



PRELIMINARY GROUND INVESTIGATION REPORT DEACON BUSINESS PARK, KNOWSLEY

TE1704-TE-00-XX-RP-GE-002-V01

VERSION 1.0

03 JANUARY 2023

FINAL

Prepared for:

C4 Projects

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DOCUMENT CONTROL

Report No. :	TE1704-TE-00-XX-RP-GE-002-V01
Report Status:	FINAL
Version No.:	1.0
Project Engineer:	Stefani Ellis
Date of Issue:	03/01/2023

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Version No.	Description of Issue / Revision	Date of Issue	Author	Reviewed By	Approved By
1.0	FINAL	03/01/2023	Stefani Ellis	Adrian Read	Adrian Read



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EXECUTIVE SUMMARY

Introduction	Tier Environmental was commissioned by C4 Projects to undertake a Preliminary Ground Investigation of Deacon Business Park, Knowsley. The purpose of the investigation was to determine the nature and extent of soil, bedrock and groundwater beneath the Site for the purposes of environmental and geotechnical assessment. The Site was occupied at the time of the investigation thereby limiting the nature and extent of the ground investigation works possible at this stage.
Proposed land use	It is proposed that the existing buildings on site will be demolished, and the site will be developed as warehouse (use class B8) with ancillary offices, reconfigured points of access, new security gatehouses and associated works. Areas of proposed soft landscaping are located in the perimeter parts of the south, west and north of the Site.
Site location and surrounding land uses	The site is located at Deacon Business Park, Moorgate Road, Kirkby, Knowsley, L33 7RX, which is located within the existing Knowsley Industrial Estate. The surrounding Site uses comprise of commercial/industrial developments to the north, east and south with residential developments to the west.
Site history	The Site remained undeveloped from earliest available mapping (1890) as assumed agricultural land, with the 'Britain Plantation' shown in the north east quadrant of the Site. A factory appeared on Site on mapping from 1960 and the Site was redeveloped as an engineering works by 1968. The land surrounding the Site was predominantly undeveloped fields (assumed agricultural) associated with multiple farms, until the start of the development of the Kirkby Industrial Estate, later Knowsley Industrial Estate, in 1960 to the north, east and south of the Site. No map evidence is available for the Site area during World War II, however publicly available online photographs show that the Royal Ordnance Factory (ROF) Kirkby was situated approx. 245m north of Site during this time period. A residential area (Southdene) appeared on mapping from 1960 to the west of Site. Within the Knowsley Industrial Estate multiple businesses (works, vehicle repair depots, warehouses, engineering works, television repair depots, depots and body repair works) are shown between 80m and 165m south east.
Potential contaminative features	Anticipated widespread Made Ground. Although not recorded on mapping – it is possible, due to the fact the Site was detailed as an engineering works on 1966 mapping and a factory prior to this, that unrecorded features associated with these land uses such as tanks, boiler rooms and / or fuel storage area etc may be present, or may have been present, on site. In total, 2 No. circular buildings are shown in the southeast corner of site between 1966 and 2001 which, although not labelled as such, could be tanks or similar storage infrastructure. An electric substation in the northern part of the Site has been in existence since 1968 and may present a potential source of PCBs. The Phase 1 Preliminary Risk Assessment has determined a moderate to moderate/low risk to human health and a low to medium/low risk to controlled waters at the Site with respect to potential contamination and a moderate / low risk to high risk to human health with respect to hazardous ground gases.
Mining and quarrying	The Site is not located within a mining area or an area subject to historic quarrying.
Previous investigations	Tier Environmental have previously undertaken a Preliminary Risk Assessment for the Site, referenced TE1704-TE-00-XX-RP-GE-001-V01 and dated 21 st November 2022.
Fieldwork	A total of 9no. window sample holes were undertaken across the site, 7no. of which have been installed with gas and groundwater monitoring wells.
Laboratory testing	Samples of soil and groundwater were submitted for analysis of a range of metal, other inorganic and organic components including asbestos. Geotechnical testing was scheduled on selected samples. All testing was undertaken at accredited laboratories.
Ground conditions	Made Ground was encountered across the site, comprising asphalt, concrete or block paving at the surface and generally overlying granular Made Ground to depths of between 0.28m and 4.65m bgl, generally recorded to deepen towards the south west. Cohesive Made Ground was encountered within the south of the site. Made Ground was generally underlain by a limited thickness of weathered bedrock recovered as sand, overlying sandstone bedrock of the Chester Sandstone Formation. The groundwater flow is understood to flow towards the south west based on Tier Environmental's knowledge of the surrounding area, however, groundwater encountered during this preliminary ground investigation appears to be relatively discontinuous beneath the site. Groundwater strikes during the ground investigation and subsequent groundwater monitoring visits demonstrate a range between 0.35m and 4.55m bgl, seemingly independent of topography.
Ground stability	The south and west of the site appears to have been built up by around up to 4 to 5m to form a relatively level development platform for the current building. No signs of slope instability were observed in these areas during the ground investigation.
Foundations and floor slabs	Several possibilities are considered for foundations and floor slabs including: pads founded within the Chester Sandstone and excavation and compaction of Made Ground (with possible conditioning/lime stabilisation of soft clays) or vibro stone columns beneath the building footprint in order to utilise a ground bearing floor slab; a hybrid pad foundation where shallow bedrock is present with a piled foundation where deeper Made Ground is present, again



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	with excavation and compaction of Made Ground (with possible conditioning/lime stabilisation of soft clays) or vibro stone columns beneath the building footprint in order to utilise a ground bearing floor slab; Vibro Stone Columns for both foundations and a ground bearing floor slab; or Rapid Impact Compaction beneath pad foundations and Rolling Dynamic Compaction of the Made Ground in order to utilise a ground bearing floor slab. Specialist ground improvement contractors have been contacted to advise on the suitability of ground improvement techniques.
Sulphate class	Based on the results of the preliminary ground investigation, a Design Sulphate Class of DS-1 and ACEC Class AC-1 is appropriate for buried concrete at the Site.
Contamination – Human Health	Chrysotile and amosite fibre bundles and bitumen products asbestos has been recorded within the Made Ground in a localised area in the north east of the site, at a concentration of 0.006%w/w. Works in this area will need to be undertaken in accordance with CAR:2012 regulations. Other than the localised presence of asbestos, no measured soil concentrations of potential contaminants of concern have been reported in excess of Generic Assessment Criteria (GACs) protective of human health appropriate to the proposed land use. On this basis, it is not considered that the site represents a potential risk to end-users. Neither of the samples of asphalt tested recorded the presence of coal tar, and PCBs were not recorded above the laboratory detection limits in samples taken from the vicinity of the electric substation.
Contamination – Controlled Waters	The majority of the Site (with the exception of the far western boundary) is shown to be underlain by an artificial deposit of Made Ground. The majority of the Site is shown to be underlain by superficial deposits of the Shirdley Hill Sand Formation (a Secondary A Aquifer) and the far southern extent of the Site is shown to be underlain by Diamicton Devensian Till (a Secondary Unproductive Aquifer). The bedrock beneath the Site and surrounding area is the Chester Sandstone Formation (a Principal Aquifer). The Site is situated within a Source Protection Zone; Type 3 – Total Catchment. There are no recorded potable or non-potable abstractions within 250m of the Site. The nearest surfaced water feature is an unnamed inland river not influenced by normal tidal action located 247m south of Site. Groundwater flow is assumed to be in a south / south-westerly direction based upon the topography of the Site. On this basis the controlled waters sensitivity is regarded as being moderate. Measured groundwater concentrations of arsenic, copper, nickel, zinc, fluoranthene, benzo(a)pyrene, sum PAHs and ammonia have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one order of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the Site and the nearest surface water receptor (an unnamed pond located 115m southeast) or the nearest running water feature (an unnamed inland river located 247m south), the absence of a continuous groundwater body beneath the site, the fact that the Site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, the historical commercial/industrial heritage of the site, and the moderate sensitivity of the controlled waters environment, and that the distance to the nearest active groundwater abstraction point is 845m north and none within 1km hydraulically downgradient, these exceedances are not expected to have pose a significant risk to controlled waters beneath the site; however, it is recommended that this conclusion is reviewed and pre-agreed with the Contaminated Land Officer at the Local Authority / Environment Agency otherwise further investigation and risk assessment may be necessary.
Gas protection	A worst-case preliminary Gas Screening Value (GSV) of 0.147 l/hr has been calculated for the Site after 2 No. preliminary ground gas monitoring visits based on a maximum elevated reported peak carbon dioxide concentration of 4.2 % v/v and a maximum reported peak flow rate of 3.5 l/hr. These places the Site in a Characteristic Situation 2 – Low Risk Scenario and given that the maximum reported carbon monoxide concentration has been reported in excess of the workplace long term exposure limit and WHO long term (24 hours) indoor exposure guideline value, it is considered that there the preliminary assessment indicates the possibility that basic ground gas protection measures may be required for the Site. However, this should be reassessed upon the completion of any future additional ground gas monitoring visits required to achieve the minimum requirements under CIRIA C665.
Radon Requirements	Basic radon protection measures are not currently required for the proposed development on this Site.
Soakaways	Future supplementary ground investigation could also include infiltration testing to assess the suitability of the underlying weathered sandstone bedrock for the use of soakaways.
Further works	The following is recommended for the Site: - A supplementary ground investigation (likely post demolition) to target areas of the site that were inaccessible during this investigation, including areas within the current building footprint; - This should include additional gas monitoring, targeting areas beneath the building footprint and that have recorded atypical results during this investigation, to provide a total of 4no. monitoring visits as discussed within Section 9.3. - Future supplementary ground investigation should also include infiltration testing to assess the suitability of the underlying weathered sandstone bedrock for the use of soakaways. - Further geotechnical testing, including compaction testing, should be undertaken to aid earthworks design.



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	- Further assessment and/or delineation, excavation and reuse under hardstanding/the building footprint or suitable disposal of asbestos impacted Made Ground within the north east of the site. Works in this area will need to be undertaken in accordance with CAR:2012 regulations. - A clean cover system is not required following the above recommendations for the asbestos impacted Made Ground are followed. However a minimum 300mm of suitable growing medium may be required for areas of soft landscaping to allow sufficient plant growth – this should be confirmed by a landscape specialist.
Waste Soils Classification	Basic waste characterisation has demonstrated that 2 No. of the samples of the Made Ground (WS108 at 0.90m and WS109 at 0.40m bgl) and 1 no. sample of the bedrock (WS105 at 4.00m bgl where hydrocarbon contamination was observed) tested have been classified as hazardous waste. The remaining samples tested have been classified as non-hazardous. The 2 No. samples of granular and cohesive Made Ground that were submitted for Waste Acceptance Criteria testing demonstrate that both materials tested are suitable for disposal to an inert waste landfill.
Materials re-use	Subject to volumetric cut and fill requirements the majority of Made Ground materials and natural soil materials may be considered chemically suitable for potential re-use subject to the implementation of remedial measures summarised below and to careful management and placement of materials and in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Suitability for re-use would also be subject to confirmation of the geotechnical suitability depending on whether the materials are to be re-used in load bearing areas. This would need to be detailed in a supporting document. Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand. In addition, Section 11.2 of this report includes statements with respect to re-use of excavated and stockpiled clean naturally occurring soils within the site and re-use on other sites. These statements are designed to provide a clear intention to reuse any clean, naturally occurring soils derived from future excavations at this Site (which may also include temporary future stockpiling these materials).
Outline Remediation Strategy	The following remediation activities are required: - Further assessment and/or delineation, excavation and reuse under hardstanding/the building footprint or suitable disposal of asbestos impacted Made Ground within the north east of the site. Works in this area will need to be undertaken in accordance with CAR:2012 regulations. - A clean cover system is not required following the above recommendations for the asbestos impacted Made Ground are followed. However a minimum 300mm of suitable growing medium may be required for areas of soft landscaping to allow sufficient plant growth – this should be confirmed by a landscape specialist. The above recommendations are subject to reassessment upon the completion of any future supplementary ground investigation works and identification of any additional or previously undiscovered contamination.



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1. INTRODUCTION

Tier Environmental was commissioned by C4 Projects to undertake a Land Contamination Risk Management (LCRM) Ground Investigation for an area of land referred to as Deacon Business Park, located at Moorgate Road, Southdene, Kirkby, Knowsley, L33 7RX (the "Site").

The title of this report is in accordance with that described in the Land Contamination Risk Management guidance (available at <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>) which has superseded CLR 11:

Stage 1:

- LCRM Tier 1 Preliminary Risk Assessment Report
- LCRM Tier 2 Generic Quantitative Risk Assessment Report
- LCRM Tier 3 Detailed Quantitative Risk Assessment Report

1.1. Proposed Development

Under current proposals the existing building on site will be demolished, and the site will be developed as warehouse (use class B8) with ancillary offices, reconfigured points of access, new security gatehouses and associated works, as presented in **Error! Reference source not found..** Areas of proposed soft landscaping are located in the perimeter parts of the south, west and north of the Site. As such, in accordance with the '*Updated technical background to the CLEA model*' (Environment Agency, 2009) and '*Suitable 4 Use Levels*' (LQM / CIEH 2015) the proposed generic land use for this development is commercial.

1.2. Previous Reports

Tier Environmental have previously undertaken a Preliminary Risk Assessment for the Site, referenced TE1704-TE-00-XX-RP-GE-001-V01 and dated 21st November 2022.

1.3. Objectives

Taking into account the proposed development of the Site, the objectives of this appraisal were:

- To summarise the findings from the previous Preliminary Risk Assessment Report.
- To conduct some limited ground investigation to determine current ground and groundwater conditions.
- To determine the potential risks to human health and the wider environment on the basis of the limited ground investigation works.
- To provide a preliminary waste soils classification based on the preliminary ground investigation works.
- To determine, on a preliminary basis, potential risks posed to the Site from hazardous ground gases and / or vapours.
- Provide preliminary outline remedial measures to manage any identified risks.
- To provide preliminary geotechnical parameters to inform floor slab and foundation recommendations.
- To conduct a preliminary assessment of suitability of materials for re-use.



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1.4. Assumptions

The following assumptions are made in this report:

- It is assumed that ground levels will not change significantly from those described in this report or as shown on proposed development drawings. If this is not the case, then amendments to the recommendations made in this report may be required.
- The ground investigation has been designed with due consideration of known or suspected constraints (including underground services and access constraints).
- Any references to observations of suspected asbestos-containing materials are for information only and should be verified by a suitably qualified asbestos specialist and/or confirmed by laboratory analysis.
- The use of the term 'Topsoil' within this report is based on a visual identification only and that these materials have not been classified in accordance with BS3882:2015.
- The use of the terms 'shallow' and 'deep' within this report (from a geotechnical perspective) assume *typically* between ground level to circa 3.00m below ground level (bgl) for 'shallow' and greater than 3.00m bgl regarded as 'deep';
- The comments and opinions presented in this report are based on the findings of the desk study and ground conditions encountered during intrusive investigation works performed by Tier Environmental and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the Site which have not been revealed by this investigation and which have not been taken into account by this report.
- Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of the findings is conjectural and given for guidance only. Confirmation of intermediate ground conditions should be undertaken if deemed necessary.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview.

Site name	Deacon Business Park, Knowsley.
Site address	Deacon Business Park, Moorgate Road, Southdene, Kirkby, Knowsley, L33 7RX. A site location plan is included as Drawing No. TE1704-TE-00-XX-DR-GE-001-V01 within Appendix A.
National Grid Reference (NGR)	342534, 397564.
Approximate Site area	9.38 ha.
Site shape	The Site is broadly rectangular in shape.
Current land use on the Site	The Site is currently occupied by a commercial warehouse development, with associated offices, ancillary buildings and roadways/parking. Tier Environmental conducted a Site walkover on 9th November 2022 and highlighted the following: • 3 No diesel tanks in the southwest of Site to supply site buildings including a lab, cardboard manufacturer, call centre and offices. • LPG tank in northwest corner used for forklifts for B&M. • Hydraulically operated weighbridges at northwest site entrance. • Grease interceptor in the canteen of B&M which drains into foul sewer. • Water tank in north of the Site used to supply on site sprinklers. • Electrical substation along northern Site boundary, with additional ones inside main factory building. • On site waste storage area (rubbish and recycling). • Potential asbestos roofs on warehouse. No obvious contamination was noted during the site walkover.
Surrounding land uses	The surrounding Site uses comprise of commercial/industrial developments to the north, east and south with residential developments to the west.
General topography and ground levels	OS Mapping shows the north east corner of the site situated approx. 35m AOD, sloping away to 30m AOD in the southwest corner. The surrounding area's topography also follows this pattern and generally slopes off towards the south / southwest.

An aerial photograph (from the Groundsure report) of the Site and site boundary is shown overleaf.



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Figure 2.1 Recent Aerial Photograph from Groundsure





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3. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the information provided in the previous sections of this report a combined preliminary conceptual site model and conceptual exposure model has been developed for the proposed future land use. This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors. In assessing the likely contaminants of concern present at the Site, reference has also been made to Defra and Environment Agency supporting documentation. A preliminary qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

The preliminary conceptual model is presented in schematic form in **Error! Reference source not found.**, Drawing No. TE1704-TE-00-XX-DR-GE-002-V01. The potential pollutant linkages identified and the qualitative risk assessment for these are presented in Table 3.1 below. The terms used in the preliminary qualitative risk assessment are defined in Appendix G.

3.1. Uncertainties

The following uncertainties exist in the preliminary conceptual model:

- The presence of any features unrecorded by the historic maps.
- Any unrecorded geological features.
- Any unrecorded pollution events during the Site's history.



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Table 3.1 Preliminary Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
- The Site is currently occupied by a commercial warehouse development, with associated offices, ancillary buildings and roadways and parking. The surrounding Site uses comprise of commercial/industrial developments to the north, east and south with residential developments to the west. - Site walkover detailed: 3 No diesel tanks in the southwest of Site to supply site buildings including a lab, cardboard manufacturer, call centre and offices, LPG tank in northwest corner used for forklifts for B&M, hydraulically operated weighbridges at northwest site entrance, grease interceptor in the canteen of B&M which drains into foul sewer, water tank in north of the Site used to supply on site sprinklers, electrical substation along northern Site boundary, with additional ones inside main factory building, on site waste storage area (rubbish and recycling) and asbestos roofs on warehouse, with likely more unrecorded asbestos around Site. - The Site remained undeveloped from earliest available mapping (1890) as assumed agricultural land, with the 'Britain Plantation' shown in the north east quadrant of the Site. A Factory appeared on Site on mapping from 1960 (labelled as an engineering works on the 1966 maps) The land surrounding the Site was predominantly undeveloped fields (assumed agricultural) associated with multiple farms, until the development of the Kirkby, later Knowsley, Industrial Estate started being developed in 1960 to the north, east and south of the Site. A residential area (Southdene) appeared on mapping from 1960 to the west of Site. within the Knowsley Industrial estate multiple businesses (works, vehicle repair depots, warehouses, engineering works, television repair depots and body repair works) are shown between 80m and 165m south east on 1966 map, on Faraday Road and Abercrombie Road. An electric substation is shown in the north of the Site (from 1968) that may represent a potential source of Poly Chlorinated Biphenyls. - The Site is shown to be located within an area of artificial ground, and given the history of development on Site, Made Ground is anticipated. GroundSure mapping shows Made Ground present across the majority of the Site, with only the very western edge shown not to have any artificial ground The Site walkover highlighted that the site has been raised up, which can be seen along the western edge of Site by a raised grass verge up to Site. - Superficial deposits of Devensian (Diamicton) Till are shown to cover the majority of the Site. The southeast of the Site is shown to have superficial deposits of the Shirdley Hill Sand Formation. - The Site is shown as underlain by Bedrock of the Chester Sandstone Formation. 3 No. aquifers are present on Site. The Superficial Shirdley Hill Sand Formation and Till deposits are classed as a Secondary A Aquifer and a Secondary Undifferentiated Aquifer respectively. The bedrock is classed as a Principal Aquifer. The superficial and the bedrock aquifers are all classed as high vulnerability. It is assumed based on topography, that groundwater flow is south / southwest. - There are no potable water abstractions within 1km, or non-potable abstractions recorded within 500m of the Site. A pump was shown associated with Gore's Farm (470m northeast of Site) on mapping until 1966, after which it no longer appears. The Site is situated within a 'Type 3 – Total Catchment' Source Protection Zone. - The nearest surface water feature is shown 115m southeast of the Site as an unnamed pond. The nearest running water feature is shown 247m south as an unnamed inland river not influenced by normal tidal action. - There are no active or recent landfills recorded within 250m of Site. There is 1 No. historical waste site located 214m north. There is 1 No. waste exemption on site for CGL – Knowsley Integrated Recovery Service for treating waste. A further 8 No. waste exemptions are in place between 150m to 171m east of the Site for storing, treating and using waste. - Less than 1% of the properties in the Site area are above the radon action level. - It is anticipated that Made Ground and relict roots, tree stumps and organic rich materials beneath the Site in the northeast associated with the former plantation may present potential sources of ground gas. - The Site is situated within a Nitrate Vulnerable Zone. - The Site is not located within an ecologically sensitive area.



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Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
Anticipated widespread Made Ground associated with the Site's former use as an unspecified factory, engineering works, Site levels being raised as shown along the western site boundary and current land uses.	Metals PAHs pH Hexavalent chromium	Direct contact, dust inhalation and ingestion	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
		Migration via water pipes	Future site users (commercial)	Severe	Likely	High Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary A Aquifer associated with Shirdley Hill Sand Formation	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Secondary (Undifferentiated) Aquifer associated with Till.	Mild	Low Likelihood	Low Risk
			Aquifer 3 - Principal Aquifer associated with Chester Sandstone Formation	Medium	Low Likelihood	Moderate / Low Risk
			Pond 115m southeast and Inland River not influenced by tidal action located approximately 247m south	Medium	Unlikely	Low Risk
	Naphthalene (a semi-volatile PAH) TPH / BTEX / MTBE VOCs / SVOCs Phenols PolyChlorinated Biphenyls (PCBs)	Vapour inhalation, direct contact, dust inhalation and ingestion	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
		Migration via water pipes	Future site users (commercial)	Severe	Likely	High Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary A Aquifer associated with Shirdley Hill Sand Formation	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Secondary (Undifferentiated) Aquifer associated with Till.	Mild	Low Likelihood	Low Risk
			Aquifer 3 - Principal Aquifer associated with Chester Sandstone Formation	Medium	Low Likelihood	Moderate / Low Risk
			Inland River not influenced by tidal action located approximately 247m south	Medium	Low Likelihood	Moderate / Low Risk
	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
Electric substation in the north of the Site (present since Circa 1968, 3 No. diesel tanks, LPG tank) and potential unrecorded tanks / boiler rooms / fuel storage areas etc based on the sites historic use as an engineering works – 4 No. circular buildings were shown in the southeast corner of Site on maps between 1966 and 2001	PAHs pH	Direct contact, dust inhalation and ingestion	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
		Migration via water pipes	Future site users (commercial)	Severe	Likely	High Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary A Aquifer associated with Shirdley Hill Sand Formation	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Secondary (Undifferentiated) Aquifer associated with Till.	Mild	Low Likelihood	Low Risk
			Aquifer 3 - Principal Aquifer associated with Chester Sandstone Formation	Medium	Low Likelihood	Moderate / Low Risk



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	Naphthalene (a semi-volatile PAH) TPH / BTEX / MTBE VOCs / SVOCs Phenols PolyChlorinated Biphenyls (PCBs)	Vapour inhalation, direct contact, dust inhalation and ingestion	Inland River not influenced by tidal action located approximately 247m south	Medium	Low Likelihood	Moderate / Low Risk
			Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate Risk
		Migration via water pipes	Future site users (commercial)	Severe	Likely	High Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary A Aquifer associated with Shirdley Hill Sand Formation	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Secondary (Undifferentiated) Aquifer associated with Till.	Mild	Low Likelihood	Low Risk
			Aquifer 3 - Principal Aquifer associated with Chester Sandstone Formation	Medium	Low Likelihood	Moderate / Low Risk
			Inland River not influenced by tidal action located approximately 247m south	Medium	Low Likelihood	Moderate / Low Risk
	Asbestos (from any potential lagging etc surrounding any tank or similar infrastructure)	(Dust migration and) dust inhalation	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
Anticipated Made Ground located beneath the Site and relict roots, tree stumps and organic rich materials beneath the Site in the northeast associated with the former plantation.	Hazardous ground gasses (methane, carbon dioxide, hydrogen sulphide, carbon monoxide and depleted oxygen)	Inhalation (indoor and outdoor)	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
		Migration of hazardous ground gases from beneath the Site to adjacent sites along services or other preferential conduits	Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
		Migration of ground gas / explosion	Buildings and services	Severe	Low Likelihood	Moderate / Low Risk

For definition of the terms used in the qualitative risk assessment, please see Appendix G.



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4. FIELDWORK

The information contained in this report is limited to areas of land accessible during the ground investigation within the Site boundary, as indicated on the Site plan, presented in **Error! Reference source not found.** as Drawing No. TE1704-TE-00-XX-DR-GE-003-V02.

Tier Environmental scoped the intrusive ground investigation using guidance presented in:

- BS 10175:2011+A2:2017;
- Land Contamination Risk Management (LCRM) - <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>;
- BS 5930:2015+A1:2020;
- BS EN 1997:2004 and 2007.

Tier Environmental's standard strata description criteria are compliant with the above guidance.

4.1. Scope of Ground Investigation

The ground investigation was conducted between 14th and 15th November 2022 and was supervised by a suitably qualified Tier Environmental engineer. Table 4.1 below provides a summary of the exploratory holes completed and rationale. Exploratory hole locations are presented on Drawing No. TE1704-TE-00-XX-DR-GE-003-V02.

Table 4.1 Scope of Ground Investigation and Rationale

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depths (m bgl)	Rationale
Window sample boreholes	WS101 to WS106, WS106A, WS107 to WS109	0.50m to 5.40m bgl	To confirm the shallow ground conditions across the Site, conduct <i>in situ</i> geotechnical tests, facilitate soil sampling for geoenvironmental and geotechnical parameters and installation of gas and groundwater monitoring wells.

The following constraints were identified during the ground investigation works:

- The existing warehouse building was still in use at the time of the investigation, restricting access within loading bays/roads, and in the case of the western side of the building, restricting proximity to the building due to sensitive lab equipment in use inside.
- Existing underground services are present across the site, including gas, electric, water and drainage.

Table 4.2 Scope of Monitoring Installations

Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
WS103	Made Ground and Weathered Chester Sandstone Formation	0.30 to 0.70	Targeting shallow ground gas Made Ground source and potential perched groundwater body
WS104	Made Ground and Weathered Chester Sandstone Formation	0.40 to 1.10	Targeting shallow ground gas Made Ground source and potential perched groundwater body



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Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
WS105	Made Ground and Weathered Chester Sandstone Formation	1.00 to 4.00	Targeting shallow ground gas Made Ground source and potential perched groundwater body
WS106A	Made Ground and Weathered Chester Sandstone Formation	1.00 to 4.90	Targeting shallow ground gas Made Ground source and deeper groundwater body
WS107	Made Ground	0.50 to 4.40	Targeting shallow ground gas Made Ground source and perched groundwater body
WS108	Made Ground	0.40 to 1.40	Targeting shallow ground gas Made Ground source and potential perched groundwater body
WS109	Made Ground, Weathered Chester Sandstone Formation, Chester Sandstone Formation	0.70 to 1.70	Targeting shallow ground gas Made Ground source and potential perched groundwater body

Depths and accurate descriptions of strata and groundwater observations made during investigation works, together with details of the samples recovered, are presented on the Engineer's exploratory hole records in Appendix B.

4.2. Geoenvironmental Testing

Sampling and QA/QC protocols are presented in Appendix K. Tier Environmental's schedule of chemical laboratory testing is presented in Table 4.3. and Table 4.4. The testing was carried out by Element Materials Technology, a UKAS and MCerts (where appropriate for soils analysis) accredited laboratory.

Human Health and Preliminary Waste Classification Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected soil samples. The purpose of the testing was to:

- Determine the concentration and spatial distribution of potential contaminants of concern in the Made Ground;
- Determine the chemical composition and properties of the shallow natural soils;
- Determine the nature and extent of any hydrocarbon and VOC/SVOC impacts in the vicinity of both onsite and historic offsite storage tanks;
- Determine the nature and extent of any PCB impacts in the vicinity of the electric substation;
- Undertake a *preliminary* soils waste classification and waste disposal route determination;
- To determine the presence / absence of coal tar within the asphalt at the Site



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Table 4.3 Schedule of Chemical Testing for Human Health Risk Assessment and Preliminary Waste Soils Assessment.

Laboratory analysis	Made Ground - Asphalt	Made Ground POPULATION 1 - Gravel	Made Ground POPULATION 2 – Burnt Shale	Made Ground POPULATION 3 – Sand	Made Ground POPULATION 4 – Clay	Bedrock (Chester Sandstone Formation)	Groundwater
Tier Environmental soil suite*	-	3	2	1	3	1	NA
Asbestos screen	-	3	2	1	3	-	NA
Speciated TPH / BTEX / MTBE	-	4	1	1	2	1	3
VOCs / SVOCs	-	2	1	-	-	1	3
PCBs	-	-	-	-	1	1	-
Tier Environmental groundwater suite*	NA	NA	NA	NA	NA	NA	3
Waste Acceptance Criteria (WAC)	-	1	-	-	1	-	NA
Coal tar suite	2	NA	NA	NA	NA	NA	NA

*For definition of Tier Environmental analytical suites, please see Appendix K. NA - not applicable.

Controlled Waters Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected GROUNDWATER samples. The purpose of the testing was to:

- Determine the concentration and spatial distribution of potential leachable contaminants of concern in the Made Ground;
- Determine the dissolved phase concentrations of potential contaminants of concern within groundwater beneath the Site;
- Determine the nature and extent of dissolved phase potential hydrocarbon contaminants of concern within groundwater in the vicinity of an underground storage tank

Table 4.4 Schedule of Chemical Testing for Controlled Waters Risk Assessment.

Laboratory analysis	Groundwater
Tier Environmental groundwater suite*	3
Speciated TPH / BTEX / MTBE	3
VOCs / SVOCs	3

*For definition of Tier Environmental analytical suites, please see Appendix K. NA - not applicable.

4.3. Geotechnical Testing

Geotechnical laboratory testing was scheduled by Tier Environmental on selected samples as presented in Table 4.5. The testing was performed by Murray Rix, a UKAS accredited laboratory, with sulphate, pH and moisture content also carried out by Element Materials Technology, a UKAS and MCerts (where appropriate for soils analysis) accredited laboratory. Test certificates including details of appropriate testing standards are presented in Appendix E and discussed in Section 6, below.



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Table 4.5 Geotechnical Laboratory Testing Schedule.

Test	Stratum type	Number of tests	Rationale
1. General			
Moisture content	MG1	5	a) Assist with the determination of consistency of soil with depth. b) Assess desiccation of soils. c) Suitability of materials for reuse within earthworks.
	MG2	4	
	MG3	2	
	MG4	3	
	Natural Soils (Weathered Chester Sandstone Formation)	1	
2. Classification			
Particle size distribution (wet/dry sieve)	MG1	2	a) Classify soils for earthworks purposes. b) Establish type of soil (comply with Eurocode 7 description).
	MG2	2	
	MG3	1	
3. Chemical tests			
pH (soil and groundwater)	MG1	3	Determine correct class of concrete for both natural and made ground with specific tests for sites potentially containing sulphides (e.g., pyrites) or at low pH.
	MG2	2	
	MG3	1	
	MG4	3	
	Natural Soils (Weathered Chester Sandstone Formation)	1	
Water-soluble sulphate (soil and groundwater)	MG1	3	
	MG2	2	
	MG3	1	
	MG4	3	
	Natural Soils (Weathered Chester Sandstone Formation)	1	



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5. GROUND CONDITIONS

The following section provides a summary of the ground conditions encountered during the ground investigation including strata profile, obstructions and visual / olfactory evidence of contamination. Exploratory hole logs are provided in Appendix B.

5.1. Strata Profile

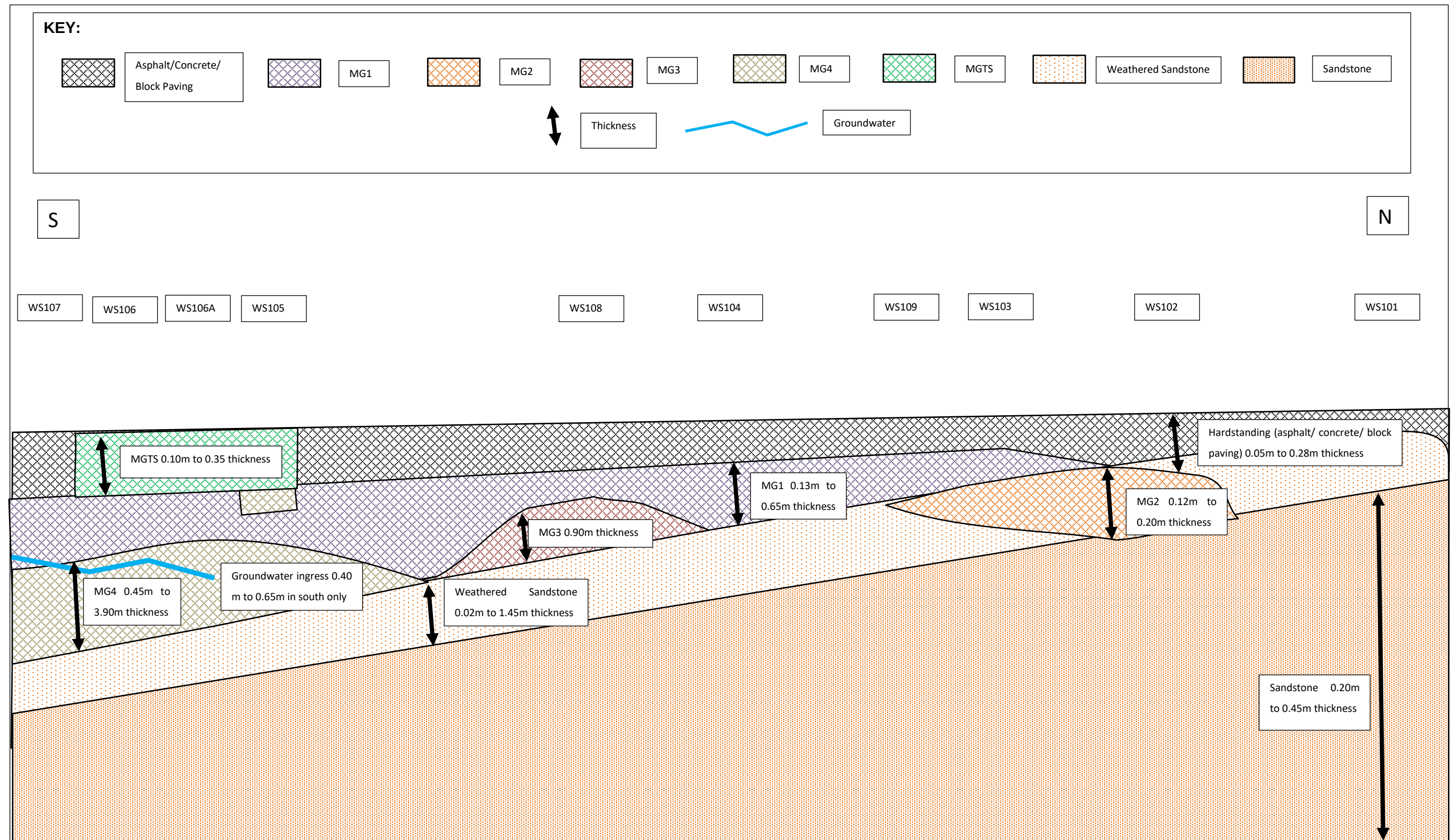
Figure 5.1 presented below provides a schematic summary of the ground conditions beneath the Site. The distinct populations of strata identified have been numbered and correspond with the more detailed descriptions below.



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Figure 5.1 Schematic Drawing of Ground Conditions





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5.2. Strata Descriptions

Made Ground – Hardstanding

CONCRETE	
Grey concrete with high aggregate content (approx. 75%). Rebar 0.02m thick in WS104 only. Generally high integrity.	
Locations encountered	WS102, WS104, WS109
Depths encountered from top of stratum (range)	Ground level to 0.20m bgl
Depths encountered to base of stratum (range)	0.25m to 0.30bgl
Thickness (range)	0.1 to 0.25m
Spatial location on site	Below ground in localised areas in north and north east, as surfacing within loading bay area in east of site
ASPHALT	
Generally 1 no. layer (with the exception of WS103 where an upper layer of 0.05m thickness was encountered) with high aggregate content (approx. 60-70%).	
Locations encountered	WS101, WS102, WS103, WS106, WS107
Depths encountered from top of stratum (range)	Ground level to 0.80m bgl
Depths encountered to base of stratum (range)	0.07m to 1.00m bgl
Thickness (range)	0.07m to 0.28m
Spatial location on site	North, east, south of building, west only in road immediately west of the existing building. Within the south of the Site gravel of asphalt was encountered within WS106
BLOCK PAVING	
Locations encountered	WS108, WS109
Depths encountered from top of stratum (range)	Ground level
Depths encountered to base of stratum (range)	0.05m to 0.15m bgl
Thickness (range)	0.05m to 0.15m
Spatial location on site	Western car park

Made Ground Topsoil

Locations encountered	WS105, WS106, WS106A
Depths encountered from top of stratum (range)	Ground level
Depths encountered to base of stratum (range)	0.1m to 0.35m bgl
Thickness (range)	0.1m to 0.35m
Spatial location on site	South and south east within limited soft landscaped areas
General description	Dark brown slightly clayey SAND with frequent rootlets, dark brown sandy CLAY within WS105 only.



