CCG-C-24-14500

PH I SE II GEOENVIRONMENTAL REPORT FOR LAND AT THE FORMER CHORLTON LEISURE CENTRE MANCHESTER ROAD CHORLTON MANCHESTER M21 9PQ

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Prepared for:

CADDICK CONSTRUCTION
Chepstow House
Trident Business Park
Warrington
WA3 6BX

Telephone: 01925 640890

By:

CC GEOTECHNICAL LIMITED
Unit 1
Deltic Way
Knowsley Industrial Estate
L33 7BA

Telephone:0151 545 2750
Facsimile: 0151 548 7892

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Main Author:	Anthony Gerrard BSc (Hons) MSc FGS
Signature:	[redacted]
Reviewed by:	Chris Bolan CEng MICE CEnv
Signature:	[redacted]
Approved for Issue by:	Chris Bolan CEng MICE CEnv
Signature	[redacted]
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1.0 INTRODUCTION

CC GEOTECHNICAL LIMITED (**CCG**) is providing consultancy services to **CADDICK CONSTRUCTION** (the *Client*) via **REID JONES AND PARTNERS (**the *Engineer***)** in connection with the proposed redevelopment of land at the former Chorlton Leisure Centre, Manchester Road, Chorlton, Manchester, M21.

Following the demolition of existing structures and subsequent site clearance works, it is understood that the site is to be redeveloped for residential use by the construction of 2nr x 5-storey residential apartment blocks, forming c. 50nr self contained dwellings (Class C3) with ancillary communal facilities, newly created hard paved access road, off-road car parking facilities and areas of soft communal landscaping.

The proposed layout of the development is as shown on **BUTTRESS** architectural drawings contained in Appendix A.

The proposed development falls within the administrative jurisdiction of **MANCHESTER CITY COUNCIL** administered under Planning Application Reference No. 136791/FO/2023.

2.0 PREVIOUS STUDIES

The development site was the subject of a *Phase I Preliminary Risk Assessment Report*' prepared by **CARLEY DAINES AND PARTNERS** under Report Reference No. 23-B-13672/Chorlton Baths, dated March 2023 which concluded that a Phase II intrusive investigation was required and made suitable recommendations on the scope of the Phase II investigation.

This report documents the findings of the Phase II investigation.

This report should be read in conjunction with the aforementioned report and with **CCG** Notes on Limitations, given in Appendix M.

3.0 PURPOSE & AIMS OF THE PHASE II INTRUSIVE INVESTIGATION

The primary purpose of the Phase II intrusive investigation was to confirm the indications of the desk study with respect to:

- The collation of data on soil and groundwater contamination, as far as they may adversely impact on human and/or environmental receptors
- The collation of data on the properties of the substrata, as far as they relate to the design and construction of foundations, ground slabs, and development infrastructure

4.0 SITE DATA

The site is located immediately to the east of public pavements extending along Manchester Road, Chorlton, Manchester, M21 9PQ, and immediately to the west of the Manchester Metrolink rail line as illustrated on **CCG** Drawing No. CCG-C-24-14500-1 and Aerial Plate No. CCG-C-24-14500-2 contained herein.

The **ORDNANCE SURVEY** coordinates for the approximate site centre are 381710, 394520. Its western boundary stands at an elevation of c. 28maOD.

A detailed description of the site is discussed in by **CARLEY DAINES AND PARTNERS** Report Reference No. 23-B-13672/Chorlton Baths, with the salient points being presented hereunder.

The site is located within a mixed residential / commercial context. It comprises an irregular shaped parcel of land which extends to the approximate dimensions of c. 95m x 45m (c. 2676m^2); its long axis being on a north – south alignment. It is bound to the west by public pavements extending along Manchester Road, beyond which lies a development of retail properties, with the Manchester Metro Link rail line extending along its eastern boundary. Its southern boundary adjoins a retail store (**UNICORN GROCERY**), with a large diameter above ground pipeline associated with the Thirlmere Aqueduct extending along its northern boundary on an east – west alignment.

The external surface topography across the site was seen to be sensibly flat with surface cover comprising mainly poorly maintained hard standing to the north with areas of unkempt vegetation (including Japanese Knotweed (*Fallopia japonica*)) extending along the railway alignment with lesser areas comprising gravel, particularly within the eastern section of the site.

Permanent structures occupying the site comprise a brick built former leisure facility (public baths *etc*.), c. 1934 construction.

Access to the site is *via* its Manchester Road frontage to the west.

Given that the site was previously developed for commercial land uses, there is a potential for the presence of buried services to exist beneath the site.

4.1 Published Geology

The geology of the site was researched by reference to Croft. R.G. *et.al* (2012) '*Geology of the Manchester district: a brief explanation of the geological map Sheet 85 Manchester.*, Keyworth, Nottingham, and the **BRITISH GEOLOGICAL SURVEY** (BGS) 1:50, 000 scale Sheet 085 Manchester (2010 - 2011), and 1:10, 000 scale (Solid and Drift Editions) geological mapping data.

The **BGS** 1:10, 000 Scale Drift Geological map indicate that the site and its immediate environs are underlain by glaciofluvial sheet deposits (sands and gravel) of glacial origin (*Pleistocene Epoch - Late Quaternary - Devensian Sub Age*).

The solid geology is documented to comprise the Wilmslow Sandstone Formation (*formerly the Bunter Sandstone Formation*) of the Sherwood Sandstone Group comprising red / brown fine and medium-grained, generally pebble-free, cross-bedded sandstones, with sporadic siltstone horizons of the Early Triassic Epoch (*Mesozoic Era, Olenekian Sub-Age*).

There are no documented geological lines of weakness (*i.e. faults etc*.) within, or within 250m of, the site.

The '*Indicative Atlas of Radon in England and Wales*' (Miles. J.C.H *et.al*, 2007) Map 13 '*Northern Welsh Marches and Liverpool',* shows the site to be situated within an area where it is believed that less than 1% of the properties within the area are affected by Radon and therefore no Radon Protection Measures will be required for new structures in contact with the ground.

The site does not fall within a Coal Mining Reporting Area and is not located within a 'Development High Risk Area' for coal mining, as defined by the **COAL AUTHORITY**. As such, it is considered that there are no shallow coal mining related hazards which could impact the future redevelopment of the site.

As with many previously developed sites superficial made ground deposits of an unknown composition thickness and extent associated with the development of the site and its immediate environs may underlie the site.

4.2 Hydrogeology & Hydrology

Information pertaining to hydrogeological and hydrological features of the site may be summarised as follows:

- Made ground deposits, if present, classify as being an Unproductive Aquifer
- The underlying glaciofluvial sheet deposits (sands and gravel), classifies as being a Secondary Aquifer
- The solid geology (Wilmslow Sandstone Formation) is classified as a Principal Aquifer
- There are records pertaining to current / active Ground Water Abstraction Licences within, or within 500m of, the site
- There are no records pertaining to the presence of current / active Surface Water Abstraction Licences within, or within 500m of, the site
- There are no records pertaining to the presence of current / active Portable Water Abstraction Licences within, or within 500m of, the site
- The site is not located within a designated Source Protection Zone
- The site is not located within an Environment Agency Zone II Flood Plain
- The site is not located within an Environment Agency Zone III Flood Plain

5.0 PRELIMINARY CONCEPTUAL MODEL

5.1 Introduction

The risk assessment methodologies adopted by **CCG** are based on current available guidance from several sources and are included in Appendix L.

A Tier 1 Risk Assessment and Preliminary Conceptual Model (PCM) were formulated using the information collated in the Phase I Desk Study and based on the following assumptions:

- Following the demolition of existing structures and subsequent site clearance works, it is understood that the site is to be redeveloped for residential land use by the construction of 2nr 5-storey residential apartment blocks, forming c. 50nr self contained dwellings (Class C3) with ancillary communal facilities, newly created hard paved access / egress roads, off road car parking facilities and areas of communal landscaping.
- The proposed layout of the development is as shown on **BUTTERESS** architectural drawings contained herein.
- Drinking water will be from a mains supply.

