

GEO-ENVIRONMENTAL GROUND INVESTIGATION REPORT

Starwood House, Letchworth Garden City, SG6 2TT

Confidential

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This report dated 09 April 2024 has been prepared for Tesco Stores Limited (the “Client”) in accordance with the terms and conditions of appointment dated 07 February 2024(the “Appointment”) between the Client and **Arcadis (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

EXECUTIVE SUMMARY

Background

Arcadis (UK) Limited (Arcadis) was commissioned by Tesco Stores Limited (Tesco, the 'client') to undertake a Phase 2 Geo-environmental Ground Investigation at the Tesco data centre site located at Starwood House, Avenue One, Letchworth Garden City SG6 2TT (the Site). In December 2023, Arcadis was commissioned by Tesco to undertake a Phase 1 Environmental Site Assessment (ESA) in support of the potential divestment of the leasehold for the Site (Arcadis report reference: 30204340-AUK-XX-XX-RP-ZZ-0001-01-Letchworth_Phase1). The Phase 1 concluded that the Site had historical land uses which could have resulted in the presence of contamination in the subsurface. The Site lies within a source protection zone in the proximity to a potable water abstraction point (approximately 260m to the south of the Site, abstracting from the Chalk Principal Aquifer). The aim of this Phase 2 Environmental Ground Investigation and subsequent groundwater monitoring works was an initial assessment of the presence, composition and extent of potential contamination beneath the surface of the Site, with a particular focus on the underlying Chalk aquifer. Geotechnical data was also collected to aid a future leaseholder understand the subsurface ground conditions.

Summary of works

Prior to Phase 2 Geo-environmental Ground Investigation, Arcadis commissioned and supervised a site wide topographic and utility survey of the Site, which was completed by a specialist contractor. Following the survey Arcadis undertook safe digging of hand-pits to a maximum depth of 1.20m below ground level (bgl) and then subsequent drilling, soil sampling and installation of groundwater monitoring wells at 3no locations. Drilling works were undertaken between 26th February to 15th March 2024, with the advancement of up to 3no. boreholes to a maximum depth of 30m bgl and installation of groundwater monitoring wells in all 3 boreholes aimed to intercept groundwater within the bedrock aquifer. Soils were screened for Volatile Organic Compound (VOCs) using a Photo Ionising Detector (PID) during hand pit and drilling works, and selected soil samples were submitted for laboratory analytical testing. In-situ geotechnical testing was conducted during drilling works and soil samples were submitted for laboratory geotechnical testing.

Subsequent to the drilling works, one round of groundwater monitoring and sampling works were undertaken on 15th March 2024 at the three newly installed locations, with the submission of groundwater samples for laboratory analytical testing.

Environmental Findings

The geology encountered during Site investigation was Made Ground to a maximum depth of 1.45m bgl, which was underlain by weak to very weak, light cream structureless CHALK, transitioning into weak to medium dense CHALK from Holywell Nodular Chalk Formation and New Pit Chalk Formation (Undifferentiated). The Chalk was encountered to a maximum depth of 30.00m bgl. No superficial deposits were encountered which is in line with the regional geologic mapping. The monitoring wells were developed on completion of the drilling, and prior to groundwater monitoring taking place.

Multiple refusals on a second layer of concrete hardstanding, at circa 1m bgl, were encountered during the progression of the third borehole. The attempted locations were along the northern access route and an area of land in the northwest of the Site. There is the potential that the secondary layer of concrete is associated with the historical presence of a moving crane which was situated in the north of the Site as part of a pre-data centre development.

During the Arcadis groundwater monitoring event groundwater was found resting at depths ranging from 24.8m bgl to 19.07m bgl, and associated groundwater elevations ranging from 56.34m AOD to 61.98m AOD. From these results the inferred groundwater flow beneath the Site would be interpreted as flowing towards the northwest direction. A return visit was undertaken to confirm the depth to groundwater, based on a notable change in depth to groundwater between the two monitoring wells in the east of the Site. The second set of data was comparable to the first set. It is unclear as to the cause of the large change in depth to groundwater beneath the east of the Site; the regional flow direction is still believed to be to the south towards the public water supply abstraction.

No visual or olfactory evidence of 'gross' contamination was identified in the soil samples collected. This coincided with photoionisation detector (PID) readings in the borehole sample that were observed at <1ppmV.

A Generic Quantitative Risk Assessment (GQRA) has been undertaken based on continued commercial use and screening the measured concentrations of contaminants of concern (CoC) against the Arcadis Generic Assessment Criteria (GAC) for the protection of human health (commercial workers). No exceedances for GAC for human health were recorded.

Five measured concentrations of CoC in the soil samples were found in excess of the GAC protective of water resourced for aquifers, three in BH101 and five in BH102. All were within shallow Made Ground. The exceedances recorded in BH101 were Benzo (b)fluoranthene, Benzo (k)fluoranthene and Indeno (1,2,3-c,d)pyrene and in BH102 were Benzo (b)fluoranthene, Benzo (k)fluoranthene and Indeno (1,2,3-c,d)pyrene, Benzo (a)pyrene and Benzo (g,h,i)perylene. However, these compounds are all of low mobility within the environment, identified only in made ground, and were not detected in groundwater within the underlying aquifer. As such, the potential risk from these compounds to the Principal Aquifer is considered negligible.

There were low level detections of certain metals and polycyclic aromatic hydrocarbons such as fluoranthene in groundwater, all of which are of low mobility in the environment; generally, the same CoC were not present or not consistently present in the sampled soils. As a result, Arcadis does not believe the data indicates the presence of Site-derived CoC within the Chalk aquifer at depth, but instead represents the background quality of the Chalk aquifer in the vicinity of the Site.

No asbestos was detected in samples taken during investigation.

No interpretation of the geotechnical information is provided herein, but the data has been collected for information purposes.

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1 Introduction

1.1 Appointment

Arcadis (UK) Limited (Arcadis) was commissioned by Tesco Stores Limited (the 'client') to undertake a geo-environmental ground investigation and subsequent groundwater monitoring at the Starwood House, Letchworth, SG6 2TT (the Site). These works follow on from the Phase I Environmental Site Assessment (ESA) commissioned by Tesco in January 2024, and reported in Arcadis report reference "30204340-AUK-XX-XX-RP-ZZ-0001-01-Letchworth_Phase1". This report identified the potential for contaminants of concern in the subsurface, associated with the current and historic uses of the Site, and recommended further assessment of the quality of soil and groundwater beneath the Site.

1.2 Site Description and Location

The Site is a disused data centre and it sits in a mixed commercial and industrial area to the east of Letchworth. The Site comprises one single building housing a data centre and offices to the west of the Site with a large associated car park located to the centre and east of the Site. The Site has areas of vegetation along the boundaries and an area of undeveloped land to the southeast.

The Site is located at National Grid coordinates 523280, (Easting), 232959 (Northing).

A site location plan is presented as Figure 1.

1.3 Objectives

The Site is currently leased by Tesco under a long-term lease, and it is Arcadis' understanding that Tesco is currently considering divesting the Site leasehold. No redevelopment plans have been made available to Arcadis, therefore the assessment has been undertaken on the basis of continued commercial use. However, Arcadis understands that there is potential for future redevelopment of the Site to be undertaken by a new leaseholder.

This Phase 2 geo-environmental ground investigation aims to undertake an initial assessment of the presence, composition and extent of potential contamination beneath the surface of the Site, as well as collect geotechnical information regarding the subsurface conditions to support a future leaseholder with planning potential redevelopment works.

These Phase 2 ground investigation works have not been designed specifically to satisfy potential land contamination conditions relating to a planning application or for the use in detailed geotechnical design.

1.4 Scope of Works

The scope of works for the Arcadis geo-environmental ground investigation was staged, as set out below:

- Obtaining publicly available utility plans for the Site;
- UXO assessment comprising commission of a UXO Detailed Desk Study Assessment (DDSA) for the Site from a specialist UXO contractor to assess the potential UXO risks for the proposed ground intrusive works;
- Completion of appropriate risk assessments including preparation of a Health and Safety Plan for the site works;
- Commission and supervise a full topographic and utility survey undertaken by an Arcadis approved specialist contractor with the aim to assess clear locations from utilities ahead of the ground intrusive works;

- Concrete coring of all proposed drilling locations;
- Safe digging by the advancement of utility avoidance pits to a minimum depth of 1.2m below ground level (bgl) by hand pitting prior to drilling works;
- Drilling of 3no. boreholes up to 30m bgl with in-situ geotechnical testing;
- Collection of soil samples at regular intervals for head-space screening using a Photo-ionisation Detector (PID);
- Collection and submission of soil samples for environmental laboratory testing;
- Collection and submission of soil samples for geotechnical laboratory testing;
- Soil waste disposal (borehole soil arisings only);
- Development of the newly installed groundwater monitoring wells to remove fine sediment and allow collection of a groundwater sample representative of the aquifer beneath the Site;
- Waste water disposal (Groundwater development and purging only)
- Groundwater monitoring and sampling of all newly installed monitoring locations;
- Submission of groundwater samples for environmental laboratory testing; and
- GPS Levelling of monitoring well locations.

1.5 Reliability / Limitations of Information

Arcadis' liability, pursuant to the terms of the appointment between Arcadis and Tesco, is strictly limited to the work undertaken and the matters contained and specifically referred to in this report.

A copy of Arcadis' Study Limitations is presented in Appendix A.

It is understood that the current report has been prepared for the use of Tesco. The contents of this report may not be used or relied upon by any person other than this party without the express written consent and authorisation of Arcadis.

2 Field Investigation Methodology

The following information summarises the works undertaken during this ground investigation.

2.1 Intrusive Investigation Location Rationale

The Site layout plan showing the Site boundary and locations of the intrusive investigation is presented on Figure 2.

No records of previous environmental works from third parties have been provided to Arcadis. A review of the online planning portal for North Hertfordshire District Council for the Phase 1 report did not identify any reports or records of previous environmental works undertaken at the Site. There was evidence of a borehole having been progressed towards the northwest of the Site before its use as a data centre, as recorded by the British Geological Survey and as summarised in the Phase 1 report.

Based on a review of Arcadis' historical records, in 2017 Tesco requested Arcadis' support with the collection of a limited number of soil samples during the excavation of an underground storage tank (UST) located on the north western boundary of the Site, primarily to support with the classification of soils for off-site disposal. Based on the information provided to Arcadis at the time, there were two USTs present which historically contained diesel fuel (to supply the data centre backup generator), with evidence of underground pipework leading towards the Site building (approximately north to south). Arcadis was informed that both USTs had been decommissioned, with one tank removed from the ground at the time of the Arcadis soil sampling. The second UST is understood to have been retained in situ as a result of overlying utilities. No report was produced by Arcadis, with laboratory certificates provided directly to Tesco and the Principal Contractor. The soils were analysed for petroleum hydrocarbons and indicator compounds, with the data indicating only low levels or no detections of hydrocarbons i.e. no evidence that there had been a release from the USTs, based on testing of the soils surrounding the removed tank.

The planned locations of three boreholes (BH101 to 103) were located to triangulate groundwater flow beneath the Site. Additionally, BH102 was intended to target the UST to the north west of the Site. However, multiple refusals on a second layer of concrete hardstanding, at circa 1m bgl, were encountered during the progression of the third borehole. The attempted locations were along the northern access route and an area of land in the northwest of the Site in proximity to the UST. There is the potential that the secondary layer of concrete is associated with the historical presence of a moving crane which was situated in the north of the Site as part of a pre-data centre development.

2.2 Pre-Works Planning

Preparatory works were undertaken by Arcadis prior to site works, and included the following:

2.2.1 UXO Assessment

In order to assess the risk of UXO at the Site, Arcadis commissioned a DDSA for the Site (report dated 21st December 2023). The DDSA concluded that the UXO risk at the Site was considered to be low. A copy of the DDSA is presented within Appendix B.

2.2.2 Coal Mining

An online check through the Coal Authority portal indicated the Site is not located within a Coal Mining Area. As such, no further assessment was deemed required.

2.2.3 Utility Survey

A topographic and utility survey of the Site was completed by SVS, an Arcadis-approved specialist contractor, from the 5th to the 9th of February 2024. This information was used to inform the positioning of proposed intrusive locations. A copy of the survey drawing is presented within Appendix C.

2.3 Intrusive Investigation and Monitoring

The enabling works and intrusive investigation and monitoring works conducted are detailed below.

2.3.1 Intrusive Investigation and Soil Sampling Methodology

Data	Information
Dates of investigation	26 th February to 15 th March 2024.
Concrete coring and hand pitting	Prior to drilling works, and as part of the utility avoidance process, inspection pits were advanced at all proposed intrusive investigation locations via hand pitting to a minimum depth of 1.2m bgl, following coring of the concrete/bitumen hardstanding.
Drilling method	Dynamic sampling and rotary drilling were undertaken by Arcadis drilling teams using a Commachio 205 drilling rig. For additional details see exploratory borehole logs presented within Appendix D.
Drilled depth	27 – 30m bgl.
Soil logging	Where possible (i.e. sufficient undisturbed recovery), soil samples were logged in accordance with BS 5930:2015.
Field screening	During drilling works, soil samples were collected at approximately 0.5m intervals, or more frequently in accordance with changes in geology, and placed in two polythene bags. The first bag was sealed to enclose as much air as possible around the soil sample. Where possible, the soil sample within the first bag was gently broken up and left for approximately 15 minutes, prior to the bag being pierced and a PID fitted with a 10.6eV Ultraviolet (UV) lamp being inserted to test for ionisable Volatile Compounds (VOCs). The second bag was sealed to minimise contact of the soil sample with the surrounding air and therefore reduce the potential for volatilisation of organic compounds. The soil samples submitted for laboratory testing were taken from the second bag at each sample location.

2.3.2 Standard Penetration Testing

Standard penetration tests (SPTs) were carried out as part of the in-situ geotechnical testing scope. Generally, tests were undertaken in each borehole at 1.2m bgl, then at 1.5m regular intervals until the 10m bgl, where a final test was also undertaken. Disturbed soil samples were recovered from the SPT split-spoon tool.

The N-values as determined in the field are presented on the borehole logs as uncorrected values that do not take into account the energy losses or efficiency of the automatic trip hammer used to drive the test tool into the ground. The borehole logs are presented as Appendix D. The calibration certification for the test devices used in the investigation is presented in Appendix E.

Location ID	SPT Hammer Reference No.	Energy Efficiency Ratio, E _r %	Comment
BH101, BH102, BH103	AR1704	69	-

2.3.3 Groundwater Monitoring Well Installation

Data	Information
Monitoring well type	A groundwater monitoring well (50mm HDPE) was installed at each of the three successfully drilled locations (i.e. BH101, BH102 and BH103).
Monitoring well installation	Further details on the monitoring well installations are presented in the borehole logs presented as Appendix D.

Following the installation of the groundwater monitoring wells, all newly installed wells were developed to remove fine sediment to allow the collection of a representative groundwater sample during the subsequent groundwater monitoring and sampling event.

2.3.4 Groundwater Monitoring and Sampling

The methodology and process followed during the groundwater monitoring and sampling works is summarised below:

Data	Information
Dates of monitoring	15th March 2024
Date of sampling	15 th March 2024
Monitoring wells sampled	BH101, BH102, BH103
Equipment used	An interface probe was used to measure depth to Light Non-Aqueous Phase Liquid (LNAPL) (if present), depth to groundwater and depth to base of the monitoring well. A Bladder pump set at a low speed (low-flow methodology) was used to collect a groundwater sample representative of the aquifer beneath the Site. A multiparameter probe was used to obtain groundwater hydrogeochemical parameters throughout the groundwater monitoring process. Groundwater samples were collected once the hydrogeochemical parameters were considered stable to allow for a groundwater sample representative of the aquifer beneath the Site.
Details recorded	Depth to LNAPL, if present; Depth to groundwater, if present; Thickness of LNAPL, if present, Depth to base of monitoring well.

2.3.5 Storage, Preservation and Transport of Samples

Measures taken to ensure the quality and integrity of the collected samples, from collection to receipt of the samples by the laboratory are summarised below:

Data	Information
Storage	Glass jars / bottles and vials supplied by the laboratory were used for the collection of samples to be analysed for volatile compounds.
Preservation	Filling of sample containers as far as practicable to minimise headspace and low storage temperature to minimise the potential for volatilisation and biodegradation of volatile compounds prior to analysis.
Decontamination	Disposable gloves were worn and changed between sample collections to prevent cross contamination.
Transport	Samples were stored in dedicated sample boxes provided by the laboratory. Sample details and analytical requests were recorded on the laboratory chain of custody form included with the samples, prior to dispatching to the laboratory. Where practicable, samples were dispatched to the laboratory on the day of sampling.

2.3.6 Environmental Analytical Strategy

Sample Type	Information
Soils	
Chemical laboratory	Element Materials Technology.
Accreditation	Element Materials Technology is United Kingdom Accreditation Service (UKAS) & Monitoring Certification Scheme (MCertS) accredited (for selected chemical analysis) and an Arcadis approved supplier.
Soils laboratory testing	• Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) by Gas Chromatography-Flame Ionisation Detection (GC-FID); • Fuel additives: Methyl <i>Tertiary</i>-Butyl Ether (MTBE), Benzene, Toluene, Ethylbenzene and total Xylenes (BTEX), Tertiary-Amyl Methyl Ether (TAME), Di-Isopropyl Ether (DIPE), Tertiary-Butyl Alcohol (TBA) and ethanol by GC-FID • United States Environmental Protection Agency (US EPA) 16 Polycyclic Aromatic Hydrocarbon compounds (PAH) by Gas Chromatography-Mass Spectrometry (GC-MS); • Polychlorinated biphenyls by GC-MS; • Contaminated Land Exposure Assessment (CLEA) metals by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES); • Hexavalent Chromium by kone analyser; • Sulphate by Soluble Ion analysis using Discrete Analyser; • Full WAC analysis; • Asbestos screen by visual identification; and • pH by pH meter.

Sample Type	Information
Groundwater	
Chemical laboratory	Element Materials Technology.
Accreditation	Element Materials Technology is United Kingdom Accreditation Service (UKAS) & Monitoring Certification Scheme (MCertS) accredited (for selected chemical analysis) and an Arcadis approved supplier.
Groundwater laboratory testing	• TPH CWG by GC-FID; • PAH by GC-MS; • VOC by GC-MS; • CLEA Metals by ICP-OES; and • BTEX and MTBE by GC-MS. • TAME, DIPE, TBA and ethanol by GC-MS.

Full environmental testing details are provided in the environmental laboratory certificates of analysis presented as Appendix F.

2.3.7 Quality Assurance and Quality Control (QA/QC)

The following measures were taken to ensure the quality of the data received from the laboratory:

Data	Information
Transportation	A copy of the full chain of custody documentation was included with the soil and groundwater samples.
Laboratory QA/QC	A duplicate groundwater sample from BH101 (labelled DUP) was collected and submitted for laboratory analytical testing for laboratory QA/QC purposes. Details of the Arcadis laboratory QA/QC policy are provided in Appendix G.

2.3.8 Geotechnical Testing

The geotechnical tests were carried out in accordance with either BS1377:1990: Parts 1 to 8; BS EN ISO 17892; BRE SD 1:2014; or other methods as listed below.

Sample Type	Information
Chemical laboratory	GEOLABS Limited (Geolabs).
Accreditation	Geolabs is United Kingdom Accreditation Service (UKAS) & Monitoring Certification Scheme (MCertS) accredited (for selected analysis) and an Arcadis approved supplier.
Geotechnical laboratory testing	• Natural Moisture Content; • Intact Dry Density; • Saturation Moisture content; • Porosity; and,

- Atterberg Limits; (Liquid Limit, Plastic Limit and Plasticity Index)
-

2.3.9 Waste

Soil arisings from the intrusive works were disposed in a lined soil skip on site as part of the investigation works. A representative sample of waste soils (labelled "Skip") was collected and submitted to laboratory for analytical testing for waste classification purposes. Plastic waste generated as part of the investigation works was also segregated and disposed in a plastic waste skip. Following classification both skips were removed from site by a licensed Waste carrier.

Soils from the shallow made ground were also tested against waste assessment criteria and laboratory results were assessed via the HazWaste Online™. This was to help with assessing potential for soil disposal during future development.

3 Field Investigation Findings

3.1 Ground Conditions

A detailed description of the ground conditions encountered at the Site during the intrusive investigation is included on the exploratory borehole logs, presented as Appendix D and summarised below.

Location ID	Hole Type	Start Date	End Date	Final depth (m)	Termination Reason	Comment
BH101	RC	26 Feb 2024	28 Feb 2024	30.00	Target depth	Borehole Terminated.
BH102	RC	08 Mar 2024	12 Mar 2024	28.00	Target depth	Borehole Terminated.
BH103	RC	28 Feb 2024	05 Mar 2024	28.00	Target depth	Borehole Terminated.
BH104	IP	06 Mar 2024	06 Mar 2024	0.74	Refusal due to concrete obstruction	Borehole abandoned.
BH105	IP	07 Mar 2024	07 Mar 2024	0.65	Refusal due to concrete obstruction	Borehole abandoned.
BH106	IP	07 Mar 2024	07 Mar 2024	0.90	Refusal due to concrete obstruction	Borehole abandoned.
BH107	IP	07 Mar 2024	07 Mar 2024	0.90	Refusal due to concrete obstruction	Borehole abandoned.
BH108	IP	07 Mar 2024	07 Mar 2024	0.31	Refusal due to concrete obstruction	Borehole abandoned.
BH109	IP	06 Mar 2024	06 Mar 2024	1.04	Refusal due to concrete obstruction	Borehole abandoned.

RC: Rotary Core

IP: Inspection pit

Interpreted soil type / geological unit	Minimum depth (m bgl)	Maximum depth (m bgl)	Description
Made Ground	0.0	1.45	Concrete hardstanding / Bituminous Surface Light brown – Light orangey brown gravelly cobble SAND. Gravel is angular to subrounded.
Bedrock (CHALK)	1.37	30.00	Weak to very weak, light cream CHALK. Recovered as structureless chalk to maximum depths of 12m bgl, then weak to medium dense Chalk.

3.2 Hydrogeology

Data	Information
Groundwater strikes	During the intrusive works, groundwater strikes were observed at 18.96 m bgl in BH101. Groundwater strikes could not be confirmed during drilling for BH102 and BH103 due to the requirement to add flush water during rotary drilling.
Groundwater rest levels	Groundwater was measured resting between 24.801m bgl (BH102) to 19.068m bgl (BH103) during the groundwater monitoring and sampling works undertaken by Arcadis on 15 th March 2024.

The elevation of each monitoring location was recorded by Arcadis during the groundwater monitoring on the 15th March 2024. The elevation of each location is presented alongside the exploratory logs in Appendix D, and in the table below, alongside groundwater depths as recorded on the 15th March 2024.

Monitoring Location	Ground Level (mAOD)	Depth to Water (mbgl)	Water Level (mAOD)
BH101	80.793	22.923	57.870
BH102	81.144	24.230	56.914
BH103	81.043	19.068	61.975

Additionally, groundwater depths within the monitoring wells were recorded again on the 21st March 2024 and the data is presented below.

Monitoring Location	Ground Level (mAOD)	Depth to Water (mbgl)	Water Level (mAOD)
BH101	80.79	22.923	57.840
BH102	81.14	24.801	56.343
BH103	81.04	19.068	61.975

From these results the inferred groundwater flow beneath the Site would be interpreted as flowing towards the northwest direction. A return visit was undertaken to confirm the depth to groundwater, based on a notable change in depth to groundwater between the two monitoring wells in the east of the Site. The second set of data was comparable to the first set. It is unclear as to the cause of the large change in depth to groundwater beneath the east of the Site; the regional flow direction is still believed to be to the south towards the public water supply abstraction.

3.3 Soil Quality

Data	Information
Visual or olfactory evidence	No visual or olfactory evidence of contamination was observed in soil samples collected from BH101, BH102 and BH103.
LNAPL	No LNAPL was identified in soils sampled during the intrusive investigation.
Field screening	PID readings observed in all 3 boreholes were <1ppmV. Further field screening information is presented in the exploratory logs within Appendix D.
Asbestos Containing Material (ACM)	ACM was not detected in any of the Made Ground soil samples screened at the laboratory.
Laboratory analysis	The environmental laboratory certificates of analysis for the soil samples are presented as Appendix F.

3.4 Groundwater Quality

Data	Information
Visual or olfactory evidence	No visual or olfactory evidence of contamination was observed in soil samples collected from BH101, BH102 and BH103.
LNAPL	No measurable thickness of LNAPL was observed in any of the groundwater samples collected.
Laboratory analysis	The environmental laboratory certificates of analysis for the groundwater samples are presented as Appendix F.
QA/QC	The laboratory results from the duplicate groundwater sample (DUP) are comparable to the parent sample (BH101), as presented in Table 4.
Hydrogeochemical parameters	During the Arcadis groundwater monitoring, the considered stabilised groundwater parameters were recorded. These are presented in Table 2.

3.5 Range of Geotechnical Parameters

The range of laboratory and in situ tests results for ground conditions encountered within the exploratory holes are summarised below. These are based on laboratory test results, in situ test results and published data.

Geotechnical data is presented within the exploratory logs presented in Appendix D and also within geotechnical laboratory test results are presented in Appendix I.

Parameters for Made Ground			
Test	No. of results	Min	Max
SPT N Values	3	09	43
SPT N Value corrected to N ₆₀	3	08	37

Parameters for Chalk			
Test	No. of results	Min	Max
SPT N Values	17	07	50
SPT N Value corrected to N ₆₀	17	07	173
Liquid Limit (LL) %	06	28	33
Plastic Limit (PL) %	06	22	27
Plasticity Index (PI) %	06	05	07
Modified Plasticity Index (MPI) %*	06	8.10	22.08
Water Content (%)	11	14	30
Saturation Water Content (%)	05	15	29
Porosity (%)	05	29	44
Bulk Density (Mg/m ³)	05	1.96	2.20
Dry Density (Mg/m ³)	05	1.51	1.93

*Modified Plasticity Index (NHBC) ($I'_p = I_p \times \% \text{ less than } 425\mu\text{m } 100\%$), Atterberg Classification : ML

3.6 Standard Penetration Testing (SPTs)

SPT tests were undertaken in all boreholes, with the shallowest SPT in each hole commencing at 1.20m bgl.

A total of twenty SPT were undertaken in this scope of works. Seventeen SPTs were taken in the weathered structureless CHALK from the Holywell Nodular Chalk Formation and other three SPTs were taken in the Made Ground.

The SPT data has now been corrected to an equivalent free fall energy efficiency of 69%, N₆₀. Figure 6 below shows the correlation between SPT N₆₀ values and depth (m bgl).

The SPT N₆₀ values for the for the weathered structureless CHALK appear to increase with depth. However, it should be noted this is based on the limited sample size relating to this Site.

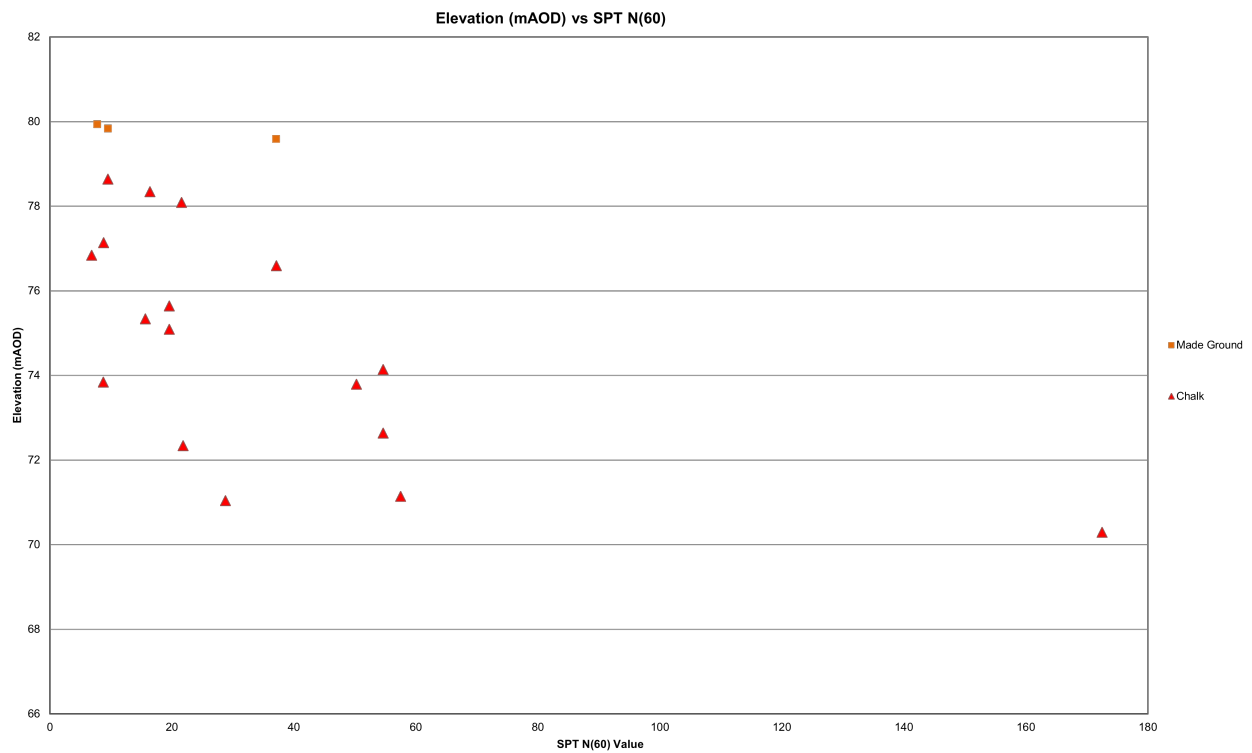


Chart 1 - SPT (N_{60}) vs Depth (m AOD) encountered on site

4 Generic Quantitative Risk Assessment

4.1 Soil and Groundwater

The aim of the Generic Quantitative Risk Assessment (GQRA) is to understand the potential risk from Contaminants of Concern (CoC) present within the soils and groundwater at the Site, based on a continued commercial use of the Site.

In order to assess the potential significance of the data collected, measured concentrations of CoC in soil and groundwater have been compared to the Arcadis GAC for continued commercial use. Based on the current use of the Site, measured concentrations of CoC in soils and groundwater have been compared to the human health GAC based on on-Site workers.

Groundwater within the bedrock is classified as Principal Aquifer. Groundwater was found resting within the weak medium density light cream CHALK from Holywell Nodular Chalk Formation and New Pit Chalk Formation between 19.068m bgl and 24.230m bgl during the Arcadis groundwater monitoring event on 15th March 2024. Hence, the risk to aquifers has been included within this GQRA. The nearest identified surface water body is an unnamed pond 50m north of the Site, given the depth to groundwater, surface water features such as the pond 50m from the Site have been discounted as potential receptors. The potable water abstraction located 261m South of the Site was identified as a potential controlled water receptor alongside the Chalk Principal aquifer itself. (Arcadis report reference: 30204340-AUK-XX-XX-RP-ZZ-0001-01-Letchworth_Phase1)

The measured concentrations of CoC in the collected soil and groundwater samples were screened against the Arcadis GAC protective of human health resources (on-Site commercial workers) and water resources (aquifers) based on a continued commercial use of the Site. The comparison of the results to the Arcadis GAC is summarised in the table below and full results presented in Tables 3 and 4. The derivation of the GAC for continued commercial use is presented in Appendix J, and Arcadis GAC for continued commercial use is presented in Appendix K.

Receptor	Soil Samples with measured concentrations of CoC in excess of GAC	Groundwater Samples with measured concentrations of CoC in excess of GAC
Human Health – Commercial	No soil samples with measured concentrations of CoC in excess of the GAC protective of human health receptor (Commercial workers).	No groundwater samples with measured concentrations of CoC in excess of the GAC protective of human health receptor (Commercial workers).
Water Resources - Aquifers	BH101 (0.2-0.4m bgl): - Benzo (b)fluoranthene; - Benzo (k)fluoranthene; - Indeno (1,2,3-c,d)pyrene; BH102 (0.2-0.4m bgl): - Benzo (b)fluoranthene; - Benzo (k)fluoranthene; - Benzo (a)pyrene; - Benzo (g,h,i)perylene; - Indeno (1,2,3-c,d)pyrene;	No groundwater samples with measured CoC in excess of the GAC protective of Water Resources (Aquifers).

4.2 Risk Evaluation – Soil and Groundwater

4.2.1 Human Health

None of the measured concentrations of CoC in soil or groundwater samples were found in excess of the GAC protective of human health for on-site commercial workers.

No ACM was detected in the any of the samples tested for from all 3no. boreholes.

4.2.2 Water Resources

Eight measured concentrations of CoC in the soil samples were found in excess of the GAC protective of water resourced for aquifers, three in BH101 and five in BH102. All were within shallow Made Ground samples taken between 0.2m bgl and 0.4m bgl.