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Made Ground – MG1

Locations encountered	WS103 to WS106, WS106A, TO WS109
Depths encountered from top of stratum (range)	0.05m to 1.00m bgl
Depths encountered to base of stratum (range)	0.20m to 1.55m bgl
Thickness (range)	0.13 to 0.65m
Spatial location on site	Widespread across the Site, no strong spatial correlation with thickness observed
General description	Grey slightly sandy to sandy, slightly clayey, fine to coarse angular to subangular GRAVEL of limestone, occasionally with brick, asphalt, concrete and sandstone.

Made Ground – MG2

Locations encountered	WS102, WS103
Depths encountered from top of stratum (range)	0.28 to 0.30m bgl
Depths encountered to base of stratum (range)	0.40 to 0.50m bgl
Thickness (range)	0.12 to 0.20m
Spatial location on site	North east
General description	Dense brownish red sandy, fine to coarse angular to subangular GRAVEL of burnt shale and brick.

Made Ground – MG3

Locations encountered	WS108
Depths encountered from top of stratum (range)	0.80m bgl
Depths encountered to base of stratum (range)	1.70m bgl
Thickness (range)	0.90m
Spatial location on site	West
General description	Dark brownish grey, slightly gravelly fine grained SAND. Gravel is fine to medium angular to subangular of brick and sandstone with rare coal.

Made Ground – MG4

Locations encountered	WS105, WS106A, WS107
Depths encountered from top of stratum (range)	0.45 to 1.00m bgl
Depths encountered to base of stratum (range)	1.45m to 4.65m bgl
Thickness (range)	0.45m to 3.90m
Spatial location on site	South
General description	Soft to firm brownish grey to reddish brown, slightly sandy to sandy, gravelly CLAY. Gravel is fine to coarse, angular to subangular of brick, limestone, sandstone, rare coal and metal.



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Weathered Bedrock – Chester Sandstone Formation

Weathered Chester Sandstone Formation - Sand	
Locations encountered	WS101, WS103 to WS105, WS106A, WS107 to WS109
Depths encountered from top of stratum (range)	0.28m to 4.65 bgl
Depths encountered to base of stratum (range)	0.30m to 5.15m bgl
Thickness (range)	0.02m to 1.45m
Spatial location on site	Widespread across the Site, no strong spatial correlation with thickness observed
General description	Very loose to loose reddish brown, occasionally slightly gravelly to gravelly, fine to medium grained SAND. Gravel is medium to coarse, subangular of sandstone.

Bedrock – Chester Sandstone Formation

Extremely weak to weak red to yellowish brown fine to medium grained SANDSTONE.	
Locations encountered	WS01 to WS106, WS106A, WS107 to WS109
Depths encountered from top of stratum (range)	0.30 to 5.15m bgl
Depths encountered to base of stratum (range)	Base not encountered
Thickness (range)	Base not encountered
Spatial location on site	Widespread across the Site, reported to be shallowest in north and deepest in south west, indicating a south westerly dip direction
General description	Extremely weak to weak red to yellowish brown fine to medium grained SANDSTONE.

5.3. Obstructions

The following potential obstructions were encountered during the ground investigation works.

Table 5.1 Obstructions Summary Table

Exploratory Hole Location	Location on Site	Depths recorded from (m bgl)	Depth of Base of Feature (m bgl)	General description and comments
WS109	North west	0.20	0.30	Concrete slab



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5.4. Visual and Olfactory Evidence of Contamination

A summary of visual and/or olfactory evidence of contamination noted during the Tier Environmental investigation is summarised in the Table 5.2 below:

Table 5.2 Visual and/or Olfactory Evidence of Contamination Summary

Exploratory Hole Location	Depth Range (m bgl) Encountered From	Depth Range (m bgl) Encountered To	Location on Site	Description
WS105	4.00	>4.20	North of the offsite tanks	Slight hydrocarbon odour in bedrock
WS106A	1.60	2.10	South of site	Slight organic odour in Made Ground, and black in colour
WS106A	2.10	3.30	South of site	Occasional rootlets and organic (wood) fragments

5.5. Groundwater Observations During Fieldwork

Table 5.3 below provides a summary of the groundwater observations during the fieldworks. Further information of groundwater observed is presented in the exploratory hole logs in Appendix B.

Table 5.3 Field Observations of Groundwater.

Exploratory hole	Strike (m bgl)	Rise in groundwater after 20 mins. (m bgl)	Formation	Observations
WS106	0.60	0.60	Made Ground	Perched groundwater body
WS106A	0.65	0.65	Made Ground	Perched groundwater body
WS107	0.40	0.40	Made Ground	Perched groundwater body

5.6. Groundwater Monitoring

Table 5.4 below provides a summary of the groundwater monitoring results conducted to date. In total, 2No. visits have been undertaken, undertaken on 28th November 2022 and 12th December 2022.

Table 5.4 Groundwater Monitoring Results Summary

Exploratory hole	Response Zone	Depth range (m bgl)	Formation	Observations
WS103	0.30 to 0.70	ND	-	None
WS104	0.40 to 1.10	ND	-	None
WS105	1.00 to 4.00	2.90 to 3.98	Weathered Chester Sandstone Formation	Discontinuous groundwater body
WS106A	1.00 to 4.90	4.55	Made Ground	Perched groundwater body
WS107	0.50 to 4.40	0.35 to 0.42	Made Ground	Perched groundwater body



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Exploratory hole	Response Zone	Depth range (m bgl)	Formation	Observations
WS108	0.40 to 1.40	1.12	Made Ground	Perched groundwater body
WS109	0.70 to 1.70	1.65	Chester Sandstone Formation	Discontinuous groundwater body



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6. PRELIMINARY GEOTECHNICAL ASSESSMENT

6.1. Mining and Quarrying

The site is not considered to be at risk from shallow mining. Historical plans do not indicate any quarries, clay pits or other extractive industries in the vicinity of the site. Localised workings of shallow strata cannot be wholly discounted but given the historical use of the Site this is considered unlikely.

6.2. Determination of pH and Water-Soluble Sulphate

Representative samples of the soils and groundwater encountered during the Tier Environmental ground investigation were tested to determine their pH and concentrations of water-soluble sulphate (SO_4^{2-}). The results are presented in Appendix C and Appendix D and summarised in the Table 6.1 below. It is assumed that the Site is a 'brownfield' site, and the groundwater is 'mobile' in accordance with BRE SD1.

The conclusion of the assessment is that a DS-1 and ACEC Class AC-1 is appropriate for buried concrete design purposes.

It is also noted that there is localised evidence of gross hydrocarbon contamination at the Site and as such, a concrete specialist should review the TPH results and ground conditions summary within this report to ensure appropriate concrete design against retardation / degradation due to hydrocarbons.

Table 6.1 Results of Soil pH Testing and Water-Soluble Sulphate Determination.

Exploratory Hole Location	Depth (m bgl)	pH	Water-soluble sulphate (mg/l)	Design sulphate class	ACEC sulphate class
MADE GROUND					
WS102	0.30	8.49	129.2	(Using characteristic values as detailed in BRE SD1) DS-1	(Using characteristic values as detailed in BRE SD1) AC-1
WS103	0.35	9.18	122		
WS104	0.30	10.07	39.99		
WS105	0.70	8.74	22.6		
WS106	0.50	9	55.8		
WS106A	0.80	7.09	15.9		
WS107	3.60	7.94	49.9		
WS108	0.90	9.84	122.8		
WS109	0.40	12.23	213.2		
WEATHERED BEDROCK					
WS101	0.35	8.51	335.8	DS-1	AC-1
GROUNDWATER					
WS105	3.00	7.57	114.7	(Using characteristic values as detailed in BRE SD1) DS-1	(Using characteristic values as detailed in BRE SD1) AC-1
WS107	2.00	7.77	249.9		
WS108	1.99	7.62	60		

ACEC - Aggressive Chemical Environment for Concrete (see BRE, 2005).



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6.3. Geotechnical Parameters

The data obtained during the Ground Investigation has been assessed for the recorded soil types in order to provide characteristic values in order to aid the final foundation design

Soil Classification

Granular Soils

A total of 5 No. samples of shallow Made Ground were submitted for Particle Size Distribution tests. The results are presented in Table 6.2 below

Table 6.2 Particle Size Distribution Results

Exploratory hole	Depth (m bgl)	Series 600 Classification
WS102	0.30 to 0.40	2C, 7A, 7F
WS103	0.30 to 0.50	2C, 7A, 7D, 7F
WS104	0.25 to 0.58	2C, 7A, 7F
WS108	1.00 to 1.40	2A, 2B, 7A, 7E, 7F, 7I
WS108	0.20 to 0.60	1A, 1B, 6A, 6E, 6R, 6I, 6J, 6M, 6N, 6P

Density Parameters

The results of Standard Penetration Tests undertaken within the granular Made Ground are considered to be very variable, ranging from N = 6 to N = >50 with most N values falling in the loose and medium dense categories. The values show slight variation with depth with the variable test results probably caused by variable composition and obstructions caused by a higher brick and concrete content. The variability of the *in situ* standard penetration tests tends to indicate that these materials may have been placed with limited engineering control. Based on these results a conservative SPT N value of N = 6 (loose) is tentatively proposed for the Made Ground strata; however, this value should be used with caution.

The results of 3 No. Standard Penetration Tests undertaken within the Weathered Chester Sandstone Formation range from N = 2 to N = 29, falling in the very loose and medium dense categories. Due to the limited presence/thickness of this stratum on site only a limited number of SPT tests were undertaken fully within this material. The results show a slightly lower N value where arisings were recorded to be wet. Based on these results a moderately conservative design SPT N value of N = 2 has been selected for the Weathered Chester Sandstone Formation strata, although it should be noted that this is based off of limited results.

Rock Classification

Strength Classification of Rock Strata using SPT N Value Results

Standard Penetration Tests (SPT) were carried out in 8 No. boreholes within the Chester Sandstone Formation. The results of the Standard Penetration Tests range from N=29 (WS109 at 1.10m) to N=50 (WS104 at 1.10m and WS107 at 5.00m), with N=>50 recorded at the base of all other exploratory locations.

The results show notable variation over the depth range of the tests with extrapolated N values ranging between N = 51 and N = 231.



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Based on the above results a preliminary safe bearing capacity of 200kPa can be given to the Chester Sandstone bedrock, subject to further ground investigation.

Foundation and Floor Slab Recommendations

Ground conditions beneath the footprint of the building include Made Ground, generally of limited thickness (0.28m to 1.70m) but locally proven to 4.35m and 4.65m bgl at WS107 and WS106A respectively (both in the south of the site).

Underlying the Made Ground is the Chester Sandstone Formation, which is weathered in the upper horizons. The weathering of the Chester Sandstone strata decreases with depth, with solid bedrock encountered within all exploratory holes that achieved refusal (all locations except WS106), from depths of between 0.30m at WS101 in the north west and 5.15m bgl in WS106A in the south. SPT N values of between N=2 and N=29 have been recorded within the Weathered Chester Sandstone.

Perched groundwater was encountered within the Made Ground at positions WS106, WS106A and WS107 in the south of the site only, from depths of between 0.40m to 0.65m bgl. Groundwater was encountered within the Chester Sandstone at a depth of 5.35m bgl within WS106A only. It is therefore unclear whether the groundwater body within the Chester Sandstone Formation is present beneath the entirety of the site, or is discontinuous.

Portions of the Site are covered by former or existing facilities on the site, including hard standing, floor slabs and foundations. In addition, a below ground concrete obstruction was encountered in WS109 between 0.20m and 0.30m bgl. This material is unsuitable for foundations and relict foundations and floor slabs should be broken out to avoid the formation of hard spots.

Made Ground is considered an unsuitable founding stratum due to its relatively low density and uncontrolled nature of placement. The Chester Sandstone provides the best founding solution options.

Using extrapolated N values from *in situ* testing, the competent rock of the Chester Sandstone has been attributed a conservative preliminary safe bearing capacity of 200kPa (subject to further ground investigation).

Possible foundation and floor slab solutions are as follows:

- Pad foundations: founded upon the Chester Sandstone Formation to avoid differential settlement. However due to varying depths of Made Ground across the site, excavation to a significant depth may be required, which would also generate significant volumes of arisings. If there is nowhere on site these arisings could be utilised, significant costs may be incurred with their disposal. Due to the depth and variability of Made Ground beneath the building footprint, turnover to a significant depth beneath the building footprint would be required, with possible conditioning/ lime stabilisation of soft clays and placement of Made Ground in engineered layers in order to avoid issues with differential settlement beneath a ground bearing floor slab. Alternatively ground improvement such as vibro stone columns may be required beneath the floor slab;
- Hybrid foundation solution comprising pads in the north and piled foundations in the south: where bedrock is shallow in the north, pad foundations could be utilised, founding within the competent Chester Sandstone bedrock. Where Made Ground significantly deepens in the south, a piled option such as piles could be utilised. This hybrid option would reduce costs associated with excavation and disposal of Made Ground arisings, however would encounter the same issues with a ground bearing floor slab as above;
- Vibro Stone Column (VSC) ground improvement: VSCs could be utilised for both the foundations and floor slabs. The clay across site (where encountered) is expected to have been *in situ* since the construction of the current building in the 1970s and is therefore unlikely to cause



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any consolidation issues with the use of VSCs. A specialist ground improvement contractor has been contacted regarding the suitability of this ground improvement method, for which Tier Environmental are awaiting a response;

- Rapid Impact Compaction and Rolling Dynamic Compaction: Rapid Impact Compaction could be used to provide a suitable founding stratum for pad foundations, with Rolling Dynamic Compaction used across the remainder of the building footprint to prevent differential settlement and suitably prepare the Made Ground for a ground bearing floor slab. A specialist ground improvement contractor has been contacted regarding the suitability of this ground improvement method, for which Tier Environmental are awaiting a response;

The construction of a piled foundation and/or ground improvement techniques is a specialist job and the advice of a reputable local contractor familiar with the type of ground and groundwater conditions encountered on this site should be sought prior to finalising the design. The actual working load for proposed piles will depend on the particular type of pile and method of installation adopted.

6.4. Earthworks

It is recommended that further testing including compaction testing is undertaken. The compaction data can then be assessed by comparing the results against criteria commonly used in earthworks to achieve an adequate density for engineered fills. The criteria indicate whether the samples could achieve in excess of 95% of Maximum Dry Density (MDD – a requirement often included in highways specifications) and whether they could be compacted to less than 5% air voids ratio (a requirement applied where raft foundations are to be adopted). This would determine whether any Made Ground / Demolition Material could be used as an engineered fill, subject to other suitability considerations.

Some processing of Made Ground/ Demolition Material (including screening and crushing of unsuitable elements) may be required during the enabling works phase to remove over-sized or unsuitable material, such as metal, plastic, fabric and timber, or during a turnover (dependent on the chosen foundation option). Where Made Ground is to be reused as an engineered fill, it would be sensible to select granular fills only and subject them to a confirmatory testing regime where they were required to achieve a compaction specification as a structural fill.

Further testing may also be required for materials that include burnt shale, which has the potential to degrade concrete if it contains a high sulphate content, to ensure its suitability for reuse beneath the building footprint.

Construction plant should be provided with an adequate working platform in line with the requirements of BRE report, “BR 470: Working Platforms for Tracked Plant”. Again, further advice should be sought from the temporary works designer. However, the following factors should be considered.

It would be expected that the existing Made Ground at the Site is to be excavated and re-engineered to remove buried obstructions. Excavated materials could then be processed and re-engineered as an Engineered Fill. The new Design CBR should be assumed to be equivalent to 2.5%, however values of between 10% and 20% should be achievable given the material present at the Site.

During construction, the in situ CBR value must be checked against the Design CBR value, to confirm design requirements are being met.

6.5. Groundworks, Excavation Stability and Groundwater Dewatering

In our opinion, there should be no particular difficulties in excavating the strata indicated in the boreholes utilising an appropriate and suitably sized mechanical excavator. Excavations into existing Made Ground and the underlying natural soils should be assumed to be unstable. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 097 (1983) should be made to establish suitable means of support or battering of excavation sides.



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It is recommended that all excavations to greater than 1.20 metres depth, or for shallower excavations where groundwater is encountered above this level are closely supported, especially where man entry is required. Alternatively, where space permits, the excavations might be battered back to an appropriate angle. Standing groundwater levels of between 0.35m and 4.55m were encountered in the boreholes. Should groundwater seepages occur, and water accumulate in shallow excavations it should be able to be removed by pumping from a filtered sump. However, groundwater control by more robust means, such as well pointing, may be required locally.

Great care will need to be taken if reducing groundwater levels to ensure that adjoining nearby buildings, structures and services are not affected.

6.6. Pavements and Highways

Based on a visual examination of the soil and Atterberg test results, a CBR value of 5% is suggested for granular Made Ground and the weathered bedrock, and 2.5% for cohesive Made Ground (present locally).

Once the design layout is known and demolition/remediation is complete, then *in situ* testing should be carried out to confirm CBR values.

The design of pavements, highways, and embankments should be discussed with the relevant local authority if highways are to be subject to Section 38 agreement.



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7. HUMAN HEALTH RISK ASSESSMENT

Results of chemical analysis are presented in full in Appendix C and Appendix D.

7.1. Data Interpretation Approach

The analytical data obtained were reviewed for completeness and consistency. The data for each sample type was then compiled, screened against the Generic Assessment Criteria (GACs) for a commercial land use and those potential contaminants of concern which were found to exceed the GACs were then subjected to detailed analysis as described below.

Previously, it was possible for results from soil (and leachate) samples to be subject to statistical assessment in accordance with a 2008 guidance document (CL:AIRE / CIEH Guidance on Comparing Soil Contamination Data with a Critical Concentration). This guidance has now been withdrawn and replaced with the following document:

- Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (CL:AIRE 2020)

The purpose behind statistical assessment is ultimately to determine whether concentrations of contaminants are at levels that present potential risk to the future site users (and the wider environment if the statistical assessment is conducted on leachate test results).

The new guidance places even greater emphasis and reliance on the desk study being carried out first, appropriately detailed sampling strategies, collection and testing of samples for contamination and use of appropriate screening criteria.

The guidance requires an increased number of criteria to be met before a robust statistical assessment can be conducted and introduces the principle of the Central Limit Theorem (CLT); a key tool of statistics that is used in the comparison of confidence intervals with the critical concentration. A common 'rule of thumb' is that the CLT will apply provided your sample size is between 20 and 50.

On this basis, Tier Environmental considers that statistical assessment in accordance with the CL:AIRE 2020 guidance may not be applied in this instance given that the number of samples obtained is below 20 No. for any given identified soil population.

Due consideration of the ground conditions, distinct identifiable populations of soil and proposed development layout has been undertaken and, where appropriate, laboratory results associated with discrete populations or 'hotspots' have been assessed separately.

7.2. Selection of Generic Assessment Criteria (GAC)

In short, for the majority of the contaminants of concern, LQM/CIEH Suitable 4 Use Levels (S4ULs) published in 2015 have been adopted as GACs for a commercial land use; however, further details on the hierarchical approach for the selection of the GACs used as screening criteria for this assessment is provided in Appendix H.

These values are considered as appropriate screening criteria as they incorporate updated assumption exposures derived for the production of C4SLs but within the context of deriving screening criteria above which assessment of the risks or remedial action may be needed (i.e. within the context of the planning regime rather than Part 2A context for which C4SLs were derived).

For those potential contaminants of concern where the selected GAC is dependent on Soil Organic Matter content (SOM), an assumed SOM of 1% has been selected based on the reported Total Organic Carbon (TOC) concentrations (which have been converted to SOM by dividing by a conversion



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factor of 0.58). It should be noted; however, that for any soil samples where the TOC may be artificially driven by the presence of petroleum hydrocarbons, that these TOC results have been removed from the data set when determining an appropriate characteristic SOM. For this purpose, Tier Environmental have notionally considered that any TOC results from soil samples where the measured total TPH concentration exceeds 500mg/kg should be removed.

7.3. Human Health Risk Assessment

No measured concentrations of potential contaminants of concern have been reported in excess of the respective GACs protective of human health for a commercial land use.

Measured Potential Contaminant of Concern Concentrations without Publicly Available GACs

Table 7.1 summarises the measured concentrations of potential contaminants of concern have been reported in excess of the laboratory method detection limit for which there are no current publicly available GACs and provides qualitative commentary / discussion as to whether they may represent a potential risk to human health with due consideration of the Conceptual Site Model.



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Table 7.1 Measured Concentrations of Potential Contaminants of Concern Reported in Excess of the Laboratory Method Detection Limit

Contaminant of Concern	Exploratory Hole Location	Depth (m bgl)	Soil Population	Units	Measured Concentration	Comments
VOCs/SVOCs						
1,3,5-Trimethylbenzene	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	9	It is considered that the majority of these belong to families of VOCs/SVOCs for which publicly available GACs are available such that, in effect, it has been possible to demonstrate that these reported concentrations of VOCs/SVOCs will not present a potential risk to the end-users.
sec-Butylbenzene	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	24	
4-Isopropyltoluene	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	16	
n-Butylbenzene	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	31	
2-Methylnaphthalene	WS102	0.30	MG2	ug/kg	224	
	WS104	0.30	MG1	ug/kg	51	
	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	219	
Dibenzofuran	WS102	0.30	MG2	ug/kg	161	
	WS104	0.30	MG1	ug/kg	95	
	WS105	4.00	Bedrock – Chester Sandstone Formation	ug/kg	60	
OTHERS						
pH	WS109	0.40	MG1	pH units	12.23	High alkaline pH likely the result of concrete content within gravel.



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Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g. asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments and / or fibres are present in the soil at the site. The asbestos assessment commenced on site with inspection of the Made Ground by our suitably qualified supervising engineer for the presence of bulk ACMs.

No ACM materials were reported during fieldworks.

Of the 9 No. Made Ground samples submitted for asbestos screening, 1 No. was reported to contain asbestos. This positive identification is summarised in Table 7.2 below.

Table 7.2 Summary of Asbestos Assessment

Exploratory Hole Location	Depth (m bgl)	Location on Site Description	Soil Population	Asbestos Type	Quantification (% w/w)
Asbestos in Soil Samples					
WS103	0.35	North east	MG2	Amosite and chrysotile	Fibre bundles and bitumen products 0.006%

Coal Tar

A total of 2 No. samples of asphalt were submitted for coal tar analysis. The results are presented in Table 10.4 below.

Table 7.3 Summary of Coal Tar Analysis

Exploratory Hole Location	Depth (m bgl)	Location on Site Description	Soil Population	Triterpanes 191m/z	Triaromatic Steranes 231m/z	Coal Tar (%)
WS101	0.25	North	Asphalt	Absent	Absent	<0.1
WS106	0.15	South	Asphalt	Present	Present	<0.1

The results indicate that neither sample of asphalt contains coal tar.

Groundwater

The groundwater test results have been compared to the commercial General Assessment Criteria (GAC) detailed in the SOBRA document 'Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater'. No exceedances against the commercial GACs were recorded in any of the samples.



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7.4. Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

7.5. Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

On the basis of the results obtained, the following potential exposure risks to construction and maintenance workers have been highlighted:

- Several VOCs/SVOCs for which there are no assessment criteria for commercial end use have recorded at concentrations in excess of the laboratory limits of detection;
- Asbestos has been recorded at a concentration of 0.006% within the burnt shale gravel in WS103 at 0.35, in the north east of the site.

As asbestos has been reported at concentrations potentially above 0.001% w/w (i.e. above 'trace' levels), the Control of Asbestos Regulations 2012 should be adhered to. A summary of complying with CAR: risk assessments, licensing and training is provided in Appendix L.



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8. CONTROLLED WATERS RISK ASSESSMENT

8.1. Introduction

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, samples of groundwater have been submitted for laboratory chemical analysis as per the summary presented in Table 4.4 within this report. Analytical data from groundwater sample testing undertaken by Tier Environmental has been evaluated against Water Quality Standard (WQS) values appropriate to the Conceptual Site Model.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the WQS values that are relevant to the Site and a judgment has been made against the most stringent of those relevant standards. Further details are provided, along with the approach for selection of TPH / BTEX WQS values, in Appendix I.

In some instances, the laboratory method detection limit is greater than the appropriate WQS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

For those potential contaminants of concern for which the WQS values are dependent on hardness (e.g. cadmium EQS values), a hardness of 100-200 mg CaCO₃/l has been selected based on the reported values in the groundwater beneath the Site.

8.2. Controlled Waters Environment Conceptual Site Model Summary

From a conceptual site model perspective, although not encountered directly beneath site during the ground investigation, the surrounding Till is a Secondary Undifferentiated Aquifer, and the surrounding Shirdley Hill Sand is a Secondary A Aquifer (both are shown beneath areas of the site on geological mapping). The Chester Sandstone Formation bedrock is classified as a Principal Aquifer. Groundwater flow direction beneath the Site is understood to be towards the south west. The Site is situated within a 'Type 3 – Total Catchment' Source Protection Zone, there are no potable water extractions within 1km and no non-potable water abstractions within 500m of the site. The nearest surface water receptor is an unnamed pond located 115m southeast, the nearest running water feature is shown 247m south as an unnamed inland river. The Site is set within an area of significant wider historical commercial/industrial heritage. On this basis the controlled waters sensitivity for the Secondary A and Secondary Undifferentiated aquifers is regarded as being low whilst the Principal Aquifer is moderate.

8.3. Groundwater Testing

Table 8.1 below summarises the measured concentrations of contaminants of concern from groundwater samples at the Site that have been reported in excess of the respective WQS values.

Table 8.1 Summary of Measured Concentrations of Dissolved Phase Groundwater Potential Contaminants of Concern in Excess of WQS Values

Potential Contaminant of Concern	Units	LoD*	WQS	Maximum Concentration	No. samples >WQS	Monitoring Well Location
Arsenic	µg/l	0.9	10	20.5	1 of 3	WS107
Copper	µg/l	1	1	5	3 of 3	WS105, WS107, WS108
Nickel	µg/l	0.2	4	10.2	1 of 3	WS105
Zinc	µg/l	1.5	10.9	117.6	1 of 3	WS105
Fluoranthene	µg/l	0.005	0.12	0.254	2 of 3	WS105, WS108
Benzo(a)pyrene	µg/l	0.005	0.01	0.103	2 of 3	WS105, WS108



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Potential Contaminant of Concern	Units	LoD*	WQS	Maximum Concentration	No. samples >WQS	Monitoring Well Location
Sum of PAH	µg/l	0.173	0.1	0.394	2 of 3	WS105, WS108
Total Ammonia as N	mg/l	0.03	0.6	0.91	1 of 3	WS108

* LOD= Laboratory Method Limit of Detection

Measured groundwater concentrations of arsenic, copper, nickel, zinc, fluoranthene, benzo(a)pyrene, sum PAHs and ammonia have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one order of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the Site and the nearest surface water receptor (an unnamed pond located 115m southeast) or the nearest running water feature (an unnamed inland river located 247m south), the absence of a continuous groundwater body beneath the site, the fact that the Site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, the historical commercial/industrial heritage of the surrounding area, the moderate sensitivity of the controlled waters environment, and that the distance to the nearest active groundwater abstraction point is 845m north and none within 1km hydraulically downgradient, these exceedances are not expected to have pose a significant risk to controlled waters beneath the site.



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9. GROUND GAS RISK ASSESSMENT

9.1. Introduction

The ground gas risk assessment has been undertaken in accordance with the following guidance:

- BS 8485:2015+A1:2019;
- CIRIA C665, 2007;
- Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide Are Present, NHBC, 2007;
- A Pragmatic Approach to Ground Gas Risk Assessment RB17. CL:AIRE, 2012; and,
- Ground Gas Monitoring and 'Worst-Case' Conditions TB17, CL:AIRE, 2018

The ground gas risk assessment has been conducted with full consideration of the viable sources, pathways and receptors included within the Preliminary Conceptual Site Model presented in Section 3.

Ground gas monitoring was conducted in conjunction with groundwater monitoring (and sampling); however, it should be noted during the gas monitoring was conducted first, prior to any groundwater monitoring / sampling works. The monitoring well locations and construction were designed with due consideration of the proposed development layout and preliminary conceptual site model. Further information pertaining to monitoring wells is provided in Table 4.2.

9.2. Ground Gas Monitoring Results

The full ground gas monitoring results from the installations are presented in Appendix F and summarised below:



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Table 9.1 Ground Gas Monitoring Results Summary – 2No. Visit of Proposed Monitoring Programme of 2 No. Visits

Strata targeted by response zone	Monitoring well reference	Maximum peak CH ₄ (%v/v)	Maximum steady state CH ₄ (%v/v)	Maximum peak CO ₂ (%v/v)	Maximum steady state CO ₂ (%v/v)	Lowest O ₂ recorded (%v/v)	Maximum peak gas flow rate (l/h)	Maximum steady state gas flow (l/h)
Made Ground, Weathered Bedrock	WS103	0.2	0.1	0.8	0.8	18.6	0.1	ND
Made Ground, Weathered Bedrock	WS104	0.3	0.1	1.0	0.2	18.3	ND	ND
Made Ground, Weathered Bedrock	WS105	1.2	1.1	3.4	0.9	13.8	ND	ND
Made Ground, Weathered Bedrock	WS106A	1.5	1.5	4.2	4.2	13.3	ND	ND
Made Ground	WS107	0.3	0.2	0.7	0.7	2.7	1.8	1.5
Made Ground	WS108	0.4	0.4	0.1	0.1	0.4	3.5	3.3
Made Ground, Weathered Bedrock, Bedrock	WS109	0.2	0.2	0.1	0.1	11.4	ND	ND

Bold = maximum value reported across all visits.



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9.3. Ground Gas Risk Assessment

Table 9.2 and Table 9.3 demonstrate how, in accordance with CIRIA C665, the periods and frequency of monitoring required.

Table 9.2 From Table 5.5a CIRIA C665 - Typical/idealised periods of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of development	Low (commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (flats)	2 months	3 months	6 months	12 months	24 months
	High (residential with gardens)	3 months ¹	6 months	6 months	12 months ¹	24 months

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over "high", "medium" or "low" generation potential of source.

Table 9.3 From Table 5.5b CIRIA C665 - Typical/idealised frequency of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of development	Low (commercial)	4	6	6	12	12
	Moderate (flats)	6	6	9	12	24
	High (residential with gardens)	6 ¹	9	12	24 ¹	24

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over "high", "medium" or "low" generation potential of source.

However, it should be noted that since this is a Preliminary Ground Investigation, a total of 2 No. gas monitoring visits have been undertaken. It is recommended that further gas monitoring be undertaken when any supplementary ground investigation works are undertaken at the site (likely post-demolition), which should also include monitoring locations within the current building footprint (which was occupied and therefore inaccessible during this investigation) in order to bring the full ground gas monitoring programme into line with the CIRIA C665 requirements above.

The total atmospheric pressure range of the ground gas monitoring data included in this report was 1005 mbar and 1009 mbar. This range covers moderate atmospheric pressures. Monitoring events included periods of steady and rising pressure trends.



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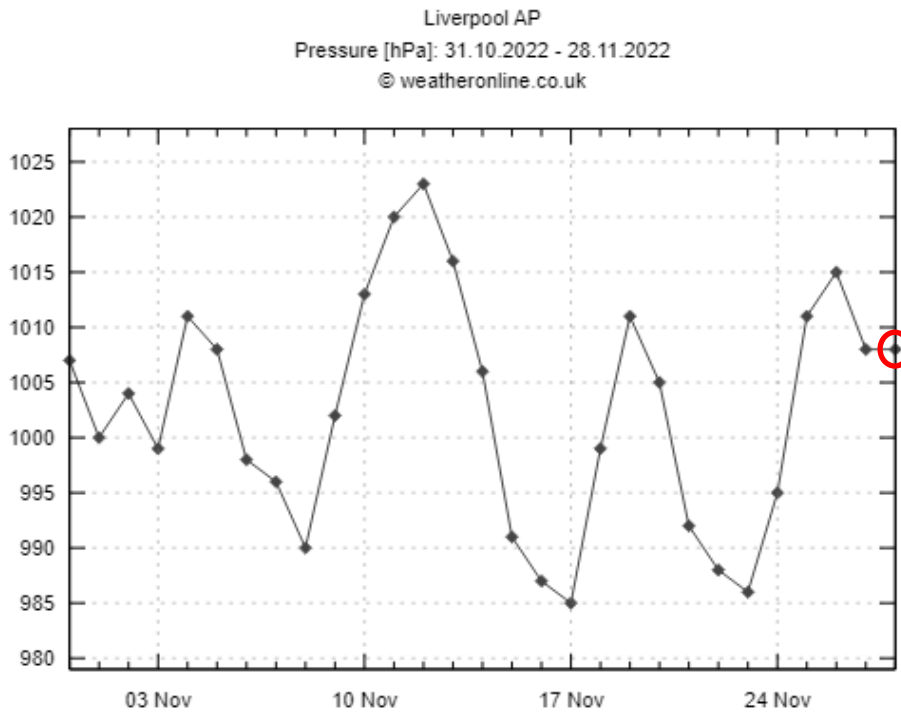
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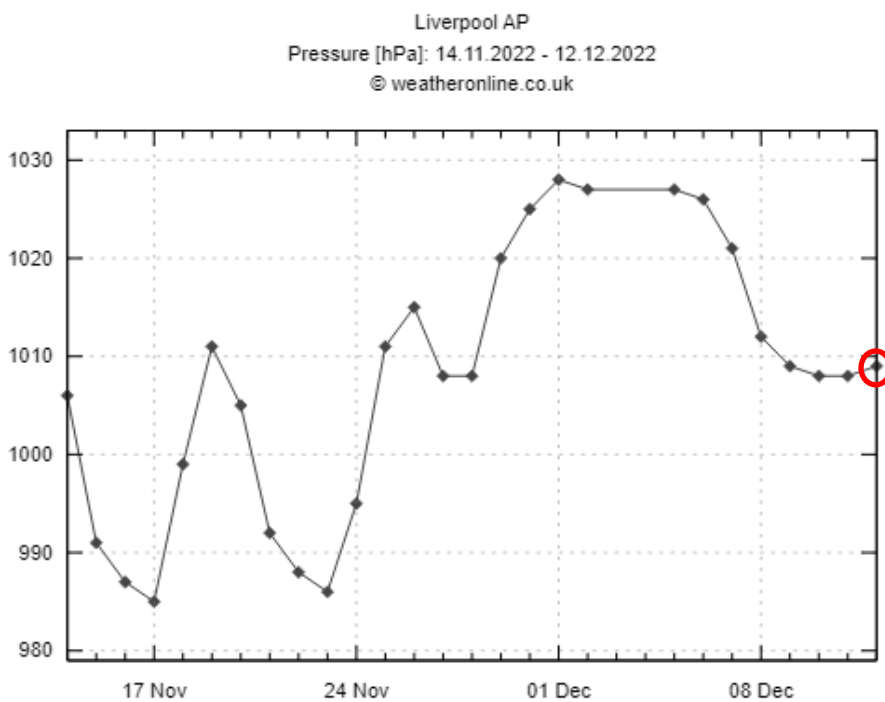
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Visit 1 – 28.11.22



Visit 2 – 12.12.22





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Initial 'Worst-Case' GSV Calculation – Carbon Dioxide and Methane

An initial conservative assessment has been made by calculating a 'worst-case' Gas Screening Value (GSV) for the Site by using:

- the maximum reported methane or carbon dioxide concentration (whichever is highest) from any monitoring well and during any ground gas monitoring visit; and,
- the maximum peak positive flow rate from any monitoring well and during any ground gas monitoring visit

Table 9.4 Initial Worst-Case GSV Calculation

Ground Gas	Maximum Reported Peak Concentration (% v/v)	}	Selected Concentration used in GSV Calculation (% v/v)	X	Maximum Appropriately Selected Gas Flow Rate (l/hr)	=	'Worst case' GSV (l/hr)
Methane (CH ₄)	1.5		4.2		3.5		0.147
Carbon dioxide (CO ₂)	4.2						

CIRIA C665 provides two separate methods to 'characterise' a site that firstly requires the assessor to distinguish between two fundamental development 'situations':

- Situation A** - Any development other than Situation B (e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc) for which the **Modified Wilson and Card 'Characteristic Situation' classification system** is applied; and,
- Situation B** - Low rise building with minimum ventilated under floor void (min 150 mm) for which the **NHBC Traffic light classification system** is applied

In this instance, as the Site is due to be redeveloped as commercial units, it shall be regarded as a 'Situation A' scenario for the purposes of the ground gas risk assessment.

Table 9.4 demonstrates that the Site is placed in a Characteristic Situation 2 – Low Risk scenario on the basis of the 'worst case' GSV alone which would trigger the requirement for basic ground gas protection measures; however, this should be further reviewed and assessed upon completion of any future ground gas monitoring to facilitate a full ground gas risk assessment in accordance with CIRIA C665.

Carbon Monoxide and Hydrogen Sulphide

There is no current UK risk assessment guidance available for carbon monoxide and hydrogen sulphide derived from ground gases.

No measured concentrations of hydrogen sulphide have been reported in excess of the instrument's detection limit. As such, there is no evidence to suggest that the Site presents a potential risk to future land users from hydrogen sulphide.

A maximum peak carbon monoxide concentration of 37 ppm has been reported from WS107 during the first monitoring visit which exceeds the workplace long term exposure limit (30ppm) but is below the workplace short term exposure limit (200ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits) and exceeds the WHO long term (24 hours) indoor exposure guideline value (5.68 ppm).



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Considerations for Construction and Maintenance Workers

During engineering and construction activities, the ground gas data indicate that the following aspects are to be considered during the preparation of relevant site H&S plans, method statements and related documents, and appropriate working methods adopted:

- **Carbon dioxide and carbon monoxide concentrations in ground gas:** The measured CO₂ and CO concentrations in ground gas reported are elevated relative to background levels and could present an asphyxiation risk in excavations and other confined spaces. The Health & Safety Executive has published information defining safe occupational exposure levels for CO₂ / CO and the latest guidance must be consulted to determine whether the ground gas regime necessitates specific precautions during site works.
- **Methane concentrations in ground gas:** The measured methane concentrations in ground gas reported are elevated relative to background levels and could give rise to explosive mixtures in confined spaces. Safe working methods should be adopted to mitigate this risk

9.4. Radon Gas

Less than 1% of properties above the Action Level, and therefore radon precautions are not required.