In constructing the Preliminary Conceptual Model (PCM)**, CCG** applied the guidance contained in CIRIA C552: 2001. This recommends use of a Risk Matrix which classifies risk based on the product of Probability of a source being present, and the Consequence of receptors being exposed to the source. Guidance tables setting out the classifications of probability and consequence together with a risk matrix are given in Tables 1-3 hereunder. In using this approach ***CCG*** recommends actual intrusive investigation of any Risk Classification of "*Moderate*" or over.

Table 1: Matrix of consequences against probability to gain a risk classification [CIRIA C552, 2001]

		CONSEQUENCE			
		SEVERE	MEDIUM	MILD	MINOR
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table 2 : Classification Definitions (C552 CIRIA, 2001)

CLASSIFICATION	DEFINITION
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard. Or there is evidence that server harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be server, or if any harm were to occur it is more likely that harm would be relatively mild. Investigation (if not undertaken already) is normally required to clarify the risk and to determine to potential liability. Some remedial works may be required in the longer term.
Moderate / Low	
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be server.

5.2 Preliminary Conceptual Model

By application of the risk assessment methodology outlined above, the following PCM was constructed.

Table 3: Preliminary Conceptual Model (PCM)

POLLUTANT LINKAGE	SOURCE	PATHWAY	RECEPTOR	PROBABILITY	CONSEQUENCE	RISK RATING
1	Broad spectrum of heavy metals, aggressive pH, hydrocarbons, PAH`s in Made Ground associated with the development of the site & the adjoining area etc.	Soil and / or soil dust ingestion	Construction workers Future worker Offsite receptors	Likely	Medium	Moderate
2	Asbestos containing materials (ACM) in made ground soils associated with the development of the site & the adjoining area etc.	Fibre Inhalation	Construction workers Future worker Offsite receptors	Likely	Severe (ACM)	High
3	Inhalation of vapours associated with potential on-site made ground deposits	Inhalation	Future residents	Unlikely	Medium	Moderate

	& former on-site oil storage depot & historical landfill facility etc.					
4	Inhalation of ground gases from onsite or offsite sources i.e., made ground deposits etc.	Inhalation	Future residents	Unlikely	Medium	**Moderate**
5	pH & Sulphate attack on concrete	Future building	Future building	Likely	Mild	**Moderate / Low**
6	Organic contamination associated with oil & fuel spillages & onsite car parking facilities etc.	Direct contact with water mains	Potable water supply	Unlikely	Medium	**Moderate**

The contaminants of concern associated with those risks which require intrusive investigation were researched by reference to published industry profiles, and are summarised hereunder:

Table 4: Summary of Contaminants of Concern based on PCM

LINKAGE NO.	METALS	NON-METALS	ORGANICS	GASES	OTHERS
PL1, PL2, PL3, PL5, PL6	Cd, Cr (total & hexavalent), Ni, Cu, Zn, Pb, Hg, Se, Mo, Sb	As, sulphates, sulphides, boron, free cyanide	TPHCWG, PAH's, BTEX, Volatiles (by PID), VOC's & SVOC's, SOM,	-	pH Asbestos
PL4	-	-	-	CH_4, CO_2, CO, H_2S	-
PL1-PL6	Cd, Cr (total), Ni, Cu, Zn, Pb, Hg, Se, Mo, Sb	As, sulphates, sulphides, boron, free cyanide	TPHCWG, PAH's, BTEX, Volatiles (by PID), VOC's & SVOC's, SOM,	CH_4, CO_2, CO, H_2S	pH Asbestos

5.3 Summary of Risks

The foregoing analysis identified a number of potential risks, and if present, these could adversely impact on human or environmental receptors. Given the sensitivity of the proposed end use, an intrusive phase of investigation was undertaken to determine whether the postulated pollutant linkages are present on site.

6.0 FIELDWORK

6.1 Introduction

A programme of fieldwork investigation was undertaken in April 2024. The programme comprised:

- The manual excavation and CAT scanning of 4nr borehole service avoidance pits, each extending to 1.2mbngl
- The subsampling of borehole starter pit arisings for soil contamination analyses
- The advancement of boreholes from the base of 2nr of the service avoidance pits using cable percussive boring methods at 2nr locations with associated *in-situ* testing
- The logging and sampling of borehole arisings for laboratory testing
- The advancement of boreholes from the base of 2nr service avoidance pits using light dynamic sampling methods to a notional depth of 5mbgl with associated *in-situ* testing
- The subsampling of borehole arisings for soil contamination / classification testing
- The further advancement of light dynamic sampling boreholes using dynamic probe (super heavy) tests methods in accordance with BS 137: Part 9: Clause 3.2
- Installation of 50mm HDPE plain and slotted well-tube and associated headworks, complete with non-lime pea gravel surround and bentonite seals at 4nr borehole positions
- The instigation of a programme of groundwater / gas monitoring comprising 6nr rounds distributed over a 3-month period
- The mechanical excavation, logging and photographing of 1nr trial pit using a JCB 3cx and associated breaker attachment
- The subsampling of trial pit arisings for soil contamination / classification testing
- The undertaking of a soil infiltration rate determination in accordance with BRE Digest 365

The fieldwork was planned in accordance with BSEN 1997-1 (2007) Eurocode 7, BS10175: 2011, BS5930: 1999, and the sampling and monitoring methodologies employed by **CCG** as presented in Appendix B, as far as they related to the scope of the investigation.

The layout of the proposed intrusive investigation is as annotated on **CCG** Drawing No. CCG-C-24-14500-3 '*Site Investigation Plan*' contained herein.

It must be borne in mind, that at the time of undertaking the above investigation works, it was evident that the southern section of the site, and its eastern boundary were significantly impacted by the presence of Japanese Knotweed (*Fallopia japonica*). In addition, the presence of structures associated with the former public baths / leisure centre prohibited full site access, consequently all works listed above were restricted to the northern section of the site.

Taking into account the above limitations it is recommended that further works be undertaken following the successful treatment of Japanese Knotweed and the demolition of structures and subsequent site clearance works.

6.2 Borehole Drilling & Monitoring Installations

6.2.1 Light Cable Percussive Boring

2nr cable percussion boreholes were sunk by a Dando 150 Shell and Auger rig using deploying 150mm diameter casings and associated tools.

Each borehole location was positioned clear of all overhead services and scanned for buried electrical services using CAT cable avoidance scanner before and during hand excavation of a starter pit extending to 1.2mbgl.

Boring tools were decontaminated prior to commencement and on completion of each borehole.

Standard Penetration Tests (SPT) were carried out at regular intervals throughout the borehole depths, with U100 samples taken in suitably cohesive strata.

Bulk disturbed, and small-disturbed glass amber jar/vial samples were recovered at regular incremental depths and at changes of stratum within the borehole.

The logs of the light dynamic sampling boreholes, annotated with sampling details, SPT `*N*` values and details of standpipe construction, are presented in Appendix C.

6.2.2 Light Dynamic Sampling Boreholes

2nr boreholes were sunk using light dynamic sampling methods using a Dando Terrier 2000 rig deploying 100mm casings and associated tools.

Each borehole location was positioned clear of all overhead services and scanned for buried electrical services using CAT cable avoidance scanner before and during hand excavation of a starter pit extending to 1.2mbgl.

Boring tools were decontaminated prior to commencement.

In this method of investigation samples of subsoils are recovered by driving and extracting a series of reducing diameter 1m long steel tubes. Standard penetration test's (SPT's) were undertaken at regular depth increments with hand shear vane (HSV) tests being undertaken on recovered cohesive soils. This method of sampling recovers relatively "undisturbed" soil profiles in Perspex tubes, which are used to line the steel tubes. The Perspex tubes were split and carefully logged and subsampled. Subsamples for potential chemical analysis were removed at appropriate positions from the profile and transferred to chilled amber glass jars and vials for laboratory analysis.