Exceedances recorded in BH101 were for Benzo (b)fluoranthene, Benzo (k)fluoranthene and Indeno (1,2,3-c,d)pyrene and exceedances recorded in BH102 were for Benzo (b)fluoranthene, Benzo (k)fluoranthene and Indeno (1,2,3-c,d)pyrene, Benzo (a)pyrene and Benzo (g,h,i)perylene.

None of the measured concentrations of CoC in groundwater samples were found in excess of the GAC protective of water resource for aquifers.

Concentrations of TPH CWGs and VOCs were measured below the laboratory Limit of detection in all tested groundwater.

4.3 Risk Evaluation - Conclusion

Though no asbestos was detected in samples taken during investigation, asbestos may still be present on site within shallow soil. However, even if present, the presence of the building and hardstanding should minimise the potential pathway for commercial workers may be exposed to ACM if it was present.

The results of the Arcadis ground investigation confirmed measured concentrations of CoC in soils in exceedance of GAC protective of water resources for aquifers. However, these compounds are all of low mobility within the environment, identified only in made ground, and were not detected in groundwater within the underlying aquifer. As such, the potential risk from these compounds to the Principal Aquifer is considered negligible.

There were low level detections of certain metals and polycyclic aromatic hydrocarbons such as fluoranthene in groundwater, all of which are of low mobility in the environment; generally, the same CoC were not present or not consistently present in the sampled soils. As a result, Arcadis does not believe the data indicates the presence of Site-derived CoC within the Chalk aquifer at depth, but instead represents the background quality of the Chalk aquifer in the vicinity of the Site.

5 Waste Characterisation

If future redevelopment works are to occur on the Site then the Principal Contractor completing the works will be responsible for the appropriate management of waste generated through the construction process. This would include the appropriate waste characterisation and where necessary Waste Acceptance Criteria (WAC) testing prior to disposal.

Appropriate waste characterisation can only be undertaken on the material due to be disposed of via further chemical testing, which should be completed immediately prior to disposal. For Inert waste disposal and in the event of Hazardous waste disposal, allowance will need to be made for adequate Waste Acceptance Criteria (WAC) testing with appropriate consideration of the additional time and cost associated with this process.

In all cases where soils require off-Site disposal, the materials need to be managed under the appropriate legislation and consideration given to any remedial techniques that could be used to improve the soil condition and enhance the sustainability of the operation – as a last resort only, should soils be classified as waste and disposed of at a licensed landfill. It is the responsibility of the waste producer to ensure that the waste carrier and destination facility operates under appropriate/legal licenses and permits.

A waste classification assessment for the recovered Made Ground soils has been undertaken using the HazWasteOnline program. Based on the current in-situ soil quality information for Made Ground samples, two of the Made Ground soil samples tested in this phase of works were classified as non-hazardous. One sample from BH101 was classified as hazardous.

Therefore, based on the current information, it is likely that the majority of Made Ground on the Site would be classed as non-hazardous for off-Site disposal, however this is based on a limited data set. However, the area near BH101 may impact the classification due to a Nickel concentration (408mg/l) which is considered hazardous. The Waste Classification Report is presented in Appendix H.

This is a preliminary classification of material from beneath the Site. It remains the duty of the waste producer to ensure the correct classification of any waste materials produced. The classifications given above are based on the samples of in situ soils obtained by Arcadis. Whilst the samples taken are designed to be as representative as possible, the actual material excavated for disposal may differ and additional samples of excavated materials should be assessed in order to confirm waste soils are correctly classified.

6 Conclusions

The geology encountered during Site investigation was Made Ground to a maximum depth of 1.45m bgl, which was underlain by weak to very weak, light cream structureless CHALK, that transitions into structured weak to medium dense CHALK from Holywell Nodular Chalk Formation and New Pit Chalk Formation (Undifferentiated) was encountered to a maximum depth of 30.00m bgl.

During the Arcadis groundwater monitoring event groundwater was found resting at depths ranging from 19.068m bgl to 24.230m bgl, and associated groundwater elevations ranging from 56.914m AOD to 61.975m AOD. From these results the inferred groundwater flow beneath the Site would be interpreted as flowing towards the northwest direction. A return visit was undertaken to confirm the depth to groundwater, based on a notable change in depth to groundwater between the two monitoring wells in the east of the Site. The second set of data was comparable to the first set. It is unclear as to the cause of the large change in depth to groundwater beneath the east of the Site; the regional flow direction is still believed to be to the south towards the public water supply abstraction.

6.1 Geoenvironmental

The results of the Arcadis ground investigation recorded no visual and olfactory, PID and laboratory analysis no evidence for organic contamination in all three boreholes.

Though no asbestos was detected in samples taken during investigation, asbestos may still be present on site within shallow soil. However, even if present, the presence of the building and hardstanding should minimise the potential pathway for which commercial workers may be exposed to ACM if it was present.

The results of the Arcadis ground investigation confirmed measured concentrations of CoC in soils and above the GAC for the protection of water resource receptors for aquifers. However, these compounds are all of low mobility within the environment, and identified only in Made Ground, and were not detected in groundwater within the underlying aquifer.

No exceedance of GAC were recorded in Groundwater samples. There were low level detections of certain metals and polycyclic aromatic hydrocarbons such as fluoranthene in groundwater, all of which are of low mobility in the environment; generally, the same CoC were not present or not consistently present in the sampled soils. As a result, Arcadis does not believe the data indicates the presence of Site-derived CoC within the Chalk aquifer at depth, but instead represents the background quality of the Chalk aquifer in the vicinity of the Site.

6.2 Geotechnical

No interpretation of the geotechnical information is provided herein, but the data has been collected for information purposes and present in the report. It should be noted following several borehole refusals, there is the potential that the secondary layer of concrete is associated with the historical presence of a moving crane which was situated in the north of the Site as part of a pre-data centre development.

6.3 Waste Classification

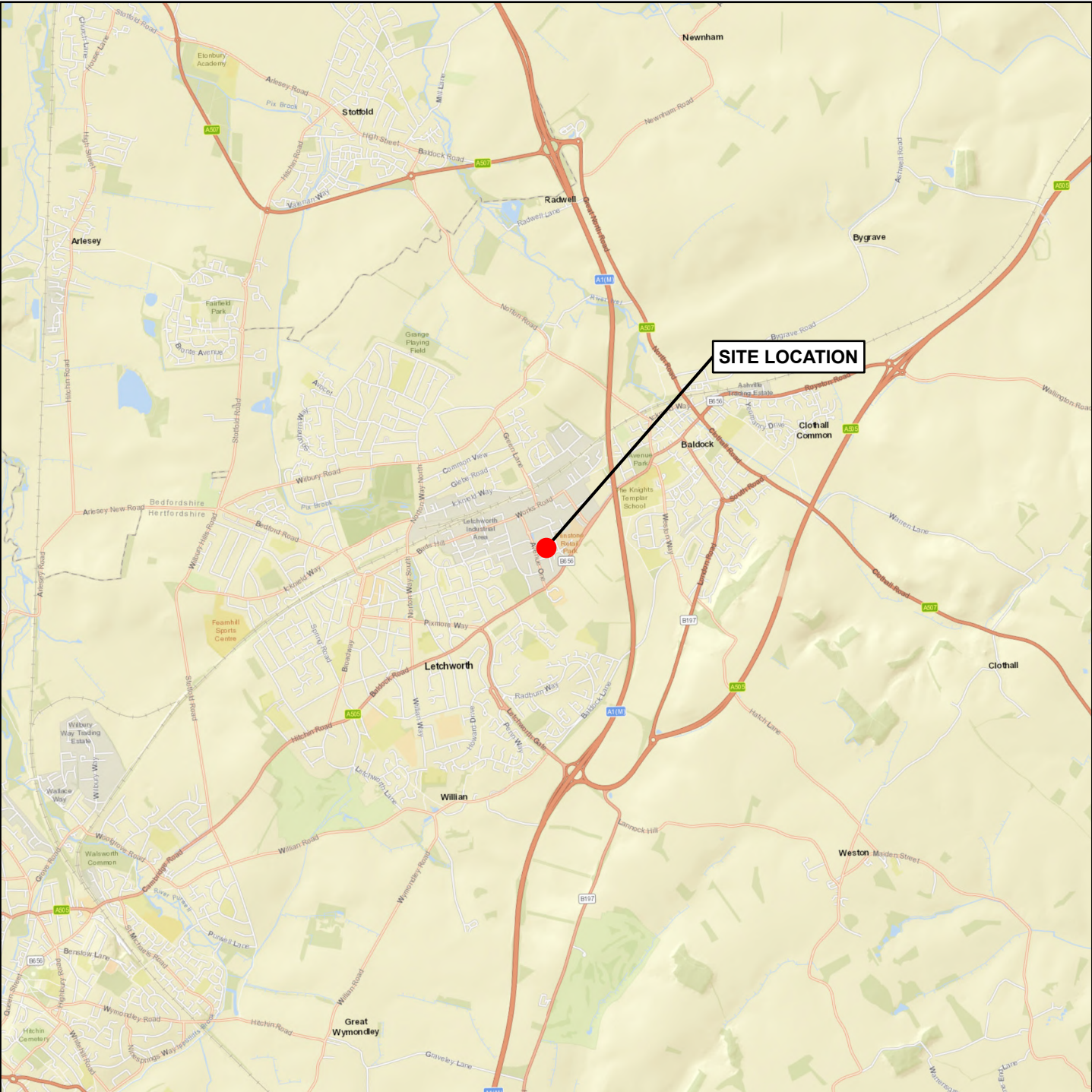
Based on the current in-situ soil quality information, two of three soil samples from the Made Ground soil would be classifiable as non-hazardous. Therefore, it is likely that the majority of the Made Ground would be classed as non-hazardous for off Site disposal. However Nickel concentrations within BH101 were recorded with a concentration considered hazardous. All waste soil generated during the future redevelopment will be the

responsibility of a Principal Contractor and must have appropriate waste characterisation and testing prior to offsite disposal.

Figures

Figure 1 - Site Location Plan

Figure 2 – Site boundary and Monitoring Well Location Plan



OS, ESRI, HERE, GARMIN, NGA, USGS, ESRI, GEBCO, GARMIN, NATURALVUE

TITLE: SITE LOCATION PLAN		NOTES SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE. 00.250.51 KILOMETRES LEGEND ● SITE LOCATION
SITE: STARWOOD HOUSE LETCHWORTH		
CLIENT: TESCO STORES LTD		
PROJECT: 30213868	FIGURE 1	
DATE: 03/04/2024	DRAWN BY: NM	
DRG NO.: 30213868-AUK-XX-XX-DR-ZZ-0005-01-SITE		
SCALE: 1:50,000	PRINT: A4	



KEY

SITE BOUNDARY

MONITORING WELL LOCATIONS

REFUSAL LOCATIONS (APPROXIMATE)

NOTES

REV	DATE	COMMENT	CAD

TITLE:

SITE BOUNDARY AND MONITORING WELL LOCATION PLAN

SITE:

STARWOOD HOUSE, LETCHWORTH

CLIENT:

TESCO STORES LTD.

PROJECT:

30213868

FIGURE 2

DATE: 21/03/24

DRAWN: BNB

REV: -

DRG.No.: 30213868-AUK-XX-XX-DR-ZZ-0006-01

PRINT: A3

ARCADIS

NOTE: ALL ENTITIES SHOWN ON THIS DRAWING ARE TO BE REGARDED AS APPROXIMATE AND ARE INDICATIVE ONLY. NO MEASUREMENTS TAKEN FROM THIS DRAWING SHOULD BE USED FOR THE LOCATION OF INTRUSIVE INVESTIGATION WORKS ON SITE. SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE. - CONTACT ARCADIS UK IN CASE OF ANY QUERY

Tables

Table 1 - Groundwater Monitoring Data

Table 2 - Groundwater Monitoring Hydrochemical Data

Table 3 - Soil Laboratory Data Comparison to Generic Assessment Criteria (GAC)

Table 4 - Groundwater Laboratory Data Comparison to Generic Assessment Criteria (GAC)

Table 1								
Groundwater Monitoring Data								
Well ID	Date	Ground Level (m AOD)	Product Thickness (m)	Depth to product (m bgl)	Depth to water (m bgl)	Depth to base (m bgl)	GW elevation (m AOD)	Depth to base (m AOD)
BH101	15/03/2024	80.79	-	-	22.92	30.00	57.87	50.79
BH102	15/03/2024	81.14	-	-	24.23	27.63	56.91	53.51
BH103	15/03/2024	81.04	-	-	19.07	26.61	61.98	54.43
BH101	21/03/2024	80.79	-	-	22.92	30.00	57.87	50.79
BH102	21/03/2024	81.14	-	-	24.80	27.63	56.34	53.51
BH103	21/03/2024	81.04	-	-	19.07	26.61	61.98	54.43

Notes:

m bgl Meters below ground level
m AOD Meter above ordnance datum
- No information to record

Table 2											
Groundwater Monitoring Hydrochemical Data											
Well ID	Date	Depth to water (m bgl)	Depth to base (m bgl)	Sample Depth (m bgl)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/l)	Specific Conductance (µS/cm)	Conductivity (µS/cm)	pH	ORP (mV)
BH101	15/03/2023	22.92	30.00	25.00	12.6	79.4	8.41	874	667	6.92	-35.2
BH102	15/03/2023	24.23	2.63	26.00	13.2	61.8	6.45	1396	1082	6.83	-35.8
BH103	15/03/2023	19.07	26.61	23.00	13.3	83.1	8.66	1347	1045	6.86	-37.3

Notes:

m bgl Meters Below Ground Level
 °C Degrees Celsius
 µS/cm Microsiemens per Centimeter
 mg/l Milligrams per Litre
 OPR Oxygen Redox Potential
 mV Millivolt

Table 3										
Soil Laboratory data comparison to Generic assessment criteria (GAC) for Continued Commercial Use										
Test	Units	LOD	Arcadis GAC - Human Health - Commercial (combined pathways)	Location ID	BH101	BH101	BH102	BH102	BH103	BH103
				Date	26/02/2024	26/02/2024	08/03/2024	08/03/2024	26/02/2024	05/03/2024
				Depth (m bgl)	0.2 - 0.4	18.3 - 18.5	0.2 - 0.4	8 - 8.2	0.8 - 1	21.3 - 21.5

Table 4
Groundwater Laboratory data comparison to Generic assessment criteria (GAC) for Continued Commercial Use

					Location ID	BH101	BH101 - Duplicate	BH102	BH103
					Date	15/03/2024	15/03/2024	15/03/2024	15/03/2024
					Depth (m bgl)	25		26	23
Test	Unit	EQL	Arcadis GAC - Human Health - Commercial	Arcadis GAC - Water Resources - Aquifers - England & Wales					
Metals									
Arsenic (filtered)	µg/L	2.5	NVP	10	<2.5	---	<2.5	<2.5	
Barium (filtered)	µg/L	3	NVP	700	39	---	49	32	
Beryllium (filtered)	µg/L	0.5	-	-	<0.5	---	<0.5	<0.5	
Boron (filtered)	µg/L	12	NVP	1,000	110	---	339	91	
Cadmium (filtered)	µg/L	0.5	NVP	5	<0.5	---	<0.5	<0.5	
Chromium (hexavalent)	µg/L	6	NVP	50	<6	---	<6	<6	
Chromium (filtered)	µg/L	1.5	NVP	50	6.7	---	<1.5	2.1	
Chromium (Trivalent) (filtered)	µg/L	6	NVP	50	7	---	<6	<6	
Copper (filtered)	µg/L	7	NVP	2,000	<7	---	<7	<7	
Lead (filtered)	µg/L	5	NVP	10	<5	---	<5	<5	
Mercury (filtered)	µg/L	1	>SOL	1	<1	---	<1	<1	
Nickel (filtered)	µg/L	2	NVP	20	<2	---	5	<2	
Selenium (filtered)	µg/L	3	NVP	10	<3	---	<3	<3	
Vanadium (filtered)	µg/L	1.5	-	-	1.5	---	<1.5	<1.5	
Zinc (filtered)	µg/L	3	NVP	3,000	6	---	10	5	
Inorganics									
Sulphate	mg/L	0.5	-	-	97.7	---	245.9	99.3	
PAH									
Naphthalene	µg/L	0.1	>SOL	2	<0.1	---	<0.1	<0.1	
Acenaphthene	µg/L	0.005	>SOL	-	<0.005	---	<0.005	<0.005	
Acenaphthylene	µg/L	0.005	>SOL	-	<0.005	---	<0.005	<0.005	
Fluoranthene	µg/L	0.005	>SOL	-	0.009	---	0.01	<0.005	
Anthracene	µg/L	0.005	>SOL	-	0.006	---	0.006	<0.005	
Phenanthrene	µg/L	0.005	>SOL	-	0.02	---	0.012	<0.005	
Fluorene	µg/L	0.005	>SOL	-	0.007	---	0.006	0.005	
Chrysene	µg/L	0.005	>SOL	-	<0.005	---	<0.005	<0.005	
Pyrene	µg/L	0.005	>SOL	-	0.015	---	0.017	<0.005	
Benzo(a)anthracene	µg/L	0.005	>SOL	-	<0.005	---	<0.005	<0.005	
Benzo(b)fluoranthene	µg/L	0.008	>SOL	0.025	<0.008	---	<0.008	<0.008	
Benzo(k)fluoranthene	µg/L	0.008	>SOL	0.025	<0.008	---	<0.008	<0.008	
Benzo(a)pyrene	µg/L	0.005	>SOL	0.01	<0.005	---	<0.005	<0.005	
Dibenz(a,h)anthracene	µg/L	0.005	>SOL	-	<0.005	---	<0.005	<0.005	
Benzo(g,h,i)perylene	µg/L	0.005	>SOL	0.025	<0.005	---	<0.005	<0.005	
Indeno(1,2,3-c,d)pyrene	µg/L	0.005	>SOL	0.025	<0.005	---	<0.005	<0.005	
PAH 16 Total	µg/L	0.173	-	-	<0.173	---	<0.173	<0.173	
Benzo(b+k)fluoranthene	µg/L	0.008	-	-	<0.008	---	<0.008	<0.008	
Leaded Fuel Indicators									
1,2-dibromoethane	µg/L	2	-	-	<2	---	<2	<2	
1,2-dichloroethane	µg/L	2	3,600	3	<2	---	<2	<2	
TPH CWG									
>C5-C6 Aliphatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>C6-C8 Aliphatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>C8-C10 Aliphatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>C10-C12 Aliphatics	µg/L	5	>SOL	See TPH	<5	<5	<5	<5	
>C12-C16 Aliphatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>C16-C21 Aliphatics	µg/L	10	NR	See TPH	<10	<10	<10	<10	
>C21-C35 Aliphatics	µg/L	10	NR	See TPH	<10	<10	<10	<10	
Total Aliphatics >C5-C35	µg/L	10	-	-	<10	<10	<10	<10	
>EC5-EC7 Aromatics	µg/L	10	57,000	1	<10	<10	<10	<10	
>EC7-EC8 Aromatics	µg/L	10	>SOL	700	<10	<10	<10	<10	
>EC8-EC10 Aromatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>EC10-EC12 Aromatics	µg/L	5	>SOL	See TPH	<5	<5	<5	<5	
>EC12-EC16 Aromatics	µg/L	10	>SOL	See TPH	<10	<10	<10	<10	
>EC16-EC21 Aromatics	µg/L	10	NR	See TPH	<10	<10	<10	<10	
>EC21-EC35 Aromatics	µg/L	10	NR	See TPH	<10	<10	<10	<10	
Total Aromatics >EC5-EC35	µg/L	10	-	-	<10	<10	<10	<10	
TPH >C5-C35 Aliphatics/Aromatics	µg/L	10	na	10	<10	<10	<10	<10	
BTEX									
Benzene	µg/L	0.5	57,000	1	<0.5	<5	<0.5	<0.5	
Toluene	µg/L	5	>SOL	700	<5	<5	<5	<5	
Ethylbenzene	µg/L	1	>SOL	300	<1	<5	<1	<1	
BTEX and MTBE									
Xylene (m & p)	µg/L	2	>SOL	250	<2	<5	<2	<2	
Xylene (o)	µg/L	1	>SOL	250	<1	<5	<1	<1	
Fuel oxygenates									
Diisopropyl ether	µg/L	1	-	-	<1	---	<1	<1	
Ethyl tertiary butyl ether	µg/L	1	2,000,000	47	<1	---	<1	<1	
MTBE	µg/L	0.1	24,000,000	15	<0.1	<5	<0.1	<0.1	
tert-Amyl methyl ether	µg/L	1	-	-	<1	---	<1	<1	
tert-Butyl alcohol	µg/L	100	100,000,000	12	<100	---	<100	<100	

Table 4
Groundwater Laboratory data comparison to Generic assessment criteria (GAC) for Continued Commercial Use

Test	Unit	EQL	Arcadis GAC - Human Health - Commercial	Location ID Date Depth (m bgl) Arcadis GAC - Water Resources - Aquifers - England & Wales	BH101	BH101 - Duplicate	BH102	BH103
					15/03/2024	15/03/2024	15/03/2024	15/03/2024
					25		26	23
Metals								
Arsenic (filtered)	µg/L	2.5	NVP	10	<2.5	---	<2.5	<2.5
VOC								
Styrene	µg/L	2	-	-	<2	---	<2	<2
cis-1,3-dichloropropene	µg/L	2	-	-	<2	---	<2	<2
trans-1,3-dichloropropene	µg/L	2	-	-	<2	---	<2	<2
1,1,1,2-tetrachloroethane	µg/L	2	-	-	<2	---	<2	<2
1,1,1-trichloroethane	µg/L	2	>SOL	2,000	<2	---	<2	<2
1,1,2,2-tetrachloroethane	µg/L	4	-	-	<4	---	<4	<4
1,1,2-trichloroethane	µg/L	2	-	-	<2	---	<2	<2
1,1-dichloroethane	µg/L	3	1,600,000	2.8	<3	---	<3	<3
1,1-dichloroethene	µg/L	3	740,000	140	<3	---	<3	<3
1,1-dichloropropene	µg/L	3	-	-	<3	---	<3	<3
1,2,3-trichloropropene	µg/L	3	-	-	<3	---	<3	<3
1,2-dibromo-3-chloropropane	µg/L	2	-	-	<2	---	<2	<2
1,2-dichloropropane	µg/L	2	-	-	<2	---	<2	<2
1,3-dichloropropane	µg/L	2	-	-	<2	---	<2	<2
2,2-dichloropropane	µg/L	1	-	-	<1	---	<1	<1
2-chlorotoluene	µg/L	3	-	-	<3	---	<3	<3
4-chlorotoluene	µg/L	3	-	-	<3	---	<3	<3
Bromobenzene	µg/L	2	-	-	<2	---	<2	<2
Bromochloromethane	µg/L	2	-	-	<2	---	<2	<2
Bromodichloromethane	µg/L	2	-	-	<2	---	<2	<2
Bromoform	µg/L	2	-	-	<2	---	<2	<2
Bromomethane	µg/L	1	-	-	<1	---	<1	<1
Carbon tetrachloride	µg/L	2	-	-	<2	---	<2	<2
Chlorodibromomethane	µg/L	2	-	-	<2	---	<2	<2
Chloroethane	µg/L	3	-	-	<3	---	<3	<3
Chloroform	µg/L	2	820,000	100	<2	---	<2	<2
Chloromethane	µg/L	3	-	-	<3	---	<3	<3
cis-1,2-dichloroethene	µg/L	3	120,000	25	<3	---	<3	<3
Dibromomethane	µg/L	3	-	-	<3	---	<3	<3
Dichlorodifluoromethane	µg/L	2	-	-	<2	---	<2	<2
Dichloromethane	µg/L	3	-	-	<3	---	<3	<3
Isopropylbenzene	µg/L	3	-	-	<3	---	<3	<3
n-butylbenzene	µg/L	3	-	-	<3	---	<3	<3
n-propylbenzene	µg/L	3	-	-	<3	---	<3	<3
p-isopropyltoluene	µg/L	3	-	-	<3	---	<3	<3
sec-butylbenzene	µg/L	3	-	-	<3	---	<3	<3
Trichloroethene	µg/L	3	13,000	5	<3	---	<3	<3
tert-butylbenzene	µg/L	3	-	-	<3	---	<3	<3
Tetrachloroethene	µg/L	3	140,000	5	<3	---	<3	<3
trans-1,2-dichloroethene	µg/L	3	430,000	25	<3	---	<3	<3
Trichlorofluoromethane	µg/L	3	-	-	<3	---	<3	<3
Vinyl chloride	µg/L	0.1	5,000	0.5	<0.1	---	<0.1	<0.1
VOC/SVOC								
1,2,3-trichlorobenzene	µg/L	3	-	-	<3	---	<3	<3
1,2,4-trichlorobenzene	µg/L	1	-	-	<3	---	<3	<3
1,2-dichlorobenzene	µg/L	1	-	-	<3	---	<3	<3
1,3-dichlorobenzene	µg/L	1	-	-	<3	---	<3	<3
1,4-dichlorobenzene	µg/L	1	-	-	<3	---	<3	<3
Chlorobenzene	µg/L	2	130,000	100	<2	---	<2	<2
Hexachlorobutadiene	µg/L	1	-	-	<3	---	<3	<3
Other Fuel Indicators								
1,2,4-trimethylbenzene	µg/L	3	-	-	<3	---	<3	<3
1,3,5-trimethylbenzene	µg/L	3	-	-	<3	---	<3	<3
Alcohols								
Ethanol	µg/L	100	-	-	<100	---	<100	<100
Other								
pH (Lab)	pH_Units	0.01	-	-	7.63	---	7.42	7.67

NOTES:

NVP	No vapour pathway. Contaminant has only a low vapour pressure in groundwater.
>SOL	Target acceptable risk not exceeded at theoretical solubility concentration
NR	No appropriate inhalation reference dose identified during review of toxicological data
na	Comprises multiple contaminants - no GAC derived
LOD	Limit of Detection
VOC	Volatile Organic Carbon
SVOC	Semi-Volatile Organic Carbon
TPH CWG	Total Petroleum Hydrocarbons Criteria Working Group
PAH	Polycyclic Aromatic Hydrocarbon
µg/L	Micrograms per Litre
---	Not tested for
<0.1	Less than limit of detection
1.23	Exceedance to the GAC for human health (Commercial worker)
1.23	Exceedance to the GAC for water resources (aquifers)

Appendix A

Study of Limitations

IMPORTANT. This appendix should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1 This report has been prepared by Arcadis UK Ltd ('Arcadis'), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with Tesco Stores Limited (the 'Client'). Arcadis does not accept responsibility for any matters outside the agreed scope.

2 This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing. The contents of this report may not be used or relied upon by any person other than this party without the express written consent and authorisation of Arcadis.

3 Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Arcadis is unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.

4 All work carried out in preparing this report has used, and is based on, Arcadis' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice, pending changes in legislation, of which Arcadis is aware, have been considered. Following delivery of the report, Arcadis has no obligation to advise the Client or any other party of such changes or their repercussions.

5 This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.

6 Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties. provided by third parties. Arcadis has taken reasonable steps to ensure that the information sources used for this assessment provided accurate information and has therefore assumed this to be the case.

7 This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received.

8 This report refers, within the limitations stated, to the condition of the Site at the time of the inspection. No warranty is given as to the possibility of changes in the condition of the Site since the time of the investigation.

9 The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does not provide specialist legal or other professional advice. The advice of other professionals may be required.

10 Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases, the investigation is further limited by Site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the Site have not been investigated.

11 If below ground intrusive investigations have been conducted as part of the scope, safe location of exploratory holes has been carried out with reference to Arcadis in-house SOP. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.

12 Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issues.

13 Unless otherwise stated, an inspection of the Site has not been undertaken and there may be conditions present at the Site which have not been identified within the scope of this assessment.

14 Unless otherwise stated, samples from the Site (soil, groundwater, building fabric or other samples) have not been obtained.

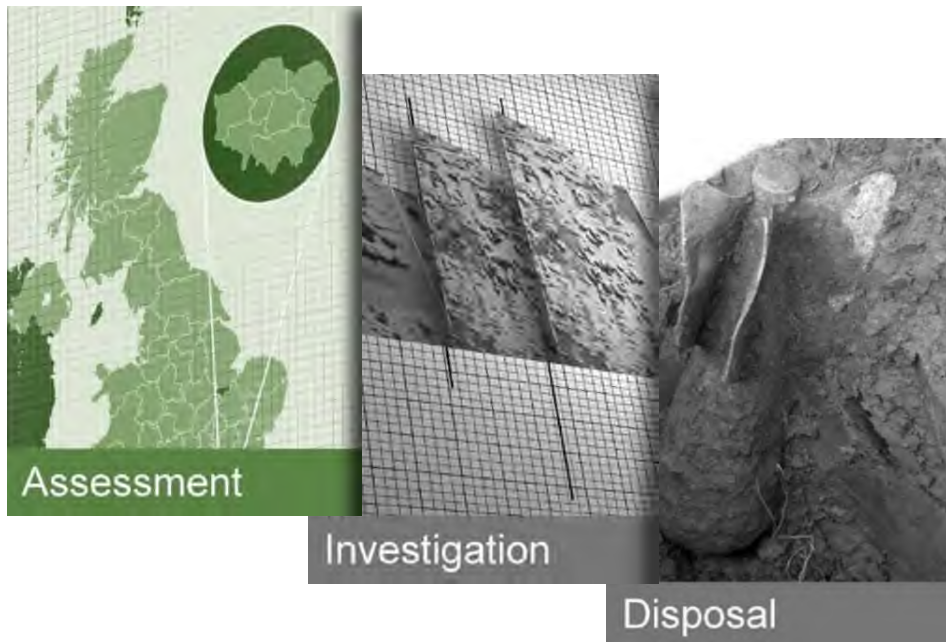
15 Arcadis has relied upon the accuracy of documents, oral information and other material and information provided by the Client and others, and Arcadis assumes no liability for the accuracy of such data, although in the event of apparent conflicts in information, Arcadis would highlight this and seek to resolve.

16 Unless otherwise stated, the scope of works has not included an environmental compliance review, health and safety compliance review, hazardous building materials assessment, interviews or contacting Local Authority, requests for information to the petroleum officer, sampling or analyses of soil, ground water, surface water, air or hazardous building materials or a chain of title review.

17 Unless otherwise stated, this assessment has considered the ongoing use of the Site and has not been prepared for the purposes of redevelopment which may act as a trigger for Site investigation and remediation works not needed for ongoing use.

Appendix B

Unexploded Ordnance (UXO) Detailed Desk Study Assessment



UXO Desk Study & Risk Assessment

Document Ref. P13911-23-R1

Revision A

Project Title Starwood House

Client Arcadis

Date 21st December 2023

Drafted by Cameron Muncer

Checked by Matthew Eatough

Authorised by Stefan Lang

UXO DESK STUDY & RISK ASSESSMENT

EXECUTIVE SUMMARY

Key findings: No significant sources of Unexploded Ordnance (UXO) hazard have been identified.

Key actions: UXO awareness briefing is recommended for staff involved in intrusive works.

UXO hazard assessment

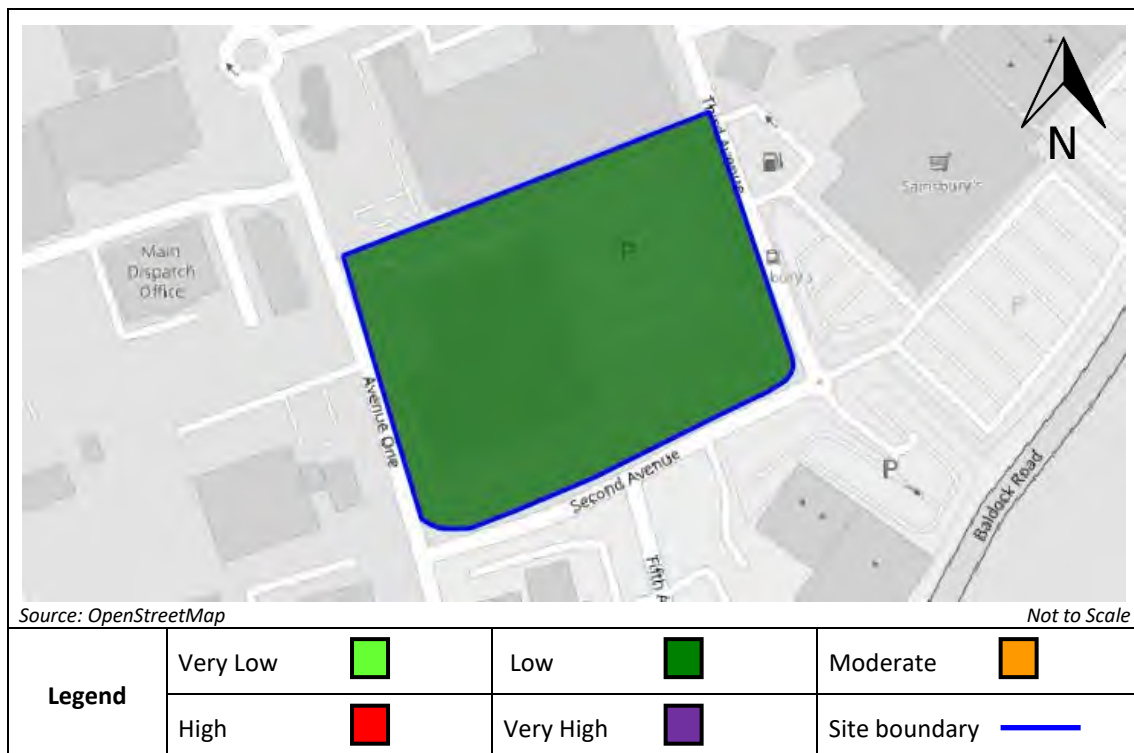
During World War One (WWI) and World War Two (WWII), the Kryn & Lahy Metal Works, encroaching onto the northern part of the Site, was involved in the production of shell and munition casings. No evidence has been found to indicate that the factory was involved in the filling of casings with explosive material.