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10. REVISED CONCEPTUAL SITE MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT OF POLLUTANT LINKAGES

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 3, has been revised in light of the ground investigation and the chemical analysis results presented above in Table 10.1, below.

A revised qualitative risk assessment has been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.



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Table 10.1 Revised Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
- The Site is currently occupied by a commercial warehouse development, with associated offices, ancillary buildings and roadways and parking. The surrounding Site uses comprise of commercial/industrial developments to the north, east and south with residential developments to the west. It is proposed to redevelop the Site with commercial units that lie broadly within the same footprint. - Made Ground was encountered across the site, comprising asphalt, concrete or block paving at the surface and generally overlying granular Made Ground to depths of between 0.28m and 4.65m bgl, generally recorded to deepen towards the south west. Cohesive Made Ground was encountered within the south of the site, generally outside of the proposed building footprint. Made Ground was generally underlain by a limited thickness of weathered bedrock recovered as sand, overlying sandstone bedrock of the Chester Sandstone Formation. - The groundwater flow is understood to flow towards the south west based on Tier Environmental's knowledge of the surrounding area, however appears to be fairly discontinuous beneath the site, having been recorded within both groundwater strikes during the ground investigation and subsequent groundwater monitoring visits to range between 0.35 m and 4.55 m bgl, seemingly independent of topography. - No measured concentrations of potential contaminants of concern have been reported in excess of the respective GACs protective of human health for a commercial land use. However, asbestos was recorded within 1no. location on site, in the form of amosite and chrysotile fibre bundles at a concentration of 0.006%w/w (within burnt shale at WS103 at 0.35m bgl). Neither of the samples of asphalt tested recorded the presence of coal tar, and PCBs were not recorded above the laboratory detection limits in samples taken from the vicinity of the substation. - No free phase product was encountered. Although concentrations in excess of the relevant WQS have been recorded, measured dissolved phase groundwater concentrations of these contaminants within the groundwater beneath the site are not considered as a significant risk to controlled waters. - A worst-case preliminary Gas Screening Value (GSV) of 0.147 l/hr has been calculated for the Site after 2 No. preliminary ground gas monitoring visits based on a maximum elevated reported peak carbon dioxide concentration of 4.2 % v/v and a maximum reported peak flow rate of 3.5 l/hr. This places the Site in a Characteristic Situation 2 – Low Risk Scenario and given that the maximum reported carbon monoxide concentration has been reported in excess of the workplace long term exposure limit and WHO long term (24 hours) indoor exposure guideline value, it is considered that there the preliminary assessment indicates the possibility that basic ground gas protection measures may be required for the Site. However, this should be reassessed upon the completion of any future additional ground gas monitoring visits required to achieve the minimum requirements under CIRIA C665.



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Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
Measured localised concentrations of asbestos (amosite and chrysotile fibre bundles) in the north east of the site reported at a concentration of 0.006%w/w	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
Measured concentrations of carbon dioxide / methane and carbon monoxide in made Ground soils beneath the Site.	Hazardous ground gasses (methane, carbon dioxide, carbon monoxide and depleted oxygen)	Inhalation (indoor and outdoor)	Future site users (commercial)	Severe	Likely	High Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Likely	High Risk
		Migration of hazardous ground gases from beneath the Site to adjacent sites along services or other preferential conduits	Adjacent site users (commercial)	Severe	Low Likelihood	Moderate / Low Risk
			Adjacent site users (residential)	Severe	Low Likelihood	Moderate / Low Risk
		Migration of ground gas / explosion	Buildings and services	Severe	Low Likelihood	Moderate / Low Risk

For definition of the terms used in the qualitative risk assessment, please see Appendix G.



11. PRELIMINARY WASTE SOILS CLASSIFICATION AND WASTE DISPOSAL ROUTE DETERMINATION

11.1. Waste Classification

If the Site is to be redeveloped and materials are disposed off Site, the material exported from the Site to Landfill should be hauled by a register waste carrier in accordance with Duty of Care Regulations 1991 and the Hazardous Waste Regulations 2005.

It will be necessary to register the Site in advance of the intended reclamation works with the Environment Agency before disposal to landfill can take place. There will be requirement for the waste producer to provide appropriate Waste Acceptance Criteria (WAC) testing of the Soils for disposal to ensure that the soils are appropriately classified and that the landfill is licensed to receive such soils. A consignment note shall be completed, signed and retained by all parties involved. The consignment note shall state the volume of waste, a physical description of the material and statement of its chemical composition. The waste consignment notes shall be kept by the contractor for a period of at least two years.

Tier Environmental have assessed the chemical results in terms of basic characterisation of soils for waste. This provides a preliminary assessment of whether a material is potentially inert/non-hazardous or hazardous waste, with the final outcome being determined by WAC testing.

Basic waste characterisation has demonstrated that 3 No. of the samples of the materials tested have been classified as hazardous waste:

- WS105 at 4.00m bgl
- WS108 at 0.90m bgl
- WS109 at 0.40m bgl

Basic waste characterisation has demonstrated that 6 No. of the samples of the material tested have been classified as non-hazardous waste:

- WS101 at 0.25m bgl.
- WS101 at 0.35m bgl.
- WS103 at 0.35m bgl.
- WS105 at 0.70m bgl.
- WS106 at 0.15m bgl.
- WS106A at 0.80m bgl.

Basic waste characterisation has demonstrated that 5 No. samples of the material tested have been classed as potentially hazardous:

- WS102 at 0.30m bgl
- WS104 at 0.30m bgl
- WS106 at 0.50m bgl
- WS107 at 0.30m bgl
- WS107 at 3.60m bgl



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These samples have all been classed as potentially hazardous due to hazardous property HP3(i): Flammable liquid waste. However, no free phase hydrocarbons were observed within these samples, and none of these samples recorded visual or olfactory evidence of hydrocarbon contamination. As such, it is considered appropriate to downgrade the above 5 No. samples to non-hazardous.

The following 2 No. samples of Made Ground were submitted for Waste Acceptance Criteria testing:

- WS107 at 3.60m bgl (cohesive Made Ground)
- WS109 at 0.40m bgl (granular Made Ground)

Based on the results of the above 2 no. samples, both the cohesive and granular Made Ground is suitable for disposal to an inert waste landfill.

Natural soils are likely to be suitable for disposal to an inert waste landfill.

11.2. Materials Re-Use

Subject to volumetric fill requirements and a future assessment of suitability of re-use (both chemically and geotechnically), some materials may be considered for potential re-use in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils on Other Sites

In addition, Tier Environmental are aware that CL:AIRE is classing stockpiled clean, naturally occurring soils as waste, unless their final destination is identified in a Materials Management Plan, before they are excavated. However, Tier Environmental consider that any clean naturally occurring soils arising from enabling works, earthworks or construction activities would be regarded as an asset and the default assumption for this Site (prior to excavation and stockpiling) is not the intention to discard these materials where they may be reasonably re-used on this, or another, development site. Stockpiling is a recognised, recommended means of safely storing soils. Whilst there may be advantages to leaving soils in-situ, stripping topsoil and subsoil prior to earthworks is a routine construction activity. Tier Environmental consider that it is not unreasonable to state that in the event that the developer owns another site where the construction phase is ongoing, soils can be transferred between their sites as an owned product and never become waste.

The above paragraph above is therefore considered a clear intention to reuse any clean, naturally occurring soils derived from excavations at this Site (which may also include temporary stockpiling these materials). It is considered; however, that in addition to this the following must be adhered to:

- Reuse does need to occur within a 'reasonable' timeframe (12 No. months); and,
- If soils are transferred to a third party (another developer), there needs to be some contractual agreement in place, as in this situation it is important to have something in place confirming that surplus soils are required by the third party.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils Within The Site They Are Excavated From

Further to the above, where soils are naturally occurring, uncontaminated and re-used on the site they are excavated from, they fall outside of the Waste Framework Directive (WFD) i.e. they will not be classified as a waste. Currently the CL:AIRE Definition of Waste Code of Practice states the



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following which appears to support this position: *"If the material is waste an Environmental Permit will be required to lawfully deposit or re-use it unless the material is "uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated", which is excluded from waste regulation by the Waste Framework Directive (2008)."*



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12.CONCLUSIONS AND RECOMMENDATIONS

12.1. Conclusions

Asbestos has been recorded within the Made Ground in a localised area in the north east of the site, at a concentration of 0.006%w/w. This material will either require further assessment and/or delineation, excavation and suitable disposal from site, or to be placed beneath an area of hardstanding or the building footprint. Works in this area will need to be undertaken in accordance with CAR:2012 regulations.

Other than this localised area of asbestos within the Made Ground, there are no other potential risks to human health from soil or groundwater concentrations. In addition, although concentrations of several contaminants have been recorded in excess of the WQS standards, these are not considered to pose a significant risk to controlled waters; however, it would be recommended that the discussion included with respect to controlled waters is reviewed by the Local Authority / Environment Agency to ensure that it is pre-agreed.

A worst-case preliminary Gas Screening Value (GSV) of 0.147 l/hr has been calculated for the Site after 2 No. preliminary ground gas monitoring visits based on a maximum elevated reported peak carbon dioxide concentration of 4.2 % v/v and a maximum reported peak flow rate of 3.5 l/hr. This places the Site in a Characteristic Situation 2 – Low Risk Scenario and given that the maximum reported carbon monoxide concentration has been reported in excess of the workplace long term exposure limit and WHO long term (24 hours) indoor exposure guideline value, it is considered that there the preliminary assessment indicates the possibility that basic ground gas protection measures may be required for the Site. However, this should be reassessed upon the completion of any future additional ground gas monitoring visits required to achieve the minimum requirements under CIRIA C665.

Basic waste characterisation has demonstrated that 2 No. of the samples of the Made Ground (WS108 at 0.90m and WS109 at 0.40m bgl) and 1 no. sample of the bedrock (WS105 at 4.00m bgl where hydrocarbon contamination was observed) tested have been classified as hazardous waste. The remaining samples tested have been classified as non-hazardous. The 2 No. samples of granular and cohesive Made Ground that were submitted for Waste Acceptance Criteria testing demonstrate that both materials tested are suitable for disposal to an inert waste landfill.

12.2. Recommendations

The following is recommended for the Site:

- A supplementary ground investigation (likely post demolition) to target areas of the site that were inaccessible during this investigation, including areas within the current building footprint;
- This should include additional gas monitoring, targeting areas beneath the building footprint and that have recorded atypical results during this investigation, to provide a total of 4no. monitoring visits as discussed within Section 9.3 above and confirm the requirement or otherwise for ground gas protection measures at the Site.
- Future supplementary ground investigation should also include infiltration testing to assess the suitability of the underlying weathered sandstone bedrock for the use of soakaways.
- Further geotechnical testing, including compaction testing, should be undertaken to aid earthworks design.



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- Further assessment and/or delineation, excavation and reuse under hardstanding/the building footprint or suitable disposal of asbestos impacted Made Ground within the north east of the site. Works in this area will need to be undertaken in accordance with CAR:2012 regulations.
- A clean cover system is not required following the above recommendations for the asbestos impacted Made Ground are followed. However a minimum 300mm of suitable growing medium may be required for areas of soft landscaping to allow sufficient plant growth – this should be confirmed by a landscape specialist.



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13.REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to undertaking any works on site.

It is recommended that conditions placed on any planning permission are discharged prior to commencement of site works.



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<http://www.warstateandsociety.com/Bombing-Britain>

<https://www.epa.gov/pfas/basic-information-pfas>

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BGS Geology of Britain Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>



PRELIMINARY GROUND INVESTIGATION REPORT
DEACON BUSINESS PARK, KNOWSLEY

Report No : TE1704-TE-00-XX-RP-GE-002-V01
Page No : 50 of 51
Engineer: Stefani Ellis
Date: 03/01/2023

15.GLOSSARY OF TERMS

ACEC	Aggressive Chemical Environment for Concrete (classification)
aOD	Above Ordnance Datum
bgl	Below ground level
BGS	British Geological Survey
BRE	Building Research Establishment
CBR	California Bearing Ratio (test)
COMAH	Control of Major Accident Hazards (regulations)
Designated location	Site (and the ecosystem on that site) protected under national or international legislation. A potential ecological receptor to be considered as part of the assessment of land contamination. Example designated locations include SSSIs (q.v.), SACs (q.v.), national nature reserves, Ramsar sites and bird special protection areas.
DQA	Data Quality Assessment
DQO	Data Quality Objective
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EQS	Environmental Quality Standard
GAC	Generic Assessment Criterion
GQA	General Quality Assessment (Environment Agency)
GSV	Gas Screening Value
HCV	Health Criteria Value
IPPC	Integrated Pollution Prevention and Control (regulations)
K _{ow}	Octanol-water partition coefficient
LEL	Lower Explosive Limit
LL	Liquid Limit
LoD	Limit of Detection (analytical)
LoQ	Limit of Quantification (analytical)
Mean Value Test	Statistical test (described in the CIEH Guidance) to estimate the mean value of a normally distributed population of data at a given level of confidence. Normally for contaminated land assessment, the 95th percentile (referred to as the 95%UCL or US95) is applied as a reasonable but conservative estimate of the mean concentration for comparison with the relevant assessment criteria.
Maximum Value Test	Statistical test (described in the CIEH Guidance) to identify whether an elevated concentration within a normally distributed data set forms part of the underlying population from which it has been sampled or whether it is an outlier (such as a localised area of contamination) that merits further consideration.
MC	Moisture Content
NGR	National Grid Reference
NIHHS	Notification of Installations Handling Hazardous Substances (regulations)
OS	Ordnance Survey
PI	Plasticity Index
PID	Photoionisation Detector
PL	Plastic Limit
ppm	Parts per million
ppmv	Parts per million by volume
QA	Quality Assurance
QC	Quality Control
SAC	Special Area of Conservation
SOM	Soil Organic Matter



**PRELIMINARY GROUND INVESTIGATION REPORT
DEACON BUSINESS PARK, KNOWSLEY**

Report No : TE1704-TE-00-XX-RP-GE-002-V01
Page No : 51 of 51
Engineer: Stefani Ellis
Date: 03/01/2023

SPT	Standard Penetration Test
SPZ	Source Protection Zone (see Appendix I)
SSAC	Site-Specific Assessment Criterion
SSSI	Site of Special Scientific Interest
SVOC	Semi-Volatile Organic Compound
TEF	Toxicity Equivalent Factor
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
US95	95 th percentile estimate of the true mean value of a data population (also known as 95%UCL).
VOC	Volatile Organic Compound

APPENDIX A - DRAWINGS



Deacon Business Park Site Location Plan



The Site

Job Number: TE1704

Job Name: Deacon Business Park

Client: C4 Projects

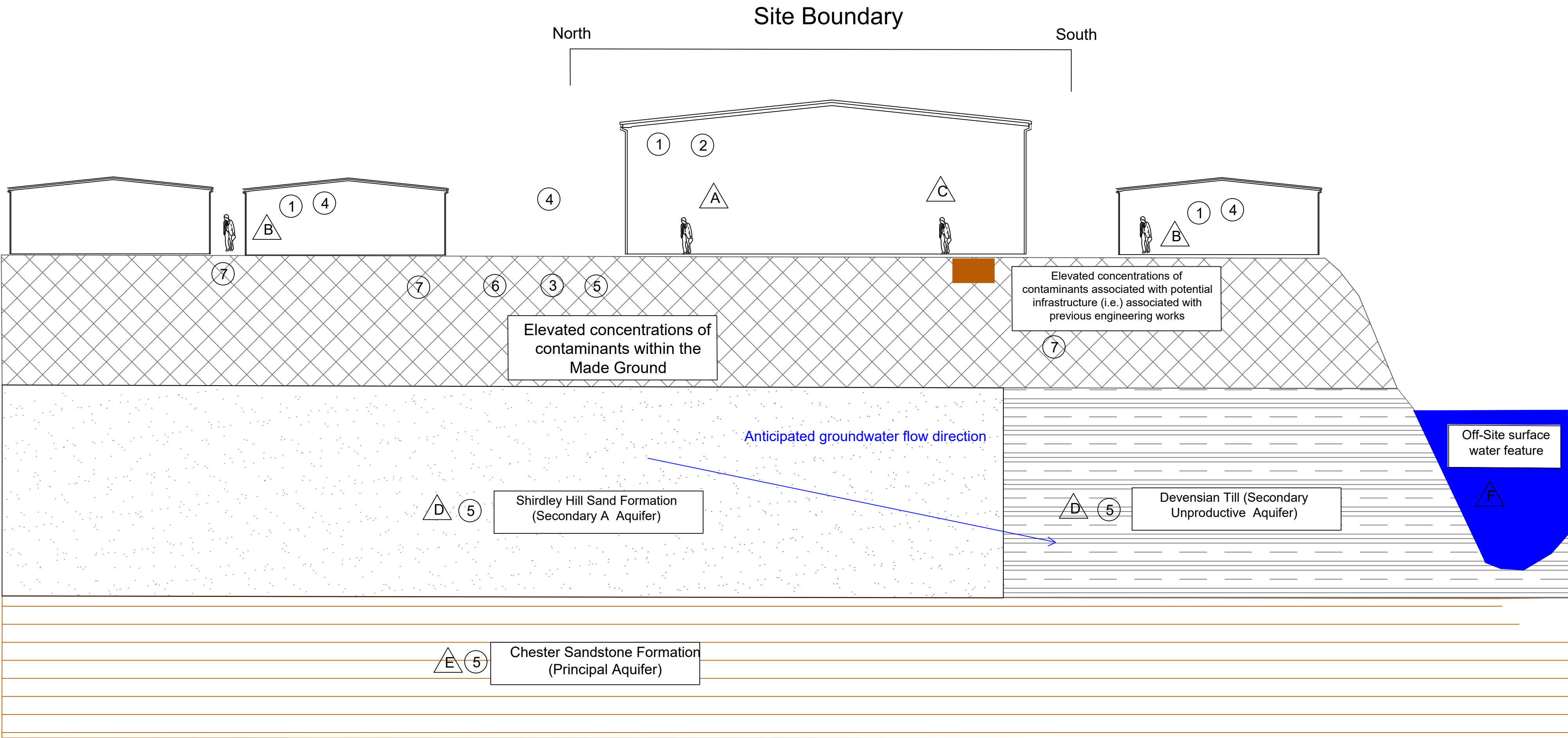
Drawing Name: Site Location Plan

Drawing Number: TE1704-TE-00-XX-DR-GE-001-V01

Drawn By: ER

Checked By: AR

Scale: NTS



- A

Future site users

B

Adjacent site users

C

Construction, site investigation, demolition and future maintenance workers

D

Superficial Aquifers

E

Bedrock Aquifer

F

Surface Water Receptor

1

Inhalation of indoor and outdoor gas

2

Direct contact

3

Migration of ground gas through permeable Made Ground

4

Dust migration and inhalation/ingestion

5

Migration of mobile contaminants

6

Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits

7

Migration of mobile contaminants through water pipes

Notes

This drawing is purely schematic and is a representation of the ground conditions and process, based upon information derived from the preliminary risk assessment.

Please refer to the table in the PRA Report for the identified potential pollutant linkages and associated qualitative risk assessment.

This model should be revised, following the site investigation and any additional information to ensure its relevance to actual conditions.

V01	07/11/22	ER	Preliminary CSM	AR
Rev	Date	By	Description	Appd
Revisions				
Status				

FINAL

Tier Environmental Ltd.
Chadwick House
Warrington Road
Birchwood
Warrington | Wa3 6AE
t: 01925 818388

Client

C4_PROJECTS

Project

DEACON_BUSINESS_PARK

Title

PRELIMINARY_CSM

Scale	Drawn	Revision
DNS	ER	01
Date	Checked	
07/11/22	AR	

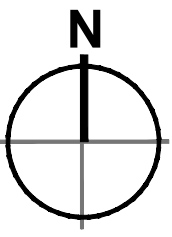
Drawing Ref : TE1704-TE-00-XX-DR-GE-003-V01

TE1704

002



- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipient's responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.



KEY

- Site Boundary:**
21.88 Acres (8.85 Hectares)
- Existing Site Access**
- Estimated Spot Heights**
+ 47m
- Existing Trees**
- Existing Buildings**
- Residential Area**

Parking Standards Knowsley Council Draft Ensuring a Choice of Travel Supplementary Planning Document (February 2010)	
B2- General Industrial (max) 1 space per 48 m² GFA	
B8- Storage and Distribution (max) 1 space per 100 m² GFA	

A	Initial Issue	##	##	###	###
rev	amendments	by	ckd	date	

Deacon Business Park, Knowsley

Site Constraints Plan



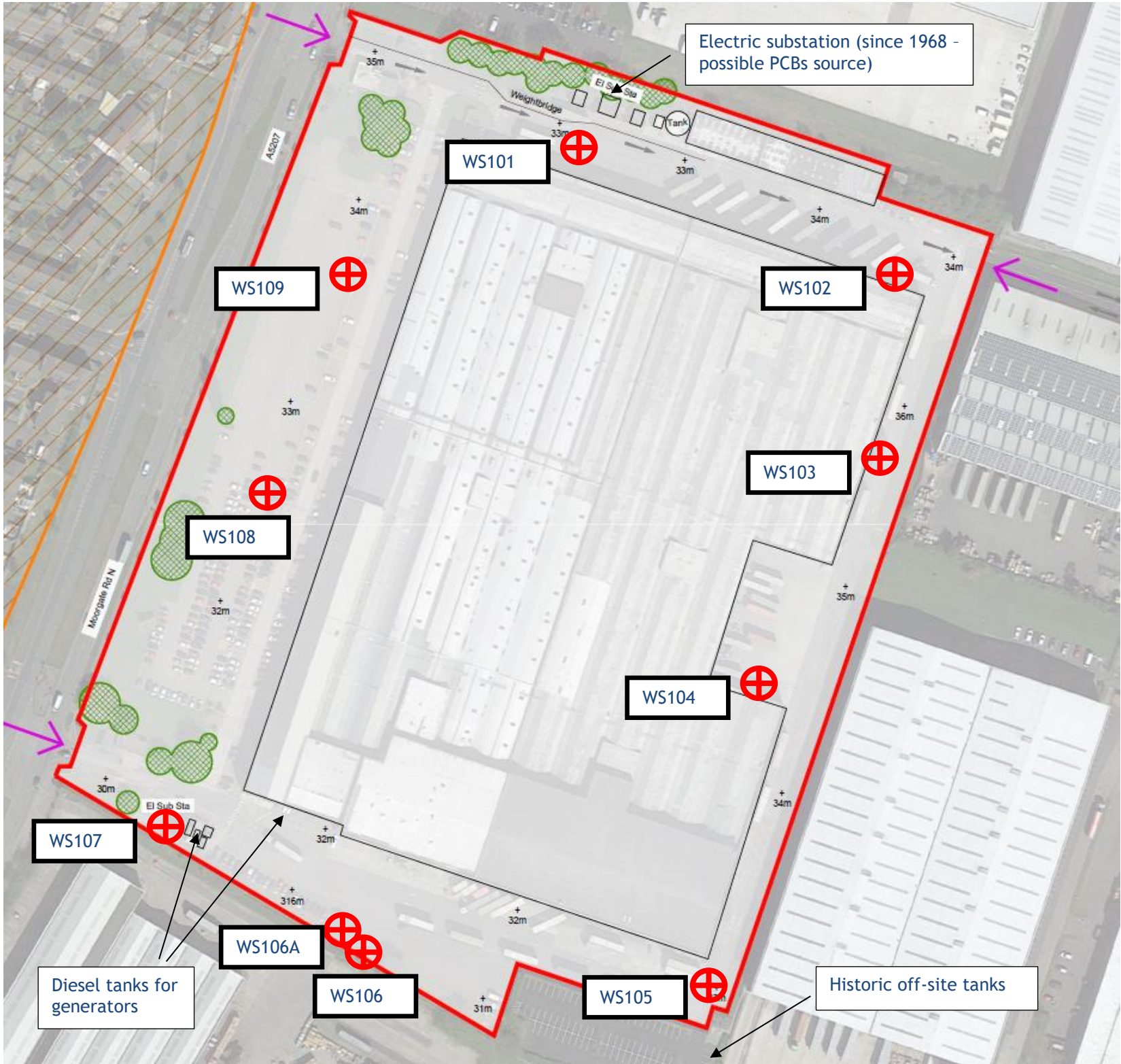
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Document Suitability:	S1
Drawn / Checked:	AF / JB
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Document Reference:	Drawing no: Revision:
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10m SCALE 1:1000



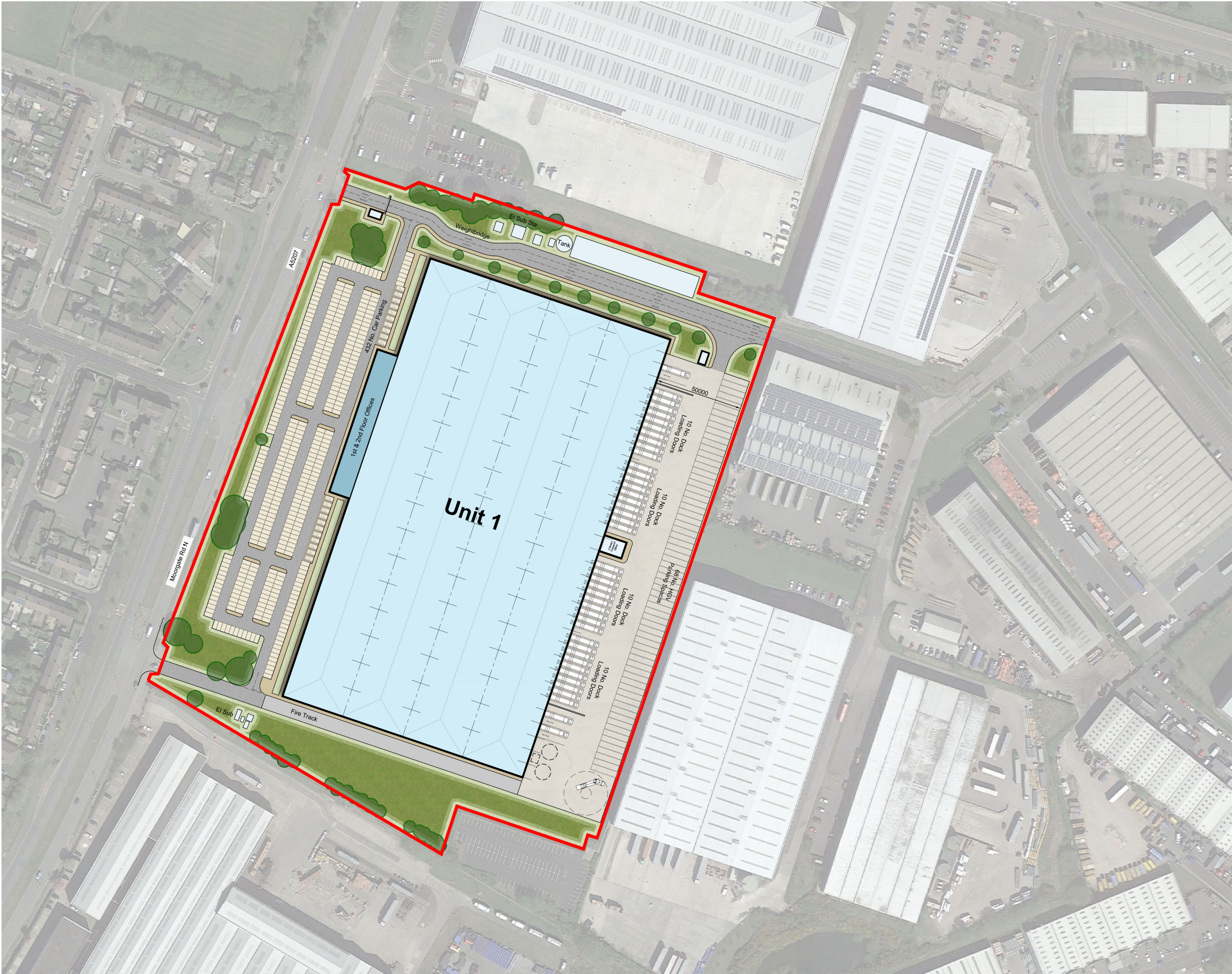
Exploratory Hole Location Plan

Contract Number	TE1704
Contract	Deacon Business Park, Knowsley
Client	C4 Projects



 WS10X Window sample borehole location

Scale	NTS	
Drawn by	AR	Approved SL
Drawing Number	TE1704-TE-00-XX-DR-GE-003-V02	



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SCHEDULE OF ACCOMMODATION
(Gross Internal Area)

Unit 1	
Warehouse Area	- 417,769 sq ft (38,812m²)
Office (2 storey)	- 21,987 sq ft (2,043m²)
Transport Office	- 2,500 sq ft (232m²)
Gatehouse	- 300 sq ft (28m²)
Total Area	- 442,556 sq ft (41,114m²)
Loading Docks	- 40
Level Access	- 3
HGV Parking	- 68
Car Parking	- 432
Plot Area	- 21.88 Acres (8.85 Hectares)
Site Density	- 46.44%

Parking Standards Knowsley Council Draft Ensuring a Choice of Travel Supplementary Planning Document (February 2010)
B2- General Industrial (max) 1 space per 48 m² GFA
B8- Storage and Distribution (max) 1 space per 100 m² GFA

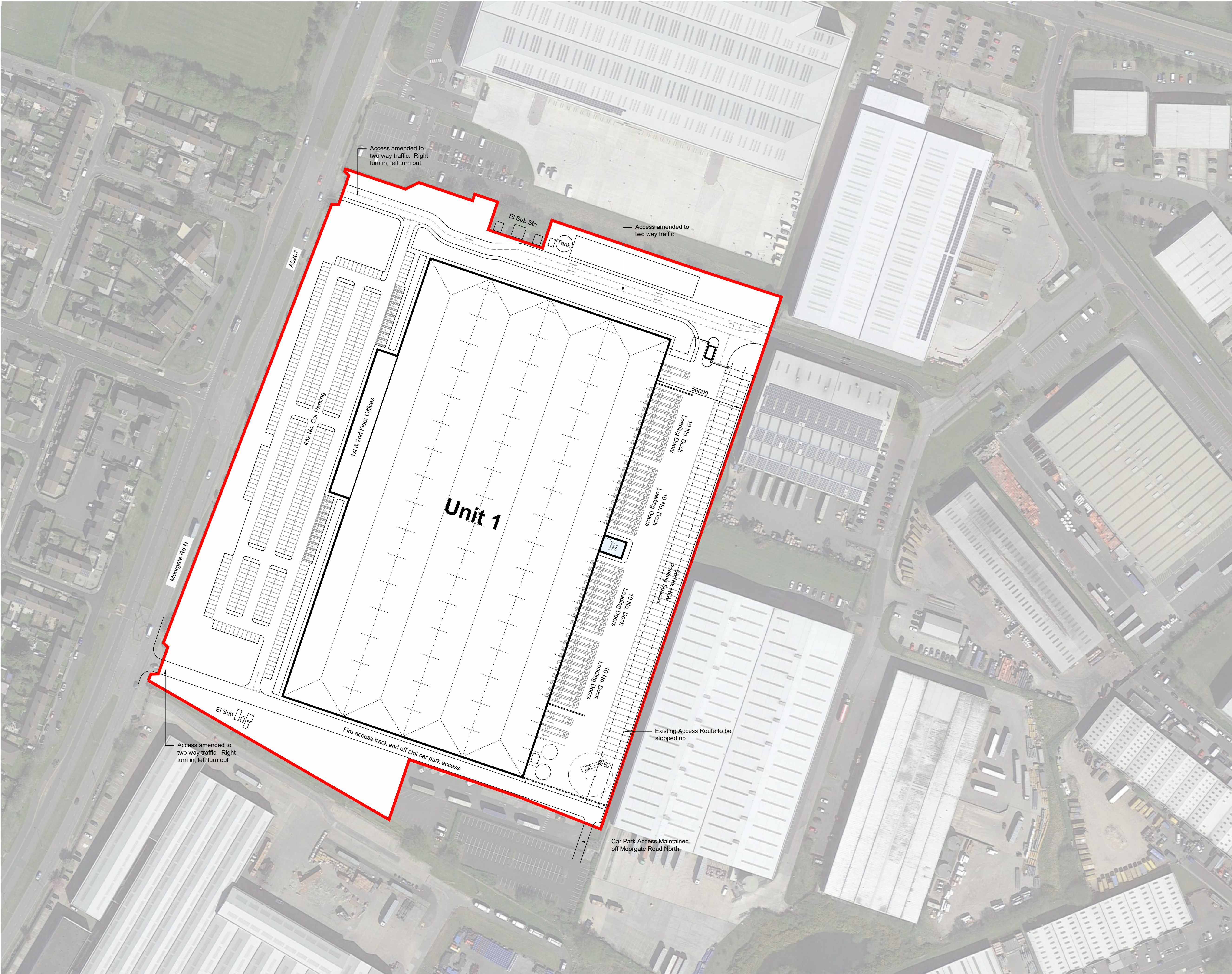
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rev	amendments	by	ckd	date	

Deacon Business Park, Knowsley

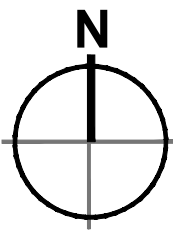
Site Layout



RIBA PoW Stage:	2 - Concept Design
Document Suitability:	S1
Drawn / Checked:	AF / JB
Date:	23/11/2021
Scale:	1:1000 A1
UMC Project Number:	21631
Document Reference:	Drawing no: Revision:
21631 - UMC - ZZZZ - SI - DR - A	0002 A



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- Scaling of this drawing is not recommended.
- It is the recipient's responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.