The logs of the light dynamic sampling boreholes, annotated with sampling details, SPT `N` and *in-lab* HSV (Cu-(kN/m^2) values and details of standpipe construction, are presented in Appendix C.

On completion of light dynamic sampling, each borehole was further advanced to a notional depth of 10mbgl using dynamic probe super heavy tests methods in accordance with BS 1377 part 9: Clause 3.2. Probe logs annotated with '*Equivalent*' SPT 'N' values are presented alongside its corresponding borehole log in Appendix C.

6.2.3 Monitoring Installations

A standpipe comprising 50mm diameter HDPE plain and slotted well tube set in bentonite and non-limestone pea gravel surround was installed at 1nr borehole position. The standpipe was fitted with a gas valve connector and was protected by a flush cover set in concrete. Standpipe installation details are provided on the relevant borehole logs in Appendix C and summarised in the tabulation hereunder:

Table 5: Borehole Installation Details

BOREHOLE	DEPTH OF BOREHOLE (mbgl)	DEPTH OF STANDPIPE [mbgl]	RESPONSE ZONE (mbgl)	
			FROM	TO
WS01	5.45m	5.45m	0.5m	5.45

The standpipe installation was periodically monitored for flow rate and composition of ground gas using a Geotechnical Instruments GA 2000 infra-red analyser. The installation was also monitored for standing water levels with an electronic dip meter.

The results of the gas and groundwater monitoring, together with calibration certificates of the instruments used are given in Appendix G.

6.2.4 Trial Pitting

A single trial pit was excavated, logged, sampled, and photographed at a location as annotated on **CCG** Drawing No. 24-14500-3 contained herein.

The trial pit location was positioned clear of known buried and overhead services and was CAT scanned before and during excavation works. Each trial pit location was mechanically excavated using a 5t tracked 360° excavator with associated 300mm excavation buckets.

The soils were excavated in thin layers and all arisings placed adjacent to the excavation, before being returned in the reverse sequence of their excavation to preserve as far as was possible, the original lithology.

On completion of excavation works, the pit was charged with water and the initial depth to the surface of the water was recorded. Further readings of depth to water were recorded at regular time intervals in accordance with *BRE Digest 365*. The results of which are contained in Appendix D and discussed in Section 15.6 hereunder.

A trial pit log annotated with sampling details is given in Appendix D.

Trial pit photographs are provided in Appendix E.

7.0 OBSERVED STRATIGRAPHY

The stratigraphy of the boreholes was consistent with the documented geology. The succession may be generalised as tabulated hereunder:

Table 6: Observed Stratigraphy

Location	STRATIGRAPHY
BH01	Tarmac paving overlying made ground deposits comprising loose/ medium dense black sands and gravel extending to 1.6mbgl. The sequence thereafter continues in natural drift deposits comprising medium dense sands and gravel to 3.6mbgl, overlying firm varying to stiff brown boulder clay, proven to 15.45mbgl
BH02	Tarmac paving overlying made ground deposits comprising dense sands and gravel extending to 1.4mbgl. The sequence thereafter continues in natural drift deposits comprising medium dense gravelly sand to 3.9mbgl, overlying firm to stiff becoming stiff brown boulder clay, proven to 15.45mbgl
WS01	Made ground deposits comprising soft dark brown reworked clay deposits to 1.2mbgl, overlying loose dark brown sands and gravel extending to 1.7mbgl. The sequence thereafter continues in natural drift deposits comprising very loose varying to loose locally gravelly sands to 4.2mbgl, then firm brown boulder clay thereafter proven to 5.45mbgl. Dynamic probing confirmed a significant increase in soils density from around 6.5mbgl
WS02	Made ground deposits comprising dark brown sands and gravel extending to 1mbgl. The sequence thereafter continues in natural drift deposits comprising very loose / loose locally gravelly sands to 3.8mbgl, overlying soft becoming firm brown boulder clay, proven to 5.45mbgl. Dynamic probing confirmed a marked increase in soils density from around 6.5mbgl
TP01	Tarmac paving overlying made ground deposits comprising dark brown sands and gravel extending to 1.1mbgl. The sequence thereafter continues in natural drift deposits comprising light brown sand proven to 2mbgl

There was no visual and/or olfactory evidence of contamination and/or biodegradable materials affecting the made ground mass and/or the natural underlying drift deposits at any sampling position.

8.0 GROUNDWATER REGIME

All borehole positions were reported to be dry on completion of fieldworks.

9.0 LABORATORY TESTING

9.1 Soil Engineering Test

A programme of soil engineering testing was undertaken at a UKAS / MCERTS accredited laboratory associated with ***CCG***. The programme comprised:

- Determination of soil Moisture Content in accordance with BS: 1377: Part 2: 1990
- Determination of Atterberg Limits in accordance with BS: 1377: Part 2: 1990
- Determination of Particle Size Distribution using wet sieving methods in accordance with BS 1377: Part 2: 1990
- Determination of Unconsolidated Undrained Triaxial Compression BS1377-7:1990 (a)

The soil classification test results are presented in Appendix H.

9.2 Contamination Analyses

A programme of soil chemical analyses was undertaken at a UKAS / MCERTS accredited laboratory:

- 5nr subsamples of soils were analysed to a broad range of contaminants including metals, non-metals, speciated PAH's
- 5nr subsamples of soil were analysed for hydrocarbons to the TPHCWG methodology
- 5nr subsamples of soil were analysed for the presence of Benzene, Toluene, Ethylbenzene and Xylene (BTEX compounds)
- 5nr subsamples of soils were analysed for the presence of Methyl tert-butyl ether (MTBE)
- 2nr subsample of soil was analysed for the presence of semi-volatile organic compounds (SVOCs)
- 2nr subsample of soil was analysed for the presence of volatile organic compounds (VOCs)
- 2nr sample of soil was analysed for the presence of Phenols
- 6nr subsamples of were screened for asbestos containing materials (ACM's)
- Determination of soil pH and water-soluble sulphate content
- Waste acceptance criteria (WAC) testing on 2nr samples of soil
- In the absence of adequate quantities of perched water, leachates prepared on soil recovered from 1nr borehole position were analysed for a broad range of contaminants including metals, non-metals, speciated PAH's
- Leachate prepared on soil recovered from 1nr borehole position were analysed for hydrocarbons to the TPHCWG methodology

The soil contamination test results and certificates are presented in Appendix I.

10.0 ASSESSMENT OF RISKS TO THE BUILT ENVIRONMENT

10.1 Specification of Buried Concrete

The data obtained in the investigations was assessed against the guidance given in BRE Special Digest 1: 2005, as summarised hereunder:

Table 7: Design Chemical Class Based on Soil Data

CONCRETE SPECIFICATION DATA SHEET		
Is the site Brownfield or Greenfield?	Brownfield	
Is the water table static or mobile?	Static	
Highest water-soluble Sulphate results	149mg/l	Design Sulphate Class of DS-2 Class of AC-1s
Lowest pH result	8.1	
Intended Working Life	50 years	Adopt Design Chemical Classification of **DC-1**

Based on the foregoing assessments, concrete in the ground should be specified to conform to the compositional requirements of Design Chemical Class **DC 1**, as defined in BRE Special Digest 1: 2005.

10.2 New Water Mains Supply

The assessment of requirements for new water mains within the investigation area was based on the criteria specified in Paper 10/WM/03/21 '*Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites*' published by UK Water Industry Research (UKWIR) January 2011.

The preliminary findings indicate that the soil concentrations of pertinent hydrocarbon contaminant species are above the permitted threshold concentrations specified by the UKWIR for the adoption of PE water mains and therefore PE-AL-PE mains must be deployed. Good practice requires that mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside.

Pipes should be laid in accordance with BS EN 12201-2 '*Plastic piping systems for water supply and for drainage and sewerage under pressure'* as stated in UKWIR guidance.