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in the following Figure, reproduced as Figure 4 in the main report.

The UXO hazard zone plan of the Site is also given in the accompanying P13911-23-R1-MAP01-A.

UXO hazard zone plan of the Site



The main findings of the report are summarised below.

- During WWI, the Kryn & Lahy Metal Works was established on land encroaching onto the northern part of the Site. It was involved in the production of shell and munition casings. No evidence has been found to indicate that any casings were filled at the factory.
- During WWII, the Kryn & Lahy Metal Works was again involved in the production of mortar bomb, shell, and air-dropped bomb casings. No evidence has been found to indicate that any casings were filled at the factory.

- During WWII the main strategic targets in the vicinity of the Site included the Kryn & Lahy Metal Works and Royal Air Force (RAF) Henlow.
- No records have been found indicating that the Site was bombed during WWII. Records indicate that the nearest High Explosive (HE) bomb fell approximately 0.5km south-southeast of the Site, on the 17th September 1940.

Proposed works

It is understood that works on the Site are associated with a ground investigation. Boreholes will be drilled to between 20m and 25m below ground level (bgl).

It is assumed that future works on the Site may include excavations.

Risk assessment

The Table below, reproduced as Table 3 in the main report, provides a UXO risk assessment for the proposed works on the Site.

Further details on the risk assessment methodology are given in Section 7.2 of the main report.

UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Excavations	1	1	1	1	5	5	Low
	Boreholes	1	1	1	1	4	4	Low
Other UXO	Excavations	1	1	1	1	4	4	Low
	Boreholes	1	1	1	1	3	3	Low
PE = Probability of Encounter; PD = Probability of Detonation; P = Likelihood								

Risk mitigation plan

The Table below, reproduced as Table 4 in the main report, summarises the UXO risk for proposed works on the Site and recommended actions.

Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		UXO awareness briefing - Given the history of wartime production on the Site, it is recommended that a formal UXO awareness briefing is provided to staff involved in intrusive works.
Boreholes		Proceed with works

In summary, it is recommended that staff involved in intrusive works are provided with a formal UXO awareness briefing so that they take appropriate action in the event of a suspect find.

What do I do next?

If you require a quote for an awareness briefing or have any comments, contact us and we can help.

	01993 886682		<u>uxo@zetica.com</u>		<u>zeticauxo.com</u>
---	---------------------	---	--	---	--

If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

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Accompanying GIS data

P13911-23-R1-MAP01-A (UXO Desk Study)

ABBREVIATIONS

AA	Anti-Aircraft
ALARP	As Low As Reasonably Practicable
AP	Anti-Personnel
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BA	British Army
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
DCLG	Department of Communities and Local Government
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
HAA	Heavy Anti-Aircraft
HE	High Explosive
HER	Historic Environment Record
IB	Incendiary Bomb
IWM	Imperial War Museum
LAA	Light Anti-Aircraft
MoD	Ministry of Defence
MU	Maintenance Unit
NARA	National Archives & Records Administration
NCAP	National Collection of Aerial Photography
OB	Oil Bomb
OSNGR	Ordnance Survey National Grid Reference
PM	Parachute Mine
RAF	Royal Air Force
RE	Royal Engineers
RFC	Royal Flying Corps
RN	Royal Navy
ROF	Royal Ordnance Factory
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
WO	War Office
WWI	World War One
WWII	World War Two
ZAA	Rocket Anti-Aircraft

UXO DESK STUDY & RISK ASSESSMENT

Please read: Zetica has colour coded each paragraph. Paragraphs with black text on a white background provide site-specific information or information specifically researched as part of this project.

Boxed paragraphs in a dark green text with a green background provide general information and, where appropriate, links to online resources giving further detail. These are all available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

1 INTRODUCTION

1.1 Project outline

Zetica Ltd was commissioned by Arcadis to carry out a detailed Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 2.7 hectares (ha) off Avenue One in Letchworth, Hertfordshire (the 'Site').

The aim of this report is to gain a fair and representative view of the potential UXO hazard on or affecting the Site in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

Where appropriate, this hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance.
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be recorded and therefore there cannot be any guarantee that all UXO hazards affecting the Site have been identified in this report.

1.2 Sources of information

Zetica Ltd researched the World War One (WWI)/World War Two (WWII) bombing and military history of the Site and its surrounding area using a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.2.1 Zetica Ltd records

Zetica Ltd's in-house records were consulted, including the Zetica Ltd bomb risk maps (<http://zeticauxo.com/downloads-and-resources/risk-maps/>), previous requests for information from government bodies, reference books, and archive materials from past work in the region.

Relevant documents have been cited in the bibliography of this report.

1.2.2 Historical records, maps, and drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, the US National Archives & Records Administration (NARA), the Imperial War Museum (IWM), Historic England, National Collection of Aerial Photography (NCAP), the Defence of Britain Project, and relevant archaeological bodies.

The British Geological Survey (BGS) was consulted for borehole information.

1.2.3 Local records

Hertfordshire County Council, the Hertfordshire Archives and Local Studies Office, local historical groups, and the Hertfordshire Historic Environment Record (HER) were consulted for records.

1.3 Data confidence level

In general, there is a high level of confidence in the researched information sources used for this report. Further detail is given in the text of the report where appropriate.

Definitions of data confidence level		
Data Confidence Level		Definition
	Low	There are very few sources of information, and/or those available are lacking in detail.
	Moderate	There is a limited range of available sources of information, a key source of information is missing, and/or some sources may be contradictory or lacking in detail.
✓	High	There is a wide range of available sources of information, which are detailed and corroborate each other.

2 THE SITE

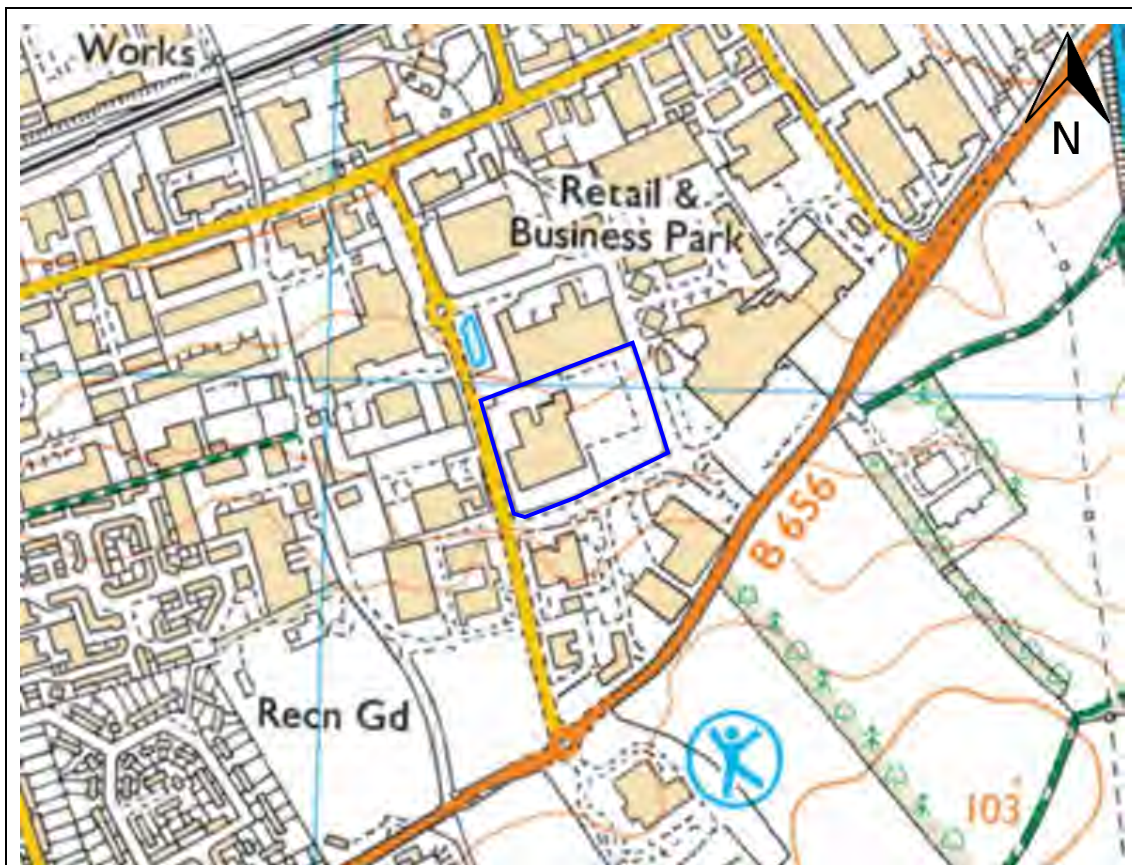
2.1 Site location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) TL 232329. It is located approximately 1.4km east of central Letchworth.

The Site comprises 1No. commercial building, hardstanding, and open ground. It is bounded to the north by commercial buildings, to the east by Third Avenue and commercial buildings, to the south by Second Avenue and commercial buildings, and to the west by Avenue One and commercial buildings.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1 Site location map



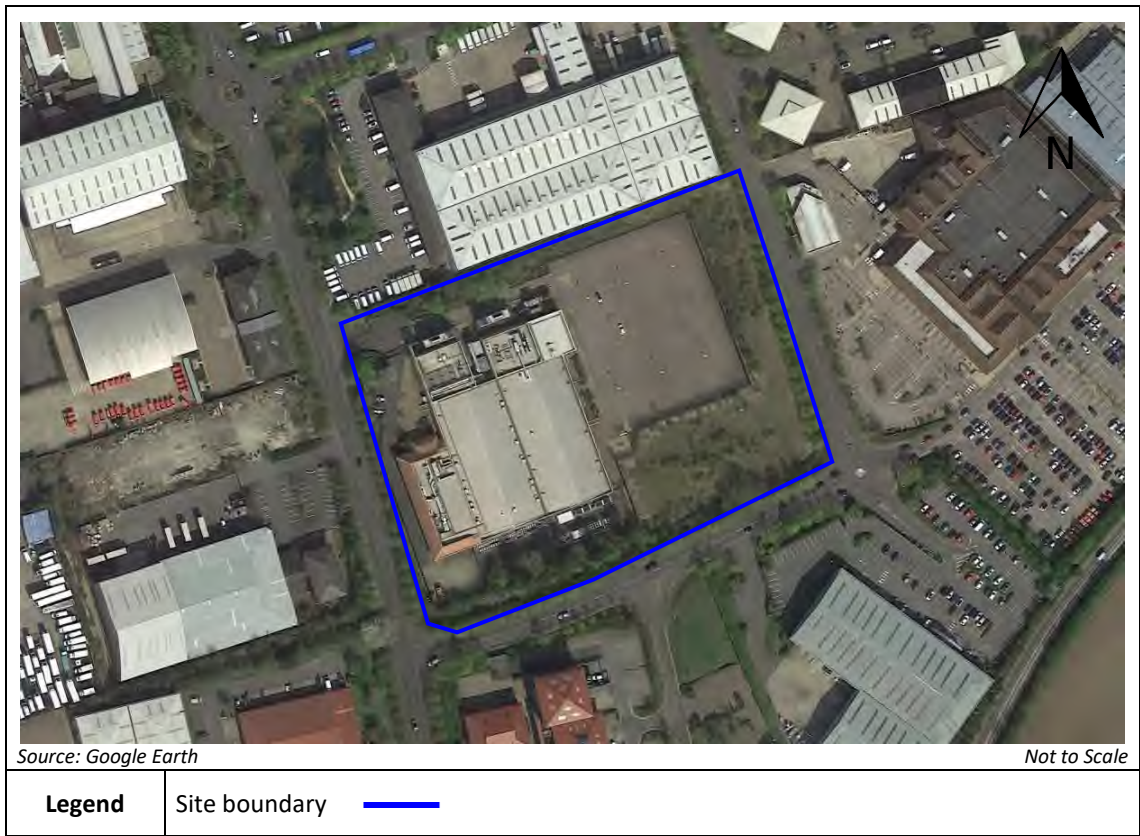
Source: © Crown Copyright 2023. Reproduced by permission of Ordnance Survey

Not to Scale

Legend	
	Site boundary



Plate 1 Recent aerial photograph of the Site



3 MILITARY ACTIVITY

The following sections outline the recorded military activity on and in the vicinity of the Site. The potential UXO hazard from WWI and WWII bombing is detailed in Section 4.

3.1 Explosives factories, munitions depots, and disposal areas

For further information on explosives factories, munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- [Explosives Factories](#)
- [Munitions Depots](#)
- [Munitions Disposal Areas](#)

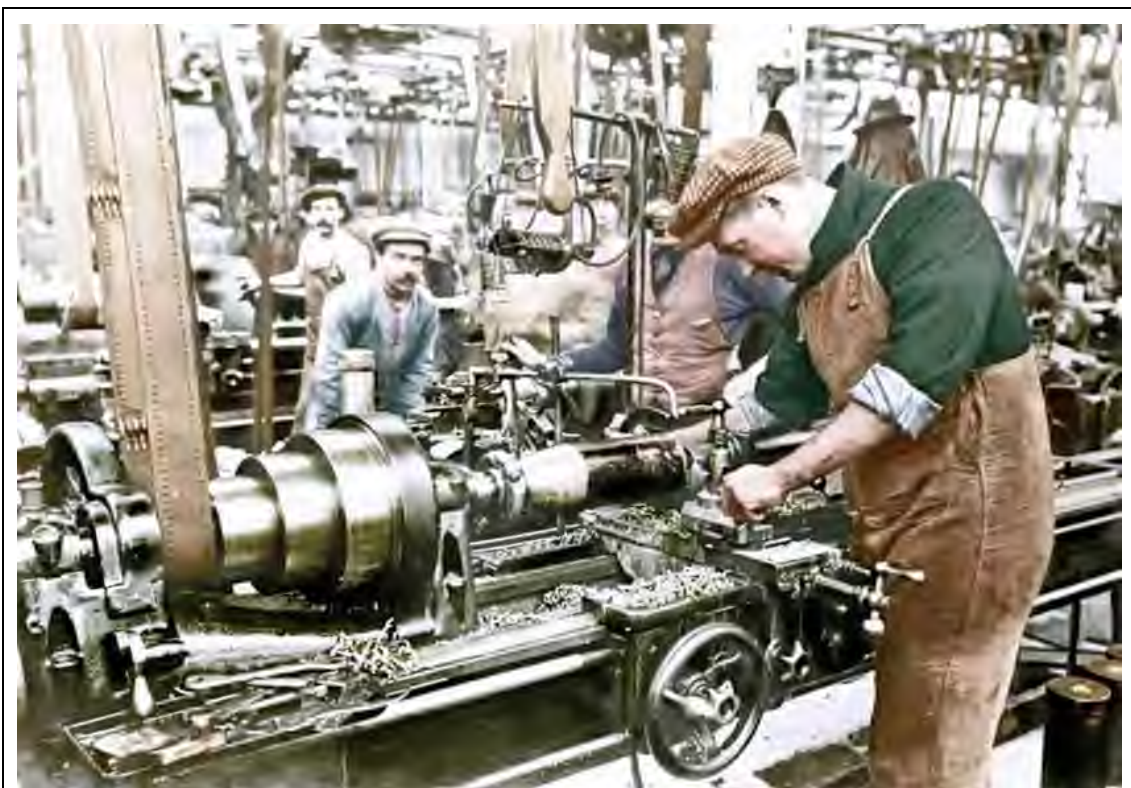
During WWI and WWII, the Kryn & Lahy Metal Works, encroaching onto the northern part of the Site, was involved in the production of shell and bomb casings. Details are provided below.

3.1.1 The Kryn & Lahy Metal Works

In 1915, the Kryn & Lahy Metal Works was established on land encroaching onto the northern part of the Site. The factory was established to produce shell and bomb casings for the war effort. Records indicate that the factory produced approximately 10,000,000 No. artillery shells casings throughout WWI.

Plate 2 is a photograph, dating from 1916. It shows a worker at the Kryn & Lahy Metal Works fashioning a shell casing using tool machinery.

Plate 2 Photograph of a worker at the Kryn & Lahy Metal Works, 1916

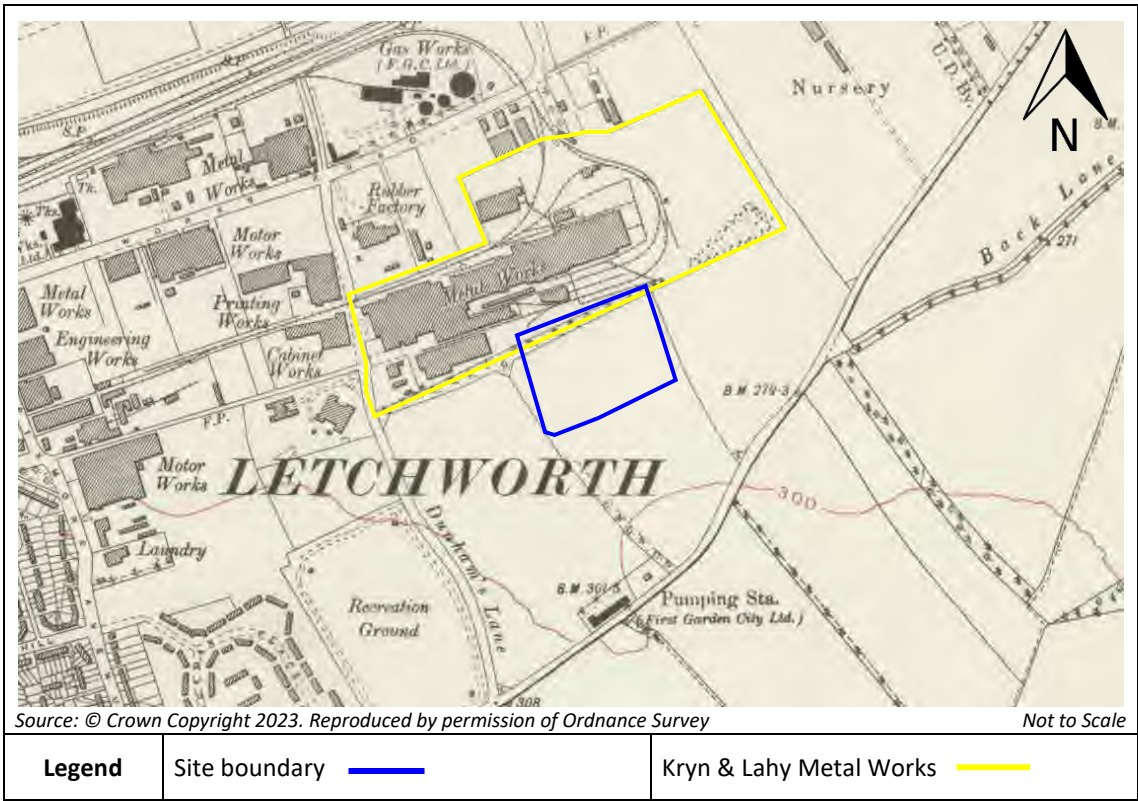


Source: Herts at War

After WWI, the factory became a civilian metal works, producing cranes and railway tracks.

Figure 2 is a historical map, dating from 1925. It shows the boundary of the Kryn & Lahy Metal Works, highlighted in yellow. This shows that the majority of the Site comprised open ground.

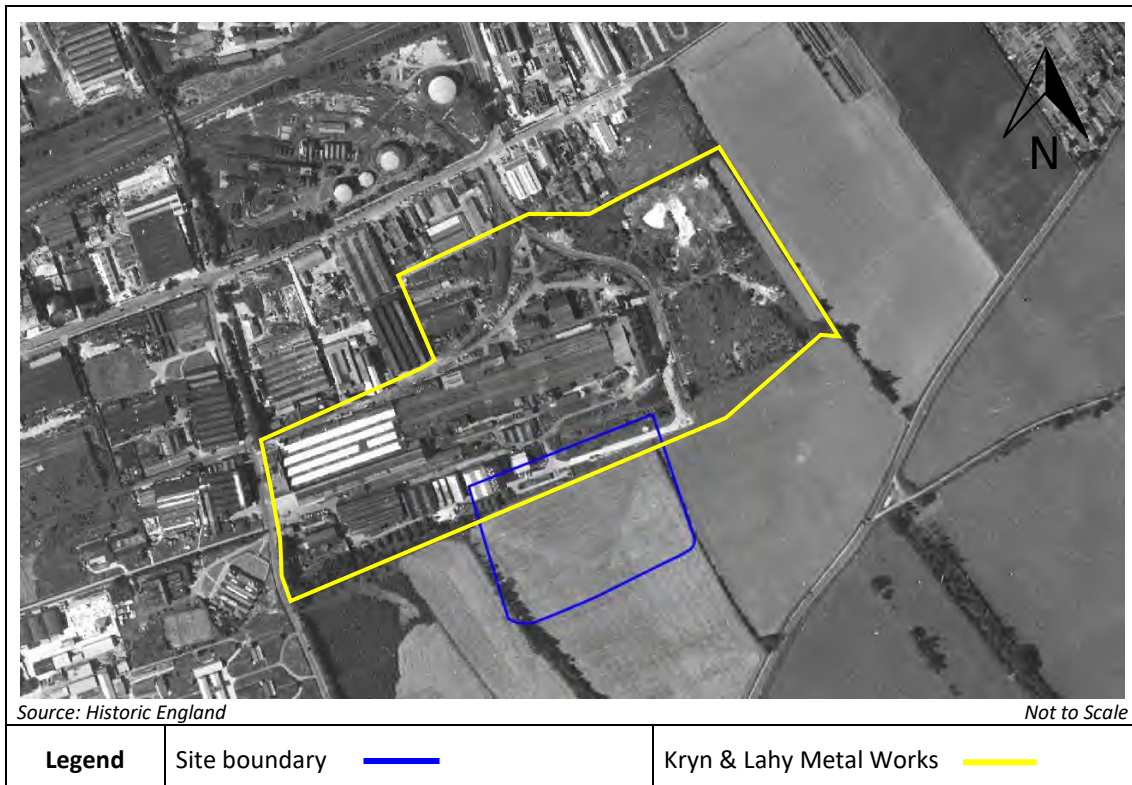
Figure 2 Historical map showing the boundary of the Kryn & Lahy Metal Works, 1925



During WWII, Kryn & Lahy Metal Works was again involved in wartime production of shell and munition casings. The factory produced casings from 3-inch (") shells to 4,000-pounder (pdr) air-dropped bomb casings. They also produced casings for mortar bombs.

Kryn & Lahy Metal Works was also involved in the production of cranes for the British Army (BA) and Royal Navy (RN).

Plate 3 is an aerial photograph, dated the 24th June 1947. This shows an extended boundary for the Kryn & Lahy Metal Works, encroaching further onto the northern part of the Site.

Plate 3 Aerial photograph of the Kryn & Lahy Metal Works, 24th June 1947

After WWII, Kryn and Lahy Metal Works reverted back to civil production. The factory closed in the 1970s and has since been redeveloped for commercial use.

No records have been found indicating that the Kryn & Lahy Metal Works handled explosive material during WWI and WWII. Shell casings and other munitions were typically transported to dedicated filling factories elsewhere in the country, such as Royal Ordnance Factory (ROF) Elstow, approximately 21.7km northwest of the Site.

Potential UXO hazard

No records have been found indicating that the Kryn & Lahy Metal Works undertook the filling of casings with explosive material during WWI or WWII.

It should be noted that the potential to find empty shell casings on the Site due to historical manufacturing activities cannot be totally discounted. Whilst these are not considered to provide a source of UXO hazard, heightened awareness of the potential for the encounter of casings should be maintained by site staff.

The Kryn & Lahy Metal Works is not considered to provide a source of UXO hazard to the Site.

3.2 Defences

For further information on military defences, and the potential UXO hazards associated with them, follow the links below:

- [Anti-Aircraft Guns](#)
- [Anti-Invasion Defences](#)
- [Barrage Balloons](#)
- [Bombing Decoys](#)
- [Home Guard](#)
- [Mined Locations](#)
- [Mortar & Gun Emplacements](#)
- [Pillboxes](#)

No military defences have been identified on the Site. The nearest are described below.

3.2.1 Anti-Aircraft (AA) guns

During WWI there were no AA batteries recorded within 10km of the Site.

During WWII there was 1No. Heavy AA (HAA) battery recorded within 10km of the Site. This was located at Langford (TL 208400), approximately 7.4km north-northwest of the Site. Its armament is unknown.

Potential UXO hazard

It should be noted that the lack of official records of AA batteries cannot be taken to imply their absence as many units were mobile, and moved around as operational requirements dictated.

The potential for an Unexploded AA (UXAA) shell to have fallen on the Site unnoticed, whilst very unlikely, cannot be totally discounted.

3.3 Military airfields

For further information on military airfields, and the potential UXO hazards associated with them, follow the link below:

- [Military Airfields](#)

No records of any military airfields on or in close proximity to the Site have been found.

During WWI, the nearest operational airfield was Royal Flying Corps (RFC) Willian, approximately 3.3km southwest of the Site.

RFC Willian opened in 1916 and was used as a fighter airfield. No. 75 Squadron was stationed at RFC Willian during WWI flying Royal Aircraft Factory B.E.2c, B.E.2e, and F.E.2b fighter aircraft. Later in the war the squadron was equipped with Avro 504K and Sopwith Pup fighter aircraft.

RFC William remained operation until 1919 when it was closed and returned to agricultural use.

During WWII, the nearest operational airfield was Royal Air Force (RAF) Henlow, approximately 7.1km northwest of the Site.

RAF Henlow was established in 1918 as an aircraft repair depot for aircraft from the Western Front. RAF Henlow remained in operational use during the inter-war period hosting a number of fighter squadrons.

During WWII, RAF Henlow was used to assemble Hawker Hurricane fighter aircraft. No. 13 Maintenance Unit (MU) was stationed at RAF Henlow throughout WWII repairing many different types of aircraft.

After WWII, a major RAF technical training college was formed at RAF Henlow in 1947 until it left in 1980. In 1980, the RAF Signals Engineering Establishment and the Radio Engineering Unit was established at RAF Henlow. RAF Henlow remains operational.

Military airfields are not considered to provide a source of UXO hazard to the Site.

3.4 Aircraft crashes

For further information on military aircraft crashes, and the potential UXO hazards associated with them, follow the link below:

- [Aircraft Crashes](#)

No records of any aircraft crashes on or in close proximity to the Site have been found.

3.5 Firing ranges and military training areas

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- [Artillery Ranges](#)
- [Bombing Ranges](#)
- [Military Training Areas](#)
- [Small Arms Ranges](#)

No records of any firing ranges or military training areas on or in close proximity to the Site have been found.

4 BOMBING

4.1 WWI bombing

For further information on WWI bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.1 or use the following link.

- [WWI Bombing](#)

No records have been found indicating that the Site was bombed during WWI.

4.2 WWII bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2 or use the following link.

- [WWII Bombing](#)

No records have been found indicating that the Site was bombed during WWII. Details of WWII bombing in the vicinity of the Site are provided in the following sections.

4.2.1 Bombing in Hertfordshire

Given its predominantly rural nature, Hertfordshire was subjected to few significant bombing raids during WWII. Raids were concentrated on the region's airfields, including RAF Steeple Morden, approximately 10.1km northeast of the Site, and RAF Nuthampstead, approximately 17.8km east of the Site.

Small towns, such as Letchworth, encompassing the Site, were subjected to 'tip and run' raids from enemy aircraft returning from bombing raids on more significant targets in the Midlands. Official records indicate that 28No. High Explosive (HE) bombs fell on Letchworth during WWII.

4.2.2 Strategic targets

From prior to the declaration of war in 1939, Britain was subjected to reconnaissance flights by the Luftwaffe which was building up a photographic record of potential targets.

The Site was located in an area which contained few strategic targets. The nearest were the Kryn & Lahy Metal Works (see Section 3.1.1) and RAF Henlow.

The nearest identified Luftwaffe target was RAF Henlow, approximately 7.1km northwest of the Site.

4.2.3 Bombing densities and incidents

Table 1 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site (highlighted by bold text) and surrounding districts. These were categorised as Rural Districts (RD), Urban Districts (UD), Municipal Borough (MB), Metropolitan Boroughs (MetB) and County Boroughs (CB). WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is Low.

15-50 bombs per 405ha is Moderate.

50-250 bombs per 405ha is High.

>250 bombs per 405ha is Very High.

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Note that Table 1 excludes the figures for Flying Bombs or Pilotless Aircraft (V1s), Long Range Rockets (V2s), and Incendiary Bombs (IBs). Discrepancies between the below list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

Table 1 Bombing statistics

Area	Bombs Recorded				Bombs per 405ha (1000 acres)
	High Explosive	Parachute Mines	Other	Total	
Letchworth UD	28	0	1	29	5.9
Hertford RD	584	7	21	612	18.7
Hitchin UD	28	0	0	28	7.2
Hitchin RD	460	7	21	488	5.9
Biggleswade RD	165	0	8	173	3.5
Stevenage UD	9	3	0	12	2.6

It should be noted that during WWII, many Unexploded Bombs (UXBs) were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXBs were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Details of the nearest recorded bombing incidents to the Site are given in the following section.

17th September 1940

2No. HE bombs fell on fields between Baldock and Willian, within approximately 0.5km south-southeast of the Site.

1No. IB fell on a field between Baldock and Willian, approximately 0.9km south-southeast of the Site.

15th October 1940

4No. HE bombs fell on Letchworth, within approximately 1.2km south-southwest of the Site.

5th February 1941

Several IBs fell on Norton, approximately 1.0km north-northwest of the Site.

5No. HE bombs fell on Norton, within approximately 1.3km north-northwest of the Site.

Figure 3 is a map showing the approximate location of recorded bomb impacts in the immediate vicinity of the Site. IBs shown are indicative of larger numbers of similar devices that fell within the given area.

The map has been compiled from different sources, including air raid incident reports, historical aerial photographs, and bomb census maps.

The bomb map is also given in the accompanying P13911-23-R1-MAP01-A.

