								0.0363 %		

Key

- User supplied data
- 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

CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because In house threshold.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462

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

■ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

■ **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

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

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

• **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

• **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

• **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

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

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

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

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulposelenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulposelenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2020.141.4306.8485 (20 May 2020)

HazWasteOnline Database: 2020.143.4308.8487 (22 May 2020)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

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

POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010

2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

GENERIC HUMAN HEALTH SCREENING TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	GAC Sources and units	With Home Grown produce	Without Home Grown produce	
Asbestos Screen & ID*	-	Detected	Detected	Detected
Cyanide - Total	SNIFFER	53.25	53.25	53.25
Cyanide - Free	SNIFFER	53.25	53.25	53.25
Loss on Ignition @ 450°C	-	-	-	-
Sulphate (as SO ₄) - Total	BRE****	2400	2400	2400
Sulphide	ICRCL	2500	2500	2500
Sulphur - Total	ICRCL	2500	2500	2500
Phenol (Total Monohydric)	CLEA	420	420	3200
pH	ICRCL	<5,>12	<5,>12	-
Metals and Metalloids (CLEA Metals)				
Arsenic	LQM S4UL	37	40	640
Beryllium	LQM S4UL	1.7	1.7	12
Cadmium	LQM S4UL	11	85	190
Chromium III	LQM S4UL	910	910	8600
Lead	DEFRA C4SL	190	310	2300
Mercury (Total)	LQM S4UL (Inorganic)	40	56	1100
Selenium	LQM S4UL	250	430	12000
Copper (phytotoxicity)	LQM S4UL	2400 (111)	7100	68000
Nickel	LQM S4UL	180	180	980
Zinc (phytotoxicity)	LQM S4UL	3700 (330)	40000	730000
Vanadium	LQM S4UL	410	1200	9000
Boron - Water Soluble	LQM S4UL	290	11000	240000
Total Petroleum Hydrocarbons**				
TPH (EC6-EC10) - PRO	LQM S4UL (2.5% SOM)	65	100	4800
TPH (EC10-EC21) - DRO	LQM S4UL (2.5% SOM)	300	600	23000
TPH (EC21-EC40) - Min. Oil	LQM S4UL (2.5% SOM)	1500	1900	28000
Total TPH (EC10-EC40)	LQM S4UL (2.5% SOM)	600	900	23000
Polycyclic Aromatic Hydrocarbons***				
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Flourene	LQM S4UL (2.5% SOM)	400	3800	68000
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Dibenzo[a,h]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6

Notes

The Generic Assessment Criteria (GAC) are based on CLEA Soil Guidance Values published values and CIEH/LQM S4CLs where available or ICRCL, DoE, BRE and HSE levels where necessary. Where gaps remain GACs were calculated using the latest CLEA spreadsheet using DEFRA C4SL toxicology and physiochemical parameters from DEFRA SP1010.

* Guidance level set at any fibre identification.

** TPH 3 band is employed as a screening tool to instigate detailed speciated analysis to the TPHCWG methodology. Based on mean of fractions included Testing based on USEPA Priority 16 compounds. GACs for four compounds and total PAH with published GACs only, used as a screening tool.

**** BRE SD1 - DS-1 Concrete Sulphate Design Class limit. Sulphate is not considered to pose a significant risk to human health under normal circumstances.



CLIENT:

PROJECT No:

PROJECT TITLE:

Oak and Lime Limited

P20-060

125 Highgrove Street,
Reading, RG1 5EJ

GENERIC HUMAN HEALTH HYDROCARBON TOTAL SOIL CONCENTRATION ASSESSMENT CRITERIA (GAC)

DETERMINAND		RESIDENTIAL (mg/kg)		COMMERCIAL (mg/kg)
Chemical	GAC Sources and units	With Home Grown produce	Without Home Grown produce	
TPH CWG				
Aliphatic EC 5-6	LQM S4UL (2.5% SOM)	78	78	5900
Aliphatic EC >6-8	LQM S4UL (2.5% SOM)	230	230	17000
Aliphatic EC >8-10	LQM S4UL (2.5% SOM)	65	65	4800
Aliphatic EC >10-12	LQM S4UL (2.5% SOM)	330	330	23000
Aliphatic EC >12-16	LQM S4UL (2.5% SOM)	2400	2400	82000
Aliphatic EC >16-35	LQM S4UL (2.5% SOM)	92000	92000	1700000
Aliphatic EC >35-44	LQM S4UL (2.5% SOM)	92000	92000	1700000
Aromatic EC 5-7 (Benzene)	LQM S4UL (2.5% SOM)	140	690	46000
Aromatic EC >7-8 (Toluene)	LQM S4UL (2.5% SOM)	290	1800	110000
Aromatic EC >8-10	LQM S4UL (2.5% SOM)	83	110	8100
Aromatic EC >10-12	LQM S4UL (2.5% SOM)	180	590	28000
Aromatic EC >12-16	LQM S4UL (2.5% SOM)	330	2300	37000
Aromatic EC >16-21	LQM S4UL (2.5% SOM)	540	1900	28000
Aromatic EC >21-35	LQM S4UL (2.5% SOM)	1500	1900	28000
Aromatic EC >35-44	LQM S4UL (2.5% SOM)	1500	1900	28000
Aliphatic and Aromatic EC >44	LQM S4UL (2.5% SOM)	1500	1900	28000
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	LQM S4UL (2.5% SOM)	510	4700	97000
Acenaphthylene	LQM S4UL (2.5% SOM)	420	4600	97000
Anthracene	LQM S4UL (2.5% SOM)	5400	35000	540000
Benzo[a]anthracene	LQM S4UL (2.5% SOM)	11	14	170
Benzo[a]pyrene	LQM S4UL (2.5% SOM)	2.7	3.2	35
Benzo[b]fluoranthene	LQM S4UL (2.5% SOM)	3.3	4	44
Benzo[ghi]perylene	LQM S4UL (2.5% SOM)	340	360	4000
Benzo[k]fluoranthene	LQM S4UL (2.5% SOM)	93	110	1200
Chrysene	LQM S4UL (2.5% SOM)	22	31	350
Dibenzo[ah]anthracene	LQM S4UL (2.5% SOM)	0.28	0.32	3.6
Fluoranthene	LQM S4UL (2.5% SOM)	560	1600	23000
Fluorene	LQM S4UL (2.5% SOM)	400	3800	68000
Indeno[123-cd]pyrene	LQM S4UL (2.5% SOM)	36	46	510
Naphthalene	LQM S4UL (2.5% SOM)	5.6	5.6	460
Phenanthrene	LQM S4UL (2.5% SOM)	220	1500	22000
Pyrene	LQM S4UL (2.5% SOM)	1200	3800	54000
Coal Tar (BaP as marker)	LQM S4UL (2.5% SOM)	0.98	1.2	15

Notes

The Generic Assessment Criteria (GAC) are based on CIEH/LQM S4ULs.



CLIENT:

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Oak and Lime Limited

P20-060

125 Highgrove Street,
Reading, RG1 5EJ