It should be noted that this recommendation is subject to the opinion of the water supplier, and in this instance the local water authority (**UNITED UTILITIES**) must be consulted to confirm that the proposals above accord with their interpretation of current guidance.

10.3 Assessment of Risk from Ground Gases

Using the data gathered in the monitoring programme, a gas risk assessment was undertaken in accordance with the ground gas risk assessment methodology (See Appendix L) employed by **CCG**. The ground gas risk assessment methodology conforms to current UK guidance on the assessment of risks posed by ground gases.

The potential sources of gas identified in the desk study were considered as sources of "*Low*" generation potential, but since the development is of high sensitivity, a programme of monitoring comprising of 6 rounds distributed over a 3-month period was adopted.

A gas risk assessment was undertaken in accordance with current UK guidelines set out in CIRCA C665 2007 "*Assessing Risk Posed by Hazardous Gases to Buildings*". The CIRIA risk assessment methodology uses typical maximum soil gas concentrations and worse case borehole flow rates to define a "*Characteristic Situation*" for the shallow gas regime.

The volumetric gas flow rate used by the risk assessment is termed "Gas Screening Value (GSV)" in the guidance and is defined below.

Table 8: Gas Monitoring Data

Position	WS01
No Monitoring Visits	2
CH_4 (%)	Nil
CO_2 (%).	6.9
O_2 (%)	11.1
H_2S (ppm)	Nil
CO (ppm)	Nil
Flow (l/hr)	<0.1
Water Levels (m)	Dry
PID response	0.0
Pressure Range (mb)	1001 > 1006mbar

After 2nr rounds of monitoring, a preliminary Gas Screening Value (GSV) of 0.00069l/hrs is calculated for CO_2, and <0.00001l/hr for CH_4.

Using these GSV values, the risk to the proposed development was assessed in line with Situation A as defined in CIRIA C665, and on this basis the site complies with Characteristic Situation 2 (CS2) and based on this classification gas protection measures are required.

A CS2 classification requires the adoption of remedial measures with respect to ground gas. For Type A buildings as is proposed in the development, BS 8485:2015 requires a protective regime giving a score of 3.5 or greater. This score can be achieved through use of a precast suspended segmental floor such as beam and block (Score 0.0), incorporating a passively vented subfloor void (Score 2.5), and a proprietary gas resistant membrane, such as '*Visqueen'* Gas Barrier', or similar (Score 2.0).

It must be borne in mind that a further 4nr rounds of monitoring are required to complete the ongoing monitoring programme.

11.0 HUMAN HEALTH RISK ASSESSMENT

11.1 Legislative Background to Contaminated Land Assessment

Current approaches (*CLR11- 'Model Procedures for the Management of Land Contamination' and Part IIA of the Environmental Protection Act 1990)* to risk assessment of contaminated land suggest the construction of a Preliminary Conceptual Model. The purpose of this model is to

define all possible complete pollution linkages, where the requisite source – pathway – target elements are present; these elements being defined as:

- A contaminant (source) is a hazardous substance or agent, present at levels that have the potential to cause harm or damage a receptor
- A pathway is the means by or through which a contaminant meets, or otherwise affects, the receptor
- A receptor (target) is an entity (human being, aquatic environment, flora, and fauna etc) that is vulnerable to the adverse effects of the contaminant

This relationship is termed a "pollution linkage." It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, *i.e*.

- If there is no contaminant, or contaminant present at levels below those considered to be harmful or damaging to a receptor, then there can be no adverse effect on a receptor
- If there is no receptor present that can be adversely affected by a contaminant, no harm or damage can arise
- Even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which a linkage between the two can be established

11.2 Risk Assessment Methodologies

The risk assessment methodologies employed by ***CCG*** are based on the use of CLEA 1.06 and are detailed in Appendix L.

11.3 Basis of Assessment of Risk to Human Health

The Human Health Risk Assessment was carried out in accordance with the ***CCG*** methodology for assessing soil contamination data as contained in Appendix L, and since it is proposed that the site be redeveloped for residential use, the assessment was based on criteria contained in publication LQM/CIEH S4UL`s for Human Health Risk Assessment (2015) (***CCG*** Licence No. S4UL3233), applicable to the "*Residential*" land use *With plant up-take* scenario. This document does not provide criteria for Lead, for which the results were compared to the C4SL (200mg/kg) published by DEFRA SP1010 Development of Category 4 Screening Levels.

11.4 Assessment of Contamination Data

Based on a Soil Organic Matter content of an average 2.5%, an assessment of the soil data was undertaken as summarised in the tabulations hereunder, and presented on the worksheets in Appendix J.

11.4.1 Assessment of Metal Data

The assessment of the metal data is presented hereunder:

Table 9: Assessment of Metal Data

Contaminant	LQM / CIEH S4UL (mg/kg)	Maximum (mg/kg)	Exceedances	
			(mg/kg)	Location
Cadmium	11	0.8		
Chromium	910	22		
Copper	2400	140		
Lead	**200**	**370**	**280 370**	**TP01 BH02**
Mercury	1.2	0.9		
Nickel	180	26		
Zinc	3700	440		

The above assessment confirms the presence of elevated concentrations of Lead at 2nr sampling locations. Hence a potential risk to human health is indicated.

11.4.2 Assessment of Non-Metal Data

The assessment of the non-metal data is presented hereunder:

Table 10: Assessment of Non-Metal Data

Contaminant	LQM / CIEH S4UL (mg/kg)	Maximum (mg/kg)	Exceedances	
			(mg/kg)	Location
Arsenic	37	20		
Selenium	250	<1.0		
Cyanide	22	<1.0		

The above assessment confirms that no contaminant exceeds its respective guideline criterion. Hence, no risk to human health is indicated.

11.4.3 Assessment of PAH Data

The assessment of the non-metal data is presented hereunder:

Table 11: Assessment of PAH Data

Contaminant	LQM / CIEH S4UL (mg/kg)	Maximum (mg/kg)	Exceedances	
			(mg/kg)	Location
Naphthalene	**5.6**	**38**	**38**	**TP01**
Acenaphthylene	420	1.6		
Acenaphthene	510	75		
Fluorene	400	62		
Phenanthrene	**220**	**470**	**470**	**TP01**
Anthracene	5400	120		
Fluoranthene	560	480		
Pyrene	1200	440		
Benz(a)anthracene	**11**	**210**	**210** **16** **14** **20**	**TP01** **WS02** **BH01** **BH02**
Chrysene	**22**	**210**	**210** **23**	**TP01** **BH02**
Benzo(b)fluoranthene	**3.3**	**200**	**200** **17** **16** **23**	**TP01** **WS02** **BH01** **BH02**
Benzo(k)fluoranthene	93	79		
Benzo(a)pyrene	**2.7**	**180**	**180** **15** **14** **21**	**TP01** **WS02** **BH01** **BH02**
Indeno(123-cd)pyrene	**36**	**86**	**86**	**TP01**
Dibenz(ah)anthracene	**0.28**	**23**	**23** **2.1** **1.9** **2.6**	**TP01** **WS02** **BH01** **BH02**
Benzo(ghi)perylene	340	100		

The above assessment confirms some exceedances of the PAH criteria in soil recovered at various locations. Hence a potential risk to human health is indicated.

11.4.4 Assessment of Petroleum Hydrocarbon Data

The assessment of the Petroleum Hydrocarbon (TPH) data is presented hereunder:

Table 12: Assessment of Hydrocarbon Data

Contaminant	LQM / CIEH S4UL (mg/kg)	Maximum (mg/kg)	Exceedances	
			(mg/kg)	Location
Aromatic EC5-EC7	140	<0.010		
Aromatic EC7-EC8	290	<0.010		
Aromatic EC8-EC10	83	<0.050		
Aromatic EC10-EC12	180	30		
Aromatic EC12-EC16	330	270		
Aromatic EC16-EC21	**540**	**2000**	**2000**	**TP01**
Aromatic EC21-EC35	**1500**	**2500**	**2500**	**TP01**
Aliphatic EC5-EC6	78	<0.020		
Aliphatic EC6-EC8	230	<0.020		
Aliphatic EC8-EC10	65	<0.050		
Aliphatic EC10-EC12	330	4.4		
Aliphatic EC12-EC16	2400	40		

Aliphatic EC16-EC35	92000	79		

The above assessment confirms the presence of elevated concentrations of Aromatic EC16-EC21 and Aromatic EC21-EC35 in soils recovered from TP01. Hence a potential risk to controlled waters is indicated.