Figure 3 Compiled bomb impact map for the vicinity of the Site

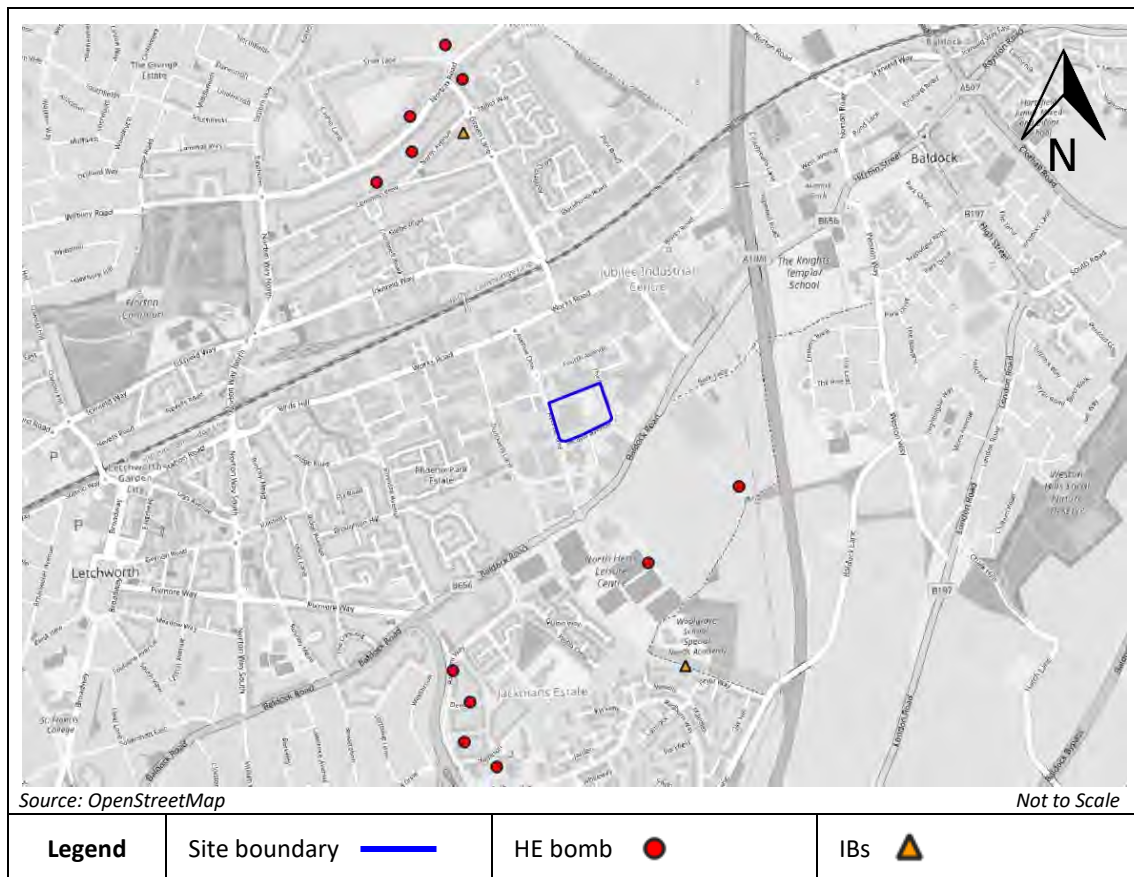
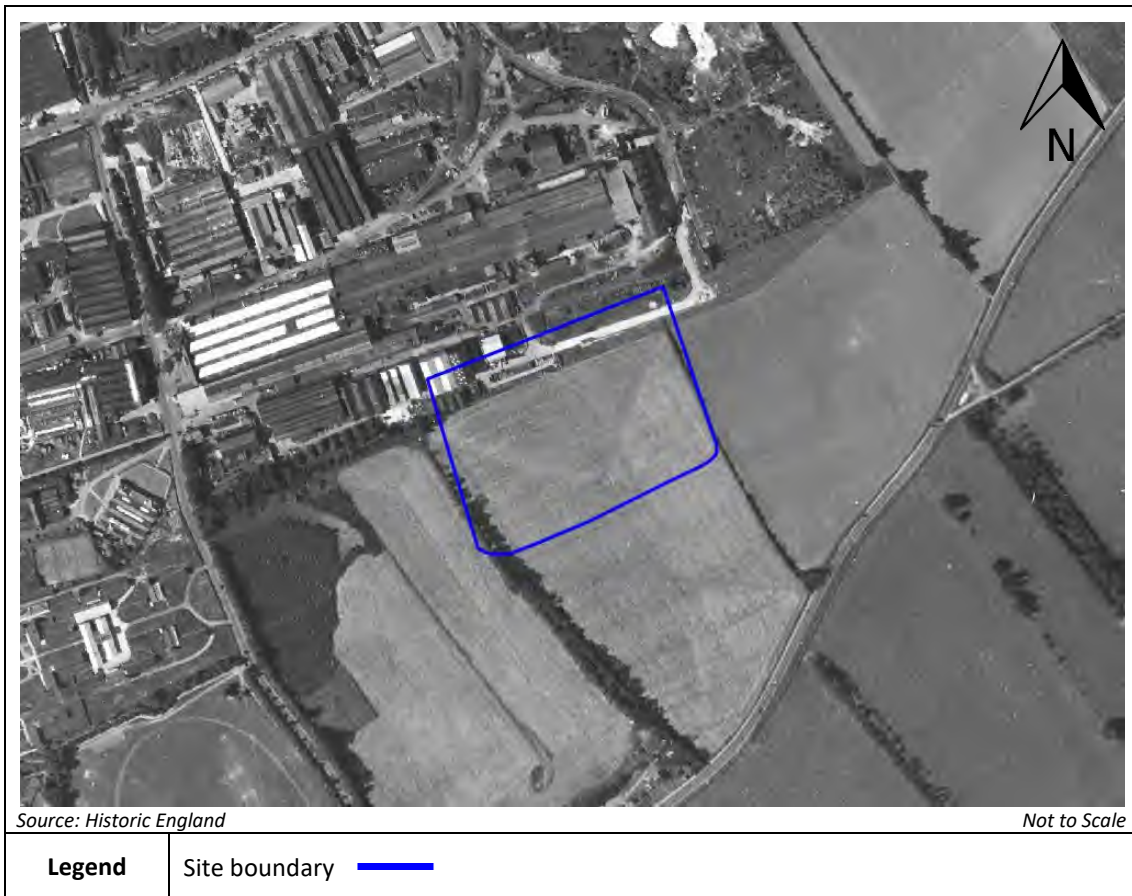


Plate 4 is an aerial photograph dated the 24th June 1947. No bomb damage or cratering has been identified on or in the vicinity of the Site.

Plate 4 Aerial photograph, 24th June 1947

Potential UXO hazard

No records have been found indicating that the Site was bombed and no bomb damage has been identified on the Site on historical aerial photography.

WWII bombing is not considered to provide a source of UXO hazard to the Site.

4.2.4 Abandoned bombs

No records have been found indicating that any officially abandoned bombs are located on the Site.

4.2.5 Bomb penetration depths

At the time of writing, no Site-specific ground investigation data was available.

BGS 1:50,000 Sheet 221 Hitchin (Solid & Drift) and BGS borehole records from nearby investigations have been consulted to get an indicative overview of the Site geology.

The WWII geology of the Site is understood to consist of topsoil, overlying the Holywell Nodular Chalk Formation and New Pit Chalk Formation.

Table 2 provides an estimate of average maximum bomb penetration depths for the Site assuming WWII ground conditions of 0.5m of topsoil (modelled as stiff clay), overlying more than 20m of chalk.

Table 2 Estimated average maximum bomb penetration depths

Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	5.5m
	250kg	8.0m
	500kg	13.5m

Where Made Ground is present, the estimated average bomb penetration depths are likely to be lesser than the ones given in Table 2.

These calculations can be refined on receipt of Site-specific information.

The estimated bomb penetration depths given in Table 2 are from the WWII ground level and are based on the following assumptions:

- a) High-level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).
- b) A strike angle of 10 to 15 ° to the vertical.
- c) That the bomb is stable, both in flight and on penetration.
- d) That no retarding units are fitted to the bomb.
- e) That the soil type is homogenous.

Assuming the above, a bomb will enter the ground and travel on the same trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The horizontal distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked horizontal movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

The average offset is one third of the penetration depth. If hardstanding or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

5 POST-WWII EXPLOSIVE ORDNANCE CLEARANCE (EOC) ACTIVITIES

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (approximately 11%) were recorded as UXBs. However, records from the Royal Engineers (RE) who were responsible for bomb disposal at the time indicate that by 27th February 1946, more than 45,000No. UXBs were disposed of.

On average, 8.5% of UXBs later self-exploded. In some cases, the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear. Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office (WO) statistics also show that between October 1940 and May 1941 most UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

5.1 EOC tasks

Zetica holds the following record of post-WWII EOC tasks having taken place in the vicinity of the Site.

10th November 2023

1No. WWII-era shell was found at Birds Hill in Letchworth, approximately 0.9km west-northwest of the Site. It was made safe and removed.

6 UXO HAZARD ASSESSMENT

6.1 UXO hazard level

Definitions of UXO Hazard Level for a Site	
Hazard Level	Definition
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present or that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

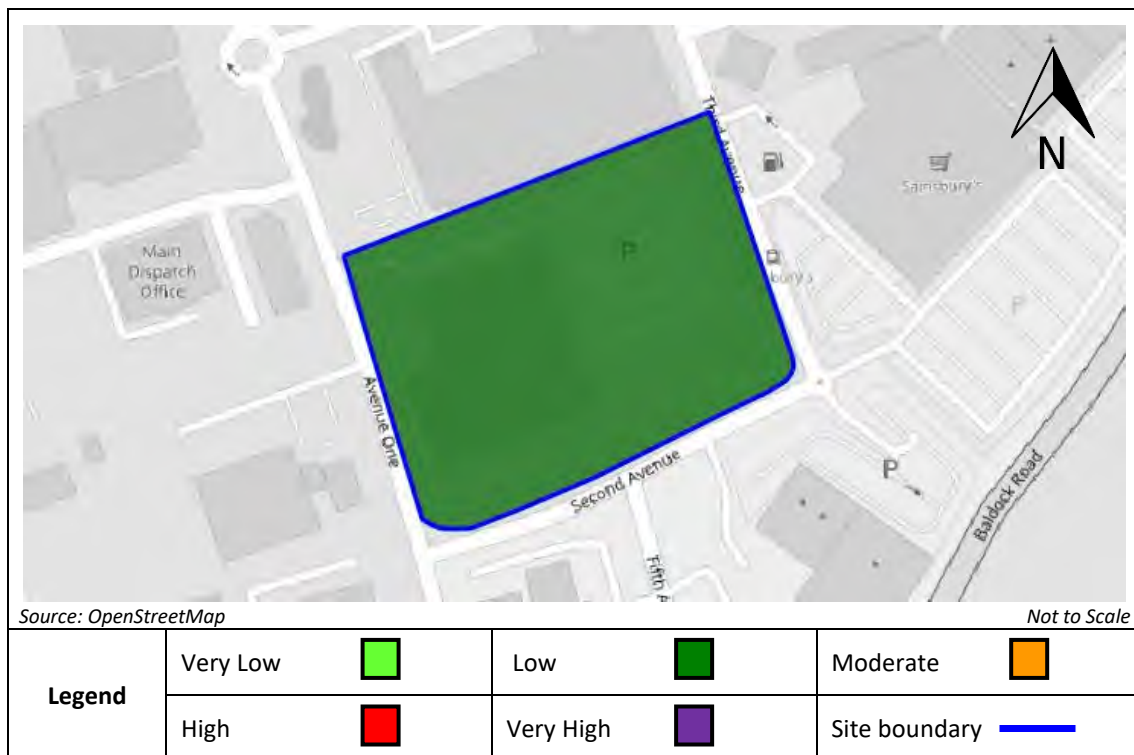
During WWI and WWII, the Kryn & Lahy Metal Works, encroaching onto the northern part of the Site, was involved in the production of shell and munition casings. No evidence has been found to indicate that the factory was involved in the filling of casings with explosive material.

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in Figure 4.

The UXO hazard zone plan of the Site is also given in the accompanying P13911-23-R1-MAP01-A.

Figure 4 UXO hazard zone plan of the Site



7 UXO RISK ASSESSMENT

7.1 Proposed works

It is understood that works on the Site are associated with a ground investigation. Boreholes will be drilled to between 20m and 25m below ground level (bgl).

It is assumed that future works on the Site may include excavations.

7.2 Risk assessment methodology

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard(s).

Firstly, the probability of encountering UXO (PE) has been considered and rated for the proposed construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating an item of UXO (PD) has been considered and rated for the proposed construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0
P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.		

The likelihood of encountering and detonating UXO during site works (P) is multiplied by the severity (S) of such an event occurring (P x S), to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix							
LIKELIHOOD (P)	SEVERITY (S)						
		5	4	3	2	1	0
	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

7.3 UXO risk level

The UXO risk assessment for proposed works on the Site is given in Table 3.

Table 3 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Excavations	1	1	1	1	5	5	Low
	Boreholes	1	1	1	1	4	4	Low
Other UXO	Excavations	1	1	1	1	4	4	Low
	Boreholes	1	1	1	1	3	3	Low

PE = Probability of Encounter; PD = Probability of Detonation; P = Likelihood

8 RISK MITIGATION PLAN

Key findings: No significant sources of UXO hazard have been identified.

Key actions: UXO awareness briefing is recommended for staff involved in intrusive works.

8.1 UXO risk summary

Table 4 summarises the UXO risk for proposed works on the Site and recommended actions.

Table 4 Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		UXO awareness briefing - Given the history of wartime production on the Site, it is recommended that a formal UXO awareness briefing is provided to staff involved in intrusive works.
Boreholes		Proceed with works

In summary, it is recommended that staff involved in intrusive works are provided with a formal UXO awareness briefing so that they take appropriate action in the event of a suspect find.

8.2 Risk mitigation techniques

8.2.1 UXO awareness briefing

A formal UXO awareness briefing should ensure that those involved in intrusive works take appropriate action if a suspect item is uncovered. The briefing can be given to all site workers, but the aim is to provide the client's key staff with the tools to provide the same induction to new staff without the UXO specialist's attendance.

The briefing will offer some recognition skills for typical UXO, and suitably sensitise those involved in excavation to be vigilant.

The induction materials are provided as a file containing both hard and electronic copies with additional information and resources such as UXO awareness posters, ordnance data sheets and emergency contact cards for staff awareness.

By providing the UXO awareness briefing, it ensures that in the unlikely event that UXO is encountered:

- All site staff take appropriate action.
- A support mechanism and points of contact are established.
- The likelihood of harm to people or property is reduced.
- Significant delays to site work are prevented.

8.3 What do I do next?

If you require a quote for an awareness briefing or have any comments, contact us and we can help.

	01993 886682		<u>uxo@zetica.com</u>		<u>zeticauxo.com</u>
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If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

APPENDICES

Appendix 1 Anticipated ordnance types

For a more comprehensive set of ordnance data sheets, see <http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/>.

Information Data Sheet

Category Projectiles (British)

Type 4.5-Inch Shell

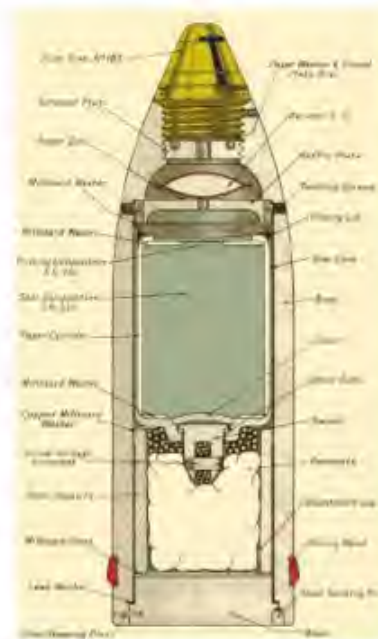
Variants	Numerous
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Body Dimensions 86mm x 114mm

Weight 35lbs (16kg)

Fuze Percussion fuze

Function Used for the Quick Firing (QF) 4.5-inch howitzer; the standard British howitzer during WWI.



Information Data Sheet

Category Projectiles (British)
Type 18-Pounder Shell

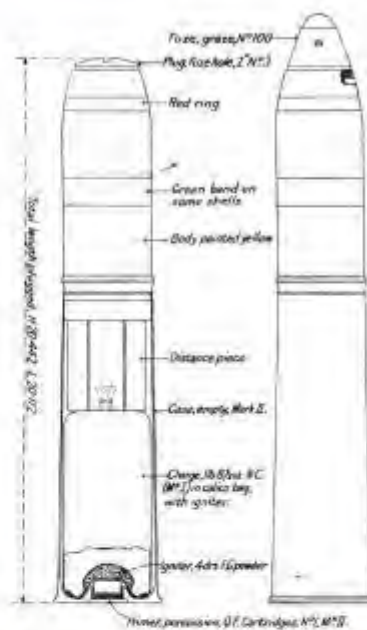
Variants Numerous

Body Dimensions 83mm x 235mm

Weight 18lbs (8.4kg)

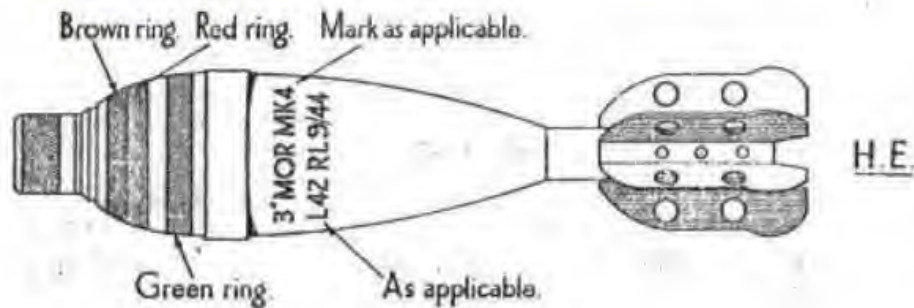
Fuze Percussion fuze

Function Used for the standard British field gun during WWI before being replaced by the 25-pounder shell.



Information Data Sheet

Category Mortar (British)
Type 3-Inch Mortar Bomb



Variants 2

Dimensions 19.3" x 3"

Weight 10lbs

Firing Mechanism Trip (small trigger)

Calibre 76.2mm (3.0 inches)

Rate of Fire 12 rounds per minute

Description Pear-shaped steel body with vaned tail fin for stability in flight. Typically filled with high explosive or white phosphorus, the latter dispersing on detonation.

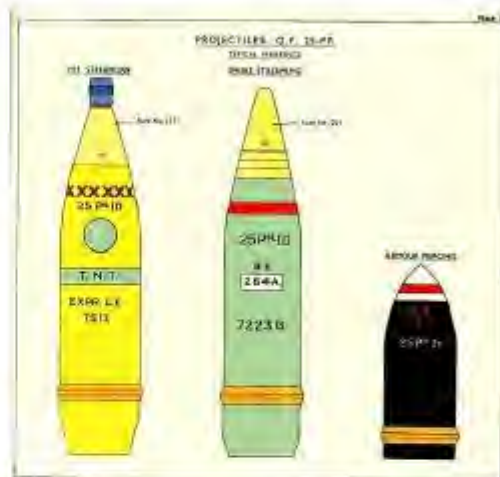
Function Range of up to 1,600 yards, the 3" mortar was used in an anti-personnel role.



Information Data Sheet

Category Projectiles (British)
Type 25-Pounder Shell

Variants	High Explosive Anti-Tank Smoke
Body Dimensions	88mm x 292mm
Weight	25lbs (11.5kg)
Fuze	Percussion fuze
Function	The Quick Fire (QF) 25-pounder became the standard British field gun and howitzer during WWII. It was highly mobile and remained in use into the 1960s



Information Data Sheet

Category Bomb (Luftwaffe)

Type Sprengbombe-Cylindrisch (SC) 50kg

Variants 8

Body Dimensions 762 x 200mm (30" x 7.9")

Weight 55kg (122lbs)

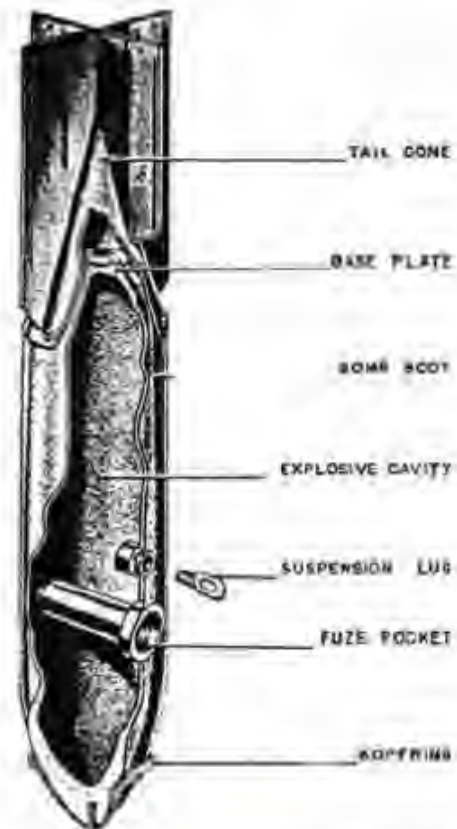
Charge Weight 25kg (54lbs)

Fuze Single electric impact fuze. Some have short time delay

Composition Sheet steel

Description Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 250kg

Variants 8

Body Dimensions 1194mm x 368mm (47" x 14.5")

Weight 249-264 kg (549-582lbs)

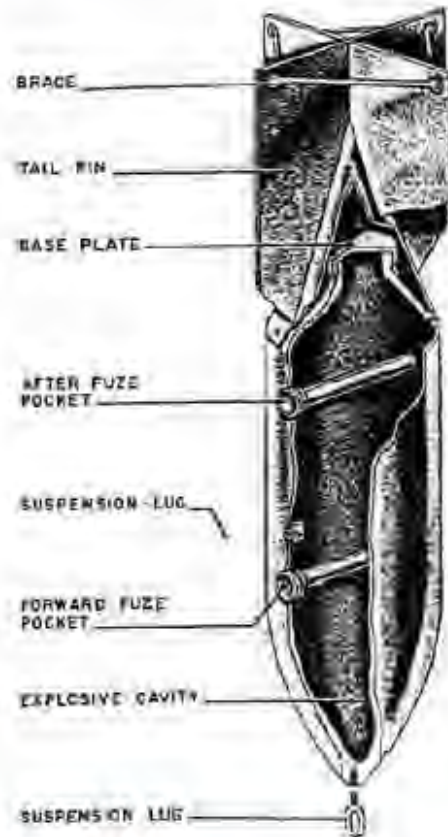
Charge Weight 130-145 kg (287-320lbs)

Fuze Electric impact fuze/electric clockwork time fuze & electric anti-disturbance fuze

Composition Sheet steel with stays

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring) or spike. Sheet metal tail attached to body with rivets/screws. Suspension eye bolt in the nose/body. Originally painted green-grey with a yellow stripe on the tail. TNT, amatol, TNT and aluminium powder, naphthalene, ammonium nitrate and wax/ wood meal filling.

Function Designed to maximize shock waves through air, water and earth and general demolition. Used against railway installations, large buildings, ammunition depots and below-ground installations (to 8m). Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) used against rail lines and country roads.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 500kg

Variants -

Body Dimensions 1414-1486mm x 470mm (55.7-58.5' x 18.5')

Weight 500kg (1100lbs)

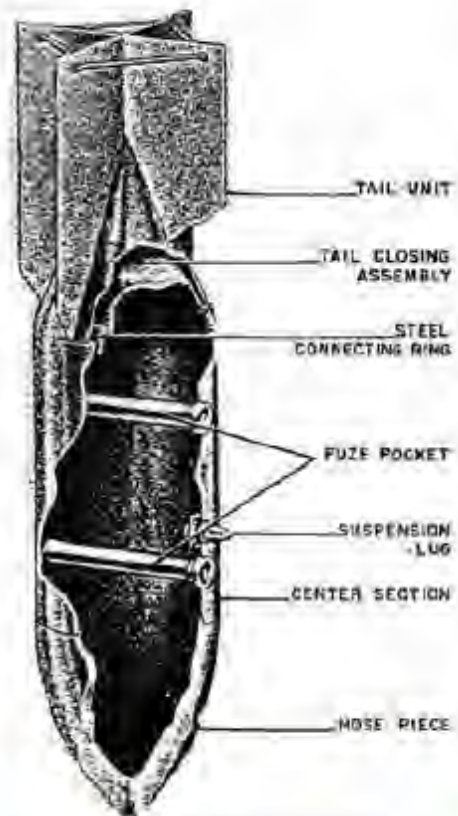
Charge Weight 220kg (484lbs)

Fuze Electric impact fuze/electric clockwork time fuze & electric anti-disturbance fuze.

Composition Sheet steel with stays or drum

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring). Tail either steel sheet or drum-shaped. Suspension band. Originally painted green-grey/ buff (some later versions sky blue) with yellow stripe on tail. Filled with amatol, TNT or trialen.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against railway property, large buildings, shipping and below-ground installations.



Information Data Sheet

Category Projectile
Type 3.7" Anti-Aircraft Shell

Variants 6

Body Dimensions 94mm x 360mm (3.7 x 14.7")

Weight 12.7kg (28lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Brass cartridge case. Square-based shell with tapered nose, filled with Amatol, TNT or RDX/TNT. MK6 had forward centring bands and a wider driving band.

Function Used as a defence against enemy aircraft, fired from fixed batteries and mobile mountings. Could fire approximately 20 rounds per minute with a maximum ceiling of 41,000ft and horizontal range of 20,600 yards.



Information Data Sheet

Category Projectile

Type 4.5" Shell (Mark II – Anti-Aircraft)

Variants -

Body Dimensions 114mm x 566mm (4.5" x 21.9")

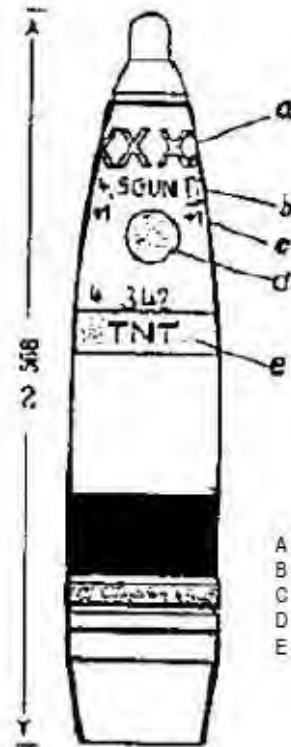
Weight 24.9kg (55lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Square-based, tapered-nosed shell filled with TNT or Amatol. Steel casing, rotating band of either copper or gilding metal located 3.5' in front of the base end with single groove.

Function Used as field artillery and adapted for use in anti-aircraft defence from fixed batteries. Rate of fire of 8 rounds per minute, maximum ceiling of 44,000ft and horizontal range of 22,800 yards.



A - Missile Identification
B - Gun and Bullet Type
C - Weight
D - Smoke pot
E - Explosives Ring



Appendix 2 Sources of UXO hazard

The sections below provide background information on the potential sources of UXO hazard affecting the Site. For a more comprehensive set of UXO information sheets, see <http://zeticauxo.com/downloads-and-resources/uxo-information-sheets/>.

Appendix 2.1 WWI bombing

Information Data Sheet

Category World War One (WWI) Bombing

Description:

During WWI, significant bombing took place across some areas of the UK. An estimated 9,000No. German bombs were dropped on Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used.

Nearly 100No. air raids were carried out on London and Southeast England, over 40No. of which were by Zeppelin airships. Areas along the East Coast was also targeted regularly due to their proximity to the European continent. Bombing raids further inland were rare and West England and Wales were out of reach for German aircraft of the time.

Aerial bombing during WWI initially relied on visual aiming, with bombsights not developed until later in the war. The inaccuracy inherent in this method meant that bombs often fell some way from their intended targets.

The first recorded raid against England occurred on the 21st December 1914 when 2No. High Explosive (HE) bombs fell near the Admiralty Pier at Dover. Zeppelin raids intensified during 1915 and 1916, with aircraft raids becoming more frequent after 1917. The last raid of WWI took place on the 19th May 1918, when 38 Gotha and 3 Giant aircraft bombed London and surrounding districts, dropping a total of more than 2,500lbs of bombs.



A variety of WWI German bombs

Hazard:

The potential of coming across an Unexploded Bomb (UXB) from WWI is far less likely than an UXB from World War Two (WWII), given the lower bombing densities during raids in WWI.

Some areas which were subjected to sustained bombing raids recorded a higher number of UXBs. In these areas, where there has been no significant development for the last century, the potential of a UXB remaining from WWI cannot be totally discounted.

Appendix 2.2 WWII bombing**Information Data Sheet****Category** World War Two (WWII) Bombing**Description:**

Bombing raids began in summer 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities, such as London, Birmingham, Coventry, and Hull, or strategic targets such as docks, harbours, industrial areas, and airfields. Coastal towns, such as Eastbourne, and cathedral cities, such as Canterbury were also heavily targeted.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). 50kg and 250kg HE bombs were most commonly used, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped. HE bombs tended to contain about half of their weight in explosives and were fitted with one or two fuzes. Not all HE bombs were intended to explode on impact and some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied IBs, to 250kg and 500kg Oil Bombs (OB). Occasionally IBs were fitted with a bursting charge which exploded after the bomb had been alight for a few minutes, causing burning debris to be scattered over a greater area. Large OBs were similar in appearance to HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineer (RE) to deal with their disposal.



Variety of WWII bombs

Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. The most common AP bombs were 1kg and 2kg, which could inflict injury across an area up to 150m away from the impact. PMs could be up to 4m in length and were typically detonated either magnetically or by noise/vibration. Anti-shipping PMs were commonly dropped over navigable rivers, dockland areas, and coastlines. Whilst the Royal Navy (RN) was responsible for ensuring that anti-shipping PMs were made safe, their removal and disposal was still the responsibility of the RE.

In 1944, new offensive weapons were introduced. The Flying Bomb (V1), a pilotless guided missile, exploded on impact and could cause significant damage. The Long Range Rocket (V2), a ballistic missile rocket, travelled at such speed that no one could see or hear its approach.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs aimed at a specific location might not just miss the intended target but could fall a considerable distance away.

Local Civil Defence authorities in urban areas typically had a comprehensive system for reporting bomb incidents and dealing with Unexploded Bombs (UXB). In more rural and coastal areas where fewer bombing raids occurred, it is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling. Bombs could be released as part of 'tip and run' raids where bomber crews would drop their bombs to avoid Anti-Aircraft (AA) fire or Allied fighter aircraft, on route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids often went unrecorded or were recorded as 'fell in open country' or 'fell in the sea'. The Luftwaffe are thought to have dropped approximately 75,000 tons of bombs on Britain throughout WWII and an estimated 11% of all bombs dropped during the war failed to detonate.



Removal of an UXB

Hazard:

The potential for a UXB hazard to exist on a site depends on a variety of factors:

- Were their strategic targets in the surrounding area?
- Was the site bombed and how heavy were the raids?
- Could an UXB impact have been missed, masked by rubble or debris?

Even in rural areas, the potential for UXBs cannot be totally discounted and therefore it is essential that detailed local bombing records are obtained when assessing the UXB hazard on any site.

Appendix 2.3 Anti-Aircraft defences

Information Data Sheet

Category Anti-Aircraft (AA) Defences

Description:

As aerial bombardment first began during World War One (WWI), AA gun batteries were gradually established throughout much of England to counter German bombing raids. By June 1916, there were approximately 271No. AA guns and 258No. searchlight installations defending London alone.

Common WWI AA defences included 3", 75mm, 6-pounder (pdr), and 1pdr guns. Many of these guns were mobile and would follow the course of an airship, firing from areas of open land.

During WWI, Unexploded AA (UXAA) shells, could land up to 13km from the firing point, although they more typically fell within 10km.



WWI 3-pdr mobile Vickers AA gun



WWII 3.7" static AA gun

During World War Two (WWII), AA gun batteries were used extensively to counter the threat posed by enemy aircraft. AA shells could be distributed over a wide area and could land up to 27km from the firing point, although they more typically fell within 15km.

3No. types of AA batteries existed:

- Heavy AA (HAA) – typically 3.7", 4.5", and 5.25" calibre guns designed to engage high flying bomber aircraft. These tended to be permanent gun emplacements.
- Light AA (LAA) – typically used 40mm shells and machine gun ammunition and designed to counter low flying aircraft. These were often mobile and were moved periodically.
- Rocket AA (ZAA) – fired 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km. These tended to be permanent gun emplacements.

Hazard:

AA batteries had munitions stores which stored shells for the batteries and Small Arms Ammunition (SAA) for troops manning the position. Such stores were typically removed at the end of WWII, although some disposal may have occurred in the immediate vicinity of the gun battery.

In areas heavily protected by AA batteries, it is prudent to consider the potential for UXAA shells in the area surrounding a battery, taking into consideration the likely extent within which shells would have fallen. Finding an UXAA shell immediately adjacent to a former gun battery is less likely.

Appendix 3 Recent UXO finds

Information Data Sheet

Category Recent UXO Finds

UXO finds in the UK are a regular occurrence, although they almost never result in an accidental detonation.

Explosives rarely lose effectiveness with age. In some instances, mechanisms such as fuzes and gaines can become more sensitive and more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay, or similar materials.

Zetica Ltd, and other commercial EOD companies, uncover and make safe thousands of items of UXO each year, though details are rarely made public knowledge.

Publicly recorded discoveries also occur regularly, as shown by the list of recent significant UXO finds in the UK below. Click [here](#) to keep up to date with the latest UXO finds.

On the 26th February 2021, a 1,000kg German "Hermann" UXB was discovered by builders at Exeter University campus (see below). It was investigated and detonated in-situ following the evacuation of nearby properties and University halls of residence.



1,000kg German UXB discovered in Exeter, 2021

On the 29th March 2021, 1No. 250lb UXB was discovered on the seabed near Hinkley Point C harbour, Bristol. A maritime exclusion was imposed while the item was investigated and then destroyed in a controlled explosion.

On the 1st June 2021, a cache of approximately 100No. WWII-era hand grenades were found in a Nottinghamshire forest, a possible relic from nearby WWII camps. They were destroyed.

On the 24th July 2021, 1No. 500lb British UXB was uncovered during construction works in Goole, East Yorkshire. Reports indicated that the UXB had been jettisoned by a Lancaster bomber aircraft prior to crashing nearby in WWII. The item was investigated and destroyed.

On the 18th August 2021, 1No. UXB was found by construction workers on a Site in Earl Sterndale, Derbyshire. Upon inspection the UXB was deemed to be dangerous, and a controlled detonation was undertaken.