SCHEDULE OF ACCOMMODATION
(Gross Internal Area)

Unit 1	
Warehouse Area	- 417,769 sq ft (38,812m ²)
Office (2-storey)	- 21,987 sq ft (2,043m ²)
Transport Office	- 2,500 sq ft (232m ²)
Gatehouse	- 300 sq ft (28m ²)
Total Area	- 442,556 sq ft (41,114m²)
Loading Docks	- 40
Level Access	- 3
HGV Parking	- 68
Car Parking	- 432
Plot Area	- 21.20 Acres (8.58 Hectares)
Site Density	- 47.92%

Parking Standards Knowsley Council	
Draft Ensuring a Choice of Travel	
Supplementary Planning Document	(February 2010)
B2- General Industrial (max)	
1 space per 48 m ² GFA	
 B8- Storage and Distribution (max)	
1 space per 100 m ² GFA	

OPTION 1

A	Initial Issue	##	##	###	###
rev	amendments	by	ckd	date	

Deacon Business Park, Knowsley

Site Layout



Newark Beacon, Cafferata Way, Newark, Nottinghamshire NG24 2TN
t: +44 (0)1636 653027 e: info@umcarchitects.com

RIBA PoW Stage:	2 - Concept Design
Document Suitability:	S1
Drawn / Checked:	AF / JB
Date:	23/11/2021
Scale:	1:1000 A1
UMC Project Number:	21631
Document Reference:	Drawing no: Revision:
21631 - UMC - ZZZZ - SI - DR - A	0003 A

10m SCALE 1:1000

APPENDIX B - EXPLORATORY HOLE LOGS



Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	ES	56 (19 for 75mm/56 for 90mm)	0.28			MADE GROUND: Black ASPHALT with high aggregate content. MADE GROUND Brownish red, gravelly, fine to medium, grained SAND. Gravel is medium to coarse, angular to subangular of sandstone. Extremely weak, yellowish brown, fine grained SANDSTONE End of borehole at 0.50 m	1
		0.28			0.30				
		0.35	ES		0.50				
		0.40	SPTLS						
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) No groundwater encountered. 2) Backfilled with arisings and asphalt reinstated. 3) Terminated due to refusal 4) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.07				
		0.30 - 0.40	B		0.28			MADE GROUND: Black ASPHALT with high aggregate content	
		0.40	ES		0.40			MADE GROUND	
		0.40	SPTL		0.60			MADE GROUND: Grey concrete with high aggregate content	
		0.40	S	50 (25 for 95mm/50 for 65mm)				MADE GROUND	
		0.55	ES					MADE GROUND: Red, sandy, fine to coarse, angular to subangular GRAVEL of brick and burnt shale.	1
								MADE GROUND	
								Extremely weak, red, fine grained SANDSTONE.	
								End of borehole at 0.60 m	
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) No groundwater encountered. 2) Backfilled with arisings and asphalt reinstated. 3) Terminated due to refusal 4) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.50	B		0.17			MADE GROUND: Black ASPHALT with high aggregate content.	
		0.35	ES		0.30			MADE GROUND	
		0.55	ES		0.50			One layer of asphalt 0.05m thick, second layer 0.12m thick.	
		0.65	SPTL		0.65			MADE GROUND: Grey, sandy, fine to coarse, angular to subangular GRAVEL of limestone.	
		0.70	S	50 (25 for 125mm/50 for 100mm)	0.95			MADE GROUND	
								MADE GROUND: Dense, brownish red, sandy GRAVEL of fine to coarse, angular BURNT SHALE with occasional brick and concrete.	1
								MADE GROUND	
								Reddish brown, slightly gravelly, fine to medium, grained SAND. Gravel is fine to medium, subangular of sandstone.	2
								Extremely weak to weak, reddish brown, medium grained SANDSTONE.	
								End of borehole at 0.95 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) No groundwater encountered. 2) Terminated due to refusal. 3) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS104

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

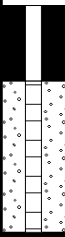
Level:

Scale
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Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25 - 0.58	B		0.25			MADE GROUND: Grey reinforced CONCRETE with high aggregate content. Rebar 0.02m thick	
		0.30	ES		0.40			MADE GROUND	
		0.45	ES		0.58			MADE GROUND: Grey, slightly sandy, fine to coarse, angular to subangular GRAVEL of limestone.	
								MADE GROUND	
		1.10	SPTL		1.05			MADE GROUND: Greyish brown, sandy, fine to coarse, angular to subangular GRAVEL of limestone, occasional concrete and sandstone	1
		1.10	S	N=50 (4,7/10,13,13,14)				MADE GROUND	
					1.55			Red, fine to medium, grained SAND	
								Extremely weak, red, with occasional brownish orange bands, fine to medium grained SANDSTONE	2
								End of borehole at 1.55 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) No groundwater encountered. 2) Terminated due to refusal. 3) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS105

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.35			MADE GROUND: Grass over dark brown, sandy CLAY. (TOPSOIL)	
								MADE GROUND	
		0.70	ES		0.85			MADE GROUND: Brown, sandy, gravelly CLAY. Gravel is fine to coarse, angular to subangular of brick, concrete, sandstone and occasional plastic.	
		1.20	ES		1.00			MADE GROUND	
		1.20		N=4 (1,0/2,0,1,1)	1.45			MADE GROUND: Grey, sandy, angular to subangular, fine to coarse GRAVEL of limestone.	
								MADE GROUND	
		2.00	SPTL					MADE GROUND: Brown, sandy, gravelly CLAY. Gravel is medium to coarse, angular to subangular of brick, occasional coal and rare metal.	
		2.00	S	N=5 (1,0/0,2,2,1)				MADE GROUND	
		2.50	ES					Very loose to loose, reddish brown, slightly gravelly, fine to medium, grained SAND. Gravel is medium to coarse, subangular of sandstone.	
		3.00	SPTL					Wet arisings around 3.00m bgl	
		3.00	S	N=2 (1,0/0,1,0,1)					
					3.90				
		4.00	SPTL		4.20			Extremely weak, yellowish brown, fine to medium, grained SANDSTONE.	
		4.00	S	50 (25 for 75mm/50 for 70mm)				Slight hydrocarbon odour from 4.00m bgl End of borehole at 4.20 m	

Remarks

1) No groundwater encountered. 2) Damp arisings between 3.00m - 3.60m bgl 3) Terminated due to refusal. 4) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS106

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES		0.10			TOPSOIL: Dark brown, slightly clayey SAND with frequent rootlets.	
		0.25 - 0.80	B		0.25			TOPSOIL	
		0.50	ES					MADE GROUND: Black, medium to coarse, angular to subangular GRAVEL of asphalt.	
		0.80	SPTL		0.80			MADE GROUND	
		0.80	S	N=41 (10,10/10,9,9,13)	1.00			MADE GROUND: Grey, sandy, fine to coarse, angular to subangular GRAVEL of limestone and frequent brick, occasional asphalt.	1
		0.85	ES		1.30			MADE GROUND	
		1.30	SPTL					MADE GROUND: Black, medium to coarse, angular to subangular GRAVEL of asphalt	
		1.30	S	50 (25 for 135mm/50 for 110mm)				MADE GROUND	
		1.40	ES					MADE GROUND: Reddish brown, slightly clayey, sandy, fine to medium, angular to subangular GRAVEL of brick fragments with occasional sandstone and concrete.	2
								MADE GROUND	
								End of borehole at 1.30 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) Groundwater encountered at 0.60m. 2) Terminated due to refusal. 3) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS106a

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Dark brown, slightly clayey SAND with frequent rootlets (TOPSOIL) MADE GROUND	
		0.80	ES		0.75			MADE GROUND: Grey, sandy, fine to coarse, angular to subangular GRAVEL of limestone and frequent brick and occasional asphalt. MADE GROUND	1
		1.10	D					MADE GROUND: Soft, brownish grey, sandy, slightly gravelly CLAY. Gravel is fine to medium, angular to subangular of brick, limestone and sandstone. Gravel content decreasing past 1.00m bgl MADE GROUND	
		1.70	ES		1.60			MADE GROUND: Soft, black, sandy CLAY with occasional rootlets. Slight organic odour. MADE GROUND	2
		2.00	SPTL S	N=8 (2,1/2,2,2,2)	2.10			MADE GROUND: Soft, grey, sandy CLAY with occasional rootlets and organic fragments (wood fragments) becoming firm from 2.60m bgl MADE GROUND	
		2.20	ES						
		3.00	SPTL S	N=14 (2,2/3,3,4,4)	3.30			MADE GROUND: Firm to stiff, brown, mottled grey, slightly sandy, reworked CLAY with rare fine gravel of sandstone and brick. MADE GROUND	3
		3.40	ES						
		3.50	D						
		4.00	SPTL S	N=20 (3,3/4,4,4,8)					4
		4.00							
					4.65				
		4.90	SPTL S	50 (8,8/50 for 190mm)	4.90			Red, fine to medium grained SAND	5
		4.90						Extremely weak to weak, red, fine, grained SANDSTONE.	
					5.35			End of borehole at 5.35 m	6

Remarks

1) Groundwater encountered at 0.65m and at base of SPT at 5.35m bgl. 2) Terminated due to refusal. 3) All strength terms are derived from field tests only







Borehole Log

Borehole No.

WS108

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

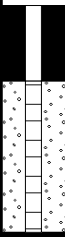
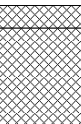
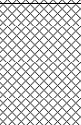
Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	N=30 (1,1/6,6,10,8)	0.15			MADE GROUND: Grey block paving	1
								MADE GROUND	
								MADE GROUND: Greyish brown, slightly clayey, sandy, fine to coarse, angular to subangular GRAVEL of brick, limestone, concrete, occasional sandstone and asphalt.	
		0.90	ES		0.80			MADE GROUND	
		1.00 - 1.40	B					MADE GROUND: Dark brownish grey, slightly gravelly, fine grained, SAND. Gravel is fine to medium, angular to subangular of brick and sandstone with rare coal.	
		1.20	SPTL	50 (7,12/50 for 265mm)	1.70			MADE GROUND	
		1.20	S					Becoming slightly clayey from 1.40m bgl.	
					2.10			Reddish brown, fine to medium, grained SAND.	
		1.80	ES		2.35			Extremely weak, red, fine grained SANDSTONE	
		2.00	SPTL						
		2.00	S						
								End of borehole at 2.35 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) No groundwater encountered. 2) Terminated on refusal. 3) All strength terms are derived from field tests only





Borehole Log

Borehole No.

WS109

Sheet 1 of 1

Project Name: DEACON BUSINESS PARK

Project No.
TE1704

Co-ords: -

Hole Type
WS

Location: KNOWSLEY

Level:

Scale
1:50

Client: C4 Projects

Dates: 15/11/2022 -

Logged By
SE

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.05			0.05			MADE GROUND: Grey block paving	
		0.20			0.20			MADE GROUND	
		0.30			0.30			MADE GROUND: Greyish brown, slightly clayey, sandy, fine to coarse, angular to subangular	
		0.40	ES		0.40			GRAVEL of brick, limestone, concrete, occasional sandstone and asphalt.	
		0.50	ES		0.50			MADE GROUND	
		0.60			0.60			MADE GROUND: Grey CONCRETE	
		0.80			0.80			MADE GROUND	
		1.10	SPTL		1.10			MADE GROUND: Greyish brown, sandy, fine to medium, angular to subangular GRAVEL of mixed lithologies including concrete, occasional limestone, brick and sandstone	1
		1.10	S	N=29 (4,6/9,10,5,5)	1.10			MADE GROUND	
		1.10 - 1.50	B		1.50			MADE GROUND: Greyish brown, sandy, fine to medium, angular to subangular GRAVEL of mixed lithologies including concrete, occasional limestone, brick and sandstone	
		1.70	SPTL		1.70			MADE GROUND	2
		1.70	S	50 (25 for 105mm/50 for 110mm)	1.90			Extremely weak, reddish brown, fine grained, SANDSTONE recovered as gravel.	
								Extremely weak, red, fine grained SANDSTONE, recovered as sand	
								Medium dense, reddish brown, medium grained SAND.	3
								Extremely weak, reddish brown, fine to medium, grained SANDSTONE	
								End of borehole at 1.90 m	

Remarks

1) No groundwater encountered. 2) Terminated on refusal. 3) All strength terms are derived from field tests only



APPENDIX C - GEOENVIRONMENTAL SOIL LABORATORY RESULTS

Tier Environmental
Suite 414, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE



Attention : Adrian Read
Date : 24th November, 2022
Your reference : TE1704
Our reference : Test Report 22/18856 Batch 1
Location : Deacon Business Park, Knowsley
Date samples received : 16th November, 2022
Status : Final Report
Issue : 1

Forty samples were received for analysis on 16th November, 2022 of which fourteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	10-12	14-17	21-24	34-37	46	50-53	54	61-64	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS101	WS101	WS102	WS103	WS104	WS105	WS105	WS106	WS106	WS106A			
Depth	0.25	0.35	0.30	0.35	0.30	0.70	4.00	0.15	0.50	0.80			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	J	V J T	J	V J T			
Sample Date	14/11/2022	14/11/2022	15/11/2022	14/11/2022	14/11/2022	14/11/2022	14/11/2022	15/11/2022	15/11/2022	15/11/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022			
Arsenic #	-	1.9	12.0	15.5	1.4	7.9	-	-	1.8	10.8	<0.5	mg/kg	TM30/PM15
Cadmium #	-	<0.1	<0.1	<0.1	0.2	0.4	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	-	31.2	32.8	31.4	8.1	28.6	-	-	47.4	50.1	<0.5	mg/kg	TM30/PM15
Copper #	-	5	19	31	7	40	-	-	11	14	<1	mg/kg	TM30/PM15
Lead #	-	7	18	13	11	25	-	-	11	17	<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	0.2	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	-	8.2	16.6	19.0	4.4	16.9	-	-	8.5	24.4	<0.7	mg/kg	TM30/PM15
Selenium #	-	<1	<1	1	<1	<1	-	-	<1	<1	<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	-	1111	2457	1239	422	412	-	-	573	179	<50	mg/kg	TM50/PM29
Zinc #	-	16	19	66	18	238	-	-	39	41	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	-	<0.04	0.07	<0.04	0.04	<0.04	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	0.05	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	0.38	0.10	0.11	0.13	-	-	0.10	0.14	<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	0.05	0.19	0.07	0.35	-	-	0.18	0.24	<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	<0.03	0.18	0.06	0.35	-	-	0.17	0.22	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	<0.06	0.11	<0.06	0.21	-	-	0.10	0.13	<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	<0.02	0.12	0.05	0.23	-	-	0.12	0.12	<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene #	-	<0.07	<0.07	0.31	0.09	0.38	-	-	0.24	0.18	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	<0.04	0.23	0.05	0.23	-	-	0.15	0.12	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	-	<0.04	<0.04	0.20	<0.04	0.17	-	-	0.13	0.08	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	<0.04	0.19	<0.04	0.15	-	-	0.13	0.07	<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	<0.6	<0.6	1.6	<0.6	2.2	-	-	1.4	1.3	<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	-	-	-	-	-	-	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	<0.05	0.22	0.06	0.27	-	-	0.17	0.13	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	<0.02	0.09	0.03	0.11	-	-	0.07	0.05	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	98	98	98	98	95	-	-	103	97	<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	-	-	<2	-	<2	-	<2	-	-	-	<2	ug/kg	TM15/PM10
Benzene #	-	-	<3	-	<3	-	<3	-	-	-	<3	ug/kg	TM15/PM10
Toluene #	-	-	5	-	4	-	<3	-	-	-	<3	ug/kg	TM15/PM10
Ethylbenzene #	-	-	<3	-	<3	-	22	-	-	-	<3	ug/kg	TM15/PM10
m/p-Xylene #	-	-	<5	-	<5	-	48	-	-	-	<5	ug/kg	TM15/PM10
o-Xylene #	-	-	<3	-	<3	-	8	-	-	-	<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	-	-	105	-	111	-	59	-	-	-	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	-	-	82	-	86	-	64	-	-	-	<0	%	TM15/PM10
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	-	-	-	-	-	-	-	-	-	<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	10-12	14-17	21-24	34-37	46	50-53	54	61-64	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS101	WS101	WS102	WS103	WS104	WS105	WS105	WS106	WS106	WS106A			
Depth	0.25	0.35	0.30	0.35	0.30	0.70	4.00	0.15	0.50	0.80			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	J	V J T	J	V J T			
Sample Date	14/11/2022	14/11/2022	15/11/2022	14/11/2022	14/11/2022	14/11/2022	14/11/2022	15/11/2022	15/11/2022	15/11/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	-	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	-	-	<0.1	-	<0.1	<0.1	0.1	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	-	-	<0.1	-	<0.1	<0.1	1.4	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	-	-	<0.2	-	<0.2	<0.2	23.7	-	<0.2	-	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	-	-	<4	-	<4	<4	237	-	<4	-	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	-	-	<7	-	<7	<7	1343	-	<7	-	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	-	-	<7	-	<7	<7	5397	-	63	-	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	-	-	<7	-	<7	<7	346	-	18	-	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	-	-	<26	-	<26	<26	7348	-	81	-	<26	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	-	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	-	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	-	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	-	-	<0.2	-	<0.2	<0.2	1.5	-	<0.2	-	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	-	-	<4	-	<4	<4	41	-	<4	-	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	-	-	<7	-	<7	<7	379	-	<7	-	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	-	-	<7	-	<7	<7	1771	-	130	-	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	-	-	<7	-	<7	<7	170	-	53	-	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	-	-	<26	-	<26	<26	2363	-	183	-	<26	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics (C5-40) (EH+HS_CU_1D_Total)	-	-	<52	-	<52	<52	9711	-	264	-	<52	mg/kg	TM5/PM8/PM16
MTBE #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
Benzene #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
Toluene #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
Ethylbenzene #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
m/p-Xylene #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
o-Xylene #	-	-	-	-	-	<5	-	-	<5	-	<5	ug/kg	TM36/PM12
PCB 28 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 52 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 101 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 118 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 138 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 153 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 180 #	-	<5	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	<35	-	-	-	-	-	-	-	-	<35	ug/kg	TM17/PM8
Total Phenols HPLC	-	<0.15	<0.15	<0.15	<0.15	<0.15	-	-	<0.15	<0.15	<0.15	mg/kg	TM26/PM21B
SEM #	563	-	-	-	-	-	-	48446	-	-	<110	mg/kg	TM7/PM6
Saturates (Aliphatics)	11.86	-	-	-	-	-	-	5.83	-	-	<0.01	%	TM13/PM6
Aromatics	15.60	-	-	-	-	-	-	21.22	-	-	<0.01	%	TM13/PM6

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	76	81,112,116	89-90,104,113	96-98,117							Please see attached notes for all abbreviations and acronyms		
Sample ID	WS107	WS107	WS108	WS109									
Depth	0.30	3.60	0.90	0.40									
COC No / misc													
Containers	J	T J	T J	V J T									
Sample Date	15/11/2022	15/11/2022	15/11/2022	15/11/2022									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022							LOD/LOR	Units	Method No.
Arsenic #	-	6.4	7.1	8.5							<0.5	mg/kg	TM30/PM15
Cadmium #	-	<0.1	0.3	0.2							<0.1	mg/kg	TM30/PM15
Chromium #	-	39.0	60.8	32.5							<0.5	mg/kg	TM30/PM15
Copper #	-	13	27	17							<1	mg/kg	TM30/PM15
Lead #	-	<5	34	28							<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel #	-	33.6	25.2	14.0							<0.7	mg/kg	TM30/PM15
Selenium #	-	<1	<1	<1							<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	-	173	815	1502							<50	mg/kg	TM50/PM29
Zinc #	-	33	89	53							<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	-	<0.04	<0.04	0.05							<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	<0.05	0.10							<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	<0.04	0.10							<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	0.21	1.28							<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	0.12	0.15							<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	0.64	1.69							<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	0.67	1.27							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	0.31	0.63							<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	0.38	0.62							<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene #	-	<0.07	0.63	0.93							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	0.35	0.45							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	-	<0.04	0.30	0.31							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	0.06	0.07							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	0.27	0.25							<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	<0.6	3.9	7.9							<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64	-	7.90							<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	0.45	0.67							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	0.18	0.26							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	86	79	103							<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	<2	-	-	-							<2	ug/kg	TM15/PM10
Benzene #	6	-	-	-							<3	ug/kg	TM15/PM10
Toluene #	11	-	-	-							<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	-	-	-							<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	-	-	-							<5	ug/kg	TM15/PM10
o-Xylene #	<3	-	-	-							<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	104	-	-	-							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	75	-	-	-							<0	%	TM15/PM10
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	<30	-	57							<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	76	81,112,116	89-90,104,113	96-98,117							Please see attached notes for all abbreviations and acronyms		
Sample ID	WS107	WS107	WS108	WS109									
Depth	0.30	3.60	0.90	0.40									
COC No / misc													
Containers	J	T J	T J	V J T									
Sample Date	15/11/2022	15/11/2022	15/11/2022	15/11/2022									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022									
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	11	17							<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	31	19							<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7	490	21							<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7	<7	116	<7							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26	<26	648	57							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	<4							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	37	24	13							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	41	964	11							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	<7	<7	348	<7							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	<26	78	1336	<26							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	78	1984	57							<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	-	<5	<5	<5							<5	ug/kg	TM36/PM12
Benzene #	-	<5	<5	<5							<5	ug/kg	TM36/PM12
Toluene #	-	<5	<5	6							<5	ug/kg	TM36/PM12
Ethylbenzene #	-	<5	<5	<5							<5	ug/kg	TM36/PM12
m/p-Xylene #	-	<5	<5	8							<5	ug/kg	TM36/PM12
o-Xylene #	-	<5	<5	<5							<5	ug/kg	TM36/PM12
PCB 28 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 52 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 101 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 118 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 138 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 153 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
PCB 180 #	-	<5	-	<5							<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	<35	-	<35							<35	ug/kg	TM17/PM8
Total Phenols HPLC	-	<0.15	<0.15	<0.15							<0.15	mg/kg	TM26/PM21B
SEM #	-	-	-	-							<110	mg/kg	TM7/PM6
Saturates (Aliphatics)	-	-	-	-							<0.01	%	TM13/PM6
Aromatics	-	-	-	-							<0.01	%	TM13/PM6

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

SVOC Report : Solid

EMT Sample No.	1-4	10-12	21-24	46	50-53	76					Please see attached notes for all abbreviations and acronyms		
Sample ID	WS101	WS102	WS104	WS105	WS106	WS107							
Depth	0.25	0.30	0.30	4.00	0.15	0.30							
COC No / misc													
Containers	V J T	V J T	V J T	J	V J T	J							
Sample Date	14/11/2022	15/11/2022	14/11/2022	14/11/2022	15/11/2022	15/11/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022							
SVOC MS													
Phenols													
2-Chlorophenol #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2-Methylphenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2-Nitrophenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Methylphenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Nitrophenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Pentachlorophenol	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Phenol #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	-	<10 ⁺	<10 ⁺	<10	-	<10					<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	-	224	51	219	-	57					<10	ug/kg	TM16/PM8
Naphthalene	-	-	-	43	-	56					<10	ug/kg	TM16/PM8
Acenaphthylene	-	-	-	<10	-	<10					<10	ug/kg	TM16/PM8
Acenaphthene	-	-	-	132	-	<10					<10	ug/kg	TM16/PM8
Fluorene	-	-	-	149	-	<10					<10	ug/kg	TM16/PM8
Phenanthrene #	-	-	-	934	-	94					<10	ug/kg	TM16/PM8
Anthracene	-	-	-	75	-	12					<10	ug/kg	TM16/PM8
Fluoranthene #	-	-	-	87	-	56					<10	ug/kg	TM16/PM8
Pyrene #	-	-	-	340	-	47					<10	ug/kg	TM16/PM8
Benzo(a)anthracene	-	-	-	<10	-	41					<10	ug/kg	TM16/PM8
Chrysene	-	-	-	<10	-	36					<10	ug/kg	TM16/PM8
Benzo(bk)fluoranthene	-	-	-	<10	-	62					<10	ug/kg	TM16/PM8
Benzo(a)pyrene	-	-	-	<10	-	35					<10	ug/kg	TM16/PM8
Indeno(123cd)pyrene	-	-	-	<10	-	31					<10	ug/kg	TM16/PM8
Dibenzo(ah)anthracene	-	-	-	<10	-	<10					<10	ug/kg	TM16/PM8
Benzo(ghi)perylene	-	-	-	<10	-	49					<10	ug/kg	TM16/PM8
Benzo(b)fluoranthene	-	-	-	<10	-	45					<10	ug/kg	TM16/PM8
Benzo(k)fluoranthene	-	-	-	<10	-	17					<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	-	<100	<100	4324	-	114					<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	-	<100	<100	<100	-	<100					<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	-	<100	<100	126	-	<100					<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	-	<100	<100	<100	-	<100					<100	ug/kg	TM16/PM8
Diethyl phthalate	-	<100 ⁺	<100 ⁺	<100	-	<100					<100	ug/kg	TM16/PM8
Dimethyl phthalate #	-	<100	<100	<100	-	<100					<100	ug/kg	TM16/PM8

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

SVOC Report : Solid

EMT Sample No.	1-4	10-12	21-24	46	50-53	76					Please see attached notes for all abbreviations and acronyms		
Sample ID	WS101	WS102	WS104	WS105	WS106	WS107							
Depth	0.25	0.30	0.30	4.00	0.15	0.30							
COC No / misc													
Containers	V J T	V J T	V J T	J	V J T	J							
Sample Date	14/11/2022	15/11/2022	14/11/2022	14/11/2022	15/11/2022	15/11/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022							
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	-	<10	<10	45	-	<10					<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	-	<10	<10	18	-	<10					<10	ug/kg	TM16/PM8
2-Nitroaniline	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
3-Nitroaniline	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Chloroaniline	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
4-Nitroaniline	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Azobenzene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Carbazole	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Dibenzofuran #	-	161	95	60	-	30					<10	ug/kg	TM16/PM8
Hexachlorobenzene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Hexachloroethane	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Isophorone #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Nitrobenzene #	-	<10	<10	<10	-	<10					<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	-	117	118	121	-	112					<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	-	117	121	134 ^{SV}	-	112					<0	%	TM16/PM8
PAHs													
Naphthalene	56	-	-	-	124	-					<10	ug/kg	TM16/PM6
Acenaphthylene	<10	-	-	-	41	-					<10	ug/kg	TM16/PM6
Acenaphthene	26	-	-	-	42	-					<10	ug/kg	TM16/PM6
Fluorene	<10	-	-	-	26	-					<10	ug/kg	TM16/PM6
Phenanthrene	275	-	-	-	203	-					<10	ug/kg	TM16/PM6
Anthracene	27	-	-	-	70	-					<10	ug/kg	TM16/PM6
Fluoranthene	152	-	-	-	155	-					<10	ug/kg	TM16/PM6
Pyrene	120	-	-	-	136	-					<10	ug/kg	TM16/PM6
Benzo(a)anthracene	69	-	-	-	87	-					<10	ug/kg	TM16/PM6
Chrysene	52	-	-	-	121	-					<10	ug/kg	TM16/PM6
Benzo(bk)fluoranthene	84	-	-	-	181	-					<10	ug/kg	TM16/PM6
Benzo(a)pyrene	42	-	-	-	140	-					<10	ug/kg	TM16/PM6
Indeno(123cd)pyrene	32	-	-	-	89	-					<10	ug/kg	TM16/PM6
Dibenzo(ah)anthracene	12	-	-	-	37	-					<10	ug/kg	TM16/PM6
Benzo(ghi)perylene	46	-	-	-	203	-					<10	ug/kg	TM16/PM6

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read
EMT Job No: 22/18856

VOC Report : Solid

EMT Sample No.	10-12	21-24	46	76							Please see attached notes for all abbreviations and acronyms		
Sample ID	WS102	WS104	WS105	WS107									
Depth	0.30	0.30	4.00	0.30									
COC No / misc													
Containers	V J T	V J T	J	J									
Sample Date	15/11/2022	14/11/2022	14/11/2022	15/11/2022									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1							LOD/LOR	Units	Method No.
Date of Receipt	16/11/2022	16/11/2022	16/11/2022	16/11/2022									
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
Chloromethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2	<2	<2							<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1	<1	<1							<1	ug/kg	TM15/PM10
Chloroethane #	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	7	<3							<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Bromochloromethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Chloroform #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Benzene #	<3	<3	<3	6							<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	205	106	79	64							<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Dibromomethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Toluene #	5	4	<3	11							<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	5	<3							<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Chlorobenzene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3	22	<3							<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	<5	48	<5							<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3	8	<3							<3	ug/kg	TM15/PM10
Styrene	<3	<3	<3	<3							<3	ug/kg	TM15_A/PM10
Bromoform	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4	7	<4							<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	9	<3							<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	<6	59	<6							<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4	24	<4							<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4	<4	16	<4							<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4	21	<4							<4	ug/kg	TM15/PM10
n-Butylbenzene	<4	<4	31	<4							<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4	<4	48	<4							<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Naphthalene	<27	<27	<27	<27							<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	105	111	59	104							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	82	86	64	75							<0	%	TM15/PM10

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	18.7
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	84.2
Particle Size <4mm =	>95%		
EMT Job No	22/18856	Landfill Waste Acceptance Criteria Limits	
Sample No	81		
Client Sample No	WS107		
Depth/Other	3.60		
Sample Date	15/11/2022		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.13	3	5
Loss on Ignition (%)	2.4	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	7.94	-	>6
ANC to pH 7 (mol/kg)	<0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	0.06	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀	A ₁₀	
	mg/l	mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.036	0.36	2
Cadmium	<0.0005	<0.005	100
Chromium	<0.0015	<0.015	0.04
Copper	0.007	<0.07	1
Mercury	<0.001	<0.01	5
Molybdenum	0.003	0.03	0.5
Nickel	0.007	0.07	10
Lead	<0.005	<0.05	0.4
Antimony	0.002	<0.02	10
Selenium	<0.003	<0.03	0.5
Zinc	0.006	0.06	50
Chloride	6.1	61	0.01
Fluoride	<0.3	<3	0.2
Sulphate as SO ₄	15.0	150	0.5
Total Dissolved Solids	90	900	10
Phenol	<0.01	<0.1	150
Dissolved Organic Carbon	9	90	1000
			500
			800
			1000

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	<0.1		
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	124.0		
Particle Size <4mm =	>95%				
EMT Job No	22/18856		Landfill Waste Acceptance Criteria Limits		
Sample No	98				
Client Sample No	WS109		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Depth/Other	0.40				
Sample Date	15/11/2022				
Batch No	1				
Solid Waste Analysis					
Total Organic Carbon (%)	0.68		3	5	6
Loss on Ignition (%)	2.4		-	-	10
Sum of BTEX (mg/kg)	<0.025		6	-	-
Sum of 7 PCBs (mg/kg)	<0.035		1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	57		500	-	-
PAH Sum of 17(mg/kg)	7.90		100	-	-
pH (pH Units)	12.23		-	>6	-
ANC to pH 7 (mol/kg)	0.05		-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	0.19		-	to be evaluated	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg		
	C ₁₀	A ₁₀			
	mg/l	mg/kg	mg/kg		
	Arsenic	0.0156	0.156	0.5	2
Barium	0.031	0.31	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0019	0.019	0.5	10	70
Copper	0.008	0.08	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.011	0.11	0.5	10	30
Nickel	0.003	0.03	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	0.004	0.04	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	15.8	158	800	15000	25000
Fluoride	0.6	6	10	150	500
Sulphate as SO4	15.1	151	1000	20000	50000
Total Dissolved Solids	177	1770	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	7	70	500	800	1000

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/18856	1	WS102	0.30	12	Catherine Coles	21/11/2022	General Description (Bulk Analysis)	red soil, sand, stone
					Catherine Coles	21/11/2022	Asbestos Fibres	NAD
					Catherine Coles	21/11/2022	Asbestos ACM	NAD
					Catherine Coles	21/11/2022	Asbestos Type	NAD
22/18856	1	WS103	0.35	17	Catherine Coles	21/11/2022	General Description (Bulk Analysis)	red soil, stone
					Catherine Coles	21/11/2022	Asbestos Fibres	Fibre Bundles
					Catherine Coles	21/11/2022	Asbestos Fibres (2)	Fibre Bundles
					Catherine Coles	21/11/2022	Asbestos ACM	Bitumen Products
					Catherine Coles	21/11/2022	Asbestos ACM (2)	NAD
					Catherine Coles	21/11/2022	Asbestos Type	Chrysotile
					Catherine Coles	21/11/2022	Asbestos Type (2)	Amosite
					Remigiusz Blichowski	23/11/2022	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	23/11/2022	Total Detailed Gravimetric Quantification (% Asb)	0.006 (mass %)
					Remigiusz Blichowski	23/11/2022	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.006 (mass %)
					Remigiusz Blichowski	23/11/2022	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					Remigiusz Blichowski	23/11/2022	Asbestos Gravimetric & PCOM Total	0.006 (mass %)
22/18856	1	WS104	0.30	24	Catherine Coles	21/11/2022	General Description (Bulk Analysis)	soil, stones
					Catherine Coles	21/11/2022	Asbestos Fibres	NAD
					Catherine Coles	21/11/2022	Asbestos ACM	NAD
					Catherine Coles	21/11/2022	Asbestos Type	NAD
22/18856	1	WS105	0.70	37	Catherine Coles	21/11/2022	General Description (Bulk Analysis)	soil, stone
					Catherine Coles	21/11/2022	Asbestos Fibres	NAD
					Catherine Coles	21/11/2022	Asbestos ACM	NAD
					Catherine Coles	21/11/2022	Asbestos Type	NAD
22/18856	1	WS106	0.50	54	Catherine Coles	21/11/2022	General Description (Bulk Analysis)	soil, stone
					Catherine Coles	21/11/2022	Asbestos Fibres	NAD
					Catherine Coles	21/11/2022	Asbestos ACM	NAD
					Catherine Coles	21/11/2022	Asbestos Type	NAD
22/18856	1	WS106A	0.80	64	Simon Postlewhite	21/11/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	21/11/2022	Asbestos Fibres	NAD
					Simon Postlewhite	21/11/2022	Asbestos ACM	NAD
					Simon Postlewhite	21/11/2022	Asbestos Type	NAD

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business F
Contact: Adrian Read

[illegible]

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Business Park, Knowsley
Contact: Adrian Read

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/18856

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/18856

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM7	Modified USEPA 3540C:1996 and 9071B:1998 for oily wastes. In house method for the gravimetric determination of a sample following solvent extraction.	PM6	Samples are extracted using Soxtec apparatus and solvent.	Yes		AR	Yes
TM13	Determination of Saturates, Aromatics, Resins and Asphaltenes by Thin Layer Chromatography with Flame Ionisation Detection.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

EMT Job No: 22/18856

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes

EMT Job No: 22/18856

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

EMT Job No: 22/18856

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM77	Modified DDCEN/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM131	Quantification of Asbestos Fibres and ACM based on HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	
TM15_A	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes



Waste Classification Report

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

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



HX55N-G1V3G-QOZKW

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

Job name

EMT-22-18856-Batch-1-202211241605

Description/Comments

Project

TE1704

Site

Deacon Business Park, Knowsley

Classified by

Name: **Adrian Read**
Date: **25 Nov 2022 14:48 GMT**
Telephone: **01925 818388**

Company: **Tier Environmental**
Suite 414
Chadwick House
Warrington
WA3 6AE

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

HazWasteOnline™ Certification:**CERTIFIED****Course**

Hazardous Waste Classification

Date

03 Dec 2020

Next 3 year Refresher due by Dec 2023

Purpose of classification

2 - Material Characterisation

Address of the waste

Deacon Business Park, Moorgate Road, Southdene, Kirkby, Knowsley

Post Code L33 7RX

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Proposed redevelopment of land

Description of the specific process, sub-process and/or activity that created the waste

Waste created during excavation of soils during development

Description of the waste

Made ground and/or natural soils



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101-14/11/2022-0.25m		Non Hazardous		3
2	WS101-14/11/2022-0.35m		Non Hazardous		5
3	WS102-15/11/2022-0.30m		Potentially Hazardous	HP 3(i)	7
4	WS103-14/11/2022-0.35m		Non Hazardous		13
5	WS104-14/11/2022-0.30m		Potentially Hazardous	HP 3(i)	15
6	WS105-14/11/2022-0.70m		Non Hazardous		21
7	WS105-14/11/2022-4.00m		Hazardous	HP 3(i), HP 7, HP 11	23
8	WS106-15/11/2022-0.15m		Non Hazardous		29
9	WS106-15/11/2022-0.50m		Potentially Hazardous	HP 3(i)	31
10	WS106A-15/11/2022-0.80m		Non Hazardous		33
11	WS107-15/11/2022-0.30m		Potentially Hazardous	HP 3(i)	35
12	WS107-15/11/2022-3.60m		Potentially Hazardous	HP 3(i)	40
13	WS108-15/11/2022-0.90m		Hazardous	HP 3(i), HP 7, HP 11	42
14	WS109-15/11/2022-0.40m		Hazardous	HP 3(i), HP 8	45

Related documents

#	Name	Description
1	EMT-22-18856-Batch-1-202211241605.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 25 Nov 2022 14:48 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	48
Appendix B: Rationale for selection of metal species	52
Appendix C: Version	52

Classification of sample: WS101-14/11/2022-0.25m

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

Sample details

Sample name:	LoW Code:
WS101-14/11/2022-0.25m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	naphthalene				0.056 mg/kg		0.0505 mg/kg	0.00000505 %	✓	
	601-052-00-2	202-049-5	91-20-3							
2	acenaphthylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		205-917-1	208-96-8							
3	acenaphthene				0.026 mg/kg		0.0234 mg/kg	0.00000234 %	✓	
		201-469-6	83-32-9							
4	fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-695-5	86-73-7							
5	phenanthrene				0.275 mg/kg		0.248 mg/kg	0.0000248 %	✓	
		201-581-5	85-01-8							
6	anthracene				0.027 mg/kg		0.0243 mg/kg	0.00000243 %	✓	
		204-371-1	120-12-7							
7	fluoranthene				0.152 mg/kg		0.137 mg/kg	0.0000137 %	✓	
		205-912-4	206-44-0							
8	pyrene				0.12 mg/kg		0.108 mg/kg	0.0000108 %	✓	
		204-927-3	129-00-0							
9	benzo[a]anthracene				0.069 mg/kg		0.0622 mg/kg	0.00000622 %	✓	
	601-033-00-9	200-280-6	56-55-3							
10	chrysene				0.052 mg/kg		0.0468 mg/kg	0.00000468 %	✓	
	601-048-00-0	205-923-4	218-01-9							
11	benzo[a]pyrene; benzo[def]chrysene				0.042 mg/kg		0.0378 mg/kg	0.00000378 %	✓	
	601-032-00-3	200-028-5	50-32-8							
12	indeno[123-cd]pyrene				0.032 mg/kg		0.0288 mg/kg	0.00000288 %	✓	
		205-893-2	193-39-5							
13	dibenz[a,h]anthracene				0.012 mg/kg		0.0108 mg/kg	0.00000108 %	✓	
	601-041-00-2	200-181-8	53-70-3							
14	benzo[ghi]perylene				0.046 mg/kg		0.0414 mg/kg	0.00000414 %	✓	
		205-883-8	191-24-2							
15	Tar, coal; Coal tar; [The by-product from the destructive distillation of coal. Almost black semisolid. A complex combination of aromatic hydro-carbons, phenolic compounds, nitrogen bases and thiophene.]			H	<1000 mg/kg		<1000 mg/kg	<0.1 %		<LOD
	648-081-00-7	232-361-7	8007-45-2							
Total:								0.1 %		



Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected
CLP: Note H	Known incomplete entry, should not be used as is

Classification of sample: WS101-14/11/2022-0.35m

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

Sample details

Sample name:	LoW Code:
WS101-14/11/2022-0.35m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9.6% (dry weight correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.6% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				1.9	mg/kg	1.32	2.289	mg/kg	0.000229 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				31.2	mg/kg	2.27	64.62	mg/kg	0.00646 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				5	mg/kg	1.126	5.136	mg/kg	0.000514 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	7	mg/kg	1.56	9.962	mg/kg	0.000639 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				8.2	mg/kg	2.976	22.268	mg/kg	0.00223 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				16	mg/kg	2.774	40.498	mg/kg	0.00405 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	pH				8.51	pH		8.51	pH	8.51 pH		
11	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
12	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
13	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
14	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
15	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
16	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
17	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
20	chrysene	601-048-00-0	205-923-4	218-01-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
21	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
24	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
27	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
Total:								0.0145 %		

Key

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

Classification of sample: WS102-15/11/2022-0.30m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS102-15/11/2022-0.30m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
12.5% (dry weight correction)	

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

toluene: (conc.: 4.44e-07%)