11.4.5 Assessment of Asbestos Data

Asbestos containing materials (ACM's) were not detected in any sample analysed and therefore no risk to human health is indicated.

11.4.6 Assessment of BTEX / MTBE Data

The appended laboratory contamination results confirm that all BTEX / MTBE compounds are below their limit of detection (LOD) and therefore no risk to human health is indicated.

11.4.7 Assessment of VOC Data

All VOC compounds are reported to be below their LOD. Hence no risk to human health s identified.

11.4.8 Assessment of SVOC Data

All SVOC compounds are seen to be below their respective residential land use soil guideline criteria.

11.4.9 Summary of Human Health Assessment

The above human health risk assessment confirms the presence of elevated concentrations of:

- Lead at 2nr positions
- Benz[a]anthracene at 4nr positions
- Benzo[a]pyrene at 4nr positions
- Benzo[b]fluoranthene at 4nr positions
- Chrysene at 2nr positions
- Dibenzo[ah]anthracene at 4nr positions
- Indeno[123-cd]pyrene at 1nr position
- Naphthalene at 1nr position
- Phenanthrene at 1nr position
- Aromatics EC16-21 at 1nr position
- Aromatics EC21-35 at 1nr position

…….. hence a potential risk to human health is indicated.

Exposure risk associated with the above contaminants are via the ingestion, dermal and inhalation pathways and as such some remedial works in areas of proposed soft landscaping will be required to mitigate such risk.

12.0 CONTROLLED WATERS RISK ASSESSMENT

12.1 Assessment of Soil Leachate Metals, Non-Metals & Polycyclic Aromatic Hydrocarbon (PAH) Data

In the absence of adequate quantities or perched and/or natural groundwater, leachates currently being prepared on soil recovered from 1nr borehole position were analysed for a broad range of contaminants including metals, non-metals, speciated PAH and TPH concentrations. The results have been assessed against Environmental Quality Standards (AA-EQS) for freshwater as shown hereunder.

Table 13: Assessment of Soil Leachate Data

Contaminant	BH02 Result (ug/l)	AA-EQS (ug/l)
Naphthalene	<0.01	2.4
Lead	8	20
Fluoranthene	<0.01	0.1
Phenanthrene	<0.01	-
Anthracene	<0.01	-
Acenaphthylene	<0.01	-

Pyrene	<0.01	-
Chrysene	<0.01	-
Fluorene	<0.01	-
Nickel	1.4	150
Indeno(123-cd)pyrene	<0.01	0.02
Benzo(ghi)perylene	<0.01	0.02
Copper		40
Benzo[a]pyrene	<0.01	0.05
Benzo[a]anthracene	<0.01	0.05
Benzo[k]flouranthene	<0.01	0.03
Benzo[b]flouranthene	<0.01	0.03
Boron	19	1000
Cyanide	<1	-
Arsenic	5.7	25
Mercury	<0.5	1
Selenium	<4.0	-
Cadmium	<0.08	5
pH	8	-
Sulphate	43.4	400000

The above assessment confirms that no leachable contaminant exceeds its respective AA-EQS guideline criteria for inland waters. Hence no risk to controlled waters is indicated.

12.2 Assessment of Soil Leachate Hydrocarbon Data

Speciated hydrocarbon results were assessed by comparison with AA-EQS values for inland waters. In case of determinants not covered by AA-EQS values, results were compared to EQS Freshwater Criteria values or where no EQS Freshwater Criterion is available, then WHO guidelines for Drinking Water are adopted.

Table 14: Assessment of Soil Leachate Hydrocarbon Data

Contaminant	BH02 Result (ug/l	AA-EQS (ug/l)	WHO ug/l
Aromatic EC5-EC7 (benzene)	<1.0	-	10
Aromatic EC7-EC8 (toluene)	<1.0	-	700
Aromatic EC8-EC10 (ethyl benzene)	<1.0	-	300
Aromatic EC10-EC12	<10	-	100
Aromatic EC12-EC16	<10	-	100
Aromatic EC16-EC21	<10	-	90
Aromatic EC21-EC35	<10	-	90
Aliphatic EC5-EC6	<1.0	-	15000
Aliphatic EC6-EC8	<1.0	-	15000
Aliphatic EC8-EC10	<1.0	-	300
Aliphatic EC10-EC12	<10	-	300
Aliphatic EC12-EC16	<10	-	300
Aliphatic EC16-EC21	<10	-	(300)*
Aliphatic EC21-EC35	<10	-	(300)*

The above assessment confirms that no leachable contaminant exceeds its respective guideline criteria. Hence no risk to controlled waters and/or human health is indicated

12.3 Summary of Controlled Waters Risk Assessment

The above controlled waters risk assessment confirms that no leachable contaminant exceeds its respective guideline criteria. Hence no risk to controlled waters and/or human health is indicated

13.0 POST INVESTIGATION CONCEPTUAL MODEL

Based on the findings of the investigation, a post investigation conceptual model may be constructed illustrating proven pollution linkages and summarising the conceptual remediation recommendations discussed above, as tabulated hereunder.

Table 15: Post Investigation Conceptual Model

Source	Pathway	Receptor	Remedial Options
The above human health risk assessment confirms the presence of elevated concentrations of various contaminants within made ground soils hence a potential risk to human health is indicated.	Oral / ingestion / dermal pathways	Construction workers Future worker occupants	No remedial works required under areas of permanent hard standing. Site levels in cultivated landscaping to be reduced to 600mm below proposed finished garden levels, with site levels then being reconstructed by the placement of 600mm of clean imported topsoil, placed under a strict validation regime comprising a 1nr analyses per 50m^3 with a minimum of 4nr analyses per material source. Where made ground remaining in place beyond 450mm, imported topsoil is to be placed on a suitable geotextile fabric such as 'Terram 1000, or similar. Cover thickness on all gardens / soft landscaping is to be independently validated by excavation and photography for inclusion in a Validation Report. Imported soils are to comply with the analysis criteria contained in Appendix G. In addition to the above, contractors must remain aware that disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination as far as the exposed conditions may have the potential to impact on receptors including inter alia humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon ***CCG*** to site to determine the nature of the exposure and to determine an appropriate course of action. Any such incidents will be fully documented in a detailed site Remediation Report.

14.0 PRELIMINARY WASTE CLASSIFICATION

A waste classification exercise was undertaken in relation to potential offsite disposal of excavation arisings. The first stage entailed the assessment of the basic soil contamination data via the ***HAZWASTE*** online program. The output data from this basic assessment is provided in Appendix K. This program generates the baseline '*Hazardous / Non-Hazardous'* classification of soils.

The appended ***HAZWASTE*** report classifies soil recovered from borehole TP01 to be '*Hazardous'* by virtue of the presence of elevated concentrations of total petroleum hydrocarbons (TPH (C6 to C40) petroleum group (4610.4mg/kg)) and therefore surplus spoil generated for offsite purposes from this location must be disposed of at a suitable '*Hazardous'* waste acceptance facility.

All other soils analysed classify as being '*Non-Hazardous Waste.'* and therefore surplus spoil for off-site disposal from the remaining parts of the site may be disposed at a suitably licenced '*Non-Hazardous Waste'* landfill facility.

WAC analyses undertaken on soils recovered from 2nr borehole positions (BH01 and BH02) classify as being '*Non-Hazardous'*, and therefore surplus spoil generated for off-site purposes may be disposed at a licenced '*Non-Hazardous'* landfill facility.