On the 10th September 2021, EOD teams destroyed 25No. mortar bombs which had been washed up onto beaches around Nairn and Ardersier in Morayshire. These beaches had been used during WWII for training prior to the D-Day landings in Normandy.



Mortar bombs found on beaches in Nairn and Ardersier, 2021

On the 15th December 2021, approximately 200No. artillery shells were discovered at a construction site located within the former Royal Ordnance Factory at Swynnerton in Staffordshire. The shells were removed and destroyed.

On the 2nd January 2022, 1No. heavily deteriorated 105mm artillery shell was discovered by dogwalkers on a beach in Cumbria. This may have originated on one of the several offshore ranges which have been operational along the nearby coastline since WWII.

Between the 24th and 27th January 2022, 5No. empty artillery shells were uncovered at a construction site in Manchester. These were likely linked to a shell-production factory which had been active on the site during WWII.

On the 14th July 2022, 1No. 2" mortar bomb and several Small Arms Ammunition rounds were discovered on a beach near Ardnamurchan. An EOD team disposed of the items.

On the 28th November 2022, 45No. Self-Igniting Phosphorus grenades were discovered during construction works at a school in Swindon. They were disposed of by an EOD team.

On the 5th December 2022, 1No. UXB was discovered during construction at Biggin Hill Airport. An EOD team removed the UXB for safe disposal.

On the 7th February 2023 1No. 250kg bomb was found during dredging works in the River Yare, Great Yarmouth. It detonated unplanned whilst being disarmed by an Army EOD team.

On the 17th April 2023, 1No. unexploded mortar bomb was discovered at Cavenham Heath Nature Reserve. It was destroyed in a controlled explosion by an EOD team. This followed 2No. other similar discoveries on the 7th March and 12th March in the same stretch of canal.

On the 27th July 2023, 1No. 250kg WWII bomb was discovered off the coast of Guernsey by a recreational diver. It was detonated in situ by a Royal Navy EOD diver team.

Appendix 4 Glossary and definitions

Abandoned Explosive Ordnance (AXO)	Explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Demil	Derived from the term 'Demilitarisation', demil refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame, and a shock wave.
Device	Any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells, or bombs.
Explosive	Compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat, and pressure. These are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	All munitions containing explosives, nuclear fission or fusion materials, and biological and chemical agents. This includes bombs and warheads, missiles, artillery, mortar, rocket, Small Arms Ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs and dispensers, cartridge and propellant devices, electro-explosive devices, clandestine and improvised explosive devices, and all related items/components which are explosive in nature.
Explosive Ordnance Clearance (EOC)	The operation of ordnance detection, investigation, identification, and removal, with Explosive Ordnance Disposal being a separate operation.
Explosive Ordnance Disposal (EOD)	The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of Unexploded Ordnance.
Explosive Ordnance Reconnaissance (EOR)	The detection, identification, and on-site evaluation of Unexploded Ordnance before Explosive Ordnance Disposal.
Explosive Remnants of War (ERW)	Unexploded Ordnance and Abandoned Explosive Ordnance, excluding landmines.
Explosive Substances & Articles (ESA)	Explosive substances are solid or liquid substances (or a mixture) which are either: capable by a chemical reaction of producing gas at a speed, temperature, and pressure to cause damage to the surroundings; or designed to produce an effect by heat, light, sound, gas, or smoke (or a combination) as a result of a non-detonative, self-sustaining, exothermic reaction. One or more explosive substances form an explosive article.

Fuze	The part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and especially in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.
Gaine	Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.
Geophysical survey	A range of methods that can be used to detect objects or identify ground conditions without the need for intrusive methods (such as excavation or drilling). This is particularly suited to ordnance, as disturbance of ordnance is to be avoided where possible.
High Explosive (HE)	Secondary explosives (commonly known as HE) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are Nitro-glycerine (NG), Trinitrotoluene (TNT), Amatol (Ammonium nitrate and TNT), gunpowder, and Cyclotrimethylenetrinitramine (RDX).
Land Service Ammunition (LSA)	Items of ordnance thrown, propelled, or placed during land warfare, to include grenades, mortar bombs, projectiles, rockets, and landmines.
Munition	The complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in military operations, including demolitions. This includes those munitions that have been modified for use in training, ceremonial, or non-operational purposes. These fall into three distinct categories: inert (contain no explosives), live (contain explosives and have not been fired), and blind (have fired but failed to function as intended.)
Primary Explosive	Explosives used to initiate less sensitive explosives and usually extremely sensitive to friction, heat, and pressure. Primary explosives are commonly found in detonators. Examples of primary explosives are lead azide, lead styphnate, and mercury fulminate.
Propellants	Provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure, and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are ballistite, often in flake form, and cordite, often in string form.
Pyrotechnic	An explosive article or substance designed to produce an effect by heat, light, sound, gas, or smoke (or a combination), as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	Projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns, and machine guns.

Unexploded Anti-Aircraft (UXAA) Shell	Ordnance containing High Explosives, although they can also contain pyrotechnic compounds that produce smoke. They ranged from 2" to 5.25" calibre, although most common were 3.7" and 4.5" HE shells.
Unexploded Bomb (UXB)	A common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	Explosive ordnance that has been primed, fuzed, armed, or prepared for use and subsequently fired, dropped, launched, projected, or placed in such a manner as to present a hazard to operations, persons, or objects, and remains unexploded either by malfunction or design.
V1	The Vergeltungswaffe-1, also designated Fieseler Fi 103/FZG-76, known colloquially in English as the Flying Bomb, Pilotless Aircraft, Buzz Bomb, or Doodlebug, was the first guided missile used in WWII and the forerunner of today's cruise missile.
V2	The Vergeltungswaffe 2 ('Reprisal Weapon 2') was the first ballistic missile. It was used primarily against Belgian and British targets during the later stages of WWII. It was also the first man-made object launched into space, during test flights in 1944.

Appendix 5 Bibliography

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Appendix 6 General Notes

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- ☒ Desk studies
- ☒ Unexploded ordnance risk assessments and risk mitigation
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- ☒ Environmental and engineering geophysical surveys
- ☒ Transport infrastructure surveys
- ☒ Pipeline & cable route surveys
- ☒ Intrusive ground investigations

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Appendix C

Topographic and Utility Survey Plan

Appendix D

Exploratory Logs

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523235.92

Ground Level (mAOD)
80.79
Northing (OS mN)
232868.81

Start Date
26/02/2024
End Date
28/02/2024

Scale
1:50
Sheet 1 of 4

PROGRESS		SAMPLES		TESTS AND MEASUREMENTS				STRATA						Strike	Depth (Thick)	Level	Install/ Backfill	
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result		Recovery Details		Description				Legend								
2024/02/26 10:01 - / -	(ES 9) 0.20-0.40							CONCRETE					(0.20)					
	(D 2) 0.50-0.70	PID	0.50m	<1ppm				MADE GROUND: Light brown gravelly SAND . Gravel is angular to subrounded fine to coarse of flint, limestone and various igneous lithologies with occasional cobbles of brick. MADE GROUND: Recovered as light cream and brown very gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse flint and very weak to weak chalk.					0.20	80.59				
	(D 3) 1.00-1.20	PID	1.00m	<1ppm									(0.26)		80.33			
	(SPTLS 1) 1.20-1.65	SPT(S)	1.20m	N=43 (8,13/13,13,9,8)	Depth casing:1.20m									(0.99)				
	(D 4) 1.50-1.70	PID	1.50m	<1ppm				Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm)					1.45	79.34				
	(D 5) 2.00-2.20	PID	2.00m	<1ppm				[HOLYWELL NODULAR CHALK FORMATION]										
	(D 6) 2.50-2.70	PID	2.50m	<1ppm														
	(SPTLS 7) 2.70-3.15 (SPTLS 8) 2.70-3.15	SPT(S)	2.70m	N=25 (4,6/6,6,5,8)	Depth casing:2.70m													
	(D 13) 3.00-3.20	PID	3.00m	<1ppm														
	(D 14) 3.50-3.70	PID	3.50m	<1ppm														
	(D 15) 4.00-4.20	PID	4.00m	<1ppm														
	(SPTLS 10) 4.20-4.65	SPT(S)	4.20m	N=38 (4,11/13,8,9,8)	Depth casing:4.20m													
	(D 16) 4.50-4.70	PID	4.50m	<1ppm														
	(D 17) 5.00-5.20	PID	5.00m	<1ppm														
			PID	5.50m	<1ppm											(7.55)		
	(SPTLS 11) 5.70-6.15	SPT(S)	5.70m	N=20 (4,4/4,5,5,6)	Depth casing:5.70m													
	(D 19) 6.00-6.20	PID	6.00m	<1ppm														
	(D 20) 6.50-6.70	PID	6.50m	<1ppm														
	(D 21) 7.00-7.20 (SPTLS 12) 7.00-7.45	PID SPT(S)	7.00m 7.00m	<1ppm N=23 (4,4/4,6,6,7)	Depth casing:7.00m													
	(D 22) 7.50-7.70	PID	7.50m	<1ppm														
	(D 23) 8.00-8.20	PID	8.00m	<1ppm														
	(D 24) 8.50-8.70	PID	8.50m	<1ppm														
	2024/02/26 17:24 - / - 2024/02/27 09:51 - / 7.22								NO RECOVERY					9.00	71.79			

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
30.00m

Logged By
AC
Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523235.92

Ground Level (mAOD)
80.79
Northing (OS mN)
232868.81

Start Date
26/02/2024
End Date
28/02/2024

Scale
1:50
Sheet 2 of 4

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS			STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details		Description	Legend				
(D 27) 10.00-10.20 (C 28) 10.03-10.16					Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.					
(SPTLS 28) 10.50-10.95	PID 10.50m <1ppm SPT(S) 10.50m N=50 (4.5/14, 15, 15.6) Depth casing: 10.50m									
(D 30) 11.00-11.20	PID 11.00m <1ppm		TCR 100 SCR 20 RQD 20		[HOLYWELL NODULAR CHALK FORMATION]					
	PID 11.50m <1ppm									
(C 29) 11.82-12.00										
(D 31) 12.00-12.20 (C 35) 12.18-12.40	PID 12.00m <1ppm									
	PID 12.50m <1ppm		TCR 100 SCR 85 RQD 61							
(D 32) 13.00-13.20	PID 13.00m <1ppm									
	PID 13.50m <1ppm									
(D 33) 14.00-14.20	PID 14.00m <1ppm									
	PID 14.50m <1ppm		TCR 100 SCR 56 RQD 35							
(C 36) 14.68-14.98										
(D 34) 15.00-15.20	PID 15.00m <1ppm									
	PID 15.50m <1ppm		TCR 100 SCR 69 RQD 59							
(C 37) 15.68-15.91										
(D 38) 16.00-16.20	PID 16.00m <1ppm									
	PID 16.50m <1ppm									
(C 40) 16.59-16.76										
(D 39) 17.00-17.20	PID 17.00m <1ppm									
	PID 17.50m <1ppm		TCR 100 SCR 68 RQD 55							
(D 41) 18.00-18.20	PID 18.00m <1ppm									
(ES 60) 18.30-18.50	PID 18.50m <1ppm									
	PID 18.50m <1ppm		TCR 97 SCR 53 RQD 47							
(D 42) 19.00-19.20	PID 19.00m <1ppm									
	PID 19.50m <1ppm									
(D 44) 20.00-20.20	PID 20.00m <1ppm									

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	30.00	Rotary Core	300 146	1.20 30.00	150	30.00	28/02/2024 14:40	18.96											

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH101	Standpipe	-	BH101	15.00	30.00	50	Target depth achieved												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
30.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523235.92

Ground Level (mAOD)
80.79
Northing (OS mN)
232868.81

Start Date
26/02/2024
End Date
28/02/2024

Scale
1:50
Sheet 3 of 4

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS		STRATA		Strike	Depth (Thick)	Level	Install/ Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend				
2024/02/27 17:07 - 2024/02/28 07:57 - 19.00	(C 43) 20.80-21.00	PID 20.50m <1ppm	TCR 100 SCR 75 RQD 55	Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.					
	(D 45) 21.40-21.60	PID 21.50m <1ppm	TCR 87 SCR 70 RQD 39	HOLYWELL NODULAR CHALK FORMATION Nodular chalk up to 22mm diameter nodules present within core. Thin interwoven marls with white intraclasts 20.1-20.8m bgl			21.00 (0.19) 21.19	59.79 59.60	
	(C 46) 22.18-22.44	PID 22.00m <1ppm		NO RECOVERY Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.					
	(D 47) 22.60-22.80	PID 22.50m <1ppm							
	(D 48) 23.00-23.20	PID 23.00m <1ppm	TCR 100 SCR 61 RQD 32	HOLYWELL NODULAR CHALK FORMATION Light orangey grey creamy white nodular chalk. Very thin to thin interwoven, wispy marls with white intraclasts 21.8-22.1m bgl					
	(C 49) 23.72-23.87	PID 23.50m <1ppm							
	(D 50) 24.00-24.20	PID 24.00m <1ppm							
	(C 52) 24.35-24.50								
	(D 51) 25.00-25.20	PID 25.00m <1ppm	TCR 97 SCR 73 RQD 64						
		PID 25.50m <1ppm							
2024/02/28 17:14 30.00 / 18.96	(D 53) 26.00-26.20	PID 26.00m <1ppm	TCR 100 SCR 69 RQD 18				(8.81)		
		PID 26.50m <1ppm							
	(C 54) 26.81-26.95								
	(D 56) 27.30-27.50	PID 27.50m <1ppm	TCR 92 SCR 54 RQD 37						
	(C 55) 27.70-27.85								
	(D 57) 28.00-28.20	PID 28.00m <1ppm							
	(C 59) 29.00-29.26	PID 29.00m <1ppm	TCR 92 SCR 63 RQD 28						
	(D 58) 29.50-29.70	PID 29.50m <1ppm							
							30.00	50.79	

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	30.00	Rotary Core	300 146	1.20 30.00	150	30.00	28/02/2024 14:40	18.96											

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH101	Standpipe	-	BH101	15.00	30.00	50	Target depth achieved												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
30.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523235.92

Ground Level (mAOD)
80.79
Northing (OS mN)
232868.81

Start Date
26/02/2024
End Date
28/02/2024

Scale
1:50

Sheet 4 of 4

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS		STRATA				
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend	Strike Depth (Thick)	Level	Install/ Backfill
2024/02/29 11:28 - / -								

Drilling Technique			Hole / Casing Diameter				Water Observations							No Flush Undertaken				Water Added: Other		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres	
0.00	30.00	Rotary Core	300 146	1.20 30.00	150	30.00	28/02/2024 14:40	18.96												

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS
Name	Type	m AGL	Name	From	To	Dia.	
BH101	Standpipe	-	BH101	15.00	30.00	50	Target depth achieved

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used

Camacchio MC305

Termination Depth
30.00m

Logged By	Checked By
AC	NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523332.74

Ground Level (mAOD)
81.14
Northing (OS mN)
232994.01

Start Date
08/03/2024
End Date
12/03/2024

Scale
1:50
Sheet 1 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS		STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend				
2024/03/08 08:33 - / -	(ES 2) 0.20-0.40	PID 0.50m <1ppm		MADE GROUND: BITUMINOUS SURFACING MADE GROUND: Light orangey brown gravelly cobbly SAND . Gravel is angular to subrounded fine to coarse of flint, limestone, brick, concrete and various igneous lithologies with frequent cobbles of red brick.			0.10	81.04	
		PID 1.00m <1ppm		MADE GROUND: Recovered as light cream and brown very gravelly fine to coarse SAND Gravel is subangular to subrounded fine to coarse flint, and very weak to weak chalk. Rare fragments of brick and concrete			(0.52)	80.52	
	(SPTLS 1) 1.20-1.65	SPT(S) 1.20m N=9 (2,2/2,3,2,2) Depth casing:1.20m		NO RECOVERY			(0.58)	79.94	
			TCR 0 SCR 0 RQD 0				(1.30)		
	(SPTLS 3) 2.50-2.95	PID 2.50m <1ppm SPT(S) 2.50m N=11 (3,2/3,3,3,2) Depth casing:2.50m		Possible concrete noted by Driller 2.3-2.5m bgl			2.50	78.64	
		PID 3.00m <1ppm		Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm) [HOLYWELL NODULAR CHALK FORMATION			(1.50)		
		PID 3.50m <1ppm		Becomes orangey brown silty gravelly SAND. Gravel is angular to subrounded fine to medium of chalk and flint. Sand is medium to coarse 2.5-3.05m bgl					
		SPT(C) 4.00m N=9 (1,2/1,1,2,5) Depth casing:4.00m		NO RECOVERY			4.00	77.14	
			TCR 0 SCR 0 RQD 0				(1.50)		
		SPT(C) 5.50m N=20 (2,3/4,5,5,6) Depth casing:5.50m		NO RECOVERY			5.50	75.64	
			TCR 13 SCR 0 RQD 0				(1.30)		
		PID 6.50m <1ppm					6.80	74.34	
2024/03/08 14:04 - / -		PID 7.00m <1ppm SPT(C) 7.00m N=50 (10,12/8,10,12,20) Depth casing:7.00m		Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm) [HOLYWELL NODULAR CHALK FORMATION					
		PID 7.50m <1ppm							
	(ES 4) 8.00-8.20	PID 8.00m <1ppm							
		PID 8.50m <1ppm SPT(C) 8.50m N=50 (10,12/8,10,12,20) Depth casing:8.50m					(3.70)		
		PID 9.00m <1ppm							
		PID 9.50m <1ppm							

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	28.00	Rotary Core	300 146	1.20 28.00	150	28.00													

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH102	Standpipe	0.000	BH102	19.00	27.00	50	Target depth achieved.												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523332.74

Ground Level (mAOD)
81.14
Northing (OS mN)
232994.01

Start Date
08/03/2024
End Date
12/03/2024

Scale
1:50
Sheet 2 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS		STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend				
2024/03/11 17:02 - / - 2024/03/12 09:23 - / 13.20		SPT(C) 10.00m N>50 (5,10/20,30 for 50mm) Depth casing:10.00m		Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm) [HOLYWELL NODULAR CHALK FORMATION			10.50	70.64	
	PID 10.50m	<1ppm	TCR 87 SCR 60 RQD 17	Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.					
	PID 11.00m	<1ppm							
	PID 11.50m	<1ppm							
	PID 12.00m	<1ppm	TCR 93 SCR 54 RQD 7	[HOLYWELL NODULAR CHALK FORMATION					
	PID 12.50m	<1ppm							
	PID 13.50m	<1ppm	TCR 67 SCR 41 RQD 0						
	PID 14.00m	<1ppm							
	PID 15.00m	<1ppm	TCR 67 SCR 15 RQD 0				(17.50)		
	PID 15.50m	<1ppm							
	PID 16.00m	<1ppm							
	PID 16.50m	<1ppm	TCR 100 SCR 83 RQD 11						
	PID 17.00m	<1ppm							
	PID 18.00m	<1ppm	TCR 87 SCR 55 RQD 33						
	PID 18.50m	<1ppm							
	PID 19.00m	<1ppm							
	PID 19.50m	<1ppm	TCR 100 SCR 73 RQD 31	Nodular chalk up to 36mm diameter nodules 19.35-20.23m bgl					
	PID 20.00m	<1ppm							

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	28.00	Rotary Core	300 146	1.20 28.00	150	28.00													

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH102	Standpipe	0.000	BH102	19.00	27.00	50	Target depth achieved.												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523332.74

Ground Level (mAOD)
81.14
Northing (OS mN)
232994.01

Start Date
08/03/2024
End Date
12/03/2024

Scale
1:50
Sheet 3 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS			STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend					
2024/03/12 16:58 - / 23.40 2024/03/12 17:00 - / 13.90				Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.						
		PID 21.00m <1ppm	TCR 67 SCR 35 RQD 13	[HOLYWELL NODULAR CHALK FORMATION]						
		PID 21.50m <1ppm								
		PID 22.50m <1ppm	TCR 83 SCR 71 RQD 53							
		PID 23.00m <1ppm								
		PID 24.00m <1ppm	TCR 50 SCR 6 RQD 0							
		PID 25.00m <1ppm								
		PID 25.50m <1ppm	TCR 100 SCR 83 RQD 52							
		PID 26.00m <1ppm								
		PID 26.50m <1ppm								
		PID 27.00m <1ppm	TCR 93 SCR 61 RQD 21							
		PID 27.50m <1ppm								
								28.00	53.14	

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	28.00	Rotary Core	300 146	1.20 28.00	150	28.00													

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS													
Name	Type	m AGL	Name	From	To	Dia.														
BH102	Standpipe	0.000	BH102	19.00	27.00	50	Target depth achieved.													

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523341.49

Ground Level (mAOD)
81.04
Northing (OS mN)
232961.29

Start Date
28/02/2024
End Date
05/03/2024

Scale
1:50
Sheet 1 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS		STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details	Description	Legend				
2024/02/28 12:00 - / -				MADE GROUND: BITUMINOUS SURFACING			(0.18) 0.18	80.86	
		PID 0.50m <1ppm		MADE GROUND: Light orangey brown gravelly cobbly SAND. Gravel is angular to subrounded fine to coarse of flint, limestone, brick, concrete and various igneous lithologies with frequent cobbles of red brick.			(0.62)		
	(ES 1) 0.80-1.00			MADE GROUND: Recovered as Light white and brown clayey gravelly SAND. Gravel angular to subrounded fine to coarse of chalk, brick and concrete. Sand is fine to coarse.			0.80	80.24	
2024/02/28 13:43		PID 1.00m <1ppm					(0.57)		
2024/02/29 12:37 - / -	(SPTLS 4) 1.20-1.65	SPT(S) 1.20m N=11 (4,5/5,3,2,1) Depth casing:1.20m		Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm)			1.37	79.67	
	(D 2) 1.50-1.70	PID 1.50m <1ppm		[HOLYWELL NODULAR CHALK FORMATION]					
	(D 3) 2.00-2.20	PID 2.00m <1ppm	TCR 100 SCR 0 RQD 0						
		PID 2.50m <1ppm							
	(SPTLS 5) 2.70-3.15	SPT(S) 2.70m N=19 (2,3/4,5,5,5) Depth casing:2.70m							
	(D 6) 3.00-3.20	PID 3.00m <1ppm							
		PID 3.50m <1ppm	TCR 100 SCR 0 RQD 0						
	(D 7) 4.00-4.20	PID 4.00m <1ppm							
	(SPTLS 8) 4.20-4.65	SPT(S) 4.20m N=7 (1,2/1,2,2,2) Depth casing:4.20m		Becomes cream white and dark brownish grey medium to coarse slight gravelly SAND. Gravel is angular to subrounded fine to coarse of chalk 4.2-4.36m bgl					
		PID 4.50m <1ppm							
	(D 9) 5.00-5.20	PID 5.00m <1ppm	TCR 100 SCR 0 RQD 0						
		PID 5.50m <1ppm							
	(SPTLS 10) 5.70-6.15	SPT(S) 5.70m N=16 (2,3/4,5,3,4) Depth casing:5.70m					(10.84)		
	(D 11) 6.00-6.20	PID 6.00m <1ppm							
		PID 6.50m <1ppm	TCR 100 SCR 0 RQD 0						
	(D 12) 7.00-7.20	PID 7.00m <1ppm							
	(SPTLS 15) 7.20-7.65	SPT(S) 7.20m N=8 (1,2/2,3,2,1) Depth casing:7.20m							
		PID 7.50m <1ppm							
	(D 14) 8.00-8.20	PID 8.00m <1ppm	TCR 100 SCR 0 RQD 0						
		PID 8.50m <1ppm							
2024/02/29 17:00 - / 11.62									
2024/03/01 08:57 - / 7.85	(SPTLS 13) 8.70-9.15	SPT(S) 8.70m N=20 (2,3/1,4,7,8) Depth casing:8.70m							
	(D 16) 9.00-9.20	PID 9.00m <1ppm							
		PID 9.50m <1ppm	TCR 100 SCR 0 RQD 0						

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	28.00	Rotary Core	300 146	1.20 28.00	150	28.00													

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH103	Standpipe	-	BH103	19.00	27.00	50	Target depth achieved.												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523341.49

Ground Level (mAOD)
81.04
Northing (OS mN)
232961.29

Start Date
28/02/2024
End Date
05/03/2024

Scale
1:50
Sheet 2 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS			STRATA		Strike	Depth (Thick)	Level	Install/Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Recovery Details		Description	Legend				
2024/03/01 15:01 2024/03/04 09:13 - / - - / -	(SPTLS 17) 10.00-10.45	SPT(S) 10.00m N=25 (6,6/6,5,3,1) Depth casing:10.00m	TCR 23 SCR 0 RQD 0		Structureless CHALK composed of silty angular to subangular fine to coarse GRAVEL of extremely weak to weak low density black speckled chalk. (Dm) [HOLYWELL NODULAR CHALK FORMATION]					
	(D 18) 11.20-11.40	PID 11.30m <1ppm PID 11.50m <1ppm			Becomes Structured CHALK 11.5-11.59m bgl					
	(D 19) 12.00-12.20	PID 12.00m <1ppm PID 12.50m <1ppm	TCR 100 SCR 51 RQD 7		Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.			12.21	68.83	
	(D 20) 13.00-13.20									
	(D 21) 13.40-13.60	PID 13.50m <1ppm	TCR 60 SCR 40 RQD 7		[HOLYWELL NODULAR CHALK FORMATION]					
	(D 22) 14.10-14.30	PID 14.00m <1ppm								
	(D 23) 15.20-15.40		TCR 63 SCR 35 RQD 7							
	(C 24) 15.55-15.64	PID 15.50m <1ppm								
	(D 25) 16.50-16.70		TCR 93 SCR 45 RQD 0		Becomes weathered structureless CHALK recovered as angular to subangular fine to coarse gravel. 16.48-16.75m bgl					
	(D 26) 17.00-17.20				Becomes weathered structureless CHALK recovered as angular to subangular fine to coarse gravel. 16.95-17.09m bgl					
	(D 27) 18.00-18.20	PID 17.50m <1ppm PID 18.00m <1ppm	TCR 97 SCR 65 RQD 10		Becomes weathered structureless CHALK recovered as angular to subangular fine to coarse gravel. 17.79-17.95m bgl					
	(C 28) 18.65-18.79	PID 18.50m <1ppm			Becomes weathered structureless CHALK recovered as angular to subangular fine to medium gravel. 18.31-18.34m bgl Becomes weathered structureless CHALK recovered as angular to subangular fine to medium gravel. 18.58-18.65m bgl					
	(D 29) 19.20-19.40		TCR 90 SCR 31 RQD 17		Becomes weathered structureless CHALK recovered as angular to subangular fine to coarse gravel. 18.79-18.88m bgl					

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	28.00	Rotary Core	300 146	1.20 28.00	150	28.00													

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
BH103	Standpipe	-	BH103	19.00	27.00	50	Target depth achieved.												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523341.49

Ground Level (mAOD)
81.04
Northing (OS mN)
232961.29

Start Date
28/02/2024
End Date
05/03/2024

Scale
1:50
Sheet 3 of 3

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS				STRATA								Strike	Depth (Thick)	Level	Install/ Backfill			
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result				Recovery Details		Description				Legend								
2024/03/04 17:00 - / - 2024/03/05 08:57 - / 21.83	(C 31) 20.03-20.17 (D 30) 20.20-20.40							Weak medium density light cream CHALK Fractures are close (50,100,130), not infilled, horizontal to vertical, smooth and undulating, tight, light cream with black speckling and yellowish orange staining noted on fracture surface. Thin interwoven and wispy marls present.												
	(D 33) 21.00-21.20 (ES 38) 21.30-21.50					TCR 67 SCR 49 RQD 25		[HOLYWELL NODULAR CHALK FORMATION Becomes weathered structureless CHALK recovered as angular to subangular fine to coarse gravel. 21.4-21.6m bgl]												
	(C 32) 21.78-21.89 (D 34) 22.00-22.20					PID	22.00m	<1ppm	TCR 91 SCR 50 RQD 0											
						PID	22.50m	<1ppm												
	(D 35) 23.00-23.20					PID	23.00m	<1ppm												
						PID	23.50m	<1ppm												
(D 37) 24.00-24.20	PID	24.00m	<1ppm	TCR 100 SCR 48 RQD 37																
	PID	24.50m	<1ppm																	
2024/03/04 17:00 - / - 2024/03/05 08:57 - / 21.83	(C 36) 24.87-25.00 (D 40) 25.20-25.40					TCR 87 SCR 40 RQD 24														
(C 39) 25.80-25.96 (D 41) 26.20-26.40	PID	26.00m	<1ppm	TCR 90 SCR 40 RQD 7																
(D 43) 27.00-27.20	PID	27.00m	<1ppm																	
	PID	27.50m	<1ppm																	
2024/03/05 11:34 - / 18.63 2024/03/05 17:00 - / -	(C 42) 27.75-27.85																			

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Camacchio MC305

Termination Depth
28.00m

Logged By
AC

Checked By
NM

Project

Project No.