Determinands

Moisture content: 12.5% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	14.083 mg/kg	0.00141 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				32.8 mg/kg	2.27	66.183 mg/kg	0.00662 %	✓	
	024-017-00-8									
4	copper { dicopper oxide; copper (I) oxide }				19 mg/kg	1.126	19.015 mg/kg	0.0019 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	18 mg/kg	1.56	24.957 mg/kg	0.0016 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				0.2 mg/kg	1.353	0.241 mg/kg	0.0000241 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				16.6 mg/kg	2.976	43.916 mg/kg	0.00439 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
9	zinc { zinc chromate }				19 mg/kg	2.774	46.852 mg/kg	0.00469 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
10	TPH (C6 to C40) petroleum group				<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
			TPH							
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
12	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	toluene 601-021-00-3	203-625-9	108-88-3		0.005 mg/kg		0.0044 mg/kg	0.000000444 %	✓	
14	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
15	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.011 mg/kg		<0.011 mg/kg	<0.0000011 %		<LOD
16	pH PH				8.49 pH		8.49 pH	8.49 pH		
17	naphthalene 601-052-00-2	202-049-5	91-20-3		0.07 mg/kg		0.0622 mg/kg	0.00000622 %	✓	
18	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
21	phenanthrene 201-581-5	85-01-8			0.38 mg/kg		0.338 mg/kg	0.0000338 %	✓	
22	anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
23	fluoranthene 205-912-4	206-44-0			0.05 mg/kg		0.0444 mg/kg	0.00000444 %	✓	
24	pyrene 204-927-3	129-00-0			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
26	chrysene 601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
27	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
28	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
29	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
30	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
31	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
32	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
33	phenol 604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34	1,1-dichloroethane and 1,2-dichloroethane (combined) 203-458-1, 200-863-5	107-06-2, 75-34-3			<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
35	tetrachloroethylene 602-028-00-4	204-825-9	127-18-4		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
36	carbon tetrachloride; tetrachloromethane 602-008-00-5	200-262-8	56-23-5		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
37	trichloroethylene; trichloroethene 602-027-00-9	201-167-4	79-01-6		0.205 mg/kg		0.182 mg/kg	0.0000182 %	✓	
38	vinyl chloride; chloroethylene 602-023-00-7	200-831-0	75-01-4		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
39	hexachlorobenzene 602-065-00-6	204-273-9	118-74-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
40	dichlorodifluoromethane 200-893-9	75-71-8			<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
41	chloromethane; methyl chloride				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-001-00-7	200-817-4	74-87-3							
42	bromomethane; methylbromide				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	602-002-00-2	200-813-2	74-83-9							
43	chloroethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-009-00-0	200-830-5	75-00-3							
44	trichlorofluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-892-3	75-69-4							
45	1,1-dichloroethylene; vinylidene chloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-025-00-8	200-864-0	75-35-4							
46	dichloromethane; methylene chloride				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-004-00-3	200-838-9	75-09-2							
47	2,2-dichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		209-832-0	594-20-7							
48	bromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-826-3	74-97-5							
49	chloroform; trichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-006-00-4	200-663-8	67-66-3							
50	1,1,1-trichloroethane; methyl chloroform				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-013-00-2	200-756-3	71-55-6							
51	1,1-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-031-00-0	209-253-3	563-58-6							
52	1,2-dichloropropane; propylene dichloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-020-00-0	201-152-2	78-87-5							
53	dibromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-003-00-8	200-824-2	74-95-3							
54	bromodichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-856-7	75-27-4							
55	1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
56	trans-1,3-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		431-460-4	10061-02-6							
57	1,1,2-trichloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-014-00-8	201-166-9	79-00-5							
58	1,3-dichloropropane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		205-531-3	142-28-9							
59	dibromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		204-704-0	124-48-1							
60	1,2-dibromoethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-010-00-6	203-444-5	106-93-4							
61	chlorobenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-033-00-1	203-628-5	108-90-7							
62	1,1,1,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		211-135-1	630-20-6							
63	bromoform; tribromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-007-00-X	200-854-6	75-25-2							
64	1,1,2,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-015-00-3	201-197-8	79-34-5							
65	bromobenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-060-00-9	203-623-8	108-86-1							
66	1,2,3-trichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-062-00-X	202-486-1	96-18-4							
67	mesitylene; 1,3,5-trimethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-025-00-5	203-604-4	108-67-8							
68	tert-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		202-632-4	98-06-6							
69	1,2,4-trimethylbenzene				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	601-043-00-3	202-436-9	95-63-6							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
70	sec-butylbenzene	205-227-0	135-98-8		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
71	4-isopropyltoluene	202-796-7	99-87-6		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
72	1,3-dichlorobenzene	602-067-00-7	208-792-1	541-73-1	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
73	1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
74	n-butylbenzene	203-209-7	104-51-8		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
75	1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
76	1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
77	1,2,4-trichlorobenzene	602-087-00-6	204-428-0	120-82-1	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
78	hexachlorobutadiene	201-765-5	87-68-3		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
79	1,2,3-trichlorobenzene	201-757-1	87-61-6		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
80	styrene	601-026-00-0	202-851-5	100-42-5	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
81	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
82	2-nitrophenol	201-857-5	88-75-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
83	2,4-dichlorophenol	604-011-00-7	204-429-6	120-83-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
84	3,4-xyleneol; [1] 2,5-xyleneol; [2] 2,4-xyleneol; [3] 2,3-xyleneol; [4] 2,6-xyleneol; [5] xyleneol; [6] 2,4(or 2,5)-xyleneol [7]	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
85	2,4,5-trichlorophenol	604-017-00-X	202-467-8	95-95-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
86	2,4,6-trichlorophenol	604-018-00-5	201-795-9	88-06-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
87	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
88	4-nitrophenol; p-nitrophenol	609-015-00-2	202-811-7	100-02-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
89	pentachlorophenol	604-002-00-8	201-778-6	87-86-5	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
90	2-chloronaphthalene	202-079-9	91-58-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
91	2-methyl naphthalene	202-078-3	91-57-6		0.224 mg/kg		0.199 mg/kg	0.0000199 %	✓	
92	bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP	607-317-00-9	204-211-0	117-81-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
93	BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
94	dibutyl phthalate; DBP				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	607-318-00-4	201-557-4	84-74-2							
95	di-n-octyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-214-7	117-84-0							
96	diethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-550-6	84-66-2							
97	dimethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-011-6	131-11-3							
98	2,4-dinitrotoluene; [1] dinitrotoluene [2]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]							
99	2,6-dinitrotoluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-049-00-8	210-106-0	606-20-2							
100	4-bromophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		202-952-4	101-55-3							
101	4-chloroaniline				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	612-137-00-9	203-401-0	106-47-8							
102	4-chlorophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		230-281-7	7005-72-3							
103	azobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	611-001-00-6	203-102-5	103-33-3							
104	bis(2-chloroethoxy)methane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		203-920-2	111-91-1							
105	bis(2-chloroethyl) ether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	603-029-00-2	203-870-1	111-44-4							
106	carbazole				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-696-0	86-74-8							
107	dibenzofuran				0.161 mg/kg		0.143 mg/kg	0.0000143 %	✓	
		205-071-3	132-64-9							
108	hexachlorocyclopentadiene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-078-00-7	201-029-3	77-47-4							
109	hexachloroethane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		200-666-4	67-72-1							
110	3,5,5-trimethylcyclohex-2-enone; isophorone				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	606-012-00-8	201-126-0	78-59-1							
111	nitrosodipropylamine				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	612-098-00-8	210-698-0	621-64-7							
112	nitrobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-003-00-7	202-716-0	98-95-3							
113	1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]							
114	cumene; [1] propylbenzene [2]				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]							
115	2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]							
116	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
117	o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]							



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
Total:									0.0264 %		

Key

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

Classification of sample: WS103-14/11/2022-0.35m

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

Sample details

Sample name:	LoW Code:
WS103-14/11/2022-0.35m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
11.1%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.1% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				15.5	mg/kg	1.32	18.42	mg/kg	0.00184 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				31.4	mg/kg	2.27	64.157	mg/kg	0.00642 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	31.415	mg/kg	0.00314 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	13	mg/kg	1.56	18.252	mg/kg	0.00117 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				19	mg/kg	2.976	50.899	mg/kg	0.00509 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				1	mg/kg	2.554	2.299	mg/kg	0.00023 %	✓	
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				66	mg/kg	2.774	164.801	mg/kg	0.0165 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	pH				9.18	pH		9.18	pH	9.18 pH		
11	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
12	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
13	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
14	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
15	phenanthrene				0.1	mg/kg		0.09	mg/kg	0.000009 %	✓	
		201-581-5	85-01-8									
16	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
17	fluoranthene				0.19	mg/kg		0.171	mg/kg	0.0000171 %	✓	
		205-912-4	206-44-0									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	pyrene	204-927-3	129-00-0		0.18 mg/kg		0.162 mg/kg	0.0000162 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.11 mg/kg		0.099 mg/kg	0.0000099 %	✓	
20	chrysene	601-048-00-0	205-923-4	218-01-9	0.12 mg/kg		0.108 mg/kg	0.0000108 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.22 mg/kg		0.198 mg/kg	0.0000198 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.09 mg/kg		0.081 mg/kg	0.0000081 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.23 mg/kg		0.207 mg/kg	0.0000207 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.2 mg/kg		0.18 mg/kg	0.000018 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		0.19 mg/kg		0.171 mg/kg	0.0000171 %	✓	
27	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		60 mg/kg		54.005 mg/kg	0.0054 %	✓	
Total:								0.04 %		

Key

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

Classification of sample: WS104-14/11/2022-0.30m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS104-14/11/2022-0.30m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
3.9%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

toluene: (conc.: 3.85e-07%)

Determinands

Moisture content: 3.9% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				1.4	mg/kg	1.32	1.779	mg/kg	0.000178 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.22	mg/kg	0.000022 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				8.1	mg/kg	2.27	17.697	mg/kg	0.00177 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				7	mg/kg	1.126	7.585	mg/kg	0.000759 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	11	mg/kg	1.56	16.514	mg/kg	0.00106 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				4.4	mg/kg	2.976	12.604	mg/kg	0.00126 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				18	mg/kg	2.774	48.06	mg/kg	0.00481 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	TPH (C6 to C40) petroleum group		TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
12	benzene				<0.003	mg/kg		<0.003	mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	toluene 601-021-00-3	203-625-9	108-88-3		0.004 mg/kg		0.0038 mg/kg	0.000000385 %	✓	
14	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
15	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.011 mg/kg		<0.011 mg/kg	<0.0000011 %		<LOD
16	pH PH				10.07 pH		10.07 pH	10.07 pH		
17	naphthalene 601-052-00-2	202-049-5	91-20-3		0.04 mg/kg		0.0385 mg/kg	0.00000385 %	✓	
18	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
21	phenanthrene 201-581-5	85-01-8			0.11 mg/kg		0.106 mg/kg	0.0000106 %	✓	
22	anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
23	fluoranthene 205-912-4	206-44-0			0.07 mg/kg		0.0674 mg/kg	0.00000674 %	✓	
24	pyrene 204-927-3	129-00-0			0.06 mg/kg		0.0577 mg/kg	0.00000577 %	✓	
25	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
26	chrysene 601-048-00-0	205-923-4	218-01-9		0.05 mg/kg		0.0481 mg/kg	0.00000481 %	✓	
27	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.06 mg/kg		0.0577 mg/kg	0.00000577 %	✓	
28	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.03 mg/kg		0.0289 mg/kg	0.00000289 %	✓	
29	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.05 mg/kg		0.0481 mg/kg	0.00000481 %	✓	
30	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
31	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
32	benzo[ghi]perylene 205-883-8	191-24-2			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
33	phenol 604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34	1,1-dichloroethane and 1,2-dichloroethane (combined) 203-458-1, 200-863-5	107-06-2, 75-34-3			<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
35	tetrachloroethylene 602-028-00-4	204-825-9	127-18-4		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
36	carbon tetrachloride; tetrachloromethane 602-008-00-5	200-262-8	56-23-5		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
37	trichloroethylene; trichloroethene 602-027-00-9	201-167-4	79-01-6		0.106 mg/kg		0.102 mg/kg	0.0000102 %	✓	
38	vinyl chloride; chloroethylene 602-023-00-7	200-831-0	75-01-4		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
39	hexachlorobenzene 602-065-00-6	204-273-9	118-74-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
40	dichlorodifluoromethane 200-893-9	75-71-8			<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
41	chloromethane; methyl chloride				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-001-00-7	200-817-4	74-87-3							
42	bromomethane; methylbromide				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	602-002-00-2	200-813-2	74-83-9							
43	chloroethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-009-00-0	200-830-5	75-00-3							
44	trichlorofluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-892-3	75-69-4							
45	1,1-dichloroethylene; vinylidene chloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-025-00-8	200-864-0	75-35-4							
46	dichloromethane; methylene chloride				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-004-00-3	200-838-9	75-09-2							
47	2,2-dichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		209-832-0	594-20-7							
48	bromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-826-3	74-97-5							
49	chloroform; trichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-006-00-4	200-663-8	67-66-3							
50	1,1,1-trichloroethane; methyl chloroform				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-013-00-2	200-756-3	71-55-6							
51	1,1-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-031-00-0	209-253-3	563-58-6							
52	1,2-dichloropropane; propylene dichloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-020-00-0	201-152-2	78-87-5							
53	dibromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-003-00-8	200-824-2	74-95-3							
54	bromodichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-856-7	75-27-4							
55	1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
56	trans-1,3-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		431-460-4	10061-02-6							
57	1,1,2-trichloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-014-00-8	201-166-9	79-00-5							
58	1,3-dichloropropane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		205-531-3	142-28-9							
59	dibromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		204-704-0	124-48-1							
60	1,2-dibromoethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-010-00-6	203-444-5	106-93-4							
61	chlorobenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-033-00-1	203-628-5	108-90-7							
62	1,1,1,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		211-135-1	630-20-6							
63	bromoform; tribromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-007-00-X	200-854-6	75-25-2							
64	1,1,2,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-015-00-3	201-197-8	79-34-5							
65	bromobenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-060-00-9	203-623-8	108-86-1							
66	1,2,3-trichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-062-00-X	202-486-1	96-18-4							
67	mesitylene; 1,3,5-trimethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-025-00-5	203-604-4	108-67-8							
68	tert-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		202-632-4	98-06-6							
69	1,2,4-trimethylbenzene				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	601-043-00-3	202-436-9	95-63-6							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
70	sec-butylbenzene	205-227-0	135-98-8		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
71	4-isopropyltoluene	202-796-7	99-87-6		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
72	1,3-dichlorobenzene	602-067-00-7	208-792-1	541-73-1	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
73	1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
74	n-butylbenzene	203-209-7	104-51-8		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
75	1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
76	1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
77	1,2,4-trichlorobenzene	602-087-00-6	204-428-0	120-82-1	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
78	hexachlorobutadiene	201-765-5	87-68-3		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
79	1,2,3-trichlorobenzene	201-757-1	87-61-6		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
80	styrene	601-026-00-0	202-851-5	100-42-5	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
81	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
82	2-nitrophenol	201-857-5	88-75-5		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
83	2,4-dichlorophenol	604-011-00-7	204-429-6	120-83-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
84	3,4-xyleneol; [1] 2,5-xyleneol; [2] 2,4-xyleneol; [3] 2,3-xyleneol; [4] 2,6-xyleneol; [5] xyleneol; [6] 2,4(or 2,5)-xyleneol [7]	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
85	2,4,5-trichlorophenol	604-017-00-X	202-467-8	95-95-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
86	2,4,6-trichlorophenol	604-018-00-5	201-795-9	88-06-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
87	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
88	4-nitrophenol; p-nitrophenol	609-015-00-2	202-811-7	100-02-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
89	pentachlorophenol	604-002-00-8	201-778-6	87-86-5	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
90	2-chloronaphthalene	202-079-9	91-58-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
91	2-methyl naphthalene	202-078-3	91-57-6		0.051 mg/kg		0.0491 mg/kg	0.00000491 %	✓	
92	bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP	607-317-00-9	204-211-0	117-81-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
93	BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
94	dibutyl phthalate; DBP				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	607-318-00-4	201-557-4	84-74-2							
95	di-n-octyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-214-7	117-84-0							
96	diethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-550-6	84-66-2							
97	dimethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-011-6	131-11-3							
98	2,4-dinitrotoluene; [1] dinitrotoluene [2]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]							
99	2,6-dinitrotoluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-049-00-8	210-106-0	606-20-2							
100	4-bromophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		202-952-4	101-55-3							
101	4-chloroaniline				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	612-137-00-9	203-401-0	106-47-8							
102	4-chlorophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		230-281-7	7005-72-3							
103	azobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	611-001-00-6	203-102-5	103-33-3							
104	bis(2-chloroethoxy)methane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		203-920-2	111-91-1							
105	bis(2-chloroethyl) ether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	603-029-00-2	203-870-1	111-44-4							
106	carbazole				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-696-0	86-74-8							
107	dibenzofuran				0.095 mg/kg		0.0914 mg/kg	0.00000914 %	✓	
		205-071-3	132-64-9							
108	hexachlorocyclopentadiene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-078-00-7	201-029-3	77-47-4							
109	hexachloroethane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		200-666-4	67-72-1							
110	3,5,5-trimethylcyclohex-2-enone; isophorone				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	606-012-00-8	201-126-0	78-59-1							
111	nitrosodipropylamine				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	612-098-00-8	210-698-0	621-64-7							
112	nitrobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-003-00-7	202-716-0	98-95-3							
113	1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]							
114	cumene; [1] propylbenzene [2]				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]							
115	2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]							
116	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
117	o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
Total:								0.0155 %		

Key

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

Classification of sample: WS105-14/11/2022-0.70m

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

Sample details

Sample name:	LoW Code:
WS105-14/11/2022-0.70m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9.1%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.1% Dry Weight Moisture Correction applied (MC)

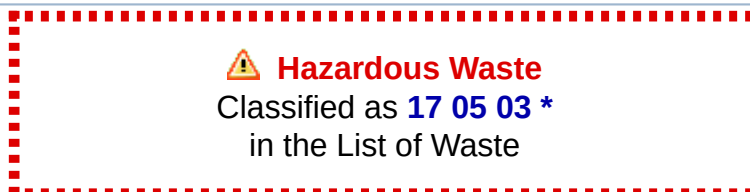
#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				7.9	mg/kg	1.32	9.561	mg/kg	0.000956 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.419	mg/kg	0.0000419 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				28.6	mg/kg	2.27	59.507	mg/kg	0.00595 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				40	mg/kg	1.126	41.279	mg/kg	0.00413 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	25	mg/kg	1.56	35.743	mg/kg	0.00229 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				16.9	mg/kg	2.976	46.103	mg/kg	0.00461 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				238	mg/kg	2.774	605.176	mg/kg	0.0605 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
			TPH									
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
12	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
13	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
14	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
15	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	• pH				8.74 pH		8.74 pH	8.74 pH		
17	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
18	• acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
19	• acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
20	• fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
21	• phenanthrene				0.13 mg/kg		0.119 mg/kg	0.0000119 %	✓	
		201-581-5	85-01-8							
22	• anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
23	• fluoranthene				0.35 mg/kg		0.321 mg/kg	0.0000321 %	✓	
		205-912-4	206-44-0							
24	• pyrene				0.35 mg/kg		0.321 mg/kg	0.0000321 %	✓	
		204-927-3	129-00-0							
25	benzo[a]anthracene				0.21 mg/kg		0.192 mg/kg	0.0000192 %	✓	
	601-033-00-9	200-280-6	56-55-3							
26	chrysene				0.23 mg/kg		0.211 mg/kg	0.0000211 %	✓	
	601-048-00-0	205-923-4	218-01-9							
27	benzo[b]fluoranthene				0.27 mg/kg		0.247 mg/kg	0.0000247 %	✓	
	601-034-00-4	205-911-9	205-99-2							
28	benzo[k]fluoranthene				0.11 mg/kg		0.101 mg/kg	0.0000101 %	✓	
	601-036-00-5	205-916-6	207-08-9							
29	benzo[a]pyrene; benzo[def]chrysene				0.23 mg/kg		0.211 mg/kg	0.0000211 %	✓	
	601-032-00-3	200-028-5	50-32-8							
30	• indeno[123-cd]pyrene				0.17 mg/kg		0.156 mg/kg	0.0000156 %	✓	
		205-893-2	193-39-5							
31	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
32	• benzo[ghi]perylene				0.15 mg/kg		0.137 mg/kg	0.0000137 %	✓	
		205-883-8	191-24-2							
Total:								0.0842 %		

Key

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

Classification of sample: WS105-14/11/2022-4.00m



Sample details

Sample name:	LoW Code:	
WS105-14/11/2022-4.00m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
14.9% (dry weight correction)		

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.845%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.845%)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinands:

ethylbenzene: (conc.: 1.91e-06%)

1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]: (conc.: 8.7e-07%)

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.845%)

xylene: (conc.: 5.57e-06%)

mesitylene; 1,3,5-trimethylbenzene: (conc.: 7.83e-07%)

1,2,4-trimethylbenzene: (conc.: 5.13e-06%)

sec-butylbenzene: (conc.: 2.09e-06%)

4-isopropyltoluene: (conc.: 1.39e-06%)

n-butylbenzene: (conc.: 2.7e-06%)

cumene; [1] propylbenzene [2]: (conc.: 6.09e-07%)

Determinands

Moisture content: 14.9% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	TPH (C6 to C40) petroleum group				9711 mg/kg		8451.697	mg/kg	0.845 %	✓	
			TPH								
2	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.002 mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
	603-181-00-X	216-653-1	1634-04-4								
3	benzene				<0.003 mg/kg		<0.003	mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
4	toluene				<0.003 mg/kg		<0.003	mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
5	ethylbenzene				0.022 mg/kg		0.0191	mg/kg	0.00000191 %	✓	
	601-023-00-4	202-849-4	100-41-4								
6	xylene				0.064 mg/kg		0.0557	mg/kg	0.00000557 %	✓	
	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]								
7	naphthalene				0.043 mg/kg		0.0374	mg/kg	0.00000374 %	✓	
	601-052-00-2	202-049-5	91-20-3								
8	acenaphthylene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		205-917-1	208-96-8								
9	acenaphthene				0.132 mg/kg		0.115	mg/kg	0.0000115 %	✓	
		201-469-6	83-32-9								
10	fluorene				0.149 mg/kg		0.13	mg/kg	0.000013 %	✓	
		201-695-5	86-73-7								
11	phenanthrene				0.934 mg/kg		0.813	mg/kg	0.0000813 %	✓	
		201-581-5	85-01-8								
12	anthracene				0.075 mg/kg		0.0653	mg/kg	0.00000653 %	✓	
		204-371-1	120-12-7								
13	fluoranthene				0.087 mg/kg		0.0757	mg/kg	0.00000757 %	✓	
		205-912-4	206-44-0								
14	pyrene				0.34 mg/kg		0.296	mg/kg	0.0000296 %	✓	
		204-927-3	129-00-0								
15	benzo[a]anthracene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-033-00-9	200-280-6	56-55-3								
16	chrysene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-048-00-0	205-923-4	218-01-9								
17	benzo[b]fluoranthene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-034-00-4	205-911-9	205-99-2								
18	benzo[k]fluoranthene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-036-00-5	205-916-6	207-08-9								
19	benzo[a]pyrene; benzo[def]chrysene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-032-00-3	200-028-5	50-32-8								
20	indeno[123-cd]pyrene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		205-893-2	193-39-5								
21	dibenz[a,h]anthracene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-041-00-2	200-181-8	53-70-3								
22	benzo[ghi]perylene				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		205-883-8	191-24-2								
23	phenol				<0.01 mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
24	1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.007 mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		203-458-1, 200-863-5	107-06-2, 75-34-3								
25	tetrachloroethylene				0.005 mg/kg		0.0043	mg/kg	0.000000435 %	✓	
	602-028-00-4	204-825-9	127-18-4								
26	carbon tetrachloride; tetrachloromethane				<0.004 mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
	602-008-00-5	200-262-8	56-23-5								
27	trichloroethylene; trichloroethene				0.079 mg/kg		0.0688	mg/kg	0.00000688 %	✓	
	602-027-00-9	201-167-4	79-01-6								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
28	vinyl chloride; chloroethylene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-023-00-7	200-831-0	75-01-4							
29	hexachlorobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.0000001 %		<LOD
	602-065-00-6	204-273-9	118-74-1							
30	dichlorodifluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-893-9	75-71-8							
31	chloromethane; methyl chloride				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-001-00-7	200-817-4	74-87-3							
32	bromomethane; methylbromide				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	602-002-00-2	200-813-2	74-83-9							
33	chloroethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-009-00-0	200-830-5	75-00-3							
34	trichlorofluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-892-3	75-69-4							
35	1,1-dichloroethylene; vinylidene chloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-025-00-8	200-864-0	75-35-4							
36	dichloromethane; methylene chloride				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-004-00-3	200-838-9	75-09-2							
37	2,2-dichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		209-832-0	594-20-7							
38	bromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-826-3	74-97-5							
39	chloroform; trichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-006-00-4	200-663-8	67-66-3							
40	1,1,1-trichloroethane; methyl chloroform				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-013-00-2	200-756-3	71-55-6							
41	1,1-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-031-00-0	209-253-3	563-58-6							
42	1,2-dichloropropane; propylene dichloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-020-00-0	201-152-2	78-87-5							
43	dibromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-003-00-8	200-824-2	74-95-3							
44	bromodichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-856-7	75-27-4							
45	1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
46	trans-1,3-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		431-460-4	10061-02-6							
47	1,1,2-trichloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-014-00-8	201-166-9	79-00-5							
48	1,3-dichloropropane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		205-531-3	142-28-9							
49	dibromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		204-704-0	124-48-1							
50	1,2-dibromoethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-010-00-6	203-444-5	106-93-4							
51	chlorobenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-033-00-1	203-628-5	108-90-7							
52	1,1,1,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		211-135-1	630-20-6							
53	bromoform; tribromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-007-00-X	200-854-6	75-25-2							
54	1,1,2,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-015-00-3	201-197-8	79-34-5							
55	bromobenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-060-00-9	203-623-8	108-86-1							
56	1,2,3-trichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-062-00-X	202-486-1	96-18-4							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
57	mesitylene; 1,3,5-trimethylbenzene				0.009 mg/kg		0.0078 mg/kg	0.000000783 %	✓	
	601-025-00-5	203-604-4	108-67-8							
58	tert-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		202-632-4	98-06-6							
59	1,2,4-trimethylbenzene				0.059 mg/kg		0.0513 mg/kg	0.00000513 %	✓	
	601-043-00-3	202-436-9	95-63-6							
60	sec-butylbenzene				0.024 mg/kg		0.0209 mg/kg	0.00000209 %	✓	
		205-227-0	135-98-8							
61	4-isopropyltoluene				0.016 mg/kg		0.0139 mg/kg	0.00000139 %	✓	
		202-796-7	99-87-6							
62	1,3-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-067-00-7	208-792-1	541-73-1							
63	1,4-dichlorobenzene; p-dichlorobenzene				0.021 mg/kg		0.0183 mg/kg	0.00000183 %	✓	
	602-035-00-2	203-400-5	106-46-7							
64	n-butylbenzene				0.031 mg/kg		0.027 mg/kg	0.00000027 %	✓	
		203-209-7	104-51-8							
65	1,2-dichlorobenzene; o-dichlorobenzene				0.048 mg/kg		0.0418 mg/kg	0.00000418 %	✓	
	602-034-00-7	202-425-9	95-50-1							
66	1,2-dibromo-3-chloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-021-00-6	202-479-3	96-12-8							
67	1,2,4-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-087-00-6	204-428-0	120-82-1							
68	hexachlorobutadiene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		201-765-5	87-68-3							
69	1,2,3-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		201-757-1	87-61-6							
70	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-026-00-0	202-851-5	100-42-5							
71	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
72	2-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-857-5	88-75-5							
73	2,4-dichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
74	3,4-xyleneol; [1] 2,5-xyleneol; [2] 2,4-xyleneol; [3] 2,3-xyleneol; [4] 2,6-xyleneol; [5] xyleneol; [6] 2,4(or 2,5)-xyleneol [7]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]							
75	2,4,5-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
76	2,4,6-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
77	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
78	4-nitrophenol; p-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-015-00-2	202-811-7	100-02-7							
79	pentachlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-002-00-8	201-778-6	87-86-5							
80	2-chloronaphthalene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		202-079-9	91-58-7							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
81	2-methyl naphthalene	202-078-3	91-57-6		0.219 mg/kg		0.191 mg/kg	0.0000191 %	✓	
82	bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP	607-317-00-9	204-211-0	117-81-7	4.324 mg/kg		3.763 mg/kg	0.000376 %	✓	
83	BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
84	dibutyl phthalate; DBP	607-318-00-4	201-557-4	84-74-2	0.126 mg/kg		0.11 mg/kg	0.000011 %	✓	
85	di-n-octyl phthalate	204-214-7	117-84-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
86	diethyl phthalate	201-550-6	84-66-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
87	dimethyl phthalate	205-011-6	131-11-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
88	2,4-dinitrotoluene; [1] dinitrotoluene [2]	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
89	2,6-dinitrotoluene	609-049-00-8	210-106-0	606-20-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
90	4-bromophenylphenylether	202-952-4	101-55-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
91	4-chloroaniline	612-137-00-9	203-401-0	106-47-8	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
92	4-chlorophenylphenylether	230-281-7	7005-72-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
93	azobenzene	611-001-00-6	203-102-5	103-33-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
94	bis(2-chloroethoxy)methane	203-920-2	111-91-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
95	bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
96	carbazole	201-696-0	86-74-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
97	dibenzofuran	205-071-3	132-64-9		0.06 mg/kg		0.0522 mg/kg	0.00000522 %	✓	
98	hexachlorocyclopentadiene	602-078-00-7	201-029-3	77-47-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
99	hexachloroethane	200-666-4	67-72-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
100	3,5,5-trimethylcyclohex-2-enone; isophorone	606-012-00-8	201-126-0	78-59-1	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
101	nitrosodipropylamine	612-098-00-8	210-698-0	621-64-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
102	nitrobenzene	609-003-00-7	202-716-0	98-95-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
103	1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]	0.01 mg/kg		0.0087 mg/kg	0.00000087 %	✓	
104	cumene; [1] propylbenzene [2]	601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]	0.007 mg/kg		0.006 mg/kg	0.000000609 %	✓	
105	2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
106		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.02 mg/kg	<0.02 mg/kg	<0.000002 %		<LOD	
	604-004-00-9	203-577-9 [1]	108-39-4 [1]								
		202-423-8 [2]	95-48-7 [2]								
		203-398-6 [3]	106-44-5 [3]								
		215-293-2 [4]	1319-77-3 [4]								
107		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.03 mg/kg	<0.03 mg/kg	<0.000003 %		<LOD	
	612-012-00-9	201-855-4 [1]	88-74-4 [1]								
		202-729-1 [2]	99-09-2 [2]								
		202-810-1 [3]	100-01-6 [3]								
Total:								0.846 %			

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Potentially Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS106-15/11/2022-0.15m

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

Sample details

Sample name:	LoW Code:
WS106-15/11/2022-0.15m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11.8% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11.8% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	naphthalene				0.124 mg/kg		0.111 mg/kg	0.0000111 %	✓	
	601-052-00-2	202-049-5	91-20-3							
2	acenaphthylene				0.041 mg/kg		0.0367 mg/kg	0.00000367 %	✓	
		205-917-1	208-96-8							
3	acenaphthene				0.042 mg/kg		0.0376 mg/kg	0.00000376 %	✓	
		201-469-6	83-32-9							
4	fluorene				0.026 mg/kg		0.0233 mg/kg	0.00000233 %	✓	
		201-695-5	86-73-7							
5	phenanthrene				0.203 mg/kg		0.182 mg/kg	0.0000182 %	✓	
		201-581-5	85-01-8							
6	anthracene				0.07 mg/kg		0.0626 mg/kg	0.00000626 %	✓	
		204-371-1	120-12-7							
7	fluoranthene				0.155 mg/kg		0.139 mg/kg	0.0000139 %	✓	
		205-912-4	206-44-0							
8	pyrene				0.136 mg/kg		0.122 mg/kg	0.0000122 %	✓	
		204-927-3	129-00-0							
9	benzo[a]anthracene				0.087 mg/kg		0.0778 mg/kg	0.00000778 %	✓	
	601-033-00-9	200-280-6	56-55-3							
10	chrysene				0.121 mg/kg		0.108 mg/kg	0.0000108 %	✓	
	601-048-00-0	205-923-4	218-01-9							
11	benzo[a]pyrene; benzo[def]chrysene				0.14 mg/kg		0.125 mg/kg	0.0000125 %	✓	
	601-032-00-3	200-028-5	50-32-8							
12	indeno[123-cd]pyrene				0.089 mg/kg		0.0796 mg/kg	0.00000796 %	✓	
		205-893-2	193-39-5							
13	dibenz[a,h]anthracene				0.037 mg/kg		0.0331 mg/kg	0.00000331 %	✓	
	601-041-00-2	200-181-8	53-70-3							
14	benzo[ghi]perylene				0.203 mg/kg		0.182 mg/kg	0.0000182 %	✓	
		205-883-8	191-24-2							
15	Tar, coal; Coal tar; [The by-product from the destructive distillation of coal. Almost black semisolid. A complex combination of aromatic hydro-carbons, phenolic compounds, nitrogen bases and thiophene.]			H	<1000 mg/kg		<1000 mg/kg	<0.1 %		<LOD
	648-081-00-7	232-361-7	8007-45-2							
Total:								0.1 %		



Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected
CLP: Note H	Known incomplete entry, should not be used as is

Classification of sample: WS106-15/11/2022-0.50m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS106-15/11/2022-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
8.1%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0244%)

Determinands

Moisture content: 8.1% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				1.8 mg/kg	1.32	2.199 mg/kg	0.00022 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				47.4 mg/kg	2.27	99.536 mg/kg	0.00995 %	✓	
	024-017-00-8									
4	copper { dicopper oxide; copper (I) oxide }				11 mg/kg	1.126	11.457 mg/kg	0.00115 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	11 mg/kg	1.56	15.872 mg/kg	0.00102 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				8.5 mg/kg	2.976	23.403 mg/kg	0.00234 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
9	zinc { zinc chromate }				39 mg/kg	2.774	100.085 mg/kg	0.01 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
10	TPH (C6 to C40) petroleum group		TPH		264 mg/kg		244.218 mg/kg	0.0244 %	✓	
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
12	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
16	pH		PH		9 pH		9 pH	9pH		
17	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
18	acenaphthylene				0.05 mg/kg		0.0463 mg/kg	0.00000463 %	✓	
		205-917-1	208-96-8							
19	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
20	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
21	phenanthrene				0.1 mg/kg		0.0925 mg/kg	0.00000925 %	✓	
		201-581-5	85-01-8							
22	anthracene				0.05 mg/kg		0.0463 mg/kg	0.00000463 %	✓	
		204-371-1	120-12-7							
23	fluoranthene				0.18 mg/kg		0.167 mg/kg	0.0000167 %	✓	
		205-912-4	206-44-0							
24	pyrene				0.17 mg/kg		0.157 mg/kg	0.0000157 %	✓	
		204-927-3	129-00-0							
25	benzo[a]anthracene				0.1 mg/kg		0.0925 mg/kg	0.00000925 %	✓	
	601-033-00-9	200-280-6	56-55-3							
26	chrysene				0.12 mg/kg		0.111 mg/kg	0.0000111 %	✓	
	601-048-00-0	205-923-4	218-01-9							
27	benzo[b]fluoranthene				0.17 mg/kg		0.157 mg/kg	0.0000157 %	✓	
	601-034-00-4	205-911-9	205-99-2							
28	benzo[k]fluoranthene				0.07 mg/kg		0.0648 mg/kg	0.00000648 %	✓	
	601-036-00-5	205-916-6	207-08-9							
29	benzo[a]pyrene; benzo[def]chrysene				0.15 mg/kg		0.139 mg/kg	0.0000139 %	✓	
	601-032-00-3	200-028-5	50-32-8							
30	indeno[123-cd]pyrene				0.13 mg/kg		0.12 mg/kg	0.000012 %	✓	
		205-893-2	193-39-5							
31	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
32	benzo[ghi]perylene				0.13 mg/kg		0.12 mg/kg	0.000012 %	✓	
		205-883-8	191-24-2							
Total:								0.0495 %		

Key

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

Classification of sample: WS106A-15/11/2022-0.80m

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

Sample details

Sample name:	LoW Code:
WS106A-15/11/2022-0.80m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
20.7%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20.7% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				10.8	mg/kg	1.32	11.814	mg/kg	0.00118 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				50.1	mg/kg	2.27	94.223	mg/kg	0.00942 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				14	mg/kg	1.126	13.059	mg/kg	0.00131 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	17	mg/kg	1.56	21.969	mg/kg	0.00141 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				24.4	mg/kg	2.976	60.166	mg/kg	0.00602 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				41	mg/kg	2.774	94.234	mg/kg	0.00942 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	pH				7.09	pH		7.09	pH	7.09 pH		
11	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
12	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
13	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
14	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
15	phenanthrene				0.14	mg/kg		0.116	mg/kg	0.0000116 %	✓	
		201-581-5	85-01-8									
16	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
17	fluoranthene				0.24	mg/kg		0.199	mg/kg	0.0000199 %	✓	
		205-912-4	206-44-0									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	pyrene	204-927-3	129-00-0		0.22 mg/kg		0.182 mg/kg	0.0000182 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.13 mg/kg		0.108 mg/kg	0.0000108 %	✓	
20	chrysene	601-048-00-0	205-923-4	218-01-9	0.12 mg/kg		0.0994 mg/kg	0.00000994 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.13 mg/kg		0.108 mg/kg	0.0000108 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.05 mg/kg		0.0414 mg/kg	0.00000414 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.12 mg/kg		0.0994 mg/kg	0.00000994 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.08 mg/kg		0.0663 mg/kg	0.00000663 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		0.07 mg/kg		0.058 mg/kg	0.0000058 %	✓	
Total:								0.0292 %		

Key

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

Classification of sample: WS107-15/11/2022-0.30m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS107-15/11/2022-0.30m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
11.5%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinands:

benzene: (conc.: 5.38e-07%)

toluene: (conc.: 9.87e-07%)