It should be noted that the final decision on waste classification is at the discretion of the accepting landfill, and it is recommended that consultation with landfill operators be undertaken during the development of the waste management plan.

15.0 GEOTECHNICAL ASSESSMENT

15.1 Introduction

Following the demolition of existing structures and subsequent site clearance works, it is understood that the site is to be redeveloped for residential land use by the construction of 2nr x 5-storey residential apartment blocks, forming c. 50nr self contained dwellings (Class C3) with ancillary communal facilities, newly created hard paved access / egress roads, off road car parking facilities and areas of communal landscaping.

The proposed layout of the development is as shown on **BUTTERESS** architectural drawings contained herein.

15.2 Foundations and Floor Slab Construction

Taking into account the above ground observation, and given the loads imposed, given the potential for total and/or differential settlements, traditional strip (spread) foundations are not recommended.

In the ground conditions encountered and given the close proximity of the adjoining Metro Link rail line, it is recommended that a bored piled foundation solution be adopted. it is recommended that piles be installed contiguous flight augured (CFA) methods.

For the purposes of preliminary design, the carrying capacity of CFA piles installed to 15mbgl may be estimated as:

Table 16: Pile Carrying Capacity

Pile Diameter mm	Carrying Capacity kN
300	450
450	610

A piling layout and calculated pile loadings should be prepared and piling contractors must be required to provide geotechnical design calculations for the actual loadings calculated to be imposed on each pile, and to provide pile installation records.

Taking into account the prevailing gas classification at this site (CS2) and given the variable thickness composition and density of the underlying made ground soils, it is strongly recommended that fully suspended passively vented block and beam floors, such as *Bison Precast Hollowcore,'* or similar, incorporating gas protective measures as described in 10.3 above

15.4 Excavations

Excavations in the observed made ground and natural drift soils may be undertaken by light hydraulic excavators.

Excavations in excess of 1.2mbgl will require side support.

15.5 Groundwater Management

All borehole positions were reported to be dry on completion of fieldworks, with the single groundwater monitoring standpipe being reported to be dry during the initial rounds of groundwater monitoring.

Notwithstanding the above, a prudent contractor would allow for some pumping during foundation construction / service installations during periods of heavy and/or prolonged periods of precipitation.

15.6 Soakaway Drainage

1nr trial pit excavation was utilised for the undertaking of a soil infiltration tests in accordance with BRE Digest 365. The appended results indicate that soakaways may be designed on a Soil Infiltration Rate of 3.72E-05m/sec^{-}. Further testing is recommended to confirm this conclusion

16.0 SUMMARY CONCLUSIONS

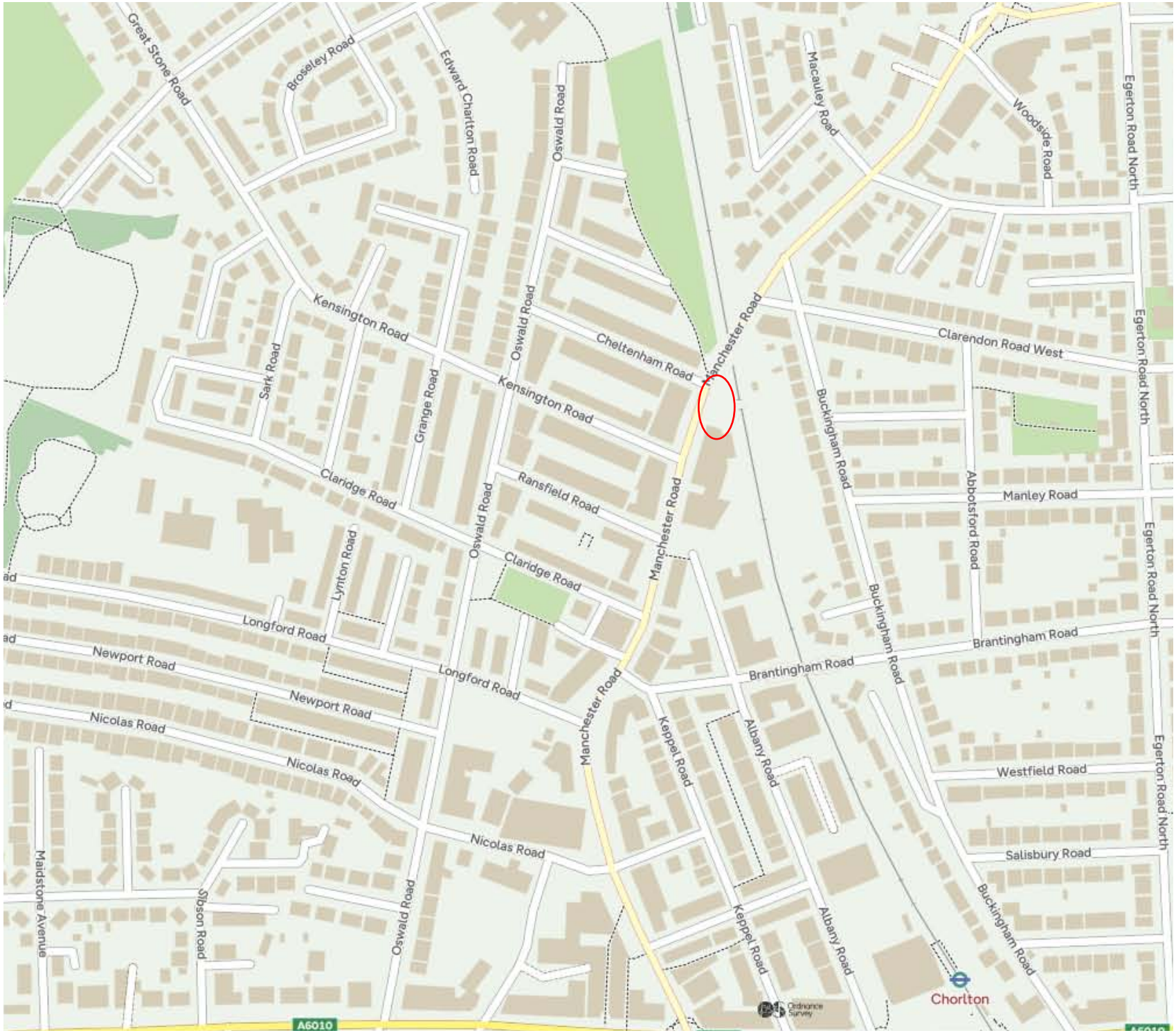
The recommendations hereunder are based on the salient sections of the report and should not be referred to in isolation of the relevant sections of the report. All recommendations are subject to Regulatory Local Authority review.

Table 17: Summary of Conclusions

Soil Contamination & Remediation	The above human health risk assessment confirms the presence of elevated concentrations of various contaminants hence a potential risk to human health is indicated. No remedial works required under areas of permanent hard standing. Site levels in all cultivated landscaping to be reduced to 600mm below proposed finished garden levels, with site levels then being reconstructed by the placement of 600mm of clean imported topsoil, placed under a strict validation regime comprising a 1nr analyses per 50m^3 with a minimum of 4nr analyses per material source. Where made ground remaining in place beyond 600mm, imported topsoil is to be placed on a suitable geotextile fabric such as '*Terram 1000*', or similar. Cover thickness on all soft landscaping is to be independently validated by excavation and photography for inclusion in a Validation Report. Imported soils are to comply with the analysis criteria contained in Appendix G In addition to the above, contractors must remain aware that disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination as far as the exposed conditions may have the potential to impact on receptors including inter alia humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon **CCG** to site to determine the nature of the exposure and to determine an appropriate course of action. Any such incidents will be fully documented in a detailed site Remediation Report.
Controlled Waters	The above controlled waters risk assessment confirms that no leachable contaminant exceeds its respective guideline criteria. Hence no risk to controlled waters and/or human health is indicated