Ground Level (mAOD)

Start Date

Scale

Sheet 1 of 1

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS	STRATA		Strike	Depth (Thick)	Level	Install/ Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Description	Legend				
2024/03/07 10:02 - / -			MADE GROUND: BITUMINOUS SURFACING			0.10		
			MADE GROUND: Light brown gravelly SAND. Gravel is angular to subrounded fine to coarse of flint, limestone brick and various igneous lithologies with occasional cobbles of brick, fire brick and concrete. <u>concrete obstruction 0.24-0.24m bgl</u>			(0.80)		
						0.90		

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	0.90	Inspection Pit	300	0.90															

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS
Name	Type	m AGL	Name	From	To	Dia.	
							Refusal at 0.9m due to concrete obstruction. Unable to advance using insulated hand tools

Unless otherwise stated:

Equipment Used

Termination Depth

Logged By

Checked By _____

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523279.37

Ground Level (mAOD)

Northing (OS mN)
232991.12

Start Date
07/03/2024
End Date
07/03/2024

Scale
1:15
Sheet 1 of 1

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS	STRATA		Strike	Depth (Thick)	Level	Install/ Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Description	Legend				
			MADE GROUND: BITUMINOUS SURFACING			(0.16)		
			MADE GROUND: Light orangey brown gravelly cobbly SAND . Gravel is angular to subrounded fine to coarse of flint, limestone, brick, concrete and various igneous lithologies with frequent cobbles of red brick.			0.16 (0.15) 0.31		

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS						NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres
0.00	0.30	Inspection Pit	300	0.30															

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.													
							Refusal at 0.31m due to concrete obstruction. Unable to advance using insulated hand tools												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Corer, insulated hand tools

Termination Depth
0.31m

Logged By
AC
Checked By
NM

Project
Tesco Letchworth
Client
Tesco

Project No.
30213868
Easting (OS mE)
523251.98

Ground Level (mAOD)

Northing (OS mN)
232998.03

Start Date
06/03/2024
End Date
06/03/2024

Scale
1:15
Sheet 1 of 1

PROGRESS	SAMPLES	TESTS AND MEASUREMENTS	STRATA		Strike	Depth (Thick)	Level	Install/ Backfill
Date / Time Casing / DTW (Remarks)	Type - Depth (m)	Type - Depth (m) - Result	Description	Legend				
2024/03/06 09:16 - / -			MADE GROUND: BITUMINOUS SURFACING			(0.17)		
			MADE GROUND: Light orangey brown gravelly cobbly SAND . Gravel is angular to subrounded fine to coarse of flint, limestone, brick, concrete and various igneous lithologies with frequent cobbles of red brick. Rare plastic and metal fragments.			0.17 (0.28)		
		PID 0.50m <1ppm	MADE GROUND: Recovered as Light white and brown clayey gravelly SAND. Gravel angular to subrounded fine to coarse of chalk, brick and concrete. Sand is fine to coarse.			0.45 (0.59)		
2024/03/06 12:28 - / - 2024/03/06 12:29 - / -		PID 1.00m <1ppm				1.04		

DRILLING TECHNIQUE			HOLE / CASING DIAMETER				WATER OBSERVATIONS							NO FLUSH UNDERTAKEN				WATER ADDED: OTHER		
From	To	Type	Hole Dia.	Depth	Casing Dia.	Depth	Date/Time	Strike	Rest	Mins	Casing	Sealed	From	To	Rtn%	Type	From	To	Litres	
0.00	1.04	Inspection Pit	300	1.04																

MONITORING INSTRUMENTS			INSTRUMENT SCREEN DESIGN				REMARKS												
Name	Type	m AGL	Name	From	To	Dia.	Refusal at 1.04m due to concrete obstruction. Unable to advance with insulated hand tools												

Unless otherwise stated:
Depth (m bgl), Diameter (mm), From/To (m bgl),
Level (m AOD/ASD), Thickness (m), Time (hhmm),
Height Above Ground Level (m AGL)

Equipment Used
Corer, insulated hand tools

Termination Depth
1.04m

Logged By
AC

Checked By
NM

Appendix E

SPT Hammer Calibration Certificate

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: AR1704
Test Date: 12/12/2023
Report Date: 12/12/2023
File Name: AR1704.spt
Test Operator: MT

Instrumented Rod Data

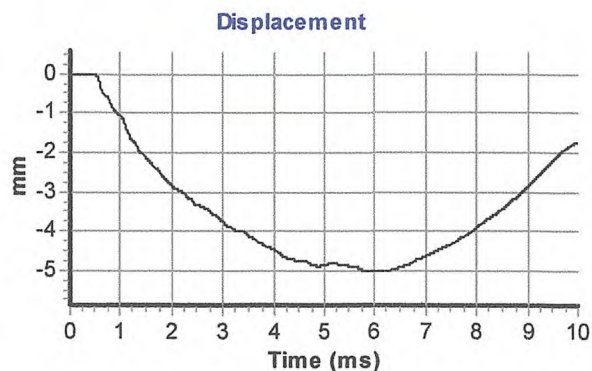
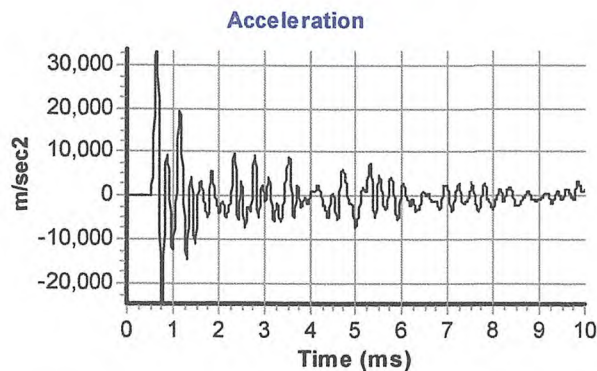
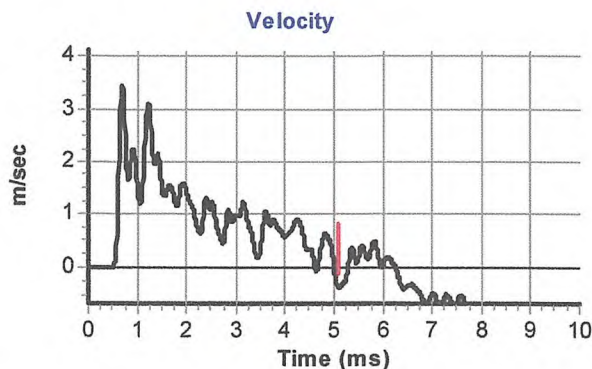
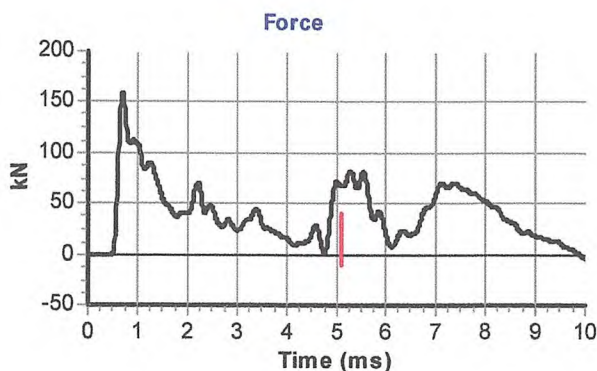
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.5
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 72572
Accelerometer No.2: 72757

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

ARCADIS UK LTD
87198



Calculations

Area of Rod A (mm²): 970
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 325

Energy Ratio E_r (%): **69**

Signed: M.TONER
Title: FITTER

The recommended calibration interval is 12 months

Appendix F

Environmental Laboratory Analysis Certificates

Arcadis
Part 3rd Floor
Charter House
62-68 Hills Road
Cambridge
Cambridgeshire
United Kingdom
CB2 1LA



Attention : Niall Maguire
Date : 14th March, 2024
Your reference : 30213868
Our reference : Test Report 24/3709 Batch 1
Location : Tesco Letchworth
Date samples received : 2nd March, 2024
Status : Final Report
Issue : 202403141123

Three samples were received for analysis on 2nd March, 2024 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 13.973 kg of CO2

Scope 1&2&3 emissions - 33.022 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/3709

Report : Solid

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

EMT Sample No.	1-4	5-7	8-11								Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101260224 SO0.2-0.4	BH101280224 SO18.3-18.5	BH103280224 SO0.8-1.0										
Depth	0.20-0.40	18.30-18.50	0.80-1.00										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	26/02/2024	26/02/2024	26/02/2024										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	02/03/2024	02/03/2024	02/03/2024								LOD/LOR	Units	Method No.
Arsenic #	2.9	-	9.0								<0.5	mg/kg	TM30/PM15
Barium #	68	-	30								<1	mg/kg	TM30/PM15
Beryllium	0.5	-	0.6								<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	-	<0.1								<0.1	mg/kg	TM30/PM15
Chromium #	89.4	-	66.6								<0.5	mg/kg	TM30/PM15
Copper #	106	-	7								<1	mg/kg	TM30/PM15
Lead #	14	-	7								<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1								<0.1	mg/kg	TM30/PM15
Nickel #	408AA	-	13.3								<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	<1								<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	1060	-	290								<50	mg/kg	TM50/PM29
Vanadium	44	-	28								<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.8	-	0.4								<0.1	mg/kg	TM74/PM32
Zinc #	57	-	31								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.07	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.21	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	0.16	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.14	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	0.14	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene #	0.24	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.10	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.10	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	<0.04	-	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.2	<0.6	<0.6								<0.6	mg/kg	TM4/PM8
PAH 17 Total	1.16	-	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.17	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.07	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	102	78	99								<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 #	<3	<3	5								<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3	<3								<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	<5	<5								<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3	<3								<3	ug/kg	TM15/PM10

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/3709

Report : Solid

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

EMT Sample No.	1-4	5-7	8-11								Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101260224 SO0.2-0.4	BH101280224 SO18.3-18.5	BH103280224 SO0.8-1.0										
Depth	0.20-0.40	18.30-18.50	0.80-1.00										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	26/02/2024	26/02/2024	26/02/2024										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	02/03/2024	02/03/2024	02/03/2024								LOD/LOR	Units	Method No.
Surrogate Recovery Toluene D8	98	98	103								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	97	105	106								<0	%	TM15/PM10
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	-	<30								<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<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	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<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	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	28	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	28	<19	<19								<19	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<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	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<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	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	10	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<19	<19	<19								<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)	<38	<38	<38								<38	mg/kg	TM5/PM8/PM16
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
Natural Moisture Content	6.9	24.0	16.7								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-	<0.3								<0.3	mg/kg	TM38/PM20
Chromium III	89.4	-	66.6								<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.05	-	0.15								<0.02	%	TM21/PM24
Ethyl Tert Butyl Ether (ETBE)	<5	<5	<5								<5	ug/kg	TM83/PM10
Di isopropyl Ether (DIPE)	<5	<5	<5								<5	ug/kg	TM83/PM10

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/3709

Report : Solid

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

[illegible]

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/3709

Report : CEN 10:1 1 Batch

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

[illegible]

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/3709

VOC Report : Solid

EMT Sample No.	1-4	5-7	8-11									
Sample ID	BH101280224 SO0.2-0.4	BH101280224 SO18.3-18.5	BH103280224 SO0.8-1.0									
Depth	0.20-0.40	18.30-18.50	0.80-1.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	26/02/2024	26/02/2024	26/02/2024									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	02/03/2024	02/03/2024	02/03/2024									
										LOD/LOR	Units	Method No.
VOC MS												
Dichlorodifluoromethane	<2	<2	<2							<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2	<2	<2							<2	ug/kg	TM15/PM10
Chloromethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2	<2							<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1	<1							<1	ug/kg	TM15/PM10
Chloroethane #	<2	<2	<2							<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2	<2	<2							<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6	<6	<6							<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7	<7	<7							<7	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3							<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4	<4							<4	ug/kg	TM15/PM10
Bromochloromethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Chloroform #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3							<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4	<4	<4							<4	ug/kg	TM15/PM10
Benzene #	<3	<3	<3							<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6	<6	<6							<6	ug/kg	TM15/PM10
Dibromomethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4	<4							<4	ug/kg	TM15/PM10
Toluene #	<3	<3	5							<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Chlorobenzene #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3	<3							<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	<5	<5							<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3	<3							<3	ug/kg	TM15/PM10
Styrene	<3	<3	8							<3	ug/kg	TM15_A/PM10
Bromoform	<3	<3	<3							<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3	<3	<3							<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2	<2							<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4	<4	<4							<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4	<4							<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3	<3							<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3							<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3	<3							<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5	<5							<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	<6	<6							<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4	<4							<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4	<4	<4							<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4	<4	<4							<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4	<4							<4	ug/kg	TM15/PM10
n-Butylbenzene	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7	<7	<7							<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4	<4							<4	ug/kg	TM15/PM10
Naphthalene	<27	<27	<27							<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7	<7	<7							<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	98	98	103							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	97	105	106							<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Mass of sample taken (kg)	0.0986	Moisture Content Ratio (%) =	10.0
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	90.9
Particle Size <4mm =	>95%		
EMT Job No	24/3709	Landfill Waste Acceptance Criteria Limits	
Sample No	3		
Client Sample No	BH101260224SO0.2-0.4		
Depth/Other	0.20-0.40		
Sample Date	26/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.05	3	5
Loss on Ignition (%)	<1.0	-	10
Sum of BTEX (mg/kg)	<0.017	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)	1.16	100	-
pH (pH Units)	8.71	-	>6
ANC to pH 7 (mol/kg)	0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	0.66	-	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 mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.016	0.16	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0031	0.031	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.005	0.05	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	6.1	61	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	98.8	988	1000
Total Dissolved Solids	206	2060	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	2	20	500

Mass of sample taken (kg)	0.1037	Moisture Content Ratio (%) =	15.2
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	86.8
Particle Size <4mm =	>95%		
EMT Job No	24/3709	Landfill Waste Acceptance Criteria Limits	
Sample No	10		
Client Sample No	BH103280224SO0.8-1.0		
Depth/Other	0.80-1.00		
Sample Date	26/02/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.15	3	5
Loss on Ignition (%)	2.0	-	10
Sum of BTEX (mg/kg)	<0.017	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)	9.39	-	>6
ANC to pH 7 (mol/kg)	0.07	-	to be evaluated
ANC to pH 4 (mol/kg)	0.80	-	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 mg/l	A ₁₀ mg/kg	
Arsenic	0.0041	0.041	0.5
Barium	<0.003	<0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0031	0.031	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.008	0.08	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	0.9	9	800
Fluoride	1.2	12	10
Sulphate as SO ₄	5.0	50	1000
Total Dissolved Solids	61	610	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	<2	<20	500

Client Name:	Arcadis
Reference:	30213868
Location:	Tesco Letchworth
Contact:	Niall Maguire

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/3709						

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.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/3709

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 requirement of our Accreditation Body 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.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. 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
AA	x5 Dilution

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: 24/3709

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
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
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		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
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

EMT Job No: 24/3709

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
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	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	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
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 USEP 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.			AD	Yes
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 USEP 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), NH ₄ + 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), NH ₄ + 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

EMT Job No: 24/3709

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
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
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
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM77	Modified DDCE/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			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	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				

EMT Job No: 24/3709

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
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	
Subcontracted	See attached subcontractor report for accreditation status and provider.					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

Arcadis
Part 3rd Floor
Charter House
62-68 Hills Road
Cambridge
Cambridgeshire
United Kingdom
CB2 1LA



Attention : Francisco Rueda
Date : 20th March, 2024
Your reference : 30213868
Our reference : Test Report 24/4148 Batch 1
Location : Tesco Letchworth
Date samples received : 8th March, 2024
Status : Final Report
Issue : 202403201052

Two samples were received for analysis on 8th March, 2024 of which two 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 8.326 kg of CO2

Scope 1&2&3 emissions - 19.677 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4148

Report : Solid

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

EMT Sample No.	1-3	4-7									Please see attached notes for all abbreviations and acronyms		
Sample ID	BH103050324 SO21.30- 21.50	SKIP060324											
Depth	21.30-21.50												
COC No / misc													
Containers	V J T	V J T											
Sample Date	05/03/2024	06/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	08/03/2024	08/03/2024									LOD/LOR	Units	Method No.
Arsenic #	-	3.4									<0.5	mg/kg	TM30/PM15
Barium #	-	28									<1	mg/kg	TM30/PM15
Beryllium	-	<0.5									<0.5	mg/kg	TM30/PM15
Cadmium #	-	<0.1									<0.1	mg/kg	TM30/PM15
Chromium #	-	22.6									<0.5	mg/kg	TM30/PM15
Copper #	-	14									<1	mg/kg	TM30/PM15
Lead #	-	8									<5	mg/kg	TM30/PM15
Mercury #	-	0.5									<0.1	mg/kg	TM30/PM15
Nickel #	-	8.5									<0.7	mg/kg	TM30/PM15
Selenium #	-	<1									<1	mg/kg	TM30/PM15
Vanadium	-	10									<1	mg/kg	TM30/PM15
Water Soluble Boron #	-	0.3									<0.1	mg/kg	TM74/PM32
Zinc #	-	29									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene #	<0.07	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6									<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	98									<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	<2	-									<2	ug/kg	TM15/PM10
Benzene #	<3	-									<3	ug/kg	TM15/PM10
Toluene #	<3	-									<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	106	-									<0	%	TM15/PM10

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4148

Report : Solid

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

EMT Sample No.	1-3	4-7											
Sample ID	BH103050324 SO21.30- 21.50	SKIP060324											
Depth	21.30-21.50												
COC No / misc													
Containers	V J T	V J T											
Sample Date	05/03/2024	06/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	08/03/2024	08/03/2024											
Please see attached notes for all abbreviations and acronyms											LOD/LOR	Units	Method No.
Surrogate Recovery 4-Bromofluorobenzene	104	-									<0	%	TM15/PM10
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	72									<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	20									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	52									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	<19	72									<19	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<19	<19									<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	<38	72									<38	mg/kg	TM5/PM8/PM16
MTBE #	-	<5									<5	ug/kg	TM36/PM12
Benzene #	-	<5									<5	ug/kg	TM36/PM12
Toluene #	-	<5									<5	ug/kg	TM36/PM12
Ethylbenzene #	-	<5									<5	ug/kg	TM36/PM12
m/p-Xylene #	-	<5									<5	ug/kg	TM36/PM12
o-Xylene #	-	<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
Natural Moisture Content	16.2	24.1									<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3									<0.3	mg/kg	TM38/PM20

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4148

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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4148

Report : CEN 10:1 1 Batch

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

[illegible]

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4148

VOC Report : Solid

EMT Sample No.	1-3												
Sample ID	BH103050324 SO21.30- 21.50												
Depth	21.30-21.50												
COC No / misc													
Containers	V J T												
Sample Date	05/03/2024												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	08/03/2024												
											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2										<2	ug/kg	TM15/PM10
Chloromethane #	<3										<3	ug/kg	TM15/PM10
Vinyl Chloride	<2										<2	ug/kg	TM15_A/PM10
Bromomethane	<1										<1	ug/kg	TM15/PM10
Chloroethane #	<2										<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2										<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6										<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7										<7	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3										<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4										<4	ug/kg	TM15/PM10
Bromochloromethane #	<3										<3	ug/kg	TM15/PM10
Chloroform #	<3										<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3										<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4										<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4										<4	ug/kg	TM15/PM10
Benzene #	<3										<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3										<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6										<6	ug/kg	TM15/PM10
Dibromomethane #	<3										<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3										<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4										<4	ug/kg	TM15/PM10
Toluene #	<3										<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3										<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3										<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3										<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3										<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3										<3	ug/kg	TM15/PM10
Chlorobenzene #	<3										<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3										<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
Styrene	<3										<3	ug/kg	TM15_A/PM10
Bromoform	<3										<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3										<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3										<3	ug/kg	TM15/PM10
Bromobenzene	<2										<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4										<4	ug/kg	TM15/PM10
Propylbenzene #	<4										<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3										<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5										<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6										<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4										<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4										<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
n-Butylbenzene	<4										<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4										<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7										<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4										<4	ug/kg	TM15/PM10
Naphthalene	<27										<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7										<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	106										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	104										<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Mass of sample taken (kg)	0.1207	Moisture Content Ratio (%) =	34.0
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	74.7
Particle Size <4mm =	>95%		
EMT Job No	24/4148	Landfill Waste Acceptance Criteria Limits	
Sample No	6		
Client Sample No	SKIP060324		
Depth/Other			
Sample Date	06/03/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.06	3	5
Loss on Ignition (%)	<1.0	-	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)	72	500	-
PAH Sum of 17(mg/kg)	<0.64	100	-
pH (pH Units)	9.55	-	>6
ANC to pH 7 (mol/kg)	0.08	-	to be evaluated
ANC to pH 4 (mol/kg)	1.16	-	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 mg/l	A ₁₀ mg/kg	
Arsenic	<0.0025	<0.025	0.5
Barium	0.003	<0.03	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	<0.007	<0.07	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.002	<0.02	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	<0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	<0.003	<0.03	4
Chloride	4.5	45	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	6.7	67	1000
Total Dissolved Solids	37	370	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	<2	<20	500

Note:

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

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

[illegible]

Contact: Francisco Rueda

[illegible]

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4148

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 requirement of our Accreditation Body 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.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. 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: 24/4148

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
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		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
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

EMT Job No: 24/4148

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
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	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	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
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 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.			AD	Yes
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 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), NH ₄ + 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), NH ₄ + 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

EMT Job No: 24/4148

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
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
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
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM77	Modified DDCE/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			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	NONE	No Method Code			AD	Yes

EMT Job No: 24/4148

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
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
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

Arcadis
Part 3rd Floor
Charter House
62-68 Hills Road
Cambridge
Cambridgeshire
United Kingdom
CB2 1LA



Attention : Francisco Rueda
Date : 26th March, 2024
Your reference : 30213868
Our reference : Test Report 24/4373 Batch 1
Location : Tesco Letchworth
Date samples received : 13th March, 2024
Status : Final Report
Issue : 202403261516

Two samples were received for analysis on 13th March, 2024 of which two 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 7.892 kg of CO2

Scope 1&2&3 emissions - 18.65 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4373

Report : Solid

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

EMT Sample No.	1-4	5-7											
Sample ID	BH102	BH102											
Depth	0.20-0.40	8.00-8.20											
COC No / misc													
Containers	V J T	V J T											
Sample Date	08/03/2024	08/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	13/03/2024	13/03/2024											
											Please see attached notes for all abbreviations and acronyms		
											LOD/LOR	Units	Method No.
Arsenic #	7.1	-									<0.5	mg/kg	TM30/PM15
Barium #	241	-									<1	mg/kg	TM30/PM15
Beryllium	<0.5	-									<0.5	mg/kg	TM30/PM15
Cadmium #	0.1	-									<0.1	mg/kg	TM30/PM15
Chromium #	66.2	-									<0.5	mg/kg	TM30/PM15
Copper #	67	-									<1	mg/kg	TM30/PM15
Lead #	547	-									<5	mg/kg	TM30/PM15
Mercury #	<0.1	-									<0.1	mg/kg	TM30/PM15
Nickel #	12.0	-									<0.7	mg/kg	TM30/PM15
Selenium #	<1	-									<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	682	-									<50	mg/kg	TM50/PM29
Vanadium	20	-									<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.7	-									<0.1	mg/kg	TM74/PM32
Zinc #	145	-									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.06	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.14	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.48	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	0.44	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.29	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.30	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.59	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.37	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.28	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.30	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	0.06	-									<0.04	mg/kg	TM4/PM8
PAH 16 Total	3.4	<0.6									<0.6	mg/kg	TM4/PM8
PAH 17 Total	3.45	-									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.42	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.17	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	101	92									<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	<2	<2									<2	ug/kg	TM15/PM10
Benzene #	<3	<3									<3	ug/kg	TM15/PM10
Toluene #	<3	<3									<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3									<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	<5									<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3									<3	ug/kg	TM15/PM10

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4373

Report : Solid

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

EMT Sample No.	1-4	5-7									Please see attached notes for all abbreviations and acronyms		
Sample ID	BH102	BH102											
Depth	0.20-0.40	8.00-8.20											
COC No / misc													
Containers	V J T	V J T											
Sample Date	08/03/2024	08/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	13/03/2024	13/03/2024											
Surrogate Recovery Toluene D8	99	104									<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	91	105									<0	%	TM15/PM10
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	-									<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	<19	<19									<19	mg/kg	TM5/PM8/PM16/PM12/PM10
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<19	<19									<19	mg/kg	TM5/PM8/PM16/PM12/PM10
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)	<38	<38									<38	mg/kg	TM5/PM8/PM16/PM12/PM10
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
Natural Moisture Content	10.7	24.3									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-									<0.3	mg/kg	TM38/PM20
Chromium III	66.2	-									<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.52	-									<0.02	%	TM21/PM24
Ethyl Tert Butyl Ether (ETBE)	<5	<5									<5	ug/kg	TM83/PM10
Di isopropyl Ether (DIPE)	<5	<5									<5	ug/kg	TM83/PM10

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4373

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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4373

Report : CEN 10:1 1 Batch

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

[illegible]

Client Name: Arcadis
Reference: 30213868
Location: Tesco Letchworth
Contact: Francisco Rueda
EMT Job No: 24/4373

VOC Report : Solid

EMT Sample No.	1-4	5-7										
Sample ID	BH102	BH102										
Depth	0.20-0.40	8.00-8.20										
COC No / misc												
Containers	V J T	V J T										
Sample Date	08/03/2024	08/03/2024										
Sample Type	Soil	Soil										
Batch Number	1	1										
Date of Receipt	13/03/2024	13/03/2024										
	LOD/LOR	Units	Method No.									
VOC MS												
Dichlorodifluoromethane	<2	<2								<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2	<2								<2	ug/kg	TM15/PM10
Chloromethane #	<3	<3								<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2								<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1								<1	ug/kg	TM15/PM10
Chloroethane #	<2	<2								<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2	<2								<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6	<6								<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7	<7								<7	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3								<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3	<3								<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3								<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4								<4	ug/kg	TM15/PM10
Bromochloromethane #	<3	<3								<3	ug/kg	TM15/PM10
Chloroform #	<3	<3								<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3	<3								<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3								<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4	<4								<4	ug/kg	TM15/PM10
Benzene #	<3	<3								<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3	<3								<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6	<6								<6	ug/kg	TM15/PM10
Dibromomethane #	<3	<3								<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3	<3								<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4								<4	ug/kg	TM15/PM10
Toluene #	<3	<3								<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3								<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3	<3								<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3								<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3	<3								<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3	<3								<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3								<3	ug/kg	TM15/PM10
Chlorobenzene #	<3	<3								<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3	<3								<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3								<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	<5								<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3								<3	ug/kg	TM15/PM10
Styrene	<3	<3								<3	ug/kg	TM15_A/PM10
Bromoform	<3	<3								<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3								<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3	<3								<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2								<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4	<4								<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4								<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3								<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3								<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3								<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5								<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	<6								<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4								<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4	<4								<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4	<4								<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4								<4	ug/kg	TM15/PM10
n-Butylbenzene	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4	<4								<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7	<7								<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4								<4	ug/kg	TM15/PM10
Naphthalene	<27	<27								<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7	<7								<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	99	104								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	91	105								<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Mass of sample taken (kg)	0.1049	Moisture Content Ratio (%) =	16.7
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	85.7
Particle Size <4mm =	>95%		
EMT Job No	24/4373	Landfill Waste Acceptance Criteria Limits	
Sample No	3		
Client Sample No	BH102		
Depth/Other	0.20-0.40		
Sample Date	08/03/2024		
Batch No	1		
Solid Waste Analysis		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non- Hazardous Landfill
Total Organic Carbon (%)	0.52	3	5
Loss on Ignition (%)	1.6	-	10
Sum of BTEX (mg/kg)	<0.017	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)	3.45	100	-
pH (pH Units)	8.91	-	>6
ANC to pH 7 (mol/kg)	0.04	-	to be evaluated
ANC to pH 4 (mol/kg)	5.14	-	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 mg/l	A ₁₀ mg/kg	
Arsenic	0.0050	0.050	0.5
Barium	0.009	0.09	20
Cadmium	<0.0005	<0.005	0.04
Chromium	0.0029	0.029	0.5
Copper	0.008	0.08	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.004	0.04	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	0.002	0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.004	0.04	4
Chloride	4.0	40	800
Fluoride	0.4	4	10
Sulphate as SO ₄	9.5	95	1000
Total Dissolved Solids	81	810	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	2	20	500

Note:

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%.

[illegible]

Client Name:	Arcadis
Reference:	30213868
Location:	Tesco Letchworth
Contact:	Francisco Rueda

[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.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4373

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 35°C ±5°C.

Where Mineral Oil 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 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 requirement of our Accreditation Body 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.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
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: 24/4373

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
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
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		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
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

EMT Job No: 24/4373

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
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.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	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
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 USEP 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.			AD	Yes
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 USEP 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), NH ₄ + 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), NH ₄ + 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

EMT Job No: 24/4373

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
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
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM77	Modified DDCEN/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			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	NONE	No Method Code			AD	Yes

EMT Job No: 24/4373

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
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
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

Arcadis
Part 3rd Floor
Charter House
62-68 Hills Road
Cambridge
Cambridgeshire
United Kingdom
CB2 1LA



Attention : Niall Maguire
Date : 26th March, 2024
Your reference : 30213868 1.3.1
Our reference : Test Report 24/4661 Batch 1
Location : Tesco Letchworth
Date samples received : 16th March, 2024
Status : Final Report
Issue : 202403261134

Five samples were received for analysis on 16th March, 2024 of which five 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 9.412 kg of CO2

Scope 1&2&3 emissions - 22.243 kg of CO2

Authorised By:



Simon Gomery BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

Report : Liquid

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

[illegible]

Element Materials Technology

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

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	13-16	17-20						Please see attached notes for all abbreviations and acronyms		
Sample ID	01BH1011503 24WG2510.00	02DUP150324 WG	03BH1021503 24WG2612.00	04BH1031503 24WG2313.30	05WASTE150 324WO								
Depth	25		26	23									
COC No / misc													
Containers	V P G	V P G	V P G	V P G	V P G								
Sample Date	15/03/2024 10:00	15/03/2024	15/03/2024 12:00	15/03/2024 13:30	15/03/2024 14:00								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Liquid								
Batch Number	1	1	1	1	1						LOD/LOR	Units	Method No.
Date of Receipt	16/03/2024	16/03/2024	16/03/2024	16/03/2024	16/03/2024								
PAH MS													
Naphthalene	-	-	-	-	0.6						<0.1	ug/l	TM4/PM30
Naphthalene #	<0.1	-	<0.1	<0.1	-						<0.1	ug/l	TM4/PM30
Acenaphthylene	-	-	-	-	<0.005						<0.005	ug/l	TM4/PM30
Acenaphthylene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Acenaphthene	-	-	-	-	<0.005						<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Fluorene	-	-	-	-	0.013						<0.005	ug/l	TM4/PM30
Fluorene #	0.007	-	0.006	0.005	-						<0.005	ug/l	TM4/PM30
Phenanthrene	-	-	-	-	0.058						<0.005	ug/l	TM4/PM30
Phenanthrene #	0.020	-	0.012	<0.005	-						<0.005	ug/l	TM4/PM30
Anthracene	-	-	-	-	0.012						<0.005	ug/l	TM4/PM30
Anthracene #	0.006	-	0.006	<0.005	-						<0.005	ug/l	TM4/PM30
Fluoranthene	-	-	-	-	0.101						<0.005	ug/l	TM4/PM30
Fluoranthene #	0.009	-	0.010	<0.005	-						<0.005	ug/l	TM4/PM30
Pyrene	-	-	-	-	0.103						<0.005	ug/l	TM4/PM30
Pyrene #	0.015	-	0.017	<0.005	-						<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	-	-	-	-	0.036						<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Chrysene	-	-	-	-	0.038						<0.005	ug/l	TM4/PM30
Chrysene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	-	-	-	-	<0.008						<0.008	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.008	-	<0.008	<0.008	-						<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	-	-	-	-	<0.005						<0.005	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	-	-	-	-	0.019						<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	-	-	-	-	<0.005						<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	-	-	-	-	0.024						<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.005	-	<0.005	<0.005	-						<0.005	ug/l	TM4/PM30
PAH 16 Total	-	-	-	-	1.004						<0.173	ug/l	TM4/PM30
PAH 16 Total #	<0.173	-	<0.173	<0.173	-						<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	-	<0.008	<0.008	<0.008						<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	-	<0.008	<0.008	<0.008						<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	77	-	88	88	70						<0	%	TM4/PM30
Methyl Tertiary Butyl Ether	-	-	-	-	<0.1						<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	-	<0.1	<0.1	-						<0.1	ug/l	TM15/PM10
Benzene	-	-	-	-	<0.5						<0.5	ug/l	TM15/PM10
Benzene #	<0.5	-	<0.5	<0.5	-						<0.5	ug/l	TM15/PM10
Toluene	-	-	-	-	<5						<5	ug/l	TM15/PM10
Toluene #	<5	-	<5	<5	-						<5	ug/l	TM15/PM10
Ethylbenzene	-	-	-	-	<1						<1	ug/l	TM15/PM10

Element Materials Technology

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HN₃

EMT Sample No.	1-4	5-8	9-12	13-16	17-20						Please see attached notes for all abbreviations and acronyms		
Sample ID	01BH1011503 24WG2510.00	02DUP150324 WG	03BH1021503 24WG2612.00	04BH1031503 24WG2313.30	05WASTE150 324WO								
Depth	25		26	23									
COC No / misc													
Containers	V P G	V P G	V P G	V P G	V P G								
Sample Date	15/03/2024 10:00	15/03/2024	15/03/2024 12:00	15/03/2024 13:30	15/03/2024 14:00								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	16/03/2024	16/03/2024	16/03/2024	16/03/2024	16/03/2024						LOD/LOR	Units	Method No.
Ethylbenzene #	<1	-	<1	<1	-						<1	ug/l	TM15/PM10
m/p-Xylene	-	-	-	-	<2						<2	ug/l	TM15/PM10
m/p-Xylene #	<2	-	<2	<2	-						<2	ug/l	TM15/PM10
o-Xylene	-	-	-	-	<1						<1	ug/l	TM15/PM10
o-Xylene #	<1	-	<1	<1	-						<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	94	-	96	98	95						<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	95	-	94	96	93						<0	%	TM15/PM10
MTBE #	-	<5	-	-	-						<5	ug/l	TM36/PM12
Benzene #	-	<5	-	-	-						<5	ug/l	TM36/PM12
Toluene #	-	<5	-	-	-						<5	ug/l	TM36/PM12
Ethylbenzene #	-	<5	-	-	-						<5	ug/l	TM36/PM12
m/p-Xylene #	-	<5	-	-	-						<5	ug/l	TM36/PM12
o-Xylene #	-	<5	-	-	-						<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>C5-C6 (HS_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)	-	-	-	-	<5						<5	ug/l	TM5/PM16/PM30
>C10-C12 (EH_CU_1D_AL) #	<5	<5	<5	<5	-						<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)	-	-	-	-	80						<10	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)	-	-	-	-	<10						<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)	-	-	-	-	2070						<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	-	-	-	-	2150						<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30

Element Materials Technology

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HN0₃

EMT Sample No.	1-4	5-8	9-12	13-16	17-20						Please see attached notes for all abbreviations and acronyms		
Sample ID	01BH1011503 24WG2510.00	02DUP150324 WG	03BH1021503 24WG2612.00	04BH1031503 24WG2313.30	05WASTE150 324WO								
Depth	25		26	23									
COC No / misc													
Containers	V P G	V P G	V P G	V P G	V P G								
Sample Date	15/03/2024 10:00	15/03/2024	15/03/2024 12:00	15/03/2024 13:30	15/03/2024 14:00								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	16/03/2024	16/03/2024	16/03/2024	16/03/2024	16/03/2024						LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>C5-EC7 (HS_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)	-	-	-	-	<10						<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)	-	-	-	-	<5						<5	ug/l	TM5/PM16/PM30
>EC10-EC12 (EH_CU_1D_AR) #	<5	<5	<5	<5	-						<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)	-	-	-	-	<10						<10	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)	-	-	-	-	<10						<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)	-	-	-	-	320						<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR)	-	-	-	-	320						<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)	-	-	-	-	2470						<10	ug/l	TM5/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total) #	<10	<10	<10	<10	-						<10	ug/l	TM5/PM16/PM30
Sulphate as SO ₄	-	-	-	-	144.4						<0.5	mg/l	TM38/PM0
Sulphate as SO ₄ #	97.7	-	245.9	99.3	-						<0.5	mg/l	TM38/PM0
Free Cyanide	-	-	-	-	0.78 ^{AA}						<0.01	mg/l	TM89/PM0
Total Cyanide	-	-	-	-	29.45 ^{AB}						<0.01	mg/l	TM89/PM0
Complex Cyanide	-	-	-	-	28.67 ^{AB}						<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N	-	-	-	-	0.07						<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	-	<6	<6	<6						<6	ug/l	TM38/PM0
Total Dissolved Chromium III	7	-	<6	<6	<6						<6	ug/l	TM0/PM0
Ethyl Tert Butyl Ether (ETBE) #	<1	-	<1	<1	-						<1	ug/l	TM83/PM10
Di isopropyl Ether (DIPE) #	<1	-	<1	<1	-						<1	ug/l	TM83/PM10
Tert Butyl Alcohol (TBA)	<100	-	<100	<100	-						<100	ug/l	TM83/PM10
Tert Amyl Methyl Ether (TAME) #	<1	-	<1	<1	-						<1	ug/l	TM83/PM10
Ethanol	<100	-	<100	<100	-						<100	ug/l	TM83/PM10
Sulphide	-	-	-	-	<0.01						<0.01	mg/l	TM107/PM0
Thiocyanate	-	-	-	-	0.02						<0.02	mg/l	TM107/PM0
Free Ammonia as N	-	-	-	-	<0.006						<0.006	mg/l	TM176/PM0
pH	-	-	-	-	7.96						<0.01	pH units	TM73/PM0
pH #	7.63	-	7.42	7.67	-						<0.01	pH units	TM73/PM0