Determinands

Moisture content: 11.5% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	TPH (C6 to C40) petroleum group				<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
			TPH							
2	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
3	benzene				0.006 mg/kg		0.0053 mg/kg	0.000000538 %	✓	
	601-020-00-8	200-753-7	71-43-2							
4	toluene				0.011 mg/kg		0.0098 mg/kg	0.000000987 %	✓	
	601-021-00-3	203-625-9	108-88-3							
5	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
6	xylene				<0.011 mg/kg		<0.011 mg/kg	<0.0000011 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
7	naphthalene				0.056 mg/kg		0.0502 mg/kg	0.00000502 %	✓	
	601-052-00-2	202-049-5	91-20-3							
8	acenaphthylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		205-917-1	208-96-8							
9	acenaphthene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-469-6	83-32-9							
10	fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-695-5	86-73-7							
11	phenanthrene				0.094 mg/kg		0.0843 mg/kg	0.00000843 %	✓	
		201-581-5	85-01-8							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
12	anthracene	204-371-1	120-12-7		0.012 mg/kg		0.0108 mg/kg	0.00000108 %	✓	
13	fluoranthene	205-912-4	206-44-0		0.056 mg/kg		0.0502 mg/kg	0.00000502 %	✓	
14	pyrene	204-927-3	129-00-0		0.047 mg/kg		0.0422 mg/kg	0.00000422 %	✓	
15	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.041 mg/kg		0.0368 mg/kg	0.00000368 %	✓	
16	chrysene	601-048-00-0	205-923-4	218-01-9	0.036 mg/kg		0.0323 mg/kg	0.00000323 %	✓	
17	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.045 mg/kg		0.0404 mg/kg	0.00000404 %	✓	
18	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.017 mg/kg		0.0152 mg/kg	0.00000152 %	✓	
19	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.035 mg/kg		0.0314 mg/kg	0.00000314 %	✓	
20	indeno[123-cd]pyrene	205-893-2	193-39-5		0.031 mg/kg		0.0278 mg/kg	0.00000278 %	✓	
21	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
22	benzo[ghi]perylene	205-883-8	191-24-2		0.049 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
23	phenol	604-001-00-2	203-632-7	108-95-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
24	1,1-dichloroethane and 1,2-dichloroethane (combined)	203-458-1, 200-863-5	107-06-2, 75-34-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
25	tetrachloroethylene	602-028-00-4	204-825-9	127-18-4	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
26	carbon tetrachloride; tetrachloromethane	602-008-00-5	200-262-8	56-23-5	<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
27	trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6	0.064 mg/kg		0.0574 mg/kg	0.00000574 %	✓	
28	vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4	<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
29	hexachlorobenzene	602-065-00-6	204-273-9	118-74-1	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	dichlorodifluoromethane	200-893-9	75-71-8		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
31	chloromethane; methyl chloride	602-001-00-7	200-817-4	74-87-3	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
32	bromomethane; methylbromide	602-002-00-2	200-813-2	74-83-9	<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
33	chloroethane	602-009-00-0	200-830-5	75-00-3	<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
34	trichlorofluoromethane	200-892-3	75-69-4		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
35	1,1-dichloroethylene; vinylidene chloride	602-025-00-8	200-864-0	75-35-4	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
36	dichloromethane; methylene chloride	602-004-00-3	200-838-9	75-09-2	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
37	2,2-dichloropropane	209-832-0	594-20-7		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
38	bromochloromethane	200-826-3	74-97-5		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
39	chloroform; trichloromethane	602-006-00-4	200-663-8	67-66-3	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
40	1,1,1-trichloroethane; methyl chloroform	602-013-00-2	200-756-3	71-55-6	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
41	1,1-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-031-00-0	209-253-3	563-58-6							
42	1,2-dichloropropane; propylene dichloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-020-00-0	201-152-2	78-87-5							
43	dibromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-003-00-8	200-824-2	74-95-3							
44	bromodichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-856-7	75-27-4							
45	1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
46	trans-1,3-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		431-460-4	10061-02-6							
47	1,1,2-trichloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-014-00-8	201-166-9	79-00-5							
48	1,3-dichloropropane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		205-531-3	142-28-9							
49	dibromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		204-704-0	124-48-1							
50	1,2-dibromoethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-010-00-6	203-444-5	106-93-4							
51	chlorobenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-033-00-1	203-628-5	108-90-7							
52	1,1,1,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		211-135-1	630-20-6							
53	bromoform; tribromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-007-00-X	200-854-6	75-25-2							
54	1,1,2,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-015-00-3	201-197-8	79-34-5							
55	bromobenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-060-00-9	203-623-8	108-86-1							
56	1,2,3-trichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-062-00-X	202-486-1	96-18-4							
57	mesitylene; 1,3,5-trimethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-025-00-5	203-604-4	108-67-8							
58	tert-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		202-632-4	98-06-6							
59	1,2,4-trimethylbenzene				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	601-043-00-3	202-436-9	95-63-6							
60	sec-butylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		205-227-0	135-98-8							
61	4-isopropyltoluene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		202-796-7	99-87-6							
62	1,3-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-067-00-7	208-792-1	541-73-1							
63	1,4-dichlorobenzene; p-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-035-00-2	203-400-5	106-46-7							
64	n-butylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		203-209-7	104-51-8							
65	1,2-dichlorobenzene; o-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-034-00-7	202-425-9	95-50-1							
66	1,2-dibromo-3-chloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-021-00-6	202-479-3	96-12-8							
67	1,2,4-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-087-00-6	204-428-0	120-82-1							
68	hexachlorobutadiene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		201-765-5	87-68-3							
69	1,2,3-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		201-757-1	87-61-6							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
70	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-026-00-0	202-851-5	100-42-5							
71	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
72	2-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-857-5	88-75-5							
73	2,4-dichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
74	3,4-xylene; [1] 2,5-xylene; [2] 2,4-xylene; [3] 2,3-xylene; [4] 2,6-xylene; [5] xylene; [6] 2,4(or 2,5)-xylene [7]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]							
75	2,4,5-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
76	2,4,6-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
77	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
78	4-nitrophenol; p-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-015-00-2	202-811-7	100-02-7							
79	pentachlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-002-00-8	201-778-6	87-86-5							
80	2-chloronaphthalene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		202-079-9	91-58-7							
81	2-methyl naphthalene				0.057 mg/kg		0.0511 mg/kg	0.00000511 %	✓	
		202-078-3	91-57-6							
82	bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP				0.114 mg/kg		0.102 mg/kg	0.0000102 %	✓	
	607-317-00-9	204-211-0	117-81-7							
83	BBP; benzyl butyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	607-430-00-3	201-622-7	85-68-7							
84	dibutyl phthalate; DBP				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	607-318-00-4	201-557-4	84-74-2							
85	di-n-octyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-214-7	117-84-0							
86	diethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-550-6	84-66-2							
87	dimethyl phthalate				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-011-6	131-11-3							
88	2,4-dinitrotoluene; [1] dinitrotoluene [2]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]							
89	2,6-dinitrotoluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-049-00-8	210-106-0	606-20-2							
90	4-bromophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		202-952-4	101-55-3							
91	4-chloroaniline				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	612-137-00-9	203-401-0	106-47-8							
92	4-chlorophenylphenylether				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		230-281-7	7005-72-3							
93	azobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	611-001-00-6	203-102-5	103-33-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
94	• bis(2-chloroethoxy)methane	203-920-2	111-91-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
95	bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
96	• carbazole	201-696-0	86-74-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
97	• dibenzofuran	205-071-3	132-64-9		0.03 mg/kg		0.0269 mg/kg	0.00000269 %	✓	
98	hexachlorocyclopentadiene	602-078-00-7	201-029-3	77-47-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
99	• hexachloroethane	200-666-4	67-72-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
100	3,5,5-trimethylcyclohex-2-enone; isophorone	606-012-00-8	201-126-0	78-59-1	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
101	nitrosodipropylamine	612-098-00-8	210-698-0	621-64-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
102	nitrobenzene	609-003-00-7	202-716-0	98-95-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
103	1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
104	cumene; [1] propylbenzene [2]	601-024-00-X	202-704-5 [1] 203-132-9 [2]	98-82-8 [1] 103-65-1 [2]	<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
105	2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
106	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
107	o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]	612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
Total:								0.00538 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Potentially Hazardous result
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS107-15/11/2022-3.60m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS107-15/11/2022-3.60m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
14.5%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00681%)

Determinands

Moisture content: 14.5% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				6.4 mg/kg	1.32	7.38 mg/kg	0.000738 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				39 mg/kg	2.27	77.319 mg/kg	0.00773 %	✓	
		024-017-00-8									
4		copper { dicopper oxide ; copper (I) oxide }				13 mg/kg	1.126	12.783 mg/kg	0.00128 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		lead { lead chromate }			1	<5 mg/kg	1.56	<7.799 mg/kg	<0.0005 %		<LOD
		082-004-00-2	231-846-0	7758-97-6							
6		mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
7		nickel { nickel chromate }				33.6 mg/kg	2.976	87.338 mg/kg	0.00873 %	✓	
		028-035-00-7	238-766-5	14721-18-7							
8		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
9		zinc { zinc chromate }				33 mg/kg	2.774	79.954 mg/kg	0.008 %	✓	
		024-007-00-3	236-878-9	13530-65-9							
10		TPH (C6 to C40) petroleum group				78 mg/kg		68.122 mg/kg	0.00681 %	✓	
				TPH							
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
12		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
16	pH				7.94 pH		7.94 pH	7.94 pH		
			PH							
17	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
18	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
19	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
20	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
21	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
22	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
23	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
24	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
25	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
26	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
27	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
28	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
29	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
30	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5							
31	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
32	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
33	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3							
34	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-881-7	191-07-1							
Total:								0.0341 %		

Key

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

Classification of sample: **WS108-15/11/2022-0.90m**

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS108-15/11/2022-0.90m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
19.1%	Entry:
(dry weight correction)	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.167%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.167%)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.167%)

Determinands

Moisture content: 19.1% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				7.1	mg/kg	1.32	7.871	mg/kg	0.000787 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.288	mg/kg	0.0000288 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				60.8	mg/kg	2.27	115.882	mg/kg	0.0116 %	✓	
		024-017-00-8											
4		copper { dicopper oxide; copper (I) oxide }				27	mg/kg	1.126	25.524	mg/kg	0.00255 %	✓	
		029-002-00-X	215-270-7	1317-39-1									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
5	lead { lead chromate }			1	34	mg/kg	1.56	44.529	mg/kg	0.00285 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				25.2	mg/kg	2.976	62.974	mg/kg	0.0063 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				89	mg/kg	2.774	207.304	mg/kg	0.0207 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	TPH (C6 to C40) petroleum group				1984	mg/kg		1665.827	mg/kg	0.167 %	✓	
			TPH									
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
12	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
13	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
14	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
15	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
16	pH				9.84	pH		9.84	pH	9.84 pH		
			PH									
17	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
18	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
19	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
20	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
21	phenanthrene				0.21	mg/kg		0.176	mg/kg	0.0000176 %	✓	
		201-581-5	85-01-8									
22	anthracene				0.12	mg/kg		0.101	mg/kg	0.0000101 %	✓	
		204-371-1	120-12-7									
23	fluoranthene				0.64	mg/kg		0.537	mg/kg	0.0000537 %	✓	
		205-912-4	206-44-0									
24	pyrene				0.67	mg/kg		0.563	mg/kg	0.0000563 %	✓	
		204-927-3	129-00-0									
25	benzo[a]anthracene				0.31	mg/kg		0.26	mg/kg	0.000026 %	✓	
	601-033-00-9	200-280-6	56-55-3									
26	chrysene				0.38	mg/kg		0.319	mg/kg	0.0000319 %	✓	
	601-048-00-0	205-923-4	218-01-9									
27	benzo[b]fluoranthene				0.45	mg/kg		0.378	mg/kg	0.0000378 %	✓	
	601-034-00-4	205-911-9	205-99-2									
28	benzo[k]fluoranthene				0.18	mg/kg		0.151	mg/kg	0.0000151 %	✓	
	601-036-00-5	205-916-6	207-08-9									
29	benzo[a]pyrene; benzo[def]chrysene				0.35	mg/kg		0.294	mg/kg	0.0000294 %	✓	
	601-032-00-3	200-028-5	50-32-8									
30	indeno[123-cd]pyrene				0.3	mg/kg		0.252	mg/kg	0.0000252 %	✓	
		205-893-2	193-39-5									
31	dibenz[a,h]anthracene				0.06	mg/kg		0.0504	mg/kg	0.00000504 %	✓	
	601-041-00-2	200-181-8	53-70-3									
32	benzo[ghi]perylene				0.27	mg/kg		0.227	mg/kg	0.0000227 %	✓	
		205-883-8	191-24-2									



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
Total:									0.212 %		

Key

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

Classification of sample: WS109-15/11/2022-0.40m

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS109-15/11/2022-0.40m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
14.5%	Entry:
(dry weight correction)	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 12.23 pH)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

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

Because of determinand:

toluene: (conc.: 5.24e-07%)

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00498%)

xylene: (conc.: 6.99e-07%)

Determinands

Moisture content: 14.5% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	 arsenic { arsenic trioxide }				8.5 mg/kg	1.32	9.802 mg/kg	0.00098 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	 cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.2 mg/kg	0.00002 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	 chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				32.5 mg/kg	2.27	64.432 mg/kg	0.00644 %	✓	
	024-017-00-8									
4	 copper { dicopper oxide; copper (I) oxide }				17 mg/kg	1.126	16.716 mg/kg	0.00167 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	 lead { lead chromate }			1	28 mg/kg	1.56	38.144 mg/kg	0.00245 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
6	 mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number								
7		nickel { nickel chromate }				14 mg/kg	2.976	36.391 mg/kg	0.00364 %	✓		
		028-035-00-7	238-766-5	14721-18-7								
8		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		028-031-00-5	239-125-2	15060-62-5								
9		zinc { zinc chromate }				53 mg/kg	2.774	128.41 mg/kg	0.0128 %	✓		
		024-007-00-3	236-878-9	13530-65-9								
10		TPH (C6 to C40) petroleum group				57 mg/kg		49.782 mg/kg	0.00498 %	✓		
				TPH								
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		603-181-00-X	216-653-1	1634-04-4								
12		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		601-020-00-8	200-753-7	71-43-2								
13		toluene				0.006 mg/kg		0.0052 mg/kg	0.000000524 %	✓		
		601-021-00-3	203-625-9	108-88-3								
14		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		601-023-00-4	202-849-4	100-41-4								
15		xylene				0.008 mg/kg		0.0069 mg/kg	0.000000699 %	✓		
		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]								
16		pH				12.23 pH		12.23 pH	12.23 pH			
				PH								
17		naphthalene				0.05 mg/kg		0.0437 mg/kg	0.00000437 %	✓		
		601-052-00-2	202-049-5	91-20-3								
18		acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD	
			205-917-1	208-96-8								
19		acenaphthene				0.1 mg/kg		0.0873 mg/kg	0.00000873 %	✓		
			201-469-6	83-32-9								
20		fluorene				0.1 mg/kg		0.0873 mg/kg	0.00000873 %	✓		
			201-695-5	86-73-7								
21		phenanthrene				1.28 mg/kg		1.118 mg/kg	0.000112 %	✓		
			201-581-5	85-01-8								
22		anthracene				0.15 mg/kg		0.131 mg/kg	0.0000131 %	✓		
			204-371-1	120-12-7								
23		fluoranthene				1.69 mg/kg		1.476 mg/kg	0.000148 %	✓		
			205-912-4	206-44-0								
24		pyrene				1.27 mg/kg		1.109 mg/kg	0.000111 %	✓		
			204-927-3	129-00-0								
25		benzo[a]anthracene				0.63 mg/kg		0.55 mg/kg	0.000055 %	✓		
		601-033-00-9	200-280-6	56-55-3								
26		chrysene				0.62 mg/kg		0.541 mg/kg	0.0000541 %	✓		
		601-048-00-0	205-923-4	218-01-9								
27		benzo[b]fluoranthene				0.67 mg/kg		0.585 mg/kg	0.0000585 %	✓		
		601-034-00-4	205-911-9	205-99-2								
28		benzo[k]fluoranthene				0.26 mg/kg		0.227 mg/kg	0.0000227 %	✓		
		601-036-00-5	205-916-6	207-08-9								
29		benzo[a]pyrene; benzo[def]chrysene				0.45 mg/kg		0.393 mg/kg	0.0000393 %	✓		
		601-032-00-3	200-028-5	50-32-8								
30		indeno[123-cd]pyrene				0.31 mg/kg		0.271 mg/kg	0.0000271 %	✓		
			205-893-2	193-39-5								
31		dibenz[a,h]anthracene				0.07 mg/kg		0.0611 mg/kg	0.00000611 %	✓		
		601-041-00-2	200-181-8	53-70-3								
32		benzo[ghi]perylene				0.25 mg/kg		0.218 mg/kg	0.0000218 %	✓		
			205-883-8	191-24-2								
33		polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD	
		602-039-00-4	215-648-1	1336-36-3								
34		coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD	
			205-881-7	191-07-1								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
Total:								0.034 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

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

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

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

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

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

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

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

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

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

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

Reason for additional Hazards Statement(s):

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

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

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

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

Description/Comments:

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

Reason for additional Hazards Statement(s):

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

▪ **1,1-dichloroethane and 1,2-dichloroethane (combined)** (EC Number: 203-458-1, 200-863-5, CAS Number: 107-06-2, 75-34-3)

Description/Comments: Combines the hazard statements and risk phrases for 1,1-dichloroethane and 1,2-dichloroethane

Data source: N/a

Data source date: 14 Oct 2016

Hazard Statements: Flam. Liq. 2; H225, Acute Tox. 4; H302, Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Carc. 1B; H350, Aquatic Chronic 3; H412

▪ **dichlorodifluoromethane** (EC Number: 200-893-9, CAS Number: 75-71-8)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Aquatic Chronic 3; H412, Ozone 1; H420, Press. Gas; H280

▪ **trichlorofluoromethane** (EC Number: 200-892-3, CAS Number: 75-69-4)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H312, Ozone 1; H420

▪ **2,2-dichloropropane** (EC Number: 209-832-0, CAS Number: 594-20-7)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H332, Flam. Liq. 2; H225, Acute Tox. 4; H302, Acute Tox. 4; H312, Eye Irrit. 2; H319

▪ **bromochloromethane** (EC Number: 200-826-3, CAS Number: 74-97-5)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H312, Skin Corr. 1B; H314, Eye Dam. 1; H318, Acute Tox. 4; H332, STOT SE 3; H335, Skin Irrit. 2; H315, Ozone 1; H420

▪ **bromodichloromethane** (EC Number: 200-856-7, CAS Number: 75-27-4)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302, Skin Irrit. 2; H315, Eye Dam. 1; H318, Eye Irrit. 2; H319, STOT SE 3; H335, Muta. 1B; H340, Carc. 1B; H350, Repr. 1A; H360

▪ **trans-1,3-dichloropropene** (EC Number: 431-460-4, CAS Number: 10061-02-6)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226, Acute Tox. 3; H301, Asp. Tox. 1; H304, Acute Tox. 3; H311, Skin Irrit. 2; H315, Skin Sens. 1; H317, Eye Irrit. 2; H319, Acute Tox. 4; H332, STOT SE 3; H335, Aquatic Chronic 1; H410

■ **1,3-dichloropropane** (EC Number: 205-531-3, CAS Number: 142-28-9)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335

■ **dibromochloromethane** (EC Number: 204-704-0, CAS Number: 124-48-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT SE 3; H336 , Muta. 2; H341 , Aquatic Chronic 2; H411

■ **1,1,1,2-tetrachloroethane** (EC Number: 211-135-1, CAS Number: 630-20-6)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , Carc. 2; H351 , Acute Tox. 4; H312 , Aquatic Chronic 3; H412 , Skin Irrit. 2; H315

■ **tert-butylbenzene** (EC Number: 202-632-4, CAS Number: 98-06-6)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Acute Tox. 4; H332 , STOT SE 3; H335 , Asp. Tox. 1; H304 , Aquatic Chronic 2; H411

■ **sec-butylbenzene** (EC Number: 205-227-0, CAS Number: 135-98-8)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Chronic 2; H411

■ **4-isopropyltoluene** (EC Number: 202-796-7, CAS Number: 99-87-6)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Chronic 2; H411

■ **n-butylbenzene** (EC Number: 203-209-7, CAS Number: 104-51-8)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **hexachlorobutadiene** (EC Number: 201-765-5, CAS Number: 87-68-3)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 2; H310 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 2; H330 , Carc. 2; H351 , Repr. 2; H361 , STOT SE 2; H371 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **1,2,3-trichlorobenzene** (EC Number: 201-757-1, CAS Number: 87-61-6)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 3; H410

■ **2-nitrophenol** (EC Number: 201-857-5, CAS Number: 88-75-5)

Description/Comments: VOC; Data from C&L Inventory Database

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

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **2-chloronaphthalene** (EC Number: 202-079-9, CAS Number: 91-58-7)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

▪ **2-methyl naphthalene** (EC Number: 202-078-3, CAS Number: 91-57-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **di-n-octyl phthalate** (EC Number: 204-214-7, CAS Number: 117-84-0)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Repr. 2; H361 , Skin Sens. 1; H317 , Resp. Sens. 1; H334 , Eye Irrit. 2; H319 , Aquatic Chronic 4; H413

▪ **diethyl phthalate** (EC Number: 201-550-6, CAS Number: 84-66-2)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , STOT SE 3; H335 , STOT RE 2; H373 , Repr. 2; H361 , Acute Tox. 4; H302 , STOT SE 3; H336 , Skin Sens. 1; H317 , Aquatic Chronic 1; H410

▪ **dimethyl phthalate** (EC Number: 205-011-6, CAS Number: 131-11-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , STOT SE 3; H335 , STOT SE 3; H336 , Repr. 2; H361 , Aquatic Chronic 3; H412

▪ **4-bromophenylphenylether** (EC Number: 202-952-4, CAS Number: 101-55-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **4-chlorophenylphenylether** (EC Number: 230-281-7, CAS Number: 7005-72-3)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **bis(2-chloroethoxy)methane** (EC Number: 203-920-2, CAS Number: 111-91-1)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 4; H312 , Acute Tox. 1; H330 , Acute Tox. 2; H330 , STOT SE 1; H370 , STOT RE 2; H373

▪ **carbazole** (EC Number: 201-696-0, CAS Number: 86-74-8)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 2; H341 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301

▪ **dibenzofuran** (EC Number: 205-071-3, CAS Number: 132-64-9)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Acute Tox. 4; H332 , Aquatic Chronic 2; H411

■ **hexachloroethane** (EC Number: 200-666-4, CAS Number: 67-72-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

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

Data source date: 02 Mar 2017

Hazard Statements: Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Carc. 2; H351, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, STOT RE 2; H373

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

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

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

Data source date: 16 Jun 2014

Hazard Statements: STOT SE 2; H371

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)

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(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (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) Worst 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 {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (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 v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2022.325.5408.10064 (21 Nov 2022)

HazWasteOnline Database: 2022.325.5408.10064 (21 Nov 2022)



This classification utilises the following guidance and legislation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

APPENDIX D - GEOENVIRONMENTAL GROUNDWATER LABORATORY RESULTS

Tier Environmental
Suite 414, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE



Attention : Spyridon theodoridis
Date : 7th December, 2022
Your reference : TE1704
Our reference : Test Report 22/19578 Batch 1
Location : Deacon Park
Date samples received : 28th November, 2022
Status : Final Report
Issue : 1

Three samples were received for analysis on 28th November, 2022 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Liza Klebe

Project Co-ordinator

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Park
Contact: Spyridon theodoridis
EMT Job No: 22/19578

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-4	5-8	9-12									
Sample ID	WS105	WS107	WS108									
Depth	3.00	2.00	1.99									
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	28/11/2022	28/11/2022	28/11/2022									
Sample Type	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1									
Date of Receipt	28/11/2022	28/11/2022	28/11/2022									
										LOD/LOR	Units	Method No.
Dissolved Arsenic #	1.2	20.5	9.3							<0.9	ug/l	TM170/PM14
Dissolved Cadmium #	0.06	<0.03	<0.03							<0.03	ug/l	TM170/PM14
Total Dissolved Chromium #	0.3	0.2	0.4							<0.2	ug/l	TM170/PM14
Dissolved Copper #	5	3	4							<1	ug/l	TM170/PM14
Dissolved Lead #	<0.4	<0.4	1.9							<0.4	ug/l	TM170/PM14
Dissolved Mercury #	<0.5	<0.5	<0.5							<0.5	ug/l	TM170/PM14
Dissolved Nickel #	10.2	1.6	2.5							<0.2	ug/l	TM170/PM14
Dissolved Selenium #	3.0	2.8	2.0							<1.2	ug/l	TM170/PM14
Dissolved Zinc #	117.6	3.5	5.7							<1.5	ug/l	TM170/PM14
Total Hardness Dissolved (as CaCO3)	443	379	102							<1	mg/l	TM30/PM14
PAH MS												
Naphthalene #	0.1	<0.1	<0.1							<0.1	ug/l	TM4/PM30
Acenaphthylene #	0.031	<0.005	0.009							<0.005	ug/l	TM4/PM30
Acenaphthene #	0.057	<0.005	0.054							<0.005	ug/l	TM4/PM30
Fluorene #	0.045	<0.005	0.033							<0.005	ug/l	TM4/PM30
Phenanthrene #	0.173	<0.005	0.118							<0.005	ug/l	TM4/PM30
Anthracene #	0.026	<0.005	0.026							<0.005	ug/l	TM4/PM30
Fluoranthene #	0.254	<0.005	0.178							<0.005	ug/l	TM4/PM30
Pyrene #	0.311	<0.005	0.191							<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	0.130	<0.005	0.071							<0.005	ug/l	TM4/PM30
Chrysene #	0.147	<0.005	0.078							<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	0.249	<0.008	0.151							<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	0.103	<0.005	0.067							<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	0.079	<0.005	0.046							<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	0.007	<0.005	<0.005							<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	0.066	<0.005	0.035							<0.005	ug/l	TM4/PM30
PAH 16 Total #	1.778	<0.173	1.057							<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.179	<0.008	0.109							<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	0.070	<0.008	0.042							<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	77	72	79							<0	%	TM4/PM30
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1							<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5							<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1							<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2							<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1							<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	106	100	104							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	95	88	90							<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Park
Contact: Spyridon theodoridis
EMT Job No: 22/19578

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-4	5-8	9-12								Please see attached notes for all abbreviations and acronyms		
Sample ID	WS105	WS107	WS108										
Depth	3.00	2.00	1.99										
COC No / misc													
Containers	V P G	V P G	V P G										
Sample Date	28/11/2022	28/11/2022	28/11/2022										
Sample Type	Ground Water	Ground Water	Ground Water										
Batch Number	1	1	1										
Date of Receipt	28/11/2022	28/11/2022	28/11/2022								LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	<10	<10	<10								<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10								<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10								<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5								<5	ug/l	TM5/PM16/PM3
>C12-C16 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>C16-C21 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>C21-C35 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>C35-C40	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
Total aliphatics C5-40	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
Aromatics													
>C5-EC7 #	<10	<10	<10								<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10								<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10								<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5								<5	ug/l	TM5/PM16/PM3
>EC12-EC16 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>EC16-EC21 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>EC21-EC35 #	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
>EC35-EC40	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
Total aromatics C5-40	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
Total aliphatics and aromatics(C5-40)	<10	<10	<10								<10	ug/l	TM5/PM16/PM3
Total Phenols HPLC	<0.15	<0.15	<0.15								<0.15	mg/l	TM26/PM0
Sulphate as SO4 #	114.7	249.9	60.0								<0.5	mg/l	TM38/PM0
Total Ammonia as N #	<0.03	<0.03	0.91								<0.03	mg/l	TM38/PM0
Electrical Conductivity @25C #	871	1265	508								<2	uS/cm	TM76/PM0
pH #	7.57	7.77	7.62								<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Park
Contact: Spyridon theodoridis
EMT Job No: 22/19578

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced

QF-PM 3.1.3 v11 All solid results are expressed on a dry weight basis unless stated otherwise. 4 of 12

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1704
Location: Deacon Park
Contact: Spyridon theodoridis
EMT Job No: 22/19578

VOC Report : Liquid

EMT Sample No.	1-4	5-8	9-12								Please see attached notes for all abbreviations and acronyms		
Sample ID	WS105	WS107	WS108										
Depth	3.00	2.00	1.99										
COC No / misc													
Containers	V P G	V P G	V P G										
Sample Date	28/11/2022	28/11/2022	28/11/2022										
Sample Type	Ground Water	Ground Water	Ground Water										
Batch Number	1	1	1										
Date of Receipt	28/11/2022	28/11/2022	28/11/2022								LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2	<2								<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1								<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1								<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1								<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3								<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3								<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3								<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1								<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3								<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5								<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2								<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5								<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2								<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1								<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2								<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1								<1	ug/l	TM15/PM10
Styrene	<2	<2	<2								<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2								<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4								<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3								<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3								<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	106	100	104								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	95	88	90								<0	%	TM15/PM10

Client Name: Tier Environmental

Reference: TE1704

Location: Deacon Park

Contact: Spyridon theodoridis

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/19578

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/19578

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				

EMT Job No: 22/19578

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			

APPENDIX E - GEOTECHNICAL IN SITU FIELDWORK AND LABORATORY RESULTS

TEST REPORT

Client Tier Environmental Ltd

Address Suite 513
Chadwick House
Warrington Road
Birchwood
WA3 6AE

Contract TE1704
Deacon Business Park,
Knowsley

Job Number MRN 4346/51
Date of Issue 24 November 2022
Page 1 of 6

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



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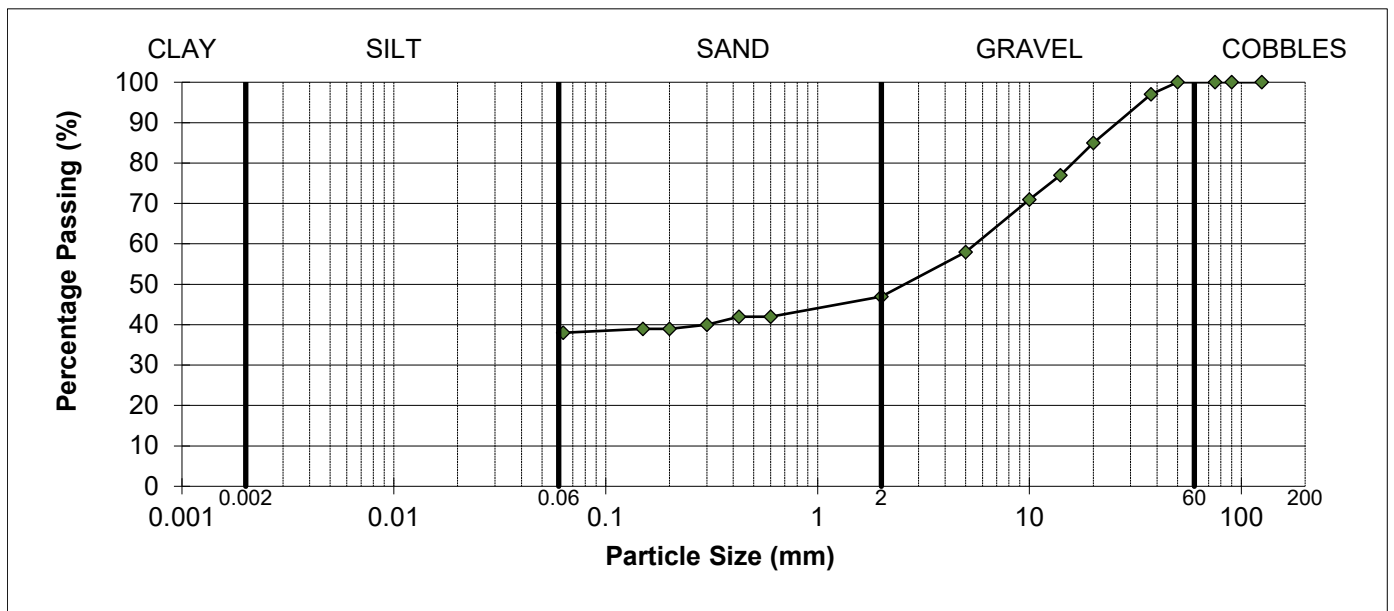
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1704 Deacon Business Park, Knowsley
JOB NUMBER	MRN 4346/51

SAMPLE LABEL	WS102 0.3-0.4	DATE SAMPLED	Not advised
LAB SAMPLE No	118943	DATE RECEIVED	17-Nov-22
DATE TESTED	18-Nov-22	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	58	
90	100		2	47	
75	100		0.6	42	
50	100		0.425	42	
37.5	97		0.3	40	
20	85		0.2	39	
14	77		0.15	39	
10	71		0.063	38	



REMARKS

As received water content = 17.4%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

24-Nov-22

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BS EN ISO 17892-4:2016

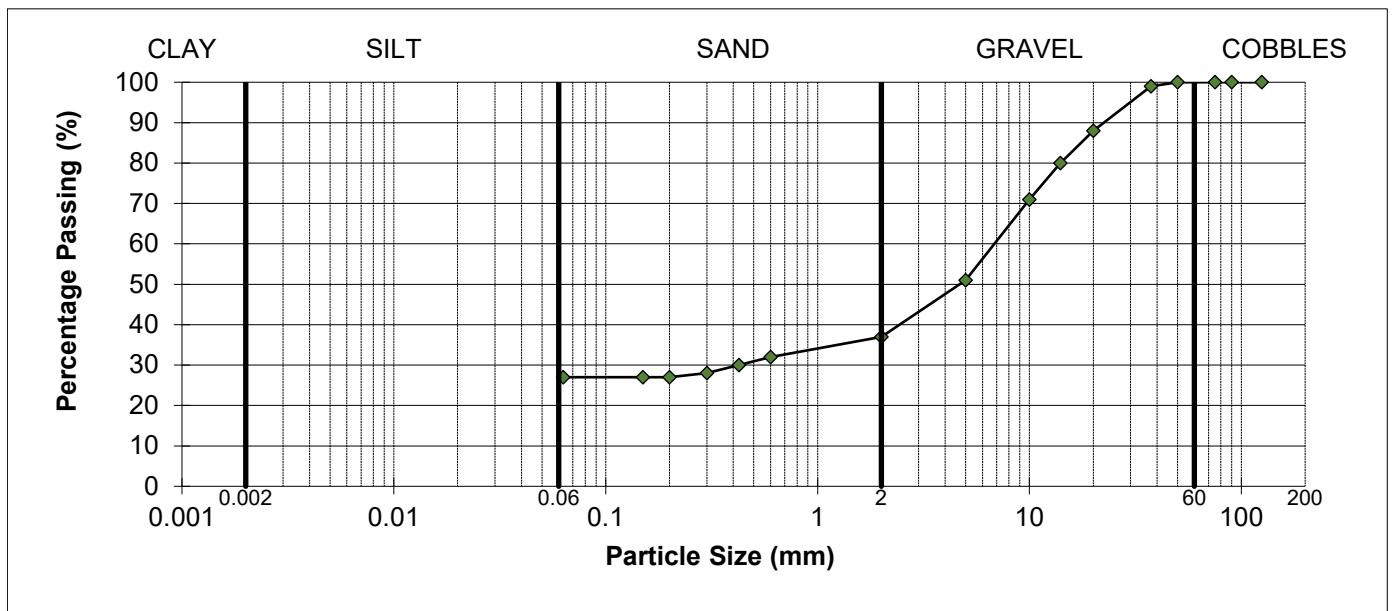
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1704 Deacon Business Park, Knowsley
JOB NUMBER	MRN 4346/51

SAMPLE LABEL	WS103 0.3-0.5	DATE SAMPLED	Not advised
LAB SAMPLE No	118944	DATE RECEIVED	17-Nov-22
DATE TESTED	18-Nov-22	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	51	
90	100		2	37	
75	100		0.6	32	
50	100		0.425	30	
37.5	99		0.3	28	
20	88		0.2	27	
14	80		0.15	27	
10	71		0.063	27	



REMARKS

As received water content = 15.9%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

24-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

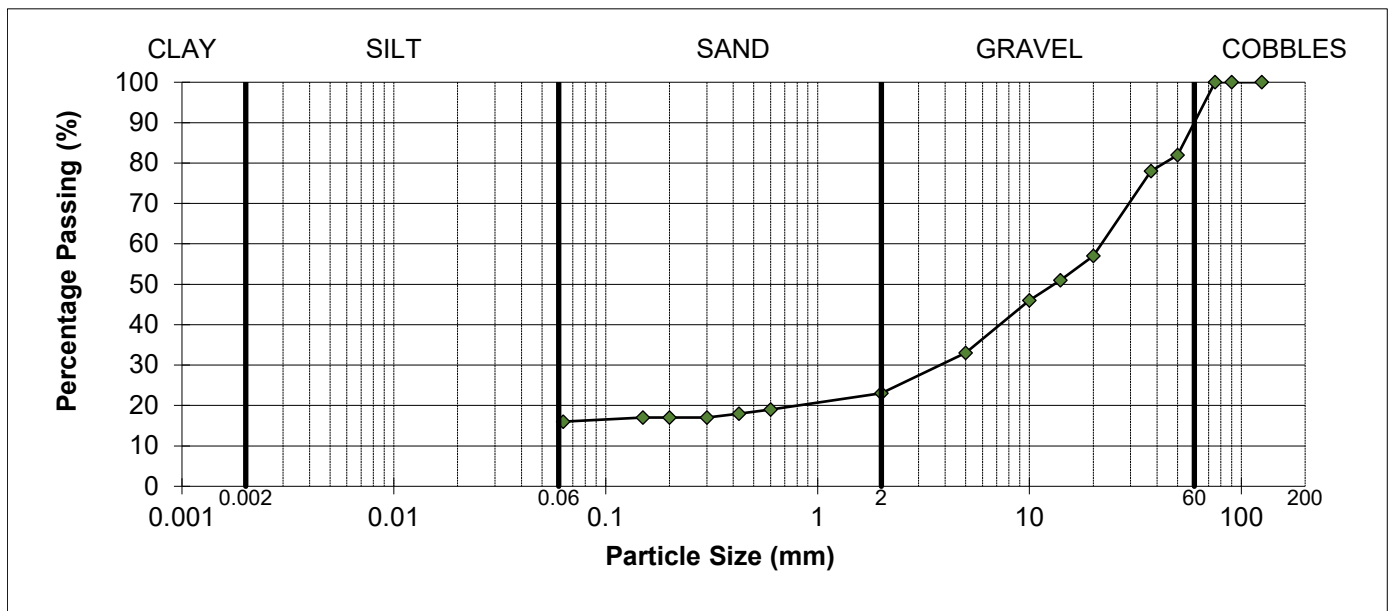
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1704 Deacon Business Park, Knowsley
JOB NUMBER	MRN 4346/51