Water Mains	The findings indicate that the soil concentrations of pertinent hydrocarbon contaminant species are above the permitted threshold concentrations specified by the UKWIR for the adoption of PE water mains. Hence PE-AL-PE mains must be deployed. Good practice requires that mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside. Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply and for drainage and sewerage under pressure' as stated in UKWIR guidance. It should be noted that this recommendation is subject to the opinion of the water supplier, and in this instance the local water authority (**YORKSHIRE WATER**) must be consulted to confirm that the proposals above accord with their interpretation of current guidance.
Preliminary Waste Classification	The appended ***Hazwaste*** report classifies soil recovered from borehole TP01 to be '*Hazardous'* by virtue of the presence of elevated concentrations of total petroleum hydrocarbons (TPH (C6 to C40) petroleum group (4610.4mg/kg)) and therefore surplus spoil generated for offsite purposes from this location must be disposed of at a suitable '*Hazardous'* waste acceptance facility. All other soils analysed classify as being '*Non-Hazardous Waste.'* and therefore surplus spoil for off-site disposal from the remaining parts of the site may be disposed at a suitably licenced '*Non-Hazardous Waste'* landfill facility. WAC analyses undertaken on soils recovered from 2nr borehole positions (BH01 and BH02) classify as being '*Non-Hazardous'*, and therefore surplus spoil generated for off-site purposes may be disposed at a licenced '*Non-Hazardous'* landfill facility. It should be noted that the final decision on waste classification is at the discretion of the accepting landfill, and it is recommended that consultation with landfill operators be undertaken during the development of the waste management plan.
Concrete specification	Concrete in the ground should be specified to conform to the compositional requirements of **DC-**1 as defined in BRE Special Digest 1: 2005
Gas Risk Assessment	After 2nr rounds of monitoring, a preliminary Gas Screening Value (GSV) of 0.00069l/hrs is calculated for CO_2, and <0.00001l/hr for CH_4. Using these GSV values, the risk to the proposed development was assessed in line with Situation A as defined in CIRIA C665, and on this basis the site complies with Characteristic Situation 2 (CS2) and based on this classification gas protection measures are required. A CS2 classification requires the adoption of remedial measures with respect to ground gas. For Type A buildings as is proposed in the development, BS 8485:2015 requires a protective regime giving a score of 3.5 or greater. This score can be achieved through use of a precast suspended segmental subfloor such as beam and block (Score 0.0), incorporating a passively vented subfloor void (Score 2.5), and a proprietary gas resistant membrane, such as '*Visqueen'* Gas Barrier', or similar (Score 2.0). It must be borne in mind that a further 4nr rounds of monitoring are required to complete the ongoing monitoring programme.
Foundation Design	See Section 15.0 for fuller discussion
Floor Slabs	See Section 15.0 for fuller discussion
Groundwater Control	All borehole positions were reported to be dry on completion of fieldworks, with the single groundwater monitoring standpipe being reported to be dry during the initial rounds of groundwater monitoring. Notwithstanding the above, a prudent contractor would allow for some minor pumping during foundation construction / service installations during periods of heavy and/or prolonged periods of precipitation.
Excavations	Excavations in the observed made ground and natural drift soils may be undertaken by light hydraulic excavators. Excavations in excess of 1.2mbgl will require side support.
Soakaway drainage	1nr trial pit excavation was utilised for the undertaking of a soil infiltration tests in accordance with BRE Digest 365. The appended results indicate that soakaways may be designed on infiltration rates of 3.72E-05m/sec^{-}. Further testing is recommended to confirm this conclusion
Further Work	• Complete the ongoing gas – groundwater monitoring programme • Update gas risk assessment • Prepare Phase III Remediation Strategy Report • Prepare Phase IV Validation Report
Further Work: Post Demolition	Taking into account the limitations as discussed above it is recommended that further works be undertaken following the successful treatment of Japanese Knotweed and the demolition of structures and subsequent site clearance works. It is recommended that a further 3nr cable percussive borehole be sunk within the footprint of the former leisure centre with 2nr boreholes being utilised for the installation of additional gas – groundwater monitoring standpipes. It is further proposed that a series of trial pits be excavated within the footprint of the former leisure centre to assessment for the presence / absence of buried structures etc. Selective samples recovered from borehole / trial pit excavations will be analysed for a broad range of contaminants. Additional determinations of Soil Infiltration Rate are recommended The finding of the above additional works will be discussed under a separate report.

APPENDIX A: DRAWINGS



DO NOT SCALE

Notes: Study Site

CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
Reid Jones Partnership

Project:
Chorlton Leisure Centre

Title:
Aerial Photograph

Scale:	Issue:
NTS	01
Drawn by:	Date:
DG	April 2024
Project No.	Drawing No.
CCG-C-24-14500	01

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Notes: Study Site

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UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

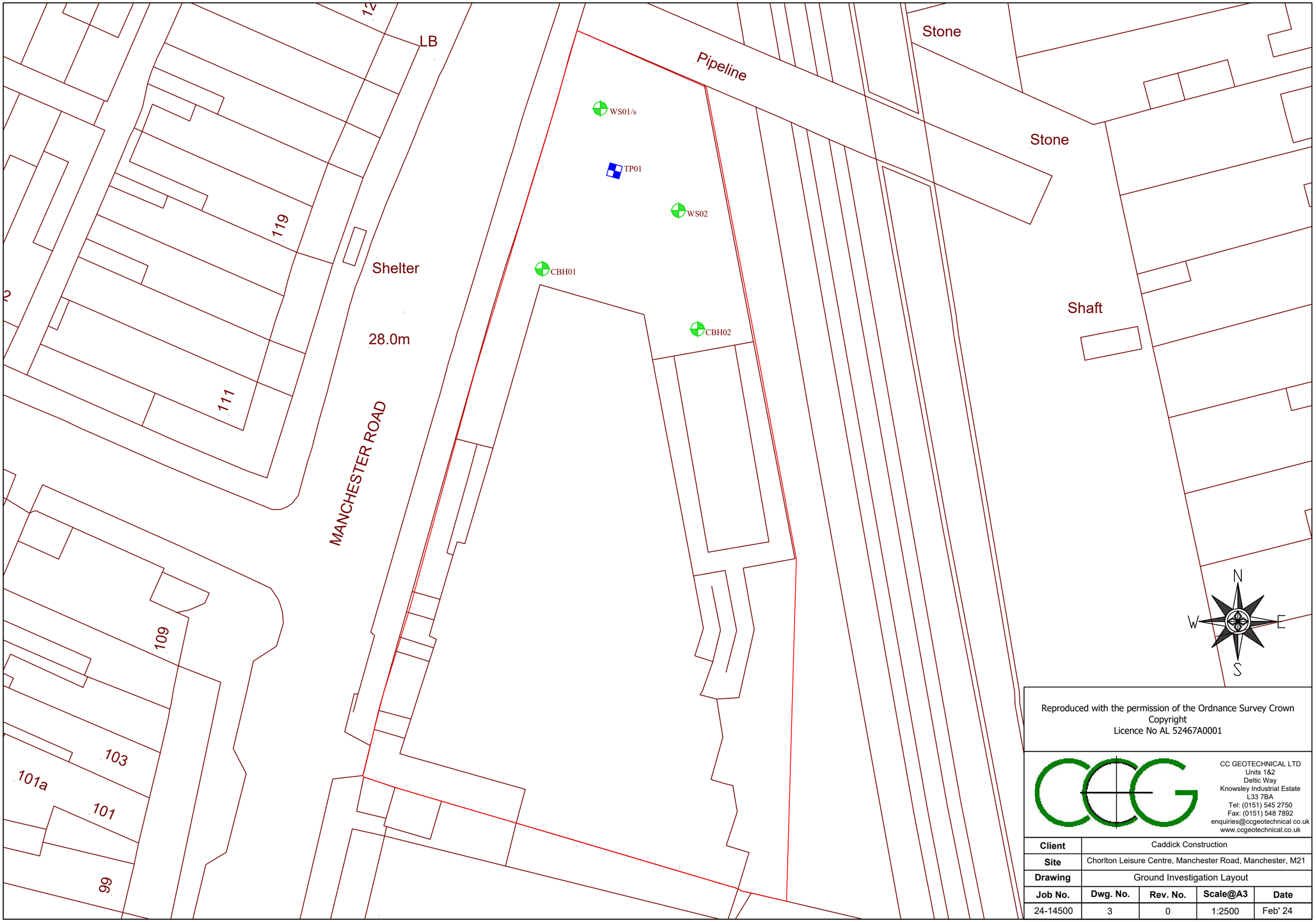
Client:
Reid Jones Partnership

Project:
Chorlton Leisure Centre

Title:
Aerial Photograph

Scale:	Issue:
NTS	01
Drawn by:	Date:
DG	April 2024
Project No.	Drawing No.
CCG-C-24-14500	02