EMT Sample No.	17-20										Please see attached notes for all abbreviations and acronyms		
Sample ID	05WASTE150 324WO												
Depth													
COC No / misc													
Containers	V P G												
Sample Date	15/03/2024 14:00												
Sample Type	Liquid												
Batch Number	1												
Date of Receipt	16/03/2024										LOD/LOR	Units	Method No.
SVOC MS													
Phenols													
2-Chlorophenol	<1										<1	ug/l	TM16/PM30
2-Methylphenol	<0.5										<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1										<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol	<0.5										<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1										<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol	<0.5										<0.5	ug/l	TM16/PM30
4-Methylphenol	<1										<1	ug/l	TM16/PM30
4-Nitrophenol	<10										<10	ug/l	TM16/PM30
Pentachlorophenol	<1										<1	ug/l	TM16/PM30
Phenol	<1										<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene	<1										<1	ug/l	TM16/PM30
2-Methylnaphthalene	<1										<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5										<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1										<1	ug/l	TM16/PM30
Di-n-butyl phthalate	<1.5										<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1										<1	ug/l	TM16/PM30
Diethyl phthalate	<1										<1	ug/l	TM16/PM30
Dimethyl phthalate	<1										<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene	<1										<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene	<1										<1	ug/l	TM16/PM30
1,3-Dichlorobenzene	<1										<1	ug/l	TM16/PM30
1,4-Dichlorobenzene	<1										<1	ug/l	TM16/PM30
2-Nitroaniline	<1										<1	ug/l	TM16/PM30
2,4-Dinitrotoluene	<0.5										<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1										<1	ug/l	TM16/PM30
3-Nitroaniline	<1										<1	ug/l	TM16/PM30
4-Bromophenylphenylether	<1										<1	ug/l	TM16/PM30
4-Chloroaniline	<1										<1	ug/l	TM16/PM30
4-Chlorophenylphenylether	<1										<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5										<0.5	ug/l	TM16/PM30
Azobenzene	<0.5										<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane	<0.5										<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether	<1										<1	ug/l	TM16/PM30
Carbazole	<0.5										<0.5	ug/l	TM16/PM30
Dibenzofuran	<0.5										<0.5	ug/l	TM16/PM30
Hexachlorobenzene	<1										<1	ug/l	TM16/PM30
Hexachlorobutadiene	<1										<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1										<1	ug/l	TM16/PM30
Hexachloroethane	<1										<1	ug/l	TM16/PM30
Isophorone	<0.5										<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine	<0.5										<0.5	ug/l	TM16/PM30
Nitrobenzene	<1										<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	110										<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	117										<0	%	TM16/PM30

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

VOC Report : Liquid

EMT Sample No.	1-4	9-12	13-16	17-20								
Sample ID	01BH1011503 24WG2510.00	03BH1021503 24WG2612.00	04BH1031503 24WG2313.30	05WASTE150 324WO								
Depth	25	26	23									
COC No / misc												
Containers	V P G	V P G	V P G	V P G								
Sample Date	15/03/2024 10:00	15/03/2024 12:00	15/03/2024 13:30	15/03/2024 14:00								
Sample Type	Ground Water	Ground Water	Ground Water	Liquid								
Batch Number	1	1	1	1								
Date of Receipt	16/03/2024	16/03/2024	16/03/2024	16/03/2024								
										LOD/LOR	Units	Method No.
VOC MS												
Dichlorodifluoromethane	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether	-	-	-	<0.1						<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	-						<0.1	ug/l	TM15/PM10
Chloromethane	-	-	-	<3						<3	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	-						<3	ug/l	TM15/PM10
Vinyl Chloride	-	-	-	<0.1						<0.1	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	-						<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Chloroethane	-	-	-	<3						<3	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	-						<3	ug/l	TM15/PM10
Trichlorofluoromethane	-	-	-	<3						<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	-						<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE)	-	-	-	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	-						<3	ug/l	TM15/PM10
Dichloromethane (DCM)	-	-	-	<3						<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	-						<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene	-	-	-	<3						<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	-						<3	ug/l	TM15/PM10
1,1-Dichloroethane	-	-	-	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	-						<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene	-	-	-	<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						<1	ug/l	TM15/PM10
Bromochloromethane	-	-	-	<2						<2	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Chloroform	-	-	-	4						<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	-						<2	ug/l	TM15/PM10
1,1,1-Trichloroethane	-	-	-	<2						<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
1,1-Dichloropropene	-	-	-	<3						<3	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	-						<3	ug/l	TM15/PM10
Carbon tetrachloride	-	-	-	<2						<2	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	-						<2	ug/l	TM15/PM10
1,2-Dichloroethane	-	-	-	<2						<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Benzene	-	-	-	<0.5						<0.5	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	-						<0.5	ug/l	TM15/PM10
Trichloroethene (TCE)	-	-	-	<3						<3	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	-						<3	ug/l	TM15/PM10
1,2-Dichloropropane	-	-	-	<2						<2	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Dibromomethane	-	-	-	<3						<3	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	-						<3	ug/l	TM15/PM10
Bromodichloromethane	-	-	-	<2						<2	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Toluene	-	-	-	<5						<5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	-						<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,2-Trichloroethane	-	-	-	<2						<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Tetrachloroethene (PCE)	-	-	-	<3						<3	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	-						<3	ug/l	TM15/PM10
1,3-Dichloropropane	-	-	-	<2						<2	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Dibromochloromethane	-	-	-	<2						<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
1,2-Dibromoethane	-	-	-	<2						<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	-						<2	ug/l	TM15/PM10
Chlorobenzene	-	-	-	<2						<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	-						<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane	-	-	-	<2						<2	ug/l	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: Arcadis
Reference: 30213868 1.3.1
Location: Tesco Letchworth
Contact: Niall Maguire
EMT Job No: 24/4661

Please see attached notes for all abbreviations and acronyms

QF-PM 3.1.4 v11

Client Name:	Arcadis
Reference:	30213868 1.3.1
Location:	Tesco Letchworth
Contact:	Niall Maguire

[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.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4661

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 35°C ±5°C.

Where Mineral Oil 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 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 requirement of our Accreditation Body 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.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
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
AA	x5 Dilution
AB	x50 Dilution

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: 24/4661

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
TM0	Not available	PM0	No preparation is required.				
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				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	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.				
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.				

EMT Job No: 24/4661

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 USEP 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				
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 USEP 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	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.				
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			
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.				
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			
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.				
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			
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			

EMT Job No: 24/4661

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
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM0	No preparation is required.				
TM176	Free ammonia based on the pH and temperature dependent equilibrium calculated in accordance with NRA Water Quality Objectives 1994 using the ammoniacal nitrogen result.	PM0	No preparation is required.				

Appendix G

Laboratory QA/QC

Arcadis is committed to providing our clients and regulators with investigative or monitoring results that are of the highest standard within the confines of the project. We recognise that a report is only as good as the data that is used to draw conclusions and thus it is important that the consultant and the client be able to have full confidence in data provided by laboratories that we use for analysis.

The first step in assuring said confidence is to ensure that our consultants on site are using appropriate sampling methodologies and are storing collected samples in the appropriate sample containers under correct conditions.

All samples are shipped to the laboratory on day of collection in sealed cold boxes with a Chain of Custody attached. The Chain of Custody identifies Arcadis as the client, the Arcadis Project Number, the Consultant/Project Manager, the type of sample i.e. water or soil and the parameters to be tested. Samples boxes are either hand delivered to the laboratory, picked up directly by the laboratory or picked up by a courier sent by the laboratory.

QA/QC of Laboratories

Arcadis has a preferred supplier program, all services sub-contracted out, including laboratory services undergo an initial H&S and Financial Audit followed by a service specific audit. All contract laboratories are expected to have UKAS accreditation and use the MCertS standard.

The MCertS accreditation was developed for the analysis of soils and is required by the EA for all sites that are within the regulatory process i.e. Part 2A designated contaminated land sites. For sites in which work is being undertaken voluntarily or through Planning it is recommended that the analysis be conducted following the MCertS standard. The MCertS standard is an application of ISO 17025 specifically for the chemical testing of soil and covers:

- the selection and validation of methods;
 - sampling pre-treatment and preparation;
 - the estimation of measurement uncertainty;
 - participation in proficiency testing schemes; and
 - the reporting of results and information.
- It is expected by Arcadis that any laboratory used by Arcadis for the analysis of samples should be working to the ISO17025:2000 standard, regardless of MCertS accreditation.

Once accepted as a potential supplier, a laboratory is subjected to an audit and a QA/QC review by the Arcadis Analytical Assessment Team. The audit is a detailed inspection of the laboratory, including review of staff and staff training, analytical methodologies used, QA/QC procedures and QA data and manuals, sample log in, sample storage and prep areas, instrument rooms and instrument maintenance logs, instrument run logs, laboratory management and laboratory hygiene. Additionally, the laboratory is blind sample tested, and the audit team follow the blind sample through the analysis process during an inspection visit. Once finally accepted as a supplier the laboratory is subjected to an annual audit.

Data quality control is extremely important to Arcadis because we must be able to rely on the data in order to make our interpretations and recommendations. The data submitted by the laboratory are reviewed by an analytical chemist in order to check the laboratory QA results. However, we have also instituted our own quality control testing program using blind samples to monitor laboratory performance. This includes the submission of blind duplicates, trip blanks and or spiked samples to laboratories as part of routine project work and the submission of either certified reference materials or prepared QC samples to all of the laboratories for inter-laboratory comparison. This internal program helps us to increase the confidence of the data received from the laboratories.

Appendix H

HazWaste Report

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)



TQ7GB-LFD0P-GN29Q

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

Job name

30213868

Description/Comments

Waste assessment has been completed using the following analytical reports:

- Element Materials Technology, report ref EMT-24-3709;
- Element Materials Technology, report ref EMT-24-4148;
- Element Materials Technology, report ref EMT-24-4373.

All Made Ground samples were tested for asbestos; however, no asbestos was indicated within the samples.

Nickel concentrations within BH101 were recorded by the laboratory with a note stating they were analysed at a x 5 dilution factor. This concentration (408mg/l) is considered to be a minimum value and considered hazardous.

Samples were also analysed for VOC; however, most determinands were not detected at concentrations greater than the detection limits, or at hazardous concentrations. Only BH103 (0.80mbgl) had concentrations of Toluene and Styrene above detection levels, and these have been included within the assessment.

Samples of taken from natural ground were not analysed for any metals; however, they have been included in the assessment, as it is assumed that the highest metal concentrations will be limited to the Made Ground.

This is not a standalone assessment, and it should be read in conjunction with any associated Arcadis report.

Project

Letchworth EDD GI

Site

Letchworth EDD

Classified by

Name: **Stephannie Coomber**
 Date: **03 Apr 2024 09:51 GMT**
 Telephone: **0191 249 3823**
 Company: **Arcadis Consulting (UK) Ltd**
Suite 27, 2nd Floor, City Quadrant
1 Waterloo Square
Newcastle upon Tyne
NE1 3DP

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

09 Dec 2021

Next 3 year Refresher due by Dec 2024

Purpose of classification

2 - Material Characterisation

Address of the waste

Starwood House, Letchworth

Post Code SG6 2TS

SIC for the process giving rise to the waste

43110 Demolition

Description of industry/producer giving rise to the waste

Formerly Steel Works site, more recently a data centre.

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

Site wide GI, shallow made ground samples to be classified to help assess future development costs

Description of the waste

Made Ground and Chalk

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH101	0.20-0.40	Hazardous	HP 7	4
2	BH101[2]	18.30-18.50	Non Hazardous		7
3	BH102	0.20-0.40	Non Hazardous		9
4	BH102[2]	8.00-8.20	Non Hazardous		12
5	BH103	0.80-1.00	Non Hazardous		14
6	BH103[2]	21.30-21.50	Non Hazardous		17
7	SKIP060324		Non Hazardous		19

Related documents

#	Name	Description
1	EMT-24-4148-Batch-1-Report-202403201052.pdf	Document attached to Job: 30213868
2	EMT-24-4373-Batch-1-Report-202403261516.pdf	Document attached to Job: 30213868
3	EMT-24-3709-Batch-1-Report-202403141123.pdf	Document attached to Job: 30213868
4	30213868	waste stream template used to create this Job

Report

Created by: Stephannie Coomber

Created date: 03 Apr 2024 09:51 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	22
Appendix B: Rationale for selection of metal species	23
Appendix C: Version	24

Classification of sample: BH101

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

Sample details

Sample name:	LoW Code:
BH101	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 03 * (Soil and stones containing hazardous substances)
0.20-0.40 m	
Moisture content:	
6.9%	
(dry weight correction)	

Hazard properties

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

Hazard Statements hit:

Carc. 1A; H350i "May cause cancer by inhalation."

Because of determinand:

nickel diiodide: (compound conc.: 0.203%)

Determinands

Moisture content: 6.9% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				0.14 mg/kg		0.131 mg/kg	0.0000131 %	✓	
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				0.17 mg/kg		0.159 mg/kg	0.0000159 %	✓	
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				0.1 mg/kg		0.0935 mg/kg	0.00000935 %	✓	
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				0.07 mg/kg		0.0655 mg/kg	0.00000655 %	✓	
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
12	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
13	acenaphthylene	205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
14	anthracene	204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	0.14 mg/kg		0.131 mg/kg	0.0000131 %	✓		
16	fluoranthene	205-912-4	206-44-0		0.21 mg/kg		0.196 mg/kg	0.0000196 %	✓		
17	fluorene	201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
18	indeno[123-cd]pyrene	205-893-2	193-39-5		0.1 mg/kg		0.0935 mg/kg	0.00000935 %	✓		
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	phenanthrene	201-581-5	85-01-8		0.07 mg/kg		0.0655 mg/kg	0.00000655 %	✓		
21	pyrene	204-927-3	129-00-0		0.16 mg/kg		0.15 mg/kg	0.000015 %	✓		
22	boron { boron trichloride }	005-002-00-5	233-658-4	10294-34-5	0.8 mg/kg	10.838	8.111 mg/kg	0.000811 %	✓		
23	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			2.9 mg/kg	1.895	5.139 mg/kg	0.000514 %	✓		
24	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	<0.1 mg/kg	1.855	<0.185 mg/kg	<0.0000185 %			<LOD
25	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	106 mg/kg	3.929	389.597 mg/kg	0.039 %	✓		
26	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			14 mg/kg		13.096 mg/kg	0.00131 %	✓		
27	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %			<LOD
28	nickel { nickel diiodide }	028-029-00-4	236-666-6	13462-90-3	408 mg/kg	5.324	2032.1 mg/kg	0.203 %	✓		
29	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5	<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9		1308-38-9	89.4 mg/kg	1.462	122.229 mg/kg	0.0122 %	✓		
31	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %			<LOD
32	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]	57 mg/kg	4.398	234.501 mg/kg	0.0235 %	✓		
33	TPH (C6 to C40) petroleum group			TPH	<38 mg/kg		<38 mg/kg	<0.0038 %			<LOD
34	coronene	205-881-7		191-07-1	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %			<LOD
36	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
37	ethanol; ethyl alcohol	603-002-00-5	200-578-6	64-17-5	<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								
38	styrene 601-026-00-0	202-851-5	100-42-5		<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %			<LOD
39	barium { barium diboron tetraoxide } 056-005-00-3	237-222-4	13701-59-2		68 mg/kg	1.623	103.27 mg/kg	0.0103 %		✓	
40	beryllium { beryllium oxide } 004-003-00-8	215-133-1	1304-56-9		0.5 mg/kg	2.775	1.298 mg/kg	0.00013 %		✓	
41	vanadium { divanadium pentaoxide; vanadium pentoxide } 023-001-00-8	215-239-8	1314-62-1		44 mg/kg	1.785	73.478 mg/kg	0.00735 %		✓	
Total:									0.303 %		

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

Classification of sample: BH101[2]

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

Sample details

Sample name:	LoW Code:
BH101[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
18.30-18.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
24%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 24% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
14	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							

#	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							
15	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
17	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
18	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5							
19	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
21	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
22	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
23	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							
24	ethanol; ethyl alcohol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	603-002-00-5	200-578-6	64-17-5							
25	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-026-00-0	202-851-5	100-42-5							
Total:								0.00387 %		

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

Classification of sample: BH102

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

Sample details

Sample name:	LoW Code:
BH102	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20-0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
10.7%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 10.7% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				0.29 mg/kg		0.262 mg/kg	0.0000262 %	✓	
	601-033-00-9	200-280-6	56-55-3							
4	benzo[a]pyrene; benzo[def]chrysene				0.37 mg/kg		0.334 mg/kg	0.0000334 %	✓	
	601-032-00-3	200-028-5	50-32-8							
5	benzo[b]fluoranthene				0.42 mg/kg		0.379 mg/kg	0.0000379 %	✓	
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				0.3 mg/kg		0.271 mg/kg	0.0000271 %	✓	
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				0.17 mg/kg		0.154 mg/kg	0.0000154 %	✓	
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				0.07 mg/kg		0.0632 mg/kg	0.00000632 %	✓	
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				0.06 mg/kg		0.0542 mg/kg	0.00000542 %	✓	
		205-917-1	208-96-8							
14	anthracene				0.07 mg/kg		0.0632 mg/kg	0.00000632 %	✓	
		204-371-1	120-12-7							

#		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									
15		chrysene 601-048-00-0205-923-4218-01-9				0.3	mg/kg		0.271	mg/kg	0.0000271 %	✓	
16	■	fluoranthene 205-912-4206-44-0				0.48	mg/kg		0.434	mg/kg	0.0000434 %	✓	
17	■	fluorene 201-695-586-73-7				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
18	■	indeno[123-cd]pyrene 205-893-2193-39-5				0.28	mg/kg		0.253	mg/kg	0.0000253 %	✓	
19		naphthalene 601-052-00-2202-049-591-20-3				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
20	■	phenanthrene 201-581-585-01-8				0.14	mg/kg		0.126	mg/kg	0.0000126 %	✓	
21	■	pyrene 204-927-3129-00-0				0.44	mg/kg		0.397	mg/kg	0.0000397 %	✓	
22	🧪	boron { boron trichloride } 005-002-00-5233-658-410294-34-5				0.7	mg/kg	10.838	6.853	mg/kg	0.000685 %	✓	
23	🧪	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex } 033-005-00-1				7.1	mg/kg	1.895	12.151	mg/kg	0.00122 %	✓	
24	🧪	cadmium { cadmium sulfate } 048-009-00-9233-331-610124-36-4				0.1	mg/kg	1.855	0.168	mg/kg	0.0000168 %	✓	
25	🧪	copper { copper sulphate pentahydrate } 029-023-00-4231-847-67758-99-8				67	mg/kg	3.929	237.802	mg/kg	0.0238 %	✓	
26	🧪	lead { ■ lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	547	mg/kg		494.128	mg/kg	0.0494 %	✓	
27	🧪	mercury { mercury dichloride } 080-010-00-X231-299-87487-94-7				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
28	🧪	nickel { nickel diiodide } 028-029-00-4236-666-613462-90-3				12	mg/kg	5.324	57.716	mg/kg	0.00577 %	✓	
29	🧪	selenium { nickel selenate } 028-031-00-5239-125-215060-62-5				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
30	🧪	chromium in chromium(III) compounds { ■ chromium(III) oxide (worst case) } 215-160-91308-38-9				66.2	mg/kg	1.462	87.403	mg/kg	0.00874 %	✓	
31	🧪	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } 024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
32	🧪	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] } 030-006-00-9231-793-3 [1]7446-19-7 [1] 231-793-3 [2]7733-02-0 [2]				145	mg/kg	4.398	576.061	mg/kg	0.0576 %	✓	
33	■	TPH (C6 to C40) petroleum group TPH				<38	mg/kg		<38	mg/kg	<0.0038 %		<LOD
34	■	coronene 205-881-7191-07-1				0.06	mg/kg		0.0542	mg/kg	0.00000542 %	✓	
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X216-653-11634-04-4				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
36	■	polychlorobiphenyls; PCB 602-039-00-4215-648-11336-36-3				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		ethanol; ethyl alcohol 603-002-00-5200-578-664-17-5				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38		styrene 601-026-00-0202-851-5100-42-5				<0.003	mg/kg		<0.003	mg/kg	<0.0000003 %		<LOD
39	🧪	barium { barium diboron tetraoxide } 056-005-00-3237-222-413701-59-2				241	mg/kg	1.623	353.439	mg/kg	0.0353 %	✓	
40	🧪	beryllium { beryllium oxide } 004-003-00-8215-133-11304-56-9				<0.5	mg/kg	2.775	<1.388	mg/kg	<0.000139 %		<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		vanadium { divanadium pentaoxide; vanadium pentoxide }				20 mg/kg	1.785	32.253 mg/kg	0.00323 %	✓	
		023-001-00-8	215-239-8	1314-62-1							
Total:									0.19 %		

Key

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

Classification of sample: BH102[2]

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

Sample details

Sample name:	LoW Code:
BH102[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
8.00-8.20 m	
Moisture content:	
24.3%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 24.3% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
14	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							

#	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							
15	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
17	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
18	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5							
19	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
21	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
22	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
23	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							
24	ethanol; ethyl alcohol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	603-002-00-5	200-578-6	64-17-5							
25	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-026-00-0	202-851-5	100-42-5							
Total:								0.00387 %		

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

Classification of sample: BH103

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

Sample details

Sample name:	LoW Code:
BH103	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.80-1.00 m	
Moisture content:	
16.7%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16.7% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				0.005 mg/kg		0.0042 mg/kg	0.000000428 %	✔	
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
14	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							

#	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								
15	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
17	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
18	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-893-2	193-39-5								
19	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
21	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
22	boron { boron trichloride }				0.4 mg/kg	10.838	3.715 mg/kg	0.000371 %	✓		
	005-002-00-5	233-658-4	10294-34-5								
23	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				9 mg/kg	1.895	14.611 mg/kg	0.00146 %	✓		
	033-005-00-1										
24	cadmium { cadmium sulfate }				<0.1 mg/kg	1.855	<0.185 mg/kg	<0.0000185 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
25	copper { copper sulphate pentahydrate }				7 mg/kg	3.929	23.568 mg/kg	0.00236 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
26	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	7 mg/kg		5.998 mg/kg	0.0006 %	✓		
	082-001-00-6										
27	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								
28	nickel { nickel diiodide }				13.3 mg/kg	5.324	60.68 mg/kg	0.00607 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
29	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								
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				66.6 mg/kg	1.462	83.41 mg/kg	0.00834 %	✓		
		215-160-9	1308-38-9								
31	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %			<LOD
	024-017-00-8										
32	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				31 mg/kg	4.398	116.826 mg/kg	0.0117 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
33	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %			<LOD
			TPH								
34	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-881-7	191-07-1								
35	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								
36	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
37	ethanol; ethyl alcohol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	603-002-00-5	200-578-6	64-17-5								
38	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %			<LOD
	601-026-00-0	202-851-5	100-42-5								
39	barium { barium diboron tetraoxide }				30 mg/kg	1.623	41.735 mg/kg	0.00417 %	✓		
	056-005-00-3	237-222-4	13701-59-2								
40	beryllium { beryllium oxide }				0.6 mg/kg	2.775	1.427 mg/kg	0.000143 %	✓		
	004-003-00-8	215-133-1	1304-56-9								

#	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	vanadium { divanadium pentaoxide; vanadium pentoxide }				28 mg/kg	1.785	42.832 mg/kg	0.00428 %	✓	
	023-001-00-8	215-239-8	1314-62-1							
	Total:							0.0437 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because There were no visual or olfactory signs of free phase hydrocarbons during the ground investigation; therefore, low level concentrations of TPH or BTEX are extremely unlikely to present flammable properties.

Hazard Statements hit:

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

Because of determinand:

toluene: (conc.: 4.28e-07%)

Classification of sample: BH103[2]

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

Sample details

Sample name:	LoW Code:
BH103[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
21.30-21.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16.2%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16.2% 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	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
10	xylene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<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]							
11	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
14	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							

#	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							
15	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
17	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
18	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5							
19	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
20	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
21	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
22	TPH (C6 to C40) petroleum group				<38 mg/kg		<38 mg/kg	<0.0038 %		<LOD
			TPH							
23	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							
24	ethanol; ethyl alcohol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	603-002-00-5	200-578-6	64-17-5							
25	styrene				0.008 mg/kg		0.0068 mg/kg	0.000000688 %	✓	
	601-026-00-0	202-851-5	100-42-5							
Total:								0.00387 %		

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because There were no visual or olfactory signs of free phase hydrocarbons during the ground investigation; therefore, low level concentrations of TPH or BTEX are extremely unlikely to present flammable properties.

Hazard Statements hit:

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

Because of determinand:

styrene: (conc.: 6.88e-07%)

Classification of sample: SKIP060324

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

Sample details

Sample name:	LoW Code:
SKIP060324	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
24.1%	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: 24.1% 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	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
2	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
4	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							
5	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
6	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2							
7	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
8	dibenzo[b,def]chrysene; dibenzo[a,h]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-091-00-5	205-878-0	189-64-0							
9	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<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]							
10	xylene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<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]							
11	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
14	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7							
15	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9							

#	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	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
18	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
20	phenanthrene	201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
21	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
22	boron { boron trichloride }	005-002-00-5	233-658-4	10294-34-5	0.3 mg/kg	10.838	2.62 mg/kg	0.000262 %		✓	
23	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			3.4 mg/kg	1.895	5.19 mg/kg	0.000519 %		✓	
24	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	<0.1 mg/kg	1.855	<0.185 mg/kg	<0.0000185 %			<LOD
25	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	14 mg/kg	3.929	44.325 mg/kg	0.00443 %		✓	
26	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			8 mg/kg		6.446 mg/kg	0.000645 %		✓	
27	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	0.5 mg/kg	1.353	0.545 mg/kg	0.0000545 %		✓	
28	nickel { nickel diiodide }	028-029-00-4	236-666-6	13462-90-3	8.5 mg/kg	5.324	36.468 mg/kg	0.00365 %		✓	
29	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5	<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9		1308-38-9	22.6 mg/kg	1.462	26.617 mg/kg	0.00266 %		✓	
31	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %			<LOD
32	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]	29 mg/kg	4.398	102.772 mg/kg	0.0103 %		✓	
33	TPH (C6 to C40) petroleum group		TPH		72 mg/kg		58.018 mg/kg	0.0058 %		✓	
34	coronene	205-881-7	191-07-1		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
36	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
37	styrene	601-026-00-0	202-851-5	100-42-5	<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %			<LOD
38	barium { barium diboron tetraoxide }	056-005-00-3	237-222-4	13701-59-2	28 mg/kg	1.623	36.63 mg/kg	0.00366 %		✓	
39	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	<0.5 mg/kg	2.775	<1.388 mg/kg	<0.000139 %			<LOD
40	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1	10 mg/kg	1.785	14.385 mg/kg	0.00144 %		✓	
Total:									0.034 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because There were no visual or olfactory signs of free phase hydrocarbons during the ground investigation; therefore, low level concentrations of TPH or BTEX are extremely unlikely to present flammable properties.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0058%)

Appendix A: Classifier defined and non GB MCL determinands

■ 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

■ 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

■ 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

■ 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

■ 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

■ 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

■ 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

■ 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

■ 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

• **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

GB MCL index number: 082-001-00-6

Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A

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 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

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

• **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

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

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

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

Data source date: 16 Jun 2014

Hazard Statements: STOT SE 2; H371

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

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

Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.

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

Reason for additional Hazards Statement(s):

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

Appendix B: Rationale for selection of metal species

boron {boron trichloride}

Based on the site history, Boron trichloride is considered more likely to be encountered on site as it was generally used in the manufacture and purification of metal alloys, in bonding of iron and steel, and in soldering fluxes.

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case species

cadmium {cadmium sulfate}

Worst case species

copper {copper sulphate pentahydrate}

Worst case species

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

There are no elevated concentrations of Chromium detected, there for the species is unlikely to be lead chromate.

mercury {mercury dichloride}

Based on the site history, there is no evidence for the use or manufacture of explosives at the site so species unlikely to be Mercury Difluoride.

nickel {nickel diiodide}

Worst case species

selenium {nickel selenate}

Worst case species

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

Worst case species

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

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

There are no elevated concentrations of Chromium detected, there for the species is unlikely to be zinc chromate.

barium {barium diboron tetraoxide}

There are no elevated concentrations of Chromium detected, there for the species is unlikely to be barium chromate.

beryllium {beryllium oxide}

Unlikely to be Beryllium Chloride present based on the site history, and the concentrations noted are close to the determinands limit of detection.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Worst case species

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**
 HazWasteOnline Classification Engine Version: 2024.80.5988.11077 (20 Mar 2024)
 HazWasteOnline Database: 2024.80.5988.11077 (20 Mar 2024)

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

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v4.0 - version 4.0 of 2nd March 2024

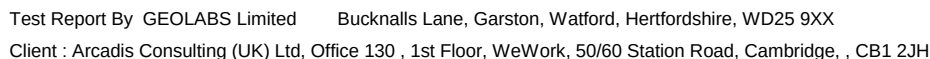
Appendix I

Geotechnical Laboratory Data

Test Type:	2 - 4 point 80g / 30° fall cone method.	Sample condition:	1 - As Received 2 - Air Dried 3 - Washed & Air Dried
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S Burke - Senior Technician
27/03/2024

STARWOOD HOUSE LETCHWORTH
30213868



SATURATION WATER CONTENT OF CHALK

[illegible]

Notes

Tested by SB
Checked and Approved by

S Burke

S Burke - Senior Technician
26/03/2024

Project Number:

GEO / 40049

Project Name:

STARWOOD HOUSE LETCHWORTH
30213868



Appendix J

Derivation of Generic Assessment Criteria (GAC)

SUMMARY

The purpose of this document is to describe the general principles adopted in the derivation of the Arcadis' Generic Assessment Criteria (GAC). The document and associated GAC underpins the generic quantitative risk assessments Arcadis undertakes for its clients and is not intended for any other use or use by others. Guidance has been provided by the EA to aid development of GAC which are appropriate for a typical England or Wales site, incorporating conservatism where warranted. Arcadis has used the EA guidance to develop in-house GAC to aid assessment of land contamination sites, and in particular to assess risks to human health receptors from chronic health effects and risks to water resource receptors. The GAC do not consider potential risks to ecological receptors, which may need to be assessed on specific sites. The following non-statutory technical guidance has been referred to in deriving the GAC.

- EA Science Reports SC050021/SR2, SC050021/SR3 and SC050021/SR7.
- Related Toxicity and Soil Guideline Value reports
- EA Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination
- EA. Groundwater Protection and Water Quality, March 2017 (accessible online <https://www.gov.uk/government/collections/groundwater-protection>)
- SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination

The GAC used within this report have been derived for "commercial end use". Commercial end use assumes a pre-1970s commercial property is present at the site with some open areas uncovered by hardstanding. A neighbouring resident is assumed present, comprising a small terraced house without basement.

Arcadis has undertaken environmental works on hundreds of potentially contaminated sites across the UK. The typical shallow geology encountered comprises granular soils or made ground, with a low organic matter content. As such, Arcadis has taken the decision to derive in-house GAC for a *sand* rather than sandy loam soil-type used by the EA to derive Soil Guideline Values, with an organic matter content of 0.34% (fraction of organic carbon content 0.002, typical of many sites).