SAMPLE LABEL	WS104 0.25-0.58	DATE SAMPLED	Not advised
LAB SAMPLE No	118945	DATE RECEIVED	17-Nov-22
DATE TESTED	18-Nov-22	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	33	
90	100		2	23	
75	100		0.6	19	
50	82		0.425	18	
37.5	78		0.3	17	
20	57		0.2	17	
14	51		0.15	17	
10	46		0.063	16	



REMARKS

As received water content = 7.1%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

24-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

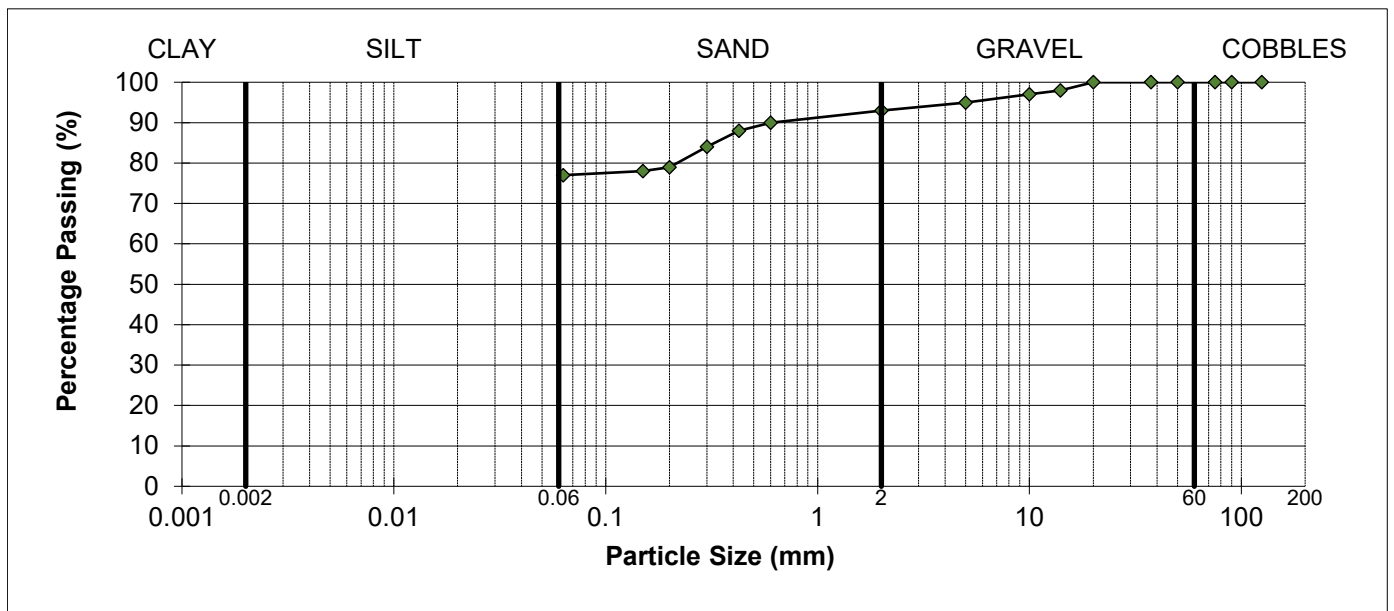
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1704 Deacon Business Park, Knowsley
JOB NUMBER	MRN 4346/51

SAMPLE LABEL	WS108 1.00-1.40	DATE SAMPLED	Not advised
LAB SAMPLE No	118946	DATE RECEIVED	17-Nov-22
DATE TESTED	18-Nov-22	SAMPLED BY	Client

MATERIAL	Dark brown clayey slightly sandy slightly gravelly SILT
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	95	
90	100		2	93	
75	100		0.6	90	
50	100		0.425	88	
37.5	100		0.3	84	
20	100		0.2	79	
14	98		0.15	78	
10	97		0.063	77	



REMARKS

As received water content = 19.7%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

24-Nov-22

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

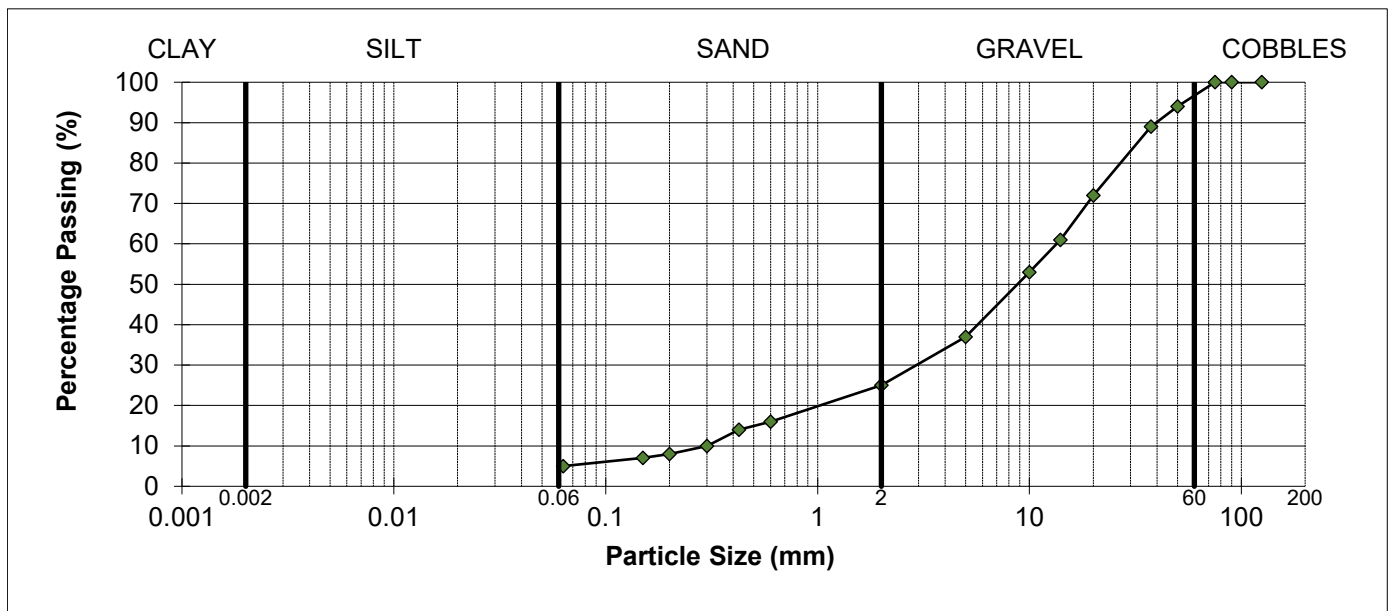
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1704 Deacon Business Park, Knowsley
JOB NUMBER	MRN 4346/51

SAMPLE LABEL	WS106 0.2-0.6	DATE SAMPLED	Not advised
LAB SAMPLE No	118954	DATE RECEIVED	17-Nov-22
DATE TESTED	18-Nov-22	SAMPLED BY	Client

MATERIAL	Made Ground
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	37	
90	100		2	25	
75	100		0.6	16	
50	94		0.425	14	
37.5	89		0.3	10	
20	72		0.2	8	
14	61		0.15	7	
10	53		0.063	5	



REMARKS

As received water content = 8.7%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

24-Nov-22

APPENDIX F - GROUNDWATER AND GAS MONITORING RESULTS

Job No:	TE1704		
Visit No:	1	of	
Operator:	LEE HOGG		
Project Manager:	STEFANI ELLIS		

O ₂	21.3
----------------	------

	Snow
	Strong
	Overcast
	Heavy
1005	After
	Rising

☐ Frozen

Pressure Trend

[illegible]

Job No:	TE1704		
Visit No:	2	of	
Operator:	LEE HOGG		
Project Manager:	STEFANI ELLIS		

O ₂	20.2
----------------	------

	Snow
	Strong
	Overcast
	Heavy
1007	After
X	Rising

☒ Frozen

[illegible][illegible]

APPENDIX G - DEFINITIONS OF TERMS USED IN QUALITATIVE AND QUANTITATIVE RISK ASSESSMENTS

CIRIA C552 Terminology

For the qualitative and quantitative assessment of risks posed by potential pollutant linkages have been undertaken using the risk matrix adapted from CIRIA C552 and outlined in the table below.

	Category	Definition
Potential severity	Severe	Acute (short term) risk to human health, Major pollution of sensitive controlled waters, ecosystems or habitat. Catastrophic damage to buildings or property or crops.
	Medium	Chronic (Medium / long term) risk to human health Pollution of sensitive controlled waters, ecosystems or species, Significant damage to crops, buildings or structures
	Mild	Easily preventable permanent health effects on humans. Pollution of non-sensitive controlled waters. Minor damage to buildings or structures.
	Minor	Easily preventable non-permanent health effects on humans, or no effects. Minor, low level and localised contamination of on-site soil. Easily repairable damage to buildings or structures.
Probability of risk	High Likelihood	Pollutant linkage may be present, and the risk is almost certain to occur , or there is evidence of harm already occurring.
	Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
	Low Likelihood	Pollutant linkages may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
	Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable.

		Potential Severity			
		Severe	Medium	Mild	Minor
Probability of risk	High Likelihood	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate / low risk	Low risk
	Low Likelihood	Moderate risk	Moderate / low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	very low risk	Very low risk

APPENDIX H - HUMAN HEALTH ASSESSEMENT CRITERIA

HUMAN HEALTH ASSESSMENT CRITERIA

Context

Contaminated Land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995 and associated guidance ("Part IIA"). These specify that a "suitable for use" approach is to be applied in the assessment of potentially contaminated land, implemented through a phased programme of site investigation and risk assessment appropriate to the site under consideration.

The assessment of potential risks posed by contaminated land is based upon the assessment of plausible contaminant source - pathway - receptor linkages ("pollutant linkages") for the current and/or proposed future use of the site. The process for the assessment of contaminated land adopted in this report is in line with guidance issued by the [Environment Agency Land contamination risk management \(LCRM\)](http://www.gov.uk) - GOV.UK (www.gov.uk)

Land contamination can harm:

- human health
- drinking water supplies, groundwater and surface water
- soils
- ecosystems including wildlife, animals and wetlands
- property

It can also affect the current and future land use. Dealing with land contamination helps make the environment clean and safe. Through regeneration it can:

- enhance the health and wellbeing of all
- add to the economic, ecological and amenity value of the area

Use land contamination risk management (LCRM) to:

- identify and assess if there is an unacceptable risk
- assess what remediation options are suitable to manage the risk
- plan and carry out remediation
- verify that remediation has worked

You can use LCRM in a range of regulatory and management contexts. For example, voluntary remediation, planning, assessing liabilities or under the Part 2A contaminated land regime. The Environment Agency expects you to follow LCRM if you are managing the risks from land contamination.

We support the use of the National Quality Mark Scheme (NQMS). You can use it for any type of land contamination report.

Using the NQMS:

- will make sure all legislative requirements and necessary standards related to managing land contamination are met
- can provide increased confidence by submitting reports of the quality we expect
- can result in cost and time savings by 'getting it right first time'

LCRM is made up of 4 guides.

1. LCRM: Before you start.
2. LCRM: Risk assessment.
3. LCRM: Options appraisal.
4. LCRM: Remediation and verification.

We use a staged risk based approach. There are 3 stages, and each stage is broken down into tiers or steps.

Stage 1: Risk assessment

You will use a tiered approach to risk assessment. The 3 tiers are:

1. Preliminary risk assessment.
2. Generic quantitative risk assessment.
3. Detailed quantitative risk assessment.

Stage 1 includes information for intrusive site investigations.

Stage 2: Options appraisal

There are 3 steps to follow.

1. Identify feasible remediation options.
2. Do a detailed evaluation of options.
3. Select the final remediation option.

Stage 3: Remediation and verification

There are 4 steps to follow.

1. Develop a remediation strategy.
2. Remediate.
3. Produce a verification report.
4. Do long term monitoring and maintenance, if required

You must always start with a preliminary risk assessment.

The risk assessment stage is an iterative process. You can do the 3 tiers in order or progress from a preliminary risk assessment to a detailed quantitative risk assessment. As part of a generic or detailed quantitative risk assessment you will need to collect detailed information about the site. This is usually through an intrusive site investigation.

Depending on the level of risk or regulatory requirements, you can proceed from a preliminary risk assessment to the options appraisal stage. If you proceed direct to the options appraisal stage, you still need to collect the detailed site investigation information required by the generic and detailed quantitative risk assessments. This is to confirm that your approach is viable and acceptable.

Following the risk assessment stage, if you conclude that the risks are acceptable, with agreement from the relevant regulator, you can end the process.

If there are unacceptable risks, then remediation or mitigation is required. Follow stages 2 and 3 in order.

In stage 2 options appraisal, you will:

- look at the most feasible options
- produce a shortlist of options
- use evaluation criteria to assess them
- select which ones are the most suitable to take forward to stage 3

In stage 3 remediation and verification, you will produce a remediation strategy, do the remediation and then produce a verification report.

You will decide at the options appraisal stage if long term monitoring and maintenance is the remediation option. You may need to do post-remediation monitoring for further verification.

The risk assessment and subsequent investigation, remediation and verification must address all potential sources of pollutants that may be present on the site (the "hazards"), all receptors that may be harmed by these (e.g., human health, controlled waters, ecological receptors) and the pathways by which the contamination may be transported from the contaminant source(s) to the receptor(s). This is defined within the conceptual model for the site, which represents the characteristics of the site in a form that shows the possible pollutant linkages. As further information becomes available (for example, through site investigation), so the conceptual model will be refined.

Remedial action can be specified at any phase within this assessment process to break the identified pollutant linkage in determining whether or not to undertake further assessment or to undertake remediation, the potential cost-savings arising from a more thorough assessment of the pollutant linkages and more tightly defined remedial strategy must be considered against the direct costs involved in the work and the time that this will take to execute and gain regulatory approval.

A different approach to the statistical appraisal of data is required depending on whether the assessment is being undertaken to assess land as Contaminated Land in accordance with the regulations or whether the assessment is to assess whether the site is suitable for new development in accordance with the Planning regime. The statistical approach to assessment is discussed further in CL:AIRE:2020 "Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration".

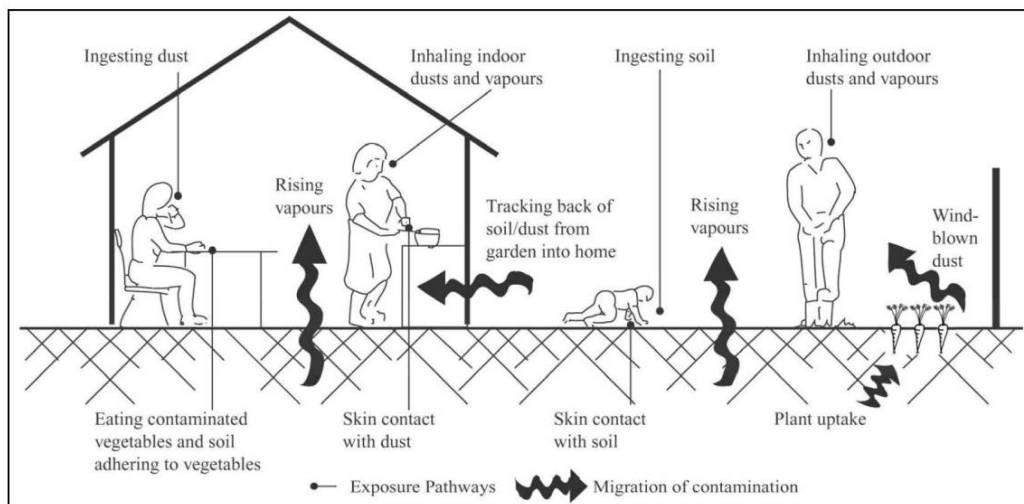
Some form of Detailed Quantitative Risk Assessment (DQRA) will be essential for those cases where appropriate GAC values cannot be established for the contaminant linkages under consideration.

Generic Assessment Criteria for Human Health Risk Assessment

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports and guidance. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. The initial documents (CLR7 – 10) were withdrawn and replaced with revised guidance issued by the Environment Agency including:

- “Using Soil Guideline Values”; EA, 2009; [Land contamination: using soil guideline values \(SGVs\) - GOV.UK \(www.gov.uk\)](http://www.gov.uk/government/publications/using-soil-guideline-values)
- “Human Health toxicology assessment of contaminants in soil” EA, 2009; <https://www.gov.uk/government/publications/human-health-toxicological-assessment-of-contaminants-in-soil>
- “Update technical background to the CLEA model” 2009; <https://www.gov.uk/government/publications/updated-technical-background-to-the-clea-model>
- CLEA Software (Version 1.05) Handbook 2015; <https://www.gov.uk/government/publications/contaminated-land-exposure-assessment-clea-tool>
- Compilation of Data for priority Organic Contaminants for Derivation of Soil Guideline Values; Science Report SC050021/SR7, 2008; and,
- “Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration”. CL:AIRE:2020 <https://www.claire.co.uk/component/phocadownload/category/9-other-cl-aire-documents?download=745:2020-stats-guidance>

The CLEA model and associated guidance was developed to calculate an estimated tolerable daily intake (TDI) of contaminants for site users given a set of ‘typical’ human health exposure pathways which are detailed in “SR3: Updated technical background to the CLEA model”



(Science Report SC050021/SR3, EA, 2009) and reproduced below.

Ingestion

- Outdoor soil;
- Indoor dust;
- Home grown produce;
- Soil attached to home grown produce.

Dermal Contact

- Outdoor soil;
- Indoor dust.

Inhalation

- Outdoor dust;
- Indoor dust;
- Outdoor vapour;
- Indoor vapour.

It should be noted that the CLEA model does not include an exhaustive list of potential exposure pathways, e.g. certain compounds can pass through plastic water pipes into drinking water supply.

The potential significance of each of the exposure pathways is dependent upon the type of land use and the nature of the contaminant being considered. The CLEA model considers principal 'default' land use scenarios and makes a series of assumptions with regards to building type (where applicable), identification of the critical human receptor group, exposure frequency and duration. The definitions of the principal land use types given in SR3 (EA, 2009) are:

Residential land use;

- A typical residential property consisting of a two-storey terraced house built on a ground-bearing slab of 0.15m thickness with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden. The critical receptor is a 0 – 6-year-old female.
- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and indoor dust and vapour

Allotments

- A plot of open space commonly made available by the Local Authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than one hectare. The tenants are assumed to be the parents or grandparents and that young children make occasional accompanied visits to the plots. The critical receptor is a 0 – 6-year-old female and there is no building present on Site.
- Active exposure pathways are ingestion of outdoor soil, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil; inhalation of outdoor vapour.

Commercial and industrial land use.

- A typical commercial or light industrial property consisting of a three-story office building (pre-1970) with a ground bearing floor slab at which employees spend most time indoors and are involved in office based or related light physical work. The critical receptor is a working female adult aged 16 – 65 years.
- Active exposure pathway is ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and inhalation of indoor dust and vapour.

Soil Guideline Values

Based on the assumption of each land use type, the EA and DEFRA developed and published Soil Guideline Value (SGV) using the CLEA model for a number of principal contaminants and 'default' end-use scenarios of residential, allotments and commercial/industrial use. The primary purpose of the SGVs is as trigger value for the tolerable daily intake (TDI), below which it can be assumed that the soil does not pose an unacceptable risk to the identified receptor. Where soils contamination is present above this level further assessment may be required. SGVs were developed for the following contaminants:

- Heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury, nickel and selenium.
- Benzene, ethylbenzene, toluene and xylenes.
- Phenol.
- Dioxins and dioxin-like polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs) – 11 substances

LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment

In addition, in 2009 CIEH through LQM and EIC published generic assessment criteria (GACs) for 82 substances including metals, petroleum hydrocarbons, PAHs and explosive substances for a variety of soil types and the three 'default' land uses – (residential, allotments and commercial end-uses) as described in SR3 (EA, 2009). These have been superseded as described below.

Category 4 Screening Values

In 2013 "SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination" (CL:AIRE 2013) was issued which detailed findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived for 6 contaminants of concern, Arsenic, Benzene, Benzo(a)pyrene, Cadmium, Chromium VI and Lead.

This was supplemented in 2014 by "SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination – Policy Companion Document" (DEFRA, 2014). SP1010 proposed several updated toxicology information relating to contaminant behaviour updated assumptions relating to the modelling of human exposure to soil contaminants, derivation of separate C4SLs for residential with the consumption of home grown produce, residential without the consumption of home grown produce, and two new land uses: public open spaces near residential housing (POS resi) and public parks (POS park).

Public Open Space: Residential

- For public open space in close proximity to residential housing and the central green area around which houses are located, as on many housing estates from the 1930s to 1970s. It is also applicable for smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting. It is considered to be a generally grassed area up to 0.5ha with up to 50% bare soil. The land use is an important resource

for children and the area is near the homes. The critical receptor is a female child age >3 - <9 years old (CLEA age class 4 – 9) as younger children are unlikely to play outdoors unsupervised.

- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor soil derived dust; inhalation of outdoor and indoor dust and inhalation of outdoor vapour.

Public Open Space: Park

- A public park is defined as an area of open space provided for recreational use and usually owned and maintained by the Local Authority. It is anticipated the park could be used for a wide range of activities, including the following:
 - Family visits and picnics;
 - Children's play area;
 - Sporting activities such as football on an informal basis (i.e. not a dedicated sports pitch); and
 - Dog walking.
- The park is modelled as an area >0.5 ha of predominantly grasses open space with no more than 25% of exposed soil.
- The critical receptor is a female child with CLEA age classes 1 – 6.
- Active exposure pathway are: ingestion of outdoor soil; direct dermal contact with outdoor soil; inhalation of outdoor dust and inhalation of outdoor vapour.

Furthermore, the C4SLs are based on a different toxicological benchmark, the 'low level of toxicological concern' (LLTC). This difference in approach was adopted because the C4SLs were primarily intended for use under Part 2A of the EPA 1990 to quickly screen out Category 4 sites where there is "*no risk or that the level of risk posed is low*". SGVs and LQM GACs are based on the more conservative 'minimal or tolerable level of risk' as defined in SR2 (EA, 2009) and were derived for assessment of contamination for the Planning process.

LQM/CIEH Suitable 4 Use Levels (S4ULs)

The publication of the C4SLs resulted in considerable and inconclusive debate about the applicability of the lower level of protection of the C4SL, which are underlain by the LLTC, outside of the Part 2A context for which they were derived. In 2014 LQM/CIEH presented a Suitable 4 Use Levels (S4ULs), which incorporate the updated assumption exposure derived for the production of the C4SLs but within the context of deriving screening criteria above which further assessment of the risks or remedial action may be needed. The S4ULs replace the 82 substances, species and fractions and congeners contained in the previous LQM/CIEH GACs issued in 2009. Additionally, following changes and new land uses proposed in the C4SL research project, S4ULs have also been derived for the majority of substances for which the EA derived SGVs in 2009 with the exception of lead (see below).

Lead

The C4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling than the withdrawn SGV and derived in line with current science of lead toxicology.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (2010)

In some instances, EIC/AGC/CL:AIRE GACs for certain VOC / SVOC potential contaminants of concern have been used *in lieu* of available LQM / CIEH S4UL values.

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Metals/metalloids																			
Arsenic	37			40			43			640			79			170			LQM (2014)
Beryllium	1.7			1.7			35			12			2.2			63			LQM (2014)
Boron	290			11000			45			240000			21000			46000			LQM (2014)
Cadmium	11			85			1.9			190			120			532			LQM (2014)
Chromium III	910			910			18000			8600			1500			33000			LQM (2014)
Chromium VI	6			6			1.8			33			7.7			220			LQM (2014)
Copper	2400			7100			520			68000			12000			44000			LQM (2014)
Lead	200			310			80			2330			630			1300			C4SL
Mercury (elemental)	1.2			1.2			21			58 (25.8)			16			30 (25.8)			LQM (2014)
Mercury (Inorganic)	40			56			19			1100			120			240			LQM (2014)
Methylmercury	11			15			6			320			40			68			LQM (2014)
Nickel	180			180			230			980			230			3400			LQM (2014)
Selenium	250			430			88			12000			1100			1800			LQM (2014)
Vanadium	410			1200			91			9000			2000			5000			LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Zinc	3700			40000			620			730000			81000			170000			LQM (2014)
Other																			
Total Sulphate	2,400			2,400			2,400			2,400			2,400			2,400			BRE (2005)
Water Soluble Sulphate (g/l)	0.5			0.5			0.5			0.5			0.5			0.5			BRE (2005)
PAHs																			
Acenaphthene	210	510	1100	3000 (57)	4700(141)	6000 (336)	34	85	200	84000 (57)	97000 (141)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Acenaphthylene	170	420	920	2900 (86.1)	4600 (212)	6000 (506)	28	69	160	8300 (86.1)	97000 (212)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Anthracene	2400	5400	11000	31000 (1.17)	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000	LQM (2014)
Benzo(a)anthracene	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29	49	56	62	LQM (2014)
Benzo(a)pyrene	2.2	2.7	3	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7	11	12	13	LQM (2014)
Benzo(b)fluoranthene	2.6	3.3	3.7	3.9	4	4	0.99	2.1	3.9	44	44	45	7.1	7.1	7.1	13	15	16	LQM (2014)
Benzo(g,h,i)perylene	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	LQM (2014)
Benzo(k)fluoranthene	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190	370	410	440	LQM (2014)
Chrysene	15	22	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57	93	110	120	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Dibenz(a,h)anthracene	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.61	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4	LQM (2014)
Fluoranthene	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100	63	6300	6400	LQM (2014)
Fluorene	170	400	860	2800 (30.9)	3800 (76.5)	4500 (183)	27	67	160	63000 (30.9)	68000	71000	9900	9900	9900	20000	20000	20000	LQM (2014)
Indeno(1,2,3-cd)pyrene	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82	150	170	180	LQM (2014)
Naphthalene	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190 (76.4)	460 (183)	1100 (432)	4900	4900	4900	1200 (76.4)	1900 (183)	3000	LQM (2014)
Phenanthrene	95	220	440	1300 (36)	1500	1500	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300	LQM (2014)
Pyrene	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000	LQM (2014)
Coal Tar (BaP as surrogate marker)	0.79	0.98	1.1	1.2	1.2	1.2	0.32	0.67	1.2	15	15	15	2.2	2.2	2.2	4.4	4.7	4.8	LQM (2014)
BTEX and TPH																			
Benzene	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73	90	100	110	LQM (2014)
Toluene	130	290	660	880 vap (869)	1900	3900	22	51	120	56000 vap (869)	110000 vap (1920)	180000 vap (4360)	56000	56000	56000	87000 vap (869)	95000 vap (1920)	100000 vap (4360)	LQM (2014)
Ethylbenzene	47	110	260	83	190	440	16	39	91	5700 vap (518)	13000 vap (1220)	27000 vap (2840)	24000	24000	25000	17000 vap (518)	22000 vap (1220)	27000 vap (2840)	LQM (2014)
Xylene - o	60	140	330	88	210	480	28	67	160	6600 (478)	15000 (1120)	33000 (2620)	41000	42000	43000	17000 (478)	24000 (1120)	33000 (2620)	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Xylene - m	59	140	320	82	190	450	31	74	170	6200 (625)	14000 (1470)	31000 (3460)	41000	42000	43000	17000 (625)	24000 (1470)	32000 (3460)	LQM (2014)
Xylene - p	56	130	310	79	180	430	29	69	160	5900 (576)	14000 (1350)	30000 (3170)	41000	42000	43000	17000 (576)	23000 (1350)	31000 (3170)	LQM (2014)
Aliphatic EC 5-6	42	78	160	42	78	160	730	1700	3900	3200 (304)	5900 (558)	12000 (1150)	570000 (304)	590000	60000 0	95000 (304)	130000 (558)	180000 (1150)	LQM (2014)
Aliphatic EC >6-8	100	230	530	100	230	530	2300	5600	13000	7800 (144)	17000 (322)	40000 (736)	600000	610000	62000 0	150000 (144)	220000 (322)	320000 (736)	LQM (2014)
Aliphatic EC >8-10	27	65	150	27	65	150	320	770	1700	2000 (78)	4800 (190)	11000 (451)	13000	13000	13000	14000 (78)	18000 (190)	21000 (451)	LQM (2014)
Aliphatic EC >10-12	130 (48)	330 (118)	760 (283)	130 (48)	330 (118)	760 (283)	2200	4400	7300	9700 (48)	23000 (118)	47000 (283)	13000	13000	13000	21000 (48)	23000 (118)	24000(283)	LQM (2014)
Aliphatic EC >12-16	1100 (24)	2400 (59)	4300 (142)	1100 (24)	2400 (59)	4300 (142)	11000	13000	13000	59000 (24)	82000 (59)	90000 (142)	13000	13000	13000	25000 (24)	25000 (59)	26000 (142)	LQM (2014)
Aliphatic EC >16-35	65000 (8.48)	92000 (21)	11000 0	65000 (8.48)	92000 (21)	110000	26000 0	270000	27000 0	160000 0	1700000	180000 0	250000	250000	25000 0	450000	480000	490000	LQM (2014)
Aliphatic EC >35-44	65000 (8.48)	92000 (21)	11000 0	65000 (8.48)	92000 (21)	110000	26000 0	270000	27000 0	160000 0	1700000	180000 0	250000	250000	25000 0	450000	480000	490000	LQM (2014)
Aromatic EC 5-7	70	140	300	370	690	1400	13	27	57	26000 (1220)	46000 (2260)	86000 (4710)	56000	56000	56000	76000 (1220)	84000 (2260)	92000 (4710)	LQM (2014)
Aromatic EC >7-8	130	290	660	860	1800	3900	22	51	120	56000 (869)	110000 (1920)	180000 (4360)	56000	56000	56000	87000 (869)	95000 (1920)	100000 (4360)	LQM (2014)
Aromatic EC >8-10	34	83	190	47	110	270	8.6	21	51	3500 (613)	8100 (1500)	17000 (3580)	5000	5000	5000	7200 (613)	8500 (1500)	9300 (3580)	LQM (2014)
Aromatic EC >10-12	74	180	380	250	590	1200	13	31	74	16000 (364)	28000 (899)	34000 (2150)	5000	5000	5000	9200 (364)	9700 (899)	10000	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Aromatic EC >12-16	140	330	660	1800	2300 (419)	2500	23	27	130	36000 (169)	37000	38000	5100	5100	5000	10000	10000	10000	LQM (2014)
Aromatic EC >16-21	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800	LQM (2014)
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >35-44	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >44-75	1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
VOCs																			
1,2-dichloroethane (1,2-DCA)	0.0071	0.011	0.019	0.0092	0.013	0.023	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28	LQM (2014)
1,1,1-trichloroethane	8.8	18	39	9	18	40	48	110	240	660	1300	3000	140000	140000	140000	57000 (1425)	76000 (2915)	100000 (6392)	LQM (2014)
1,1,2,2,tetrachloroethane	1.6	3.4	7.5	3.9	8	17	0.41	0.89	2	270	550	1100	1400	1400	1400	1800	2100	2300	LQM (2014)
tetrachloroethene	0.18	0.39	0.9	0.18	0.4	0.92	0.65	1.5	3.6	19	45	95	1400	1400	1400	810 (424)	1100 (951)	1500	LQM (2014)
tetrachloromethane (Carbon tetrachloride)	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400	LQM (2014)
Trichloroethene	0.016	0.034	0.075	0.017	0.036	0.08	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120	LQM (2014)
Trichloromethane (chloroform)	0.91	1.7	3.4	1.2	2.1	4.2	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Chloroethene (Vinyl chloride)	0.00064	0.00087	0.0014	0.00077	0.001	0.0015	0.00055	0.001	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4	LQM (2014)
2,4,6 Trinitrotoluene (TNT)	1.6	3.7	8.1	65	66	66	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270	LQM (2014)
RDX	120	250	540	13000	13000	13000	17	38	85	210000	210000	210000	26000	26000	27000	49000 (18.7)	51000	53000	LQM (2014)
HMX	5.7	13	26	6700	6700	6700	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	23000 (0.35)	23000 (0.39)	24000 (0.48)	LQM (2014)
Aldrin	5.7	6.6	7.1	7.3	7.4	7.5	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31	LQM (2014)
Dieldrin	0.97	2	3.5	7	7.3	7.4	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31	LQM (2014)
Atrazine	3.3	7.6	17.4	610	620	620	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400	LQM (2014)
Dichlovos	0.032	0.066	0.014	6.4	6.5	6.6	0.0049	0.01	0.022	140	140	140	16	16	16	26	26	27	LQM (2014)
Alpha-Endosulfan	7.4	18	41	160 (0.003)	280 (0.007)	410 (0.016)	1.2	2.9	6.8	5600 (0.003)	7400 (0.007)	8400 (0.016)	1200	1200	1200	2400	2400	2500	LQM (2014)
alpha-Hexachlorocyclohexane	0.23	0.55	1.2	6.9	9.2	11	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48	LQM (2014)
beta-hexachlorocyclohexanes	0.085	0.2	0.46	3.7	3.8	3.8	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16	LQM (2014)
gamma-hexachlorocyclohexanes	0.06	0.14	0.33	2.9	3.3	3.5	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Chlorobenzene	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	1300 (675)	2000 (1520)	2900	LQM (2014)
1,2-Dichlorobenzene	23	55	130	24	57	130	94	230	540	2000 (571)	4800 (1370)	11000 (3240)	90000	95000	98000	24000 (571)	36000 (1370)	51000 (3240)	LQM (2014)
1,3-Dichlorobenzene	0.4	1	2.3	0.44	1.1	2.5	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470	LQM (2014)
1,4-Dichlorobenzene	61	150	350	61	150	350	15	37	88	4400 (224)	10000 (540)	25000 (1280)	17000	17000	17000	36000 (224)	36000 (540)	36000 (1280)	LQM (2014)
VOCs Continued																			
1,2,3-Trichlorobenzene	1.5	3.6	8.6	1.5	3.7	8.8	4.7	12	28	102	250	590	1800	1800	1800	770 (134)	1100 (330)	1600 (789)	LQM (2014)
1,2,4-Trichlorobenzene	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700 (318)	2600 (786)	4000 (1880)	LQM (2014)
1,3,5-Trichlorobenzene	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380 (36.7)	580 (90.8)	860 (217)	LQM (2014)
1,2,3,4-Tetrachlorobenzene	15	36	78	24	56	120	4.4	11	26	1700 (122)	3080 (304)	4400 (728)	830	830	830	1500 (122)	1600	1600	LQM (2014)
1,2,3,5-Tetrachlorobenzene	0.66	1.6	3.7	0.75	1.9	4.3	0.38	0.9	2.2	49 (39.4)	120 (98.1)	240 (235)	78	79	79	110 (39)	120	130	LQM (2014)
1,2,4,5-Tetrachlorobenzene	0.33	0.77	1.6	0.73	1.7	3.5	0.06	0.16	0.37	42 (19.7)	72 (49.1)	96	13	13	13	25	26	26	LQM (2014)
Pentachlorobenzene	5.8	12	22	19	30	38	1.2	3.1	7	640 (43)	770 (107)	830	100	100	100	190	190	190	LQM (2014)

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	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	1%	2.50%	6%	
Hexachlorobenze ne	1.8 (0.2)	3.3 (0.5)	4.9	4.1 (0.2)	5.7 (0.5)	6.7 (1.2)	0.47	1.1	2.5	110 (0.2)	120	120	16	16	16	30	30	30	LQM (2014)
Phenol	280	550	1100	750	1300	2300	66	140	280	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	760 ^{dir} (31000)	1500 ^{dir} (35000)	3200 ^{dir} (37000)	LQM (2014)
Chlorophenols (excluding pentachlorophen ol)	0.87 (g)	2	4.5	94	150	210	0.13 (g)	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100	LQM (2014)
Pentachlorophen ol	0.22	0.52	1.2	27 (16.4)	29	31	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120	LQM (2014)
Carbon Disulphide	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700	LQM (2014)
Hexachlorobutadi ene	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51	LQM (2014)

(g) derived based on 2,3,4,6-tetrachlorophenol; dir - based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only); (vap) calculated for vapour phase only. SOM – Soil Organic Matter; (4.5) solubility.

APPENDIX I - CONTROLLED WATERS RISK ASSESSMENT

CURRENT GUIDANCE FOR CONTROLLED WATERS RISK ASSESSMENT

Regulatory Context

Government policy is based upon a “suitable for use approach,” which is relevant to both the current use of land and also to any proposed future use. When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health, controlled waters or the wider environment given the current use and circumstances of the land. Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

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

(a) Significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) Pollution of controlled waters is being, or is likely to be, caused.”

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter”

Controlled Waters are defined Section 104 of the Water Resources Act 1991. In summary, they comprise relevant territorial waters which extend seaward for three miles from the low-tide limit from which the territorial sea adjacent to England and Wales is measured.

The Environment Agency has powers under Part 7 of The Water Resources Act (1991) to take action to prevent or remedy the pollution of controlled waters, including circumstances where the pollution arises from contamination in the land. This is reinforced in The Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) which came into force in early April 2012.

Part IIA introduces the concept of a contaminant linkage; where for potential harm to exist there must be a connection between the source of the hazard and the receptor via a pathway. Risk assessment in contaminated land is therefore directed towards identifying the contaminants, pathways and receptors that can provide contaminant linkages. This is known as the contaminant-pathway-receptor link (CPR or contaminant linkage).

Part IIA places contaminated land responsibility as a part of the planning and redevelopment process, rather than Local Authority or Environment Agency directly, except in cases of very high pollution risk or where harm is occurring. In the planning process, guidance is provided by National Planning Policy Framework (NPPF) of March 2012. The NPPF requires that a site which has been developed shall not be capable of being determined “contaminated land” under Part IIA. Therefore, appropriate risk-based investigation is required to identify the contaminant linkages that can then be assessed, and then mitigated using methods that can be agreed with the planners.

Source Protection Zones

Source Protection Zones (SPZs) are defined by the Environment Agency (for England and Wales), SEPA (Scotland) and the Environment and Heritage Service (Northern Ireland) for groundwater sources such as wells, boreholes and springs that are used for public drinking water supply. The zones show the risk of contamination from activities that might cause groundwater pollution in the area. The size and shape of a zone depends upon subsurface conditions, how the groundwater is removed, and other environmental factors.

SPZs are classified into four categories:

- **Zone 1 (Inner protection zone).** Any pollution that can travel to the abstraction point within 50 days from any point within the zone is classified as being inside Zone 1. This applies at and below the groundwater table. This zone also has a minimum 50 m protection radius around the abstraction point. These criteria are designed to protect against the transmission of toxic chemicals and water-borne disease.
- **Zone 2 (Outer protection zone).** The outer zone covers pollution that takes up to 400 days to travel to the abstraction point, or 25% of the total catchment area, whichever area is the largest. This travel time is the minimum period over which the Environment Agency considers that pollutants need to be diluted, reduced in strength or delayed by the time they reach the abstraction point.
- **Zone 3 (Total catchment).** This is the total area needed to support removal of water from the abstraction point, and to support any discharge from this.
- **Zone of special interest.** This may occasionally be defined as a special case. This is usually where local conditions mean that industrial sites and other potential sources of contamination could affect the groundwater source, even though they are outside the normal catchment area.

Groundwater Vulnerability Assessments

From 1 April 2010 The Environment Agency Groundwater Protection Policy began to use aquifer designations which are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

The aquifer designation data is based on geological mapping provided by the British Geological Survey. It is updated regularly to reflect their ongoing programme of improvements to these maps. The maps are split into two different types of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels.
- Bedrock - solid permeable formations e.g. sandstone, chalk and limestone.

The maps display the following aquifer designations:

Table 1. Aquifer Classification ("Geological Classification").

Classification	Definition
Principal Aquifers (Highly Permeable)	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Secondary A Aquifers	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Secondary B Aquifers	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
Secondary Undifferentiated Aquifers	This has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Environment Agency Guidance

The Environment Agency's stance on groundwater resources is:

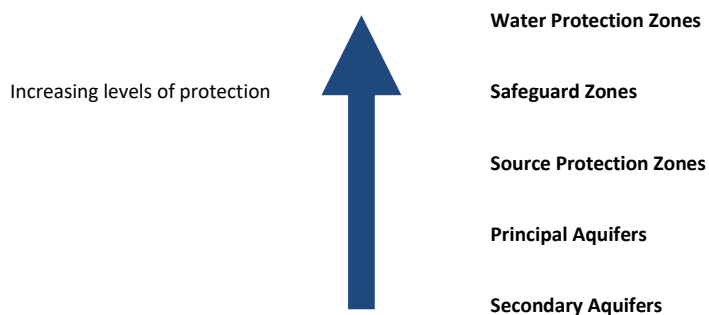
"to protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks we identify"
(Groundwater Protection: Policy and Practice GP3, 2012).

At present, the legislation and guidance pertaining to the protection of controlled waters in the UK is complex; however, the core objectives seek to enforce the position given above.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document introduced areas of focus for developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was revised in 1998, since which there have been substantial changes in legislation, driven by key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991 as amended by the Water Act 2003. Gaps in the 1998 PPPG that emerged as the result of further legislative changes were addressed in the Environment Agency Policy document Groundwater Protection: Policy and Practice (GP3), Version 1 of November 2012. The three main parts of GP3 were:

- Groundwater principals;
- Position statements and legislation; and
- Technical information.

The Environment Agency has a tiered risk based approach to drinking water protection as summarised below:



Controlled Waters Risk Assessment

A number of tools are available (as detailed in GP3) in order for a developer of a potentially contaminated site to fulfil their obligations under the legislation. A site assessment would be required in order to identify any potential risks to controlled waters and to derive suitable clean up criteria, if required, to ensure the protection of controlled waters.

There are three main stages to any risk assessment of controlled waters:

1. Risk Screening (devise Conceptual Site Model, making reference to groundwater vulnerability maps, site setting, controlled waters context etc)
2. Generic Risk Assessment (EA Remedial Targets Methodology Tier 1 / Comparison of groundwater data with relevant standards)
3. Detailed Quantitative Risk Assessment (Consideration of aquifer properties and site specific parameters, EA Remedial Targets Methodology Tiers 2 & 3)

Risk Screening

Here, the Conceptual Site Model (CSM) is a critical tool to assessing any potentially contaminated site. The information from a robust CSM can be used to establish any pathways or receptors that do not require further assessment at an early stage. For example, it may be possible to confirm the absence of a particular sensitive controlled water receptor (such as a surface water feature) within the vicinity of the Site thereby breaking the associated source-pathway-receptor pollutant linkage. Information from subsequent tiers of risk assessment, such as following intrusive investigations, are used to update the CSM accordingly.

Generic Risk Assessment - England and Wales

When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with those screening criteria.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the Water Quality Standards (WQS) that are relevant to the specific site and a judgment has been made against the most stringent of those relevant standards:

- EQS Directive 2008/105/EC
- Priority Substances Directive 2013/39/EU
- Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- UK Drinking Water Standards (UK DWS)
- World Health Organisation (WHO Guidelines) for Drinking Water Quality
- Council Directive 98/83/EC on the quality of water intended for human consumption (Drinking water directive)

In some instances, the laboratory method detection limit is greater than the appropriate EQS/UKDWS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

Please note that there is no quantitative criterion for total petroleum hydrocarbons (TPH), or speciated TPH fractions. Historically, standards provided for petroleum hydrocarbons ranges from 10µg/l (Private Water Supply Regulations 1991, removed from the 2009 regulations) to 50µg/l-1000µg/l (Surface Waters (Abstraction for Drinking Water) Regulations 1989) which related to the degree of treatment of water prior to use as drinking water. Over time, the legislative standards have been rescinded and no alternative standard provided, although the Environment Agency planned to release speciated TPH criteria (Fretwell et al., 2009).

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, the results of the groundwater chemical analysis for TPH and BTEX were evaluated against Water Quality Standards (WQS) appropriate to the conceptual model for the site:

Table 2. Summary of Selected TPH and BTEX Water Quality Standards Selected for Tier 1 Screening

Determinand	Units	WQS Selected	Source of WQS
Aliphatics >C5-C6	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C6-C8	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C8-C10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C10-C12	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C12-C16	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C16-C21	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aliphatics >C21-C35	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aromatics >C5-EC7	µg/l	10	Table 5.4 of CL:AIRE 2017#
Aromatics >EC7-EC8	µg/l	700	Table 5.4 of CL:AIRE 2017#
Aromatics >EC8-EC10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aromatics >EC10-EC12	µg/l	100	Table 5.4 of CL:AIRE 2017#

Aromatics >EC12-EC16	µg/l	100	Table 5.4 of CL:AIRE 2017#
Aromatics >EC16-EC21	µg/l	90	Table 5.4 of CL:AIRE 2017#
Aromatics >EC21-EC35	µg/l	90	Table 5.4 of CL:AIRE 2017#
Benzene	µg/l	10	Priority Substance Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Toluene	µg/l	74	Table 1 Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Ethylbenzene	µg/l	20	R&D Technical Report P2-115/TR4, 2002
Total xylenes	µg/l	30	DoE (1997c) Hedgecott S. and Lewis S, An update on proposed environmental quality standards for xylenes in water, final report to the Department of the Environment. Report No. DoE 4273/1. Medmenham: WRc; and; Table 5.3 of CL:AIRE 2017#

Notes - # = CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017),

Table 5.3 was referenced in the first instance from the CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017), the to select appropriate Freshwater EQS values for benzene, toluene and total xylenes. The selected value for Ethylbenzene was derived from the proposed EQS value of 20µg/l from the Environment Agency R&D Technical Report P2-115/TR4, 2002. This represents a more conservative value than the 300µg/l value in Table 5.3.

With respect to speciated TPH CWG fractions, Table 5.3 states and refers the reader to 'See Table 5.4'. On this basis, Tier Environmental selected the World Health Organization (WHO) guide values for TPHCWG fractions in drinking water that are presented in Table 5.4 which may be considered appropriately protective of the controlled waters environment based on the conceptual site model.

Generic Risk Assessment is generally undertaken via comparison of reported leachate and/or groundwater concentrations against selected assessment criteria for the potential contaminants of concern identified for the Site from a preliminary desk based assessment.

The selected Generic Assessment Criteria (GAC) derived from a Water Quality Standard (WQS) for any specific substance may not necessarily be a simple number and can often be found to be expressed as:

- Annual mean concentration;
- Maximum allowable concentration;
- 95th percentile concentration for *n* samples;
- Total concentration;
- Dissolved concentration (applicable to filtered samples)

The values may sometimes be expressed for individual substances (e.g. arsenic or for groups of substances e.g. total xylenes or sums of certain PAHs).

Environmental Quality Standards (EQS) have been used where available for Priority Substances and Priority Hazardous Substances set at a European level:

- Priority Substances Directive 2013/39/EU;
- Amending 2008/105 and 2000/118/EC

In addition, EQS values derived for Specific Pollutants have been used as presented in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

For assessing risks to potable water abstraction supplies, UK Drinking Water Standards presented in the Water Supply (Water Quality) Regulations 2000 (SI/2000/3184) (as amended) have been applied.

In selecting a GAC for a particular Site, Tier Environmental considers the following factors:

- Current use/function of the groundwater (e.g. drinking water, irrigation water, industrial use, base-flow to rivers and streams);
- Plausible, proposed or planned future uses of the water and nearby waters;
- Sensitivity of the critical receptor (e.g. human health, aquatic life); and,
- Requirements to trigger action under the legal context

In accordance with Part 2A:

"in deciding whether pollution of controlled waters is occurring, the assessor will have regard to all of the water quality standards that are relevant to the specific site and make a judgment against the most stringent of those relevant standards"

Should the Level 1 or 2 assessments indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

- To devise suitable remedial solutions;
- To carry out more investigation, sampling and analysis;
- To conduct a site-specific Detailed Quantitative Risk Assessment (DQRA) to whether or not the soil materials are suitable for their site-specific intended use or to devise a site-specific clean-up level.

Detailed Quantitative Risk Assessment (DQRA)

The decision to carry out a DQRA will be informed by the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the former two stages. The robust CSM will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment.

Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

Remediation criteria derived will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or compliance point. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

Hazardous and Non Hazardous Substances

The Groundwater (England and Wales) Regulations 2009 control the disposal to the hydrogeological environment of potentially polluting substances which are divided into Hazardous Substances and Non-hazardous Contaminants (this roughly approximates to the former List 1 and List 2 substances).

Hazardous Substances are the most damaging and toxic and must be prevented from directly or indirectly entering the groundwater environment. Hazardous Substances include mineral oils and hydrocarbons, pesticides, biocides, herbicides, solvents and some metals. Discharge of Hazardous Substances to Controlled Waters must be prevented.

Non-hazardous Pollutants are any contaminants other than Hazardous Substances. Non-hazardous Pollutants are potentially toxic but are less harmful than Hazardous Substances, but their direct discharge to groundwater is generally not permitted and any indirect discharge to groundwater must be limited and be controlled by technical precautions in order to prevent pollution. Non-hazardous Pollutants include ammonia and nitrites, many metals and fluorides.

APPENDIX J - ASSESSMENT CRITERIA APPLIED FOR GROUND GAS

Ground Gas Monitoring Methodology

Monitoring for the following is generally performed as part of ground gas assessment:

- Methane (CH₄): an odourless, flammable gas. Mixtures of methane with air containing between 5 and 15% v/v methane are explosive.
- Carbon dioxide (CO₂): an asphyxiant at elevated concentrations. Denser than air, it can accumulate in excavations, and within low points inside buildings
- Oxygen (O₂): important in the assessment of the potential formation of explosive mixtures with methane. Monitoring normally measures both methane and oxygen concentrations in ground gas to derive an indication of the risk of explosive mixture formation, expressed as a percentage of the Lower Explosive Limit (LEL). Low concentrations of oxygen in ground gas can also exacerbate the risk of CO₂ asphyxiation.
- Hydrogen sulphide (H₂S): odorous and toxic, capable of forming flammable mixtures with air.

In addition, depending on the Conceptual Site Model, monitoring may also include for measurements of Volatile Organic Compounds (VOCs); present as chemical contaminants of soil and sometimes also biologically produced in low concentrations.

Assessment of methane (CH₄) and carbon dioxide (CO₂)

Methane and carbon dioxide can arise from natural geological sources, mine workings, rotting organic matter (peat, landfilled materials, etc.) and/or contaminant biodegradation. Assessment of ground gas composition and flows is therefore an essential part of site assessment. The need to adequately address potential risks from ground gas on development sites is therefore required under the planning regime.

In order to appropriately assess the site risks, the Construction Industry Research and Information Association (CIRIA) and others have issued several guidance documents on landfill and ground gas that are intended to provide advice on how to investigate and deal with gas contaminated ground with respect to development. These are:

- Report 149: 'Protecting Development from Methane' (CIRIA, 1995a)
- Report 150: 'Methane Investigation Strategies' (CIRIA, 1995b)
- Report 151: 'Interpreting Measurement of Gas in the Ground' (CIRIA, 1995c)
- Report 152: 'Risk Assessment for Methane and Other Gases from the Ground' (CIRIA, 1995d)

More recent guidance has been published to update the documents detailed above to collaborate and promote industry 'good practice'. These are:

- CIRIA Report 665: 'Assessing risks posed by hazardous ground gases to buildings (CIRIA, 2008)
- NHBC: 'Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present' (NHBC, 2007)
- BS8485:201+A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BSI Group, 2019)
- BS8576:2013: Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs) (BSI Group, 2013)
- SoBRA Report Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater (Feb 2017)
- CL:AIRE Technical Bulletin TB17 Ground Gas Monitoring and 'Worst Case' Conditions (CL:AIRE Aug 2018)

The earlier CIRIA 149 approach is now considered to be too conservative. A more realistic measure of the risk posed by methane and CO₂ in ground gas can be established by determining an appropriate Gas Screening Value (GSV), using the methods described in the NHBC and CIRIA 659 documents. These values are based upon earlier work undertaken by Wilson and Card (1999).

GSVs are calculated by multiplying the borehole flow rate (l/hr) by the percentage (% v/v) concentration in the gas stream of the specific component, i.e.:

$$\text{GSV} = (\text{Concentration} / 100) \times \text{Flow rate.}$$

A risk-based methodology for deriving GSVs is defined for two situations (designated A and B), which are adequate for the great majority of site cases (as per CIRIA 665 Section 8.3):

- **Situation A:** Any development other than Situation B, e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc
- **Situation B:** Low rise building with minimum ventilated under floor void (min 150 mm)

Under Situation A, classification of the scope of protection required is determined from the site GSV, summarised in Table 1. For Situation B, GSVs derived are used in a 'Traffic Light' classification (summarised in Table 2) which determines the required level and scope of protection measures. Tables 1 and 2 are summaries only: the details provided in the body text, footnotes and appendices of the above-referenced documents should be read in conjunction with the results to determine the appropriate level of protection.

For conservatism, Tier Environmental **initially** uses the maximum concentration and gas flow rate of methane detected in any borehole during all of the monitoring visits in deriving recommendations on appropriate protection measures. This represents the worst-case risk of forming an explosive mixtures. For carbon dioxide, steady state concentrations and flow data are applied, as these determine the development of an asphyxiating mixture. All values are selected whether or not they occurred in the same borehole or during the same monitoring event.

Exceedances of the maximum concentrations used in a Tier 1 Gas Risk Assessment can be tolerated, when the conceptual site model indicates that it is safe to do so. However, appropriately derived GSV values must never be exceeded - where site-specific circumstances permit the derivation of alternative GSVs according to the defined conceptual model, then the appropriate GSV values should be applied.

Table 1. GSV Categories Defined for Situation A (Summarised from CIRIA Report 665).

Risk classification	GSV (CH ₄ or CO ₂ ; l/hr)	Additional factors	Characteristic Situation
Very low	<0.07	Typically methane <=1% and/or CO ₂ <=5%, otherwise consider increase to Low Risk.	1
Low	<0.7	Typically borehole ground gas flow rate <=70 l/hr; otherwise consider increase to Moderate Risk.	2
Moderate	<3.5	---	3
Moderate to high	<15	QRA required to evaluate scope of remediation measures.	4
High	<70	---	5
Very high	>70	---	6

Table 2. GSV Categories Defined for Situation B (Summarised from NHBC, 2007).

Methane		CO ₂		"Traffic light" classification
Typical max. conc. (% v/v)	GSV (l/hr)	Typical max. conc. (% v/v)	GSV (l/hr)	
				Green
1	0.13	5	0.78	Amber 1
5	0.63	10	1.60	
				Amber 2
20	1.60	30	3.10	Red

Assessment of hydrogen sulphide (H₂S)

H₂S is toxic and highly odorous ("rotten eggs") gas. It is often a minor component within mine gases, in ground gas within or overlying strata rich in pyrites or other sulphide-rich ores, and in most natural gas fields.

H₂S can be generated biologically in significant concentrations by the decomposition by sulphate-reducing bacteria of natural or anthropogenic organic matter under oxygen-free conditions. Its potential generation will be greater in environments containing elevated sulphate concentrations (including sea water). H₂S is therefore common within the gas arising from estuarine and marine sediments, pond sediment, stagnant water bodies, bogs and marshlands and landfilled waste, for example.

It must be noted that H₂S normally occurs together with other potentially hazardous ground gases. The measures adopted for protection against these will prove equally protective against H₂S.

There are no standards by which H₂S concentrations in ground gas can be assessed directly. Therefore, the significance of measured H₂S concentrations in ground gas must be evaluated on a case-by-case basis, taking into account the measured concentrations of other components and the specific conceptual site and exposure models. To assist in this process, the following standards and guidance may be applied.

General protection of land users

There are no UK air quality standards for general exposure to H₂S. The World Health Organisation has derived ambient air quality standards (WHO, 2000) for this gas, which may be used to inform risk assessment and decision-making:

The 24 hour average exposure guideline value for ambient air: 0.15 mg/m³ (0.1 ppmv, approx.; this was derived by the application of a 100x safety factor to the LOAEL for long-term exposure).

This is significantly above the odour threshold, which is typically around 0.01 mg/m³. To avoid substantial nuisance odour complaints, WHO (2000) recommends that the 30 minute average H₂S concentration in ambient air should not exceed: 0.007 mg/m³ (0.005 ppmv, approx.).

Occupational exposures

For occupational exposure, the HSE (2005) limits for H₂S are applicable:

- 8 hour time weighted average occupational exposure limit: 5 ppmv (7 mg/m³).
- Short-term exposure limit (15 minute reference period): 10 ppmv (14 mg/m³).

VOC Data Collection, Sampling and Assessment

BS8576 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).

Volatile organic compounds (VOCs) include, for example, halogenated hydrocarbons such as trichloroethene, non-halogenated hydrocarbons such as benzene, and organosulfur compounds such as thiols (mercaptans). They can occur as a component of ground gas originating from historically contaminated ground, spills and leaks from industry, commercial or residential properties (e.g. from pipelines, storage facilities, and at the point of use or dispensing), land-filled wastes and from naturally occurring sources.

The migration of VOCs in ground gas can be via three primary mechanisms:

- diffusive flow (movement of constituent along a concentration gradient);
- advective flow (movement of constituent due to motion of a transporting fluid);
- dispersion (transport resulting from local variations in fluid flow, e.g. due to friction effects in the matrix).

The choice of sampling and monitoring techniques should be based upon the conceptual model and be designed to achieve the objectives of the investigation, bearing in mind the requirements of any subsequent analytical procedures and the need to provide relevant data of sufficient quantity and quality. Consideration should also be given to the nature of ground under investigation, as well as the nature and distribution of contamination, the geology and the hydrogeology. Every effort should be made to avoid cross-contamination and at no point should underlying aquifers be put at risk.

Where the response zone extends below the water table, gas present in the groundwater will tend to produce an equilibrium concentration in the well headspace. This applies to both permanent gases and VOCs but can be particularly misleading in the latter case. Testing for dissolved gases in groundwater is useful to help interpret monitoring results in such a situation. Similarly, any VOCs in a floating non-aqueous hydrocarbon layer will produce an equilibrium concentration in the well headspace.

The monitoring period and frequency of monitoring for VOCs in ground gases should be developed on a site-specific basis from the conceptual site model and investigation data quality objectives.

Ground gas samples can be collected from the unsaturated zone adjacent to, or above, the known or suspected source of VOCs in ground gas through installation of a ground gas monitoring point in the unsaturated zone (see 10.2), and from a near-surface location beneath hardstanding or a floor or foundation slab through installation of a near- or sub-slab monitoring point (see 10.3). For monitoring of VOCs in ground gas the monitoring well should be installed into unsaturated ground to allow sampling for VOCs to take place. The borehole should not be progressed below the groundwater table or the surface of any floating non-aqueous layer. The borehole should be progressed to the target sampling depth within the unsaturated zone. Full details can be found in BS8576 Section 10.2 onwards.

Assessment of VOC concentrations have been made for limited number of VOCs by SoBRA with the Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater in Feb 2017.

The assessment of VOC concentrations is not covered by above-referenced reports. These data can be used to inform the human health risk assessment for site occupants but should not be relied upon to assess human health risk due to uncertainties in the ground gas flow regime, variability in the (generally low) contaminant concentrations measured and inaccuracies in the concentrations measured by PID instruments.

Data on the VOC concentration in ground gas can also help inform potential occupational exposure risks to construction and similar workers. For this purpose, the measured values can be compared to the relevant occupational exposure limit (OEL) for the contaminant(s) of concern, as given in HSE (2005). In cases of doubt as to the identity of the organic contaminants within the ground gas or when these are present as a complex mixture, then the 8 hour time-weighted average (TWA) exposure limit for benzene (1 ppmv) will be applied for screening purposes. This is a reasonably conservative approach since the OEL for benzene is lower than that for the great majority of organic contaminants commonly encountered in soil and groundwater at contaminated sites

APPENDIX K - CHEMICAL AND GEOTECHNICAL TEST SAMPLING

Samples were selected by a representative of Tier Environmental during the site investigation works in accordance with the sampling approach described elsewhere in this report.

Samples for geotechnical and related testing

Bulk samples were placed within robust heavy duty plastic bags and sealed, together with small disturbed samples, within airtight 1 litre plastic containers.

100 mm diameter ‘undisturbed’ samples (“U100 samples”) were obtained where possible from cable percussive and large diameter window sample boreholes within cohesive materials.

Samples for chemical analysis

All samples for chemical analysis were placed into clean new containers as summarised in Table 1. Unless explicitly stated elsewhere in this report, no preservatives were used to eliminate the risk that preservatives cause contaminant dissolution or analytical interference. Containers for VOC analysis were fully filled to exclude headspace.

Soil samples were dispensed as soon as possible after collection using reusable stainless steel spatulas, trowels or similar implements.

Ground water samples were collected from boreholes using single-use Teflon bailers or dedicated Waterra tubing with foot valves, except as otherwise noted within this report. Caution was taken to avoid excessive agitation during collection

New disposable gloves were used by the engineer for the collection of each sample.

Reusable equipment was washed down with distilled or deionised water between samples, except where tarry or similarly sticky materials were present. In such cases specific cleaning procedures were adopted as specifically described elsewhere in this report.

All sub-samples taken for chemical analysis were placed into refrigerators or cool boxes containing frozen ice packs immediately after aliquoting. All samples were transferred in cool boxes containing frozen ice packs to the relevant UKAS/MCERTS accredited laboratory as soon as possible. Recommended maximum holding times before analysis are summarised in Table 1.

Table 1. Sample containers and holding times.

Analysis	Container/special requirements	Max. holding time at 4°C before analysis
Soil and sediment samples		
VOCs	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner. Must be fully filled.	14 days
TPHCWG	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner PLUS 250-500 g brown or green glass jar with unwaxed cap liner. ¹ The former must be fully filled.	14 days
All other organics	250-500 g brown or green glass jar with unwaxed cap liner.	7 days
Inorganics	Air-tight 0.5-2.0 kg plastic container (250-500 g brown or green glass jar may also be used).	14 days ²
Water samples		
VOCs	40-50 ml glass vial with VOC resistant screw cap and inert liner. Must be fully filled.	14 days
TPHCWG	40-50 ml glass vial with VOC resistant screw cap and inert liner PLUS 500-1000 ml brown or green glass bottle with screw cap and unwaxed liner. ¹ The former must be fully filled, the latter should be filled if possible.	14 days
All other organics	500-1000 ml brown or green glass bottle with screw cap. Fill if possible.	7 days
Inorganics	500-1000 ml translucent or opaque screw cap plastic <i>or</i> brown or green glass bottles. Fill if possible.	14 days ³

¹ The smaller vessel is used for analysis of the volatile components within the TPH mixture and the larger one is for the non-volatile components.

² 14 days is set as a reasonable limit for all routine analyses of soil for those inorganic components vulnerable to chemical and/or biological breakdown. Samples for sulphate analysis are vulnerable to biological sulphate-reduction but can be held for up to 28 days. For total metals, a holding period of up to 6 months is acceptable.

³ 14 days applies for all routine analyses of most inorganic components that may be vulnerable to chemical and/or biological reactions. In the specific cases of sulphide, nitrite, nitrate and phosphate analyses, storage time must not exceed 48 hours. For total metals, a holding time of up to 6 months is acceptable.

Tier Environmental standard analytical suites

The analyses included with Tier Environmental's standard analytical suites for soil, soil leachate and water samples are presented in Table 2. Other individual analyses were specified as described within this report.

Table 2. Tier Environmental Standard Analytical Suites.

Parameter	Sample type					
	Soil		Leachate ¹		Water	
		LoD ² (mg/kg or as stated)		LoD (µg/l or as stated)		LoD (µg/l or as stated)
Metals and metalloids						
Arsenic	✓	1	✓	10	✓	10
Cadmium	✓	1	✓	5	✓	5
Chromium	✓	1	✓	5	✓	5
Mercury	✓	1	✓	1	✓	1
Lead	✓	1	✓	4	✓	4
Selenium	✓	2	✓	10	✓	10
Copper	✓	1	✓	1	✓	1
Nickel	✓	1	✓	50	✓	50
Zinc	✓	1	✓	8	✓	8
Other inorganics						
Ammonia (as NH ₄ -N)					✓	15
Total sulphate	✓	100			✓	50 mg/l
Water-soluble sulphate	✓	0.1 g/l				
Hardness (as CaCO ₃)					✓	1 mg/l
Organics						
Monohydric phenol	✓	1	✓	0.5	✓	0.5
Speciated PAHs (USEPA 16)	✓	0.1	✓	0.01	✓	0.01
Total Organic Carbon	✓	0.1 wt%				
Others						
Electrical conductivity					✓	NA
pH	✓	NA	✓	NA	✓	NA

NA - Not applicable

¹ Leachate preparation according to NRA (1994), 10:1 liquid to solid ratio.

² The table presents the desired limit of detection for the analysis. Higher LoDs may be reported on analytical data sheets due to interference between analytes within specific samples or if the laboratory needed to dilute samples to achieve results within the calibrated range for that instrument.

Analytical QA procedures

Introduction

Quality Assurance (QA) is a system of review and audit that assesses the effectiveness of that product and assures the producer and user that defined standards of quality have been met. If we consider site investigation and chemical analysis, QA is the management system that ensures these measures are in place and working as intended.

QA within the laboratory form part of relevant certification programmes (such as UKAS and MCERTS) and, indeed, will be undertaken in some form by any reputable analyst, whether for a certified technique or not. Laboratory QA/QC is beyond the control of Tier Environmental and will not be considered further in this document, although the relevant laboratory documentation can be obtained upon request. QA must also form part of the design and execution of a site investigation.

Two parameters often used to assess measurement quality objectives are bias and precision. Bias is a systematic deviation in the data. For example, a positive bias (concentrations higher than in reality) would be introduced if sampling bottles were a source of the analyte and this fact was unknown. Precision is the variation in the measurements around a central 'expected' value. This could be due both to real variability in the environmental medium being measured and random errors in the analytical process. Both precision and bias can be assessed by the use of appropriate blanks and replicates within the site investigation programme.

The objectives of the QA activities undertaken in this present site investigation were to recognise and quantify systematic bias within the analytical dataset and to obtain an indication of precision. In environmental samples, much of the observed variability is likely to result from heterogeneity in the sampled medium, particularly for soil and sediment samples.

Such QA practice within the sampling programme is required by current guidance (e.g., Environment Agency report P5-065/TR (2000); Environment Agency LFTGN02 (2002); BS 10175:2001).

Alternative QA procedures to the generic approach presented in this appendix may be specified for a project, provided case-specific justification is given.

QA checking procedure (data validation)

The responsible Engineer and Project Reviewer are required to undertake data validation and provide comment on data quality within the main body of the report(s) issued, when noteworthy matters arise. This QA checking should involve:

Confirming that data reported by the laboratory have achieved the standards specified by the certification scheme (MCERTS or UKAS). This will be indicated on the analytical certificates issued by the laboratory.

Checking that the limit of detection (LoD) and limit of quantification (LoQ) achieved by the laboratory for an individual analyte is appropriate for the purposes of the report. LoD and LoQ will vary dependent upon analyte concentrations, sample matrix properties and interference from co-contaminants.

A check that the reported range of concentrations are reasonable for the analyte. For example, the dissolved concentration of an analyte in a water sample should not exceed saturation. If it does, then this merits further consideration (e.g., was colloidal organic matter or other solid-phase material present or could there have been unobserved free-phase organic liquid?) and explicit comment. At its simplest, there may be a unit error.

Where analysis involves reporting of Tentatively Identified Compounds (TICs; normally by mass spectrometry), the reviewers should check that these might reasonably be expected at the site under consideration. The uncertainties in identification by MS mean that it is not uncommon that TICs are incorrectly assigned. In cases of doubt, the analytical laboratory can re-check the raw data and confirm.

A review of the analytical precision by comparing data obtained for duplicate samples. There is no absolute threshold - variability is entirely dependent upon the sample matrix and manner in which the contaminant has entered the sample. Variability that cannot reasonably be assigned to such factors (for example a very high apparent variability in data for sediment-free water samples) should be reviewed with the laboratory. Variability that is attributable to the sample matrix can nevertheless provide important pointers to improve understanding of contaminant transport pathways and the risks posed by pollutant linkages (e.g., soil heterogeneity, the association of contamination with particular soil fractions, the presence of residual NAPL within soil pores or the role of suspended sediments in contaminant transport).

Confirmation that no errors have been introduced by data transcription, unit conversion or corrections between preliminary and certificates issued by the laboratory. The reviewer should audit a proportion (typically 5-10%) of all data from the original (final) certificates of analysis through to the equivalent values in the report for those specific samples.

It is important to consult the analytical laboratory if apparent QA issues arise. Many apparent concerns can be adequately resolved on the basis of revisiting the raw analytical data or by obtaining a better understanding of the inherent limitations of the analysis for a particular matrix or sample type.

APPENDIX L - COMPLYING WITH CONTROL OF ASBESTOS REGULATIONS 2012

Complying with Control of Asbestos Regulations (CAR): Risk Assessments, Licensing and Training

This appendix outlines CAR risk assessments and where they should be applied in relation to assessing and remediating brownfield sites. The information below details the different classifications of work with asbestos under CAR, summarises the legal requirements for asbestos awareness training for all involved in the investigation and management of asbestos containing soil (ACS), and details the potential requirements for suitable proficiency training relating specifically to ACS.

CAR RISK ASSESSMENTS

A CAR Risk Assessment is required for any work which may expose employees to asbestos. It is recommended that a precautionary approach is adopted if there is any doubt about risks associated with asbestos.

There are three main activities for potential asbestos exposure during work on brownfield sites:

- Site reconnaissance visits;
- Site investigation works; and
- Site remediation.

CAR risk assessments are needed at each stage but may be incorporated during the site investigation stage into the overarching health and safety risk assessments.

The CAR risk assessment must:

- Identify the type of asbestos to which employees are liable to be exposed, where possible, or assume it is present in different forms;
- Determine the type and extent of exposures to asbestos that may occur during the work
- Identify the steps to be taken to prevent exposure or reduce it to the lowest level reasonably practicable; and,
- Consider the effects of control measures that have been or will be taken.

The CAR risk assessment should include any information used to inform the risk assessment such as asbestos reports or desk study information. In the event that this information is not available, the assessor should be assumed that all forms of asbestos may be present on Site.

For all investigation and remediation of ACSs, a detailed written work plan should be produced and followed as detailed on the HSE website and in the CAR.

The CAR risk assessments for specific investigations or remediation projects, will determine whether or not work is 'licensable work' (LW), notifiable non-licensable work' (NNLW) or 'non-licensed work' (NLW). In addition, training requirements are also defined by the CAR risk assessment.

Some examples of control measures that apply during site reconnaissance, site investigation works, and site remediation are given below and should be applied depending on the asbestos risks identified for the Site at each stage of investigation:

- Avoiding stirring up dust;
- Cleaning footwear after site works;
- Removing and bagging any overalls for disposal/laundry;
- Respirators and hygiene facilities for high risk sites;
- Segregated welfare units;
- Wetting ground
- Minimising soil disturbances;
- Implementation or retention of capping/break layers;
- Implementation of awareness training;
- Air monitoring;
- Managing stockpiles;
- Area segregation;
- Wheel washing
- Road washing/cleaning

It is important to note that during Site reconnaissance visits, Site investigation works and Site remediation that asbestos should not be considered in isolation and control measures are likely to form part of a wider health and safety precautions.

Respiratory protective equipment (RPE)

RPE is the last line of defence and its requirement would be defined by the CAR risk assessment. HSE (2013b) advises that RPE should have an assigned protection factor of 20 or more for all work with asbestos. In certain instances, full face-piece, positive pressure respirators with a protection factor of 40 are necessary (to EN 12942:1998, TM3).

Suitable types of RPE for most **short** duration non-licensed asbestos work:

- Disposable respirator to standards EN149 (type FFP3) or EN1827 (type FMP3)
- Half mask respirator (to standard EN140) with P3 filter
- Semi-disposable respirator (to EN405) with P3 filter

These filters are not suitable for people with beards/stubble or for long or continuous use.

LICENSING

CAR defined certain types of activities involving asbestos as 'licensable work' (LW) or as 'notifiable non-licensable work' (NNLW). All other work would be 'non-licensable work' (NLW).

LW is defined as:

- work where exposure is not 'sporadic and low intensity'
- work where the risk assessment cannot demonstrate that the control limits (four hour and 10 minute limits) will not be exceeded
- work on asbestos coating
- work on AIB or insulation where risk assessment is either of first two points above or not of short duration (where short duration is defined for any work liable to disturb asbestos as taking less than two hours per week (including ancillary work) and no one person carries out that work for more than one hour').

NNLW includes work with:

- AIB or asbestos insulation of short duration that is not licensable
- fire-damaged asbestos cement or asbestos cement damaged so as to create significant dust and debris
- asbestos ropes, yarns, woven cloths in poor condition or handling cutting or breaking up the materials
- asbestos papers, felts and cardboard in poor condition, unencapsulated or not bound into another material.

Work with weathered asbestos cement, air monitoring and collecting samples of ACM in buildings would not normally be notifiable.

It is impossible to specify definitively what activities will and will not be licensable. This decision should be made as part of the CAR risk assessment. CAR is not primarily aimed at work with ACSs and there is little published information on airborne asbestos concentrations during work with ACSs. Nevertheless, CAR will require some remediation projects, and occasionally site investigations, to be LW. Investigations on other sites may involve NNLW. The decision as to whether work is LW or NNLW should be made during the CAR risk assessment by those in charge of the brownfield site investigations and remediation projects.

TRAINING REQUIREMENTS

Asbestos health and safety courses are offered by a number of providers in the UK. Training courses that include the problem of identifying ACMs in soil should be undertaken at regular intervals by those involved in the investigation, assessment and management of sites where ACs are known or suspected. It is the role of the employer to identify the level of training required for an employee based on their role, experience and duties. Reference to Regulation 10 of CAR should be referred to for more information on training requirements.

Recognising asbestos within soils is challenging due to the heterogeneity of such soils and the discolouration of asbestos by smeared soil. Specific training for ground workers should include understanding fibre release potential, potential control measures in the field, how to take representative ACSs safely, sample labelling and what analytical tests are available and when they should be implemented.

Health and safety training required under CAR includes asbestos awareness, non-licensable work (including notifiable non-licensable work) and licensable work with asbestos.

In addition to health and safety training, some staff involved in the technical identification on site of ACMs, sampling and analysis may require technical proficiency training (competency training).

Training vs. Competence

HSE (2005) identifies that 'training alone does not make people competent. Training must be consolidated by practical experience so that the person becomes confident, skilful and knowledgeable in practice on the job'. It is critical that ACS surveyors demonstrate competency with details of relevant field experience alongside training and examples of previous works/references.