To derive Human Health GAC (HH-GAC), the following exposure pathways are considered active for potential soil, groundwater or soil gas exposures:

Site End-Use	On-Site Pathways
Commercial/ Industrial	• Incidental ingestion of soil or dust • Incidental dermal contact with soil or dust • Inhalation of dusts inside or outside • Inhalation of vapours outside from a soil or groundwater source • Inhalation of vapours inside from a soil, groundwater or soil gas source
Neighbouring resident	• Inhalation of vapours inside from a soil gas source (assumed that the neighbouring residential property directly overlies the soil gas source); and, Migration of impacted groundwater beneath neighbouring property, and subsequently: • Inhalation of indoor air in an off-site property (originating from an on-site soil or groundwater source) • Inhalation of outdoor air in an off-site garden (originating from an on-site soil or groundwater source)

Two levels of water quality standard have been considered to enable Water Resource GAC (WR-GAC) to be developed depending on the environmental setting of a site. The WR-GAC have been derived based on adopted Environmental Quality Standards and Drinking Water Standards. No attenuation with transport off-site is assumed.

The following modelling tools have been utilised in the derivation of the GAC:

HH-GAC (on-site):	CLEA 1.07 and RBCA Toolkit v2.6
HH-GAC (off-site):	CLEA 1.07 RBCA Toolkit v2.6 and Remedial Targets Worksheet v3.2
WR-GAC:	Remedial Targets Worksheet v3.2

Example model inputs are presented in the following tables, alongside the CLEA modelling outputs.

	Air-water partition co-efficient		Diffusion co-efficient in air		Diffusion co-efficient in water		Relative molecular mass		Vapour pressure		Water solubility		Koc	Notes
	cm ³ cm ³	Notes	m ² s ⁻¹	Notes	m ² s ⁻¹	Notes	g mol ⁻¹	Notes	Pa	Notes	mg L ⁻¹	Notes	Log (dimension)	
Benzene	1.16E-01	Science Report – SC050021/SR7	8.77E-06	Science Report – SC050021/SR7	6.64E-10	Science Report – SC050021/SR7	78.11	Science Report – SC050021/SR7	6.24E+03	Science Report – SC050021/SR7	1.78E+03	Science Report – SC050021/SR7	1.83E+00	Science Report – SC050021/SR7
Toluene	1.15E-01	Science Report – SC050021/SR7	7.78E-06	Science Report – SC050021/SR7	5.88E-10	Science Report – SC050021/SR7	92.14	Science Report – SC050021/SR7	1.73E+03	Science Report – SC050021/SR7	5.90E+02	Science Report – SC050021/SR7	2.31E+00	Science Report – SC050021/SR7
Ethylbenzene	1.39E-01	Science Report – SC050021/SR7	7.04E-06	Science Report – SC050021/SR7	5.31E-10	Science Report – SC050021/SR7	106.17	Science Report – SC050021/SR7	5.53E+02	Science Report – SC050021/SR7	1.80E+02	Science Report – SC050021/SR7	2.65E+00	Science Report – SC050021/SR7
Sum xylenes	1.04E-01	Average for three xylenes	7.03E-06	Average for three xylenes	5.3E-10	Average for three xylenes	106.17	Average for three xylenes	4.52E+02	Average for three xylenes	1.91E+02	Average for three xylenes	2.66E+00	Average for three xylenes
MTBE	2.04E-02	Literature review	7.10E-06	Literature review	9.00E-10	Literature review	88.17	Literature review	3.45E+04	Literature review	4.80E+04	Literature review	1.08E+00	Literature review
Aliphatic >C5-6	3.40E+01	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	81	Literature review	3.60E+04	Literature review	3.60E+01	Literature review	2.90E+00	Literature review
Aliphatic >C6-8	5.10E+01	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	100	Literature review	6.40E+03	Literature review	5.40E+00	Literature review	3.60E+00	Literature review
Aliphatic >C8-10	8.20E+01	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	130	Literature review	6.40E+02	Literature review	4.30E-01	Literature review	4.51E+00	Literature review
Aliphatic >C10-12	1.30E+02	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	160	Literature review	6.50E+01	Literature review	3.40E-02	Literature review	5.40E+00	Literature review
Aliphatic >C12-16	5.40E+02	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	200	Literature review	4.80E+00	Literature review	7.60E-04	Literature review	6.70E+00	Literature review
Aliphatic >C16-35	6.40E+03	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	270	Literature review	7.70E-01	Literature review	1.30E-06	Literature review	9.00E+00	Literature review
Aromatic >C8-10	4.90E-01	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	120	Literature review	6.40E+02	Literature review	6.50E+01	Literature review	3.20E+00	Literature review
Aromatic >C10-12	1.40E-01	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	130	Literature review	6.40E+01	Literature review	2.50E+01	Literature review	3.40E+00	Literature review
Aromatic >C12-16	5.40E-02	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	150	Literature review	4.80E+00	Literature review	5.80E+00	Literature review	3.70E+00	Literature review
Aromatic >C16-21	1.30E-02	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	190	Literature review	7.70E-01	Literature review	5.10E-01	Literature review	4.20E+00	Literature review
Aromatic >C21-35	6.80E-04	TPHCWG	1.00E-05	Literature review	0.000000001	Literature review	240	Literature review	4.40E-04	Literature review	6.60E-03	Literature review	5.11E+00	Literature review

Chemical Name	Chemical Type	Oral HCV						Inhalation HCV						Combine oral and Inhalation AC	Oral MDI for adults		Inhalation MDI for adults	
		Type	µg kg-1 BW day-1	Notes	Oral exposure	Dermal exposure	Inhalation exposure	Type	µg kg-1 BW day-1	Notes	Oral exposure	Dermal exposure	Inhalation exposure		µg kg-1 BW day-1	Notes	µg kg-1 BW day-1	Notes
Benzene	organic	ID	2.90E-01	UK TOX (March 2009)	Yes	Yes	No	ID	1.40E+00	UK TOX (March 2009)	No	No	Yes	Yes	NR	NA	NR	NA
Toluene	organic	TDI	2.23E+02	UK TOX (March 2009)	Yes	Yes	No	TDI	1.40E+03	UK TOX (March 2009)	No	No	Yes	Yes	1.00E+01	UK TOX (March 2009)	5.20E+02	UK TOX (March 2009)
Ethylbenzene	organic	TDI	1.00E+02	UK TOX (March 2009)	Yes	Yes	No	TDI	7.43E+01	Literature review	No	No	Yes	Yes	5.00E+00	UK TOX (March 2009)	1.30E+02	UK TOX (March 2009)
Sum xylenes	organic	TDI	1.80E+02	UK TOX (March 2009)	Yes	Yes	No	TDI	6.00E+01	UK TOX (March 2009)	No	No	Yes	Yes	1.10E+01	UK TOX (March 2009)	1.40E+02	UK TOX (March 2009)
MTBE	organic	TDI	8.60E+02	Literature review	Yes	Yes	No	TDI	8.60E+02	Literature review	No	No	Yes	Yes	3.00E+01	EU Risk Assessment Report	1.89E+02	EU Risk Assessment Report
Aliphatic>C5-6	organic	TDI	5.00E+03	TPHCWG	Yes	Yes	No	TDI	5.26E+03	TPHCWG	No	No	Yes	Yes	3.50E+05	TDI x 70kg (MDI unknown)	3.68E+05	TDI x 70kg (MDI unknown)
Aliphatic>C6-8	organic	TDI	5.00E+03	TPHCWG	Yes	Yes	No	TDI	5.26E+03	TPHCWG	No	No	Yes	Yes	3.50E+05	TDI x 70kg (MDI unknown)	3.68E+05	TDI x 70kg (MDI unknown)
Aliphatic>C8-10	organic	TDI	1.00E+02	TPHCWG	Yes	Yes	No	TDI	2.70E+02	TPHCWG	No	No	Yes	Yes	7.00E+03	TDI x 70kg (MDI unknown)	1.89E+04	TDI x 70kg (MDI unknown)
Aliphatic>C10-12	organic	TDI	1.00E+02	TPHCWG	Yes	Yes	No	TDI	2.70E+02	TPHCWG	No	No	Yes	Yes	7.00E+03	TDI x 70kg (MDI unknown)	1.89E+04	TDI x 70kg (MDI unknown)
Aliphatic>C12-16	organic	TDI	1.00E+02	TPHCWG	Yes	Yes	No	TDI	2.70E+02	TPHCWG	No	No	Yes	Yes	7.00E+03	TDI x 70kg (MDI unknown)	1.89E+04	TDI x 70kg (MDI unknown)
Aliphatic>C16-35	organic	TDI	2.00E+03	TPHCWG	Yes	Yes	No	NR			NR	NR	NR	NR	1.40E+05	TDI x 70kg (MDI unknown)		
Aromatic >C8-10	organic	TDI	4.00E+01	TPHCWG	Yes	Yes	No	TDI	5.50E+01	TPHCWG	No	No	Yes	Yes	2.80E+03	TDI x 70kg (MDI unknown)	3.85E+03	TDI x 70kg (MDI unknown)
Aromatic >C10-12	organic	TDI	4.00E+01	TPHCWG	Yes	Yes	No	TDI	5.50E+01	TPHCWG	No	No	Yes	Yes	2.80E+03	TDI x 70kg (MDI unknown)	3.85E+03	TDI x 70kg (MDI unknown)
Aromatic >C12-16	organic	TDI	4.00E+01	TPHCWG	Yes	Yes	No	TDI	5.50E+01	TPHCWG	No	No	Yes	Yes	2.80E+03	TDI x 70kg (MDI unknown)	3.85E+03	TDI x 70kg (MDI unknown)
Aromatic >C16-21	organic	TDI	3.00E+01	TPHCWG	Yes	Yes	No	NR			NR	NR	NR	NR	2.10E+03	TDI x 70kg (MDI unknown)		
Aromatic >C21-35	organic	TDI	3.00E+01	TPHCWG	Yes	Yes	No	NR			NR	NR	NR	NR	2.10E+03	TDI x 70kg (MDI unknown)		

PHYSICAL PROPERTIES

		Commercial Land Use	Source
Soil type	na	Sand	Professional experience
Porosity (total)	cm3 cm-3	0.54	SC050021/SR3
Porosity (air-filled)*	cm3 cm-3	0.30	SC050021/SR3
Porosity (water-filled)*	cm3 cm-3	0.24	SC050021/SR3
Capillary fringe porosity (air-filled)	cm3 cm-3	0.01	Literature value
Capillary fringe porosity (water-filled)	cm3 cm-3	0.53	Literature value
Thickness of capillary fringe	m	0.1	Literature value
Residual soil water content	cm3 cm-3	0.07	SC050021/SR3
Saturated hydraulic conductivity	cm s-1	7.36E-03	SC050021/SR3
van Genuchten shape parameter	dimensionless	3.51E-01	SC050021/SR3
Bulk density	g cm-3	1.18	SC050021/SR3
Soil organic matter content	%	0.34	Professional experience
Threshold value of wind speed at 10m	m s-1	7.20	SC050021/SR3
Empirical function for dust model	dimensionless	1.22	SC050021/SR3
Ambient soil temperature	K	283	SC050021/SR3
Mean annual windspeed (10m)	m s-1	5.00	SC050021/SR3
Air dispersion factor at 0.8m	g m-2 s-1 per kg m-3	68.0	SC050021/SR3
Air dispersion factor at 1.6m	g m-2 s-1 per kg m-3	120.0	SC050021/SR3
Fraction of site with hard or vegetative cover	m2 m-2	0.80	SC050021/SR3
Depth to groundwater (RBCA)	m	1	Assumption
Infiltration rate in vadose zone	m day-1	6.80E-04	Likely worst-case
Aquifer type**	na	Sand	Assumption
Source width	m	40	Likely worst-case
Source length	m	40	Likely worst-case
Saturated aquifer thickness	m	10	Assumption
Mixing zone depth	m	5.5	Calculated in RTW
Hydraulic conductivity	m day-1	20	Literature value
Hydraulic gradient	m m-1	0.001	Typical value for sand
Aquifer soil organic matter content	%	0.34	Professional experience
Effective Porosity (total)**	cm3 cm-3	0.3	Literature value
Aquifer bulk density**	g cm-3	1.18	SC050021/SR3
Distance to neighbouring resident**	m	5	Likely worst-case

Notes:

* Assumed to be present in foundation cracks when modelling in RBCA Toolkit

** Only used to generate GAC for neighbouring residents through off-site migration of impact in groundwater

For the purpose of assessing the risk to on-Site commercial workers from impacts in soil it is assumed that the soil source is present 65cm below the grounds surface. For soil gas it is assumed that the source is present 20cm beneath the grounds surface (in relation to both on-Site commercial worker and off-Site residents.

Development of GAC_March 2022

BUILDING PROPERTIES

		Residential (neighbouring resident)	Commercial (on-site)	Source
Building footprint	m2	2.80E+01	4.24E+02	SC050021/SR3
Living space air exchange rate	hr-1	0.50	1.00	SC050021/SR3
Living space height (above ground)	m	4.8	9.6	SC050021/SR3
Living space height (below ground)	m	0.0	0.0	SC050021/SR3
Pressure difference	Pa	3.1	4.4	SC050021/SR3
Foundation thickness	m	1.50E-01	1.50E-01	SC050021/SR3
Floor crack area	cm2	4.23E+02	1.65E+03	SC050021/SR3
Dust loading factor	µg m-3	5.00E+01	1.00E+02	SC050021/SR3

CLEA 1.07 EXPOSURE DATA

		Age Class						
		Residents						Commercial Worker
Age class	-	1	2	3	4	5	6	17
Frequency of inhalation (dust and vapour indoors)	days yr-1	365	365	365	365	365	365	230
Frequency of inhalation (dust and vapour outdoors)	days yr-1	365	365	365	365	365	365	170
Occupancy period (indoors)	hr day-1	23	23	23	23	19	19	8.3
Occupancy period (outdoors)	hr day-1	1	1	1	1	1	1	0.7
Body weight	kg	5.6	9.8	12.7	15.1	16.9	19.7	70
Body height	m	0.7	0.8	0.9	0.9	1	1.1	1.6
Inhalation rate*	m3 day-1	5.4	8	8.9	10.1	10.1	10.1	15.7

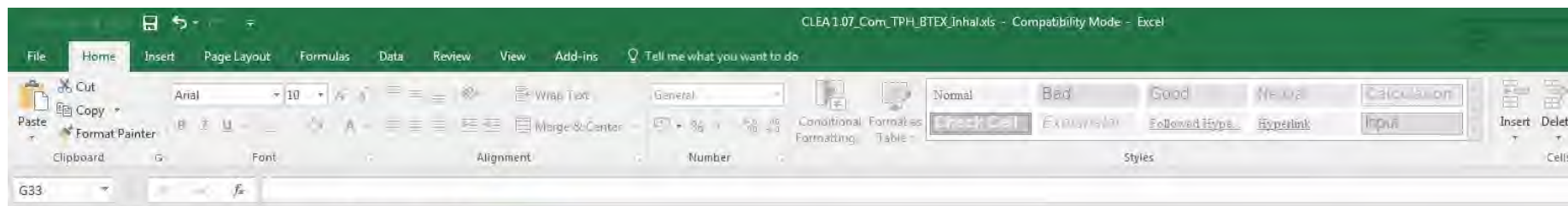
* Inhalation rate adopted from Category 4 Screening Levels

RBCA Toolkit EXPOSURE DATA		Age Class	
		0-6	17
Averaging time	yrs	6	49
Body weight	kg	13.3	70
Exposure duration	yrs	6	49
Averaging time (vapour flux)	yrs	6	49
Exposure frequency (indoors)*	days yr-1	365	29.9
Exposure frequency (outdoors)*	days yr-1	16.8	1.87

Notes:

Time-weighted average used for 0-6 year old female child

* RBCA Toolkit compares an acceptable air concentration to a predicted air concentration. Only the exposure frequency can be modified (i.e. inhalation rate, time exposed cannot). As such, the TDSI (or ID) was converted to an acceptable indoor air concentration using the time-weighted properties for a 0-6 year old female child as defined within the Category 4 Screening Levels. The exposure frequency for other scenarios was modified to account for the differing exposure scenarios for the remaining pathways, to be equivalent to modifying the inhalation rate and time exposed.



STEP 5: RESULTS

		Ratio of ADE to relevant Health Criteria Value			Soil Assessment Criteria			SAC Flag	Soil Saturation Limit	Pathway Contributions (%)						
		oral HCV	inhal HCV	Combined	oral HCV	inhal HCV	Combined	Current SAC used for determining pathway contributions		direct soil ingestion	sum of consumption of homegrown produce and attached soil	dermal contact (indoor)	dermal contact (outdoor)	inhalation of dust (indoor)	inhalation of dust (outdoor)	inhalation of vapour (indoor)
Number	Chemical	(dimensionless)	(dimensionless)	(dimensionless)	mg kg ⁻¹	mg kg ⁻¹	mg kg ⁻¹	(unitless)	mg kg ⁻¹	%	%	%	%	%	%	%
1	Benzene	0.01	0.99	1.00	5.53E+02	7.41E+00	7.43E+00	Combined	6.52E+02	0.24	0.00	0.02	0.02	0.00	0.00	99.55
2	Toluene	0.03	0.97	1.00	4.25E+05	1.35E+04	1.31E+04	Combined	3.74E+02	0.43	0.00	0.03	0.04	0.00	0.00	99.16
3	Ethylbenzene	0.01	0.99	1.00	1.91E+05	1.07E+03	1.07E+03	Combined	2.01E+02	0.65	0.00	0.04	0.06	0.00	0.00	98.53
4	Sum xylenes	0.00	1.00	1.00	3.43E+05	1.15E+03	1.14E+03	Combined	2.16E+02	0.85	0.00	0.06	0.08	0.01	0.00	95.99
5	MTBE	0.00	1.00	1.00	1.64E+06	1.78E+01	1.75E+01	Combined	1.11E+04	0.09	0.00	0.01	0.01	0.00	0.00	99.50
6	ETBE	0.04	0.96	1.00	1.31E+03	7.69E+01	7.29E+01	Combined	3.50E+03	0.04	0.00	0.00	0.00	0.00	0.00	99.93
7	TBA	0.10	0.90	1.00	1.72E+05	1.86E+04	1.68E+04	Combined	2.35E+05	8.73	0.00	0.58	0.86	0.06	0.00	89.42
8																
9	Aliphatic >C5-C6	0.00	1.00	1.00	4.77E+06	1.31E+03	1.31E+03	Combined	3.75E+02	0.01	0.00	0.00	0.00	0.00	0.00	49.96
10	Aliphatic >C6-C8	0.00	1.00	1.00	4.77E+06	1.76E+03	1.76E+03	Combined	1.12E+02	0.02	0.00	0.00	0.00	0.00	0.00	49.95
11	Aliphatic >C8-C10	0.00	1.00	1.00	9.53E+04	2.26E+02	2.26E+02	Combined	3.65E+01	0.04	0.00	0.00	0.00	0.00	0.00	49.90
12	Aliphatic >C10-C12	0.00	1.00	1.00	9.53E+04	8.88E+02	8.86E+02	Combined	1.80E+01	0.15	0.00	0.01	0.01	0.00	0.00	49.73
13	Aliphatic >C12-C16	0.02	0.98	1.00	9.53E+04	4.04E+03	4.00E+03	Combined	7.57E+00	0.66	0.00	0.04	0.07	0.00	0.00	49.01
14	Aliphatic >C16-C35	1.00	NR	NR	5.31E+06	NR	NR	Oral	2.57E+00	42.91	0.00	2.86	4.23	0.00	0.00	0.00
15	Aromatic >EC5-EC7	0.00	1.00	1.00	1.91E+05	1.62E+02	1.62E+02	Combined	7.53E+02	0.07	0.00	0.00	0.01	0.00	0.00	49.85
16	Aromatic >EC7-EC8	0.00	1.00	1.00	1.91E+05	2.53E+02	2.53E+02	Combined	3.99E+02	0.10	0.00	0.01	0.01	0.00	0.00	49.79
17	Aromatic >EC8-EC10	0.00	1.00	1.00	3.81E+04	3.14E+02	3.13E+02	Combined	2.24E+02	0.25	0.00	0.02	0.03	0.00	0.00	49.57
18	Aromatic >EC10-EC12	0.02	0.98	1.00	3.81E+04	1.64E+03	1.63E+03	Combined	1.30E+02	1.30	0.00	0.09	0.13	0.01	0.00	48.17
19	Aromatic >EC12-EC16	0.11	0.89	1.00	3.81E+04	8.22E+03	7.73E+03	Combined	5.72E+01	5.81	0.00	0.39	0.57	0.04	0.00	42.60
20	Aromatic >EC16-EC21	1.00	NR	NR	2.36E+04	NR	NR	Oral	1.60E+01	42.91	0.00	2.86	4.23	0.00	0.00	0.00
21	Aromatic >EC21-EC35	1.00	NR	NR	2.36E+04	NR	NR	Oral	1.68E+00	42.91	0.00	2.86	4.23	0.00	0.00	0.00
22																
23																
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Appendix K

Arcadis Generic Assessment Criteria (GAC)

ARCADIS GENERIC ASSESSMENT CRITERIA FOR SOILS							
- COMMERCIAL END USE -							
Compound	Theoretical Soil Saturation Limit	Human Health - Commercial				Water Resources	
		Commercial Worker - Oral	Commercial Worker - Inhalation	Commercial Worker - Combined	Neighbouring Resident	Surface Waters	Aquifers
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	652	553	7.43	7.33	1.84	0.019	0.0019
Toluene	374	4.25E+05	1.35E+04	1.31E+04	ND	0.24	2.3
Ethylbenzene	201	1.91E+05	1070	1070	ND	0.11	1.7
Xylenes	216	3.43E+05	1150	1140	ND	0.17	2.9
MTBE	1.11E+04	1.64E+06	1760	1750	467	0.018	0.018
ETBE	3500	1910	76.9	73.9	55.9	0.07	0.07
TBA	2.35E+05	1.72E+05	1.86E+04	1.68E+04	1600	0.014	0.014
Aliphatic >C5-6	375	4.77E+06	1310	1310	ND	#	#
Aliphatic>C6-8	112	4.77E+06	1760	1760	ND	#	#
Aliphatic>C8-10	36.5	9.53E+04	226	226	ND	#	#
Aliphatic>C10-12	18	9.53E+04	888	886	ND	#	#
Aliphatic>C12-16	7.57	9.53E+04	4040	4000	ND	#	#
Aliphatic>C16-35	2.57	1.91E+06	NR	1.91E+06	NR	#	#
Aromatic >C5-C7 (as benzene)	652	553	7.43	7.33	1.84	0.019	0.0019
Aromatic >C7-C8 (as toluene)	374	4.25E+05	1.35E+04	1.31E+04	ND	0.24	2.3
Aromatic >C8-10	224	3.81E+04	314	313	ND	#	#
Aromatic >C10-12	130	3.81E+04	1640	1630	ND	#	#
Aromatic >C12-16	57.2	3.81E+04	8220	7730	ND	#	#
Aromatic >C16-21	16	2.86E+04	NR	2.86E+04	NR	#	#
Aromatic >C21-35	1.68	2.86E+04	NR	2.86E+04	NR	#	#
TPH	na	na	na	na	na	see Soil Assessment footnote	
Naphthalene	28.1	3.64E+04	334	331	ND	0.015	0.015
Acenaphthylene	72.7	1.10E+05	1.57E+05	6.46E+04	ND	-	-
Acenaphthene	15.6	1.10E+05	9.87E+04	5.19E+04	ND	-	-
Fluorene	12	7.31E+04	1.90E+05	5.28E+04	ND	-	-
Phenanthrene	4.83	2.28E+04	2.79E+04	1.25E+04	ND	-	-
Anthracene	0.706	5.49E+05	5.84E+06	5.02E+05	ND	-	-
Fluoranthene	6.46	2.29E+04	8.99E+05	2.23E+04	ND	-	-
Pyrene	0.75	5.49E+04	2.12E+06	5.35E+04	ND	-	-
Benzo(a)anthracene	0.582	284	325	151	ND	-	-
Chrysene	0.15	567	845	339	ND	-	-
Benzo(b)fluoranthene	0.413	71.3	115	44	ND	-	0.026
Benzo(k)fluoranthene	0.234	1880	3070	1170	ND	-	0.037
Benzo(a)pyrene (C4SL)	5.46		76		ND	0.0002	0.013
Indeno(123cd)pyrene	0.0209	810	1280	497	ND	-	0.022
Dibenzo(ah)anthracene	0.00134	5.67	9.08	3.49	ND	-	-
Benzo(ghi)perylene	0.00634	6290	1.04E+04	3920	ND	-	0.105
Dichloroethane (1,1)	1580	1.52E+05	44.2	44.1	50.6	0.0042	0.0042
Dichloroethane (1,2)	2160	229	0.212	0.212	0.0861	0.013	0.0038
Trichloroethane (111)	721	1.14E+06	160	160	ND	0.28	5.64
Dichloroethene (1,1)	1310	9.52E+04	6.39	6.39	37.7	0.019	0.372
Dichloroethene (cis 1,2)	1120	1.13E+04	3.34	3.33	3.62	0.041	0.041
Dichloroethene (trans 1,2)	2040	3.23E+04	49.4	49.3	11.9	0.041	0.041
Trichloroethene	724	953	0.28	0.28	0.73	0.013	0.013
Tetrachloroethene	183	1.12E+04	3.78	3.78	11.7	0.021	0.021
Chloroform (Trichloromethane)	2880	2.34E+04	27.4	27.4	25	0.0041	0.16
Vinyl Chloride (chloroethene)	1180	26.7	0.027	0.027	0.227	0.0011	0.0011
Chlorobenzene	279	1.48E+05	11	11	10.1	0.37	0.37
Phenol (SGV)	2.02E+04		3200		2570	0.014	0.014
Arsenic (C4SL)	NVP		640		NVP		
Barium	NVP	2.22E+04	4.69E+04	1.90E+04	NVP		
Boron	NVP	2.38E+05	2.82E+07	2.36E+05	NVP		
Cadmium (C4SL)	NVP		410		NVP		
Chromium (as VI) (C4SL)	NVP		49		NVP		
Chromium (as III)	NVP	3.31E+05	8570	8570	NVP		
Copper	NVP	1.89E+05	8.96E+04	6.83E+04	NVP		
Lead (C4SL)	NVP		2330		NVP		
Mercury (inorganic)	NVP	1180	1.97E+04	1120	NVP		
Mercury (elemental)	1.47	NR	2.68	2.68	1.43		
Mercury (methylated)	36	357	852	252	34.7		
Molybdenum	NVP	5550	1.12E+06	5540	NVP		
Nickel	NVP	3080	983	983	NVP		
Selenium (SGV)	NVP		1.30E+04		NVP		
Zinc	NVP	7.35E+05	1.97E+08	7.33E+05	NVP		

Notes:

Where combined GAC is greater than the theoretical maximum concentration in soil (1kg per kg), 1.0E+06 mg/kg presented as GAC

Italics

NR	Target exceeds theoretical soil saturation limit. Concentrations above the soil saturation limit may indicate the presence of separate phase in soil, but does not necessarily present a significant risk
#	No appropriate reference dose identified during review of toxicological data
na	No GAC for individual TPH fractions given that the compliance criteria is for sum TPH
-	Comprises multiple contaminants - no GAC derived
C4SL	No water quality standard identified as suitable for deriving generic assessment criteria
NVP	Category Four Screening Level, adopted from The Companion Document to SP1010, DEFRA 2014
Metals/inorganics	Contaminant has only a low vapour pressure in soil
ND	Inhalation exposure via dust inhalation only
	Results of modelling indicates pathway not considered to present a significant risk
	No GAC as potential for leaching commonly linked to the soil pH/cannot be readily modelled

Soil Assessment: Potential risk to water resources

Where supported by the CSM, the risk to water resource receptors is generally best assessed via groundwater, or alternatively leachate. However, in the absence of suitable groundwater or leachate data, soil data is used. For TPH in soil no criteria are present for water resources (see #). TPH concentrations measured above the laboratory MDL indicate the need for further consideration and could present a potential risk to water resource receptors.

ARCADIS GENERIC ASSESSMENT CRITERIA FOR GROUNDWATER

- COMMERCIAL END USE -

Compound	Human Health - Commercial		Water Resources	
	Commercial	Neighbouring Resident	Surface Waters	Aquifers
	µg/l	µg/l	µg/l	µg/l
Benzene	5.70E+04	1010	10	1
Toluene	>SOL	>SOL	74	700
Ethylbenzene	>SOL	5.87E+04	20	300
Xylenes	>SOL	4.99E+04	30	500
MTBE	2.40E+07	4.00E+05	15	15
ETBE	2.00E+06	3.80E+04	47	47
TBA	1.00E+08	1.38E+06	12	12
Aliphatic >C5-6	>SOL	>SOL	#	#
Aliphatic>C6-8	>SOL	>SOL	#	#
Aliphatic>C8-10	>SOL	>SOL	#	#
Aliphatic>C10-12	>SOL	>SOL	#	#
Aliphatic>C12-16	>SOL	>SOL	#	#
Aliphatic>C16-35	NR	NR	#	#
Aromatic >C5-C7 (as benzene)	5.70E+04	1010	10	1
Aromatic >C7-C8 (as toluene)	>SOL	>SOL	74	700
Aromatic >C8-10	>SOL	1.15E+04	#	#
Aromatic >C10-12	>SOL	9490	#	#
Aromatic >C12-16	>SOL	>SOL	#	#
Aromatic >C16-21	NR	NR	#	#
Aromatic >C21-35	NR	NR	#	#
TPH	na	na	10	10
Naphthalene	>SOL	4110	2	2
Acenaphthylene	>SOL	>SOL	-	-
Acenaphthene	>SOL	>SOL	-	-
Fluorene	>SOL	>SOL	-	-
Phenanthrene	>SOL	>SOL	-	-
Anthracene	>SOL	>SOL	-	-
Fluoranthene	>SOL	>SOL	-	-
Pyrene	>SOL	>SOL	-	-
Benzo(a)anthracene	>SOL	>SOL	-	-
Chrysene	>SOL	>SOL	-	-
Benzo(b)fluoranthene	>SOL	>SOL	-	0.025
Benzo(k)fluoranthene	>SOL	>SOL	-	0.025
Benzo(a)pyrene	>SOL	>SOL	0.00017	0.01
Indeno(123cd)pyrene	>SOL	>SOL	-	0.025
Dibenzo(ah)anthracene	>SOL	>SOL	-	-
Benzo(ghi)perylene	>SOL	>SOL	-	0.025
Dichloroethane (1,1)	1.60E+06	3.33E+04	2.7	2.7
Dichloroethane (1,2)	3600	69.8	10	3
Trichloroethane (111)	>SOL	2.97E+05	100	2000
Dichloroethene (1,1)	7.40E+05	FALSE	7	140
Dichloroethene (cis 1,2)	1.20E+05	2240	25 ³	25 ³
Dichloroethene (trans 1,2)	4.30E+05	7220	25 ³	25 ³
Trichloroethene	1.30E+04	274	5 ³	5 ³
Tetrachloroethene	1.40E+05	2840	5 ³	5 ³
Chloroform (Trichloromethane)	8.20E+05	1.54E+04	2.5	100 ⁴
Vinyl Chloride (chloroethene)	5000	108	0.5	0.5
Chlorobenzene	1.30E+05	2850	100	100
Phenol	>SOL	1.42E+06	7.7	7.7
Arsenic (inorganic)	NVP	NVP	50	10
Barium	NVP	NVP	700	700
Boron	NVP	NVP	2000	1000
Cadmium	NVP	NVP	0.08 - 0.25	5
Chromium (as VI)	NVP	NVP	3.4	50
Chromium (as III)	NVP	NVP	4.7	
Copper	NVP	NVP	1 ¹	2000
Lead	NVP	NVP	1.2 ¹	10
Mercury (inorganic)	NVP	NVP		
Mercury (elemental)	>SOL	9.7	0.07	1
Mercury (methylated)	>SOL	1.90E+04		
Molybdenum	NVP	NVP	70	70
Nickel	NVP	NVP	4 ¹	20
Selenium	NVP	NVP	10	10
Zinc	NVP	NVP	12.1 ^{1,2}	3000

Notes:

>SOL

NR

#

na

-

NVP

Target acceptable risk not exceeded at theoretical solubility concentration

No appropriate inhalation reference dose identified during review of toxicological data

No GAC for individual TPH fractions given that the compliance criteria is for sum TPH

Comprises multiple contaminants - no GAC derived

No water quality standard identified as suitable for deriving generic assessment criteria

Contaminant has low vapour pressure in groundwater

Bioavailable fraction. The fraction of the dissolved concentration likely to result in toxic effects as determined using the UKTAG Metal Bioavailability Assessment Tool (also referred to as a PNEC Estimator)

1

2

3

4

Adjusted to account for background concentrations

Based on values of 10µg/l combined for TCE and PCE and 50µg/l combined for cis-DCE and trans-DCE

Total value for trihalomethanes (chloroform, bromoform, dibromochloromethane and bromodichloromethane).

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