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CC GEOTECHNICAL LTD
Units 1&2
Deltic Way
Knowsley Industrial Estate
L33 7BA
Tel: (0151) 545 2750
Fax: (0151) 548 7892
enquiries@ccgeotechnical co.uk
www.ccgeotechnical.co.uk

Client	Caddick Construction			
Site	Chorlton Leisure Centre, Manchester Road, Manchester, M21			
Drawing	Ground Investigation Layout			
Job No.	**Dwg. No.**	**Rev. No.**	**Scale@A3**	**Date**
24-14500	3	0	1:2500	Feb' 24

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

Root Protection Area

Approx retained tree canopy line

Existing tree removed where hatched in red

Works to crown

Proposed tree

Refer to Tree Survey and reports by Lally Tree Management

Application Site Boundary



Proposed Site Plan
1 : 200

Rev	Date	Intls	Details
P04	07/08/23	DC	Further planning amendments
P03	06/07/23	SSU	Minor updates to planning comments. <600mm to entrance to maintain visibility splay. Bollards added to tram line boundary. Access gate to garden terrace added.
P02	16/06/23	DC	Cycle store layout revised, cycle stands added to courtyard to street frontage. Vehicular gate relocated into site; Accessible bay repositioned to improve turning radius; Note added to confirm height of boundary wall
P01	31/03/23		Drawings issued for Planning Submission

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msv mosscare st vincent's

Rowlinson

Buttress

41 Bengal Street
Manchester
M4 6AF

Clockwise, Yorkshire House
Greek Street, Leeds
LS1 5SH

T 0161 236 3303 0113 539 7965
E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Site Plan

Date 07/08/2023 19:52:47
Scale As indicated
Checker DC
Size A1
Job No: 9136
Status S0 Initial Status

Project	Origin	Volume	Level	Type	Role	Number	Rev
CHOBA	BUT	ZZ	00	DR	A	04100	P04

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.





1 Proposed West Street Elevation
1 : 200



2 Proposed North Street Elevation
1 : 200

2 0 2 4 6 8 10 m
SCALE 1:200

P01 31/03/23 Drawings issued for Planning Submission

Rev	Date	Intls	Details

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Rowlinson

Buttress

41 Bengal Street
Manchester
M4 6AF

Clockwise, Yorkshire House
Greek Street, Leeds
LS1 5SH

T 0161 236 3303 0113 539 7965
E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Street Elevations

Date 31/03/2023 18:20:54
Scale As indicated
Checker DC
Size A1
Job No: 9136
Status S0 Initial Status

Project	Origin	Volume	Level	Type	Role	Number	Rev
CHOBA	BUT	ZZ	ZZ	DR	A	05105	P01



Proposed West Elevation

1 : 100



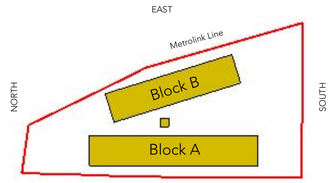
Proposed North Elevation

1 : 100

1 0 1 2 3 4 5 m

SCALE 1:100

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.



Material Key

01 Buff facing brick
02 Black contrast facing brick banding (alternating course)
03 Soldier coursing banding (3no in total)
04 Columns and beams to deck access walkways
05 Aluminium windows (RAL TBC)
06 Curtain walling (RAL TBC)
07 Projecting balcony / walkway with flat bar railings (RAL TBC)
08 Aluminium panel with horizontal joint (RAL TBC)
09 Living Wall Panel
10 Composite Entrance Doors - PAS 24
11 Aluminium panels to entrance (RAL TBC)
12 Glazed entrance door (RAL TBC)
13 Louvred steel door to plant room (RAL TBC)
14 Secure external grade steel door (RAL TBC)
15 Louvred panels to plant room (RAL TBC)

Rev	Date	Intls	Details
P02	05/04/23		Planning drawings amended
P01	31/03/23		Drawings issued for Planning Submission

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Rowlinson

Buttress

41 Bengal Street
Manchester
M4 6AF

Clockwise, Yorkshire House
Greek Street, Leeds
LS1 5SH

T 0161 236 3303 0113 539 7965
E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Elevations North and West

Date 05/04/2023 15:18:46
Scale As indicated
Checker DC
Size A1
Job No: 9136
Status S0 Initial Status

Project Origin Volume Level Type Role Number Rev
CHOBA-BUT-ZZ-ZZ-DR-A-05101-P02



Lift Core Elevation South

1 : 50



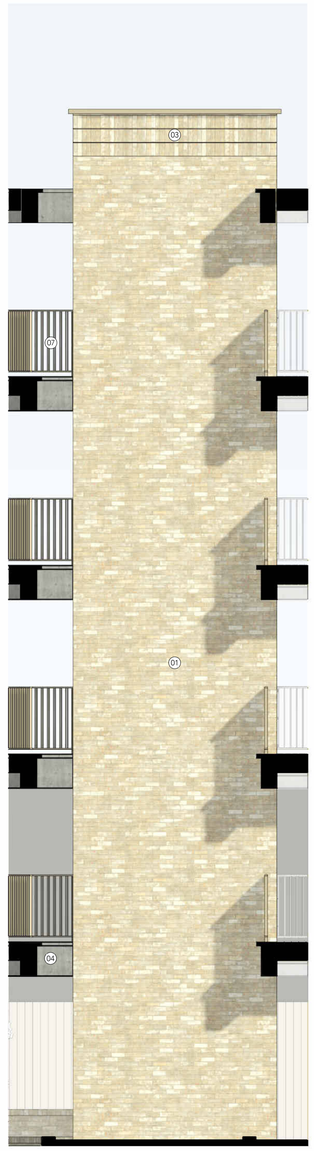
Lift Core Elevation East

1 : 50



Lift Core Elevation West

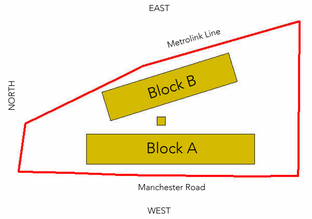
1 : 50



Lift Core Elevation North

1 : 50

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.



Material Key

01 Buff facing brick
02 Black contrast facing brick banding (alternating course)
03 Soldier coursing banding (3no in total)
04 Columns and beams to deck access walkways
05 Aluminium windows (RAL TBC)
06 Curtain walling (RAL TBC)
07 Projecting balcony / walkway with flat bar railings (RAL TBC)
08 Aluminium panel with horizontal joint (RAL TBC)
09 Living Wall Panel
10 Composite Entrance Doors - PAS 24
11 Aluminium panels to entrance (RAL TBC)
12 Glazed entrance door (RAL TBC)
13 Louvred steel door to plant room (RAL TBC)
14 Secure external grade steel door (RAL TBC)
15 Louvred panels to plant room (RAL TBC)

Rev	Date	Intls	Details
P01	06/04/23		Drawing Issued for Planning

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Rowlinson

Buttress

41 Bengal Street
Manchester
M4 6AF

Clockwise, Yorkshire House
Greek Street, Leeds
LS1 5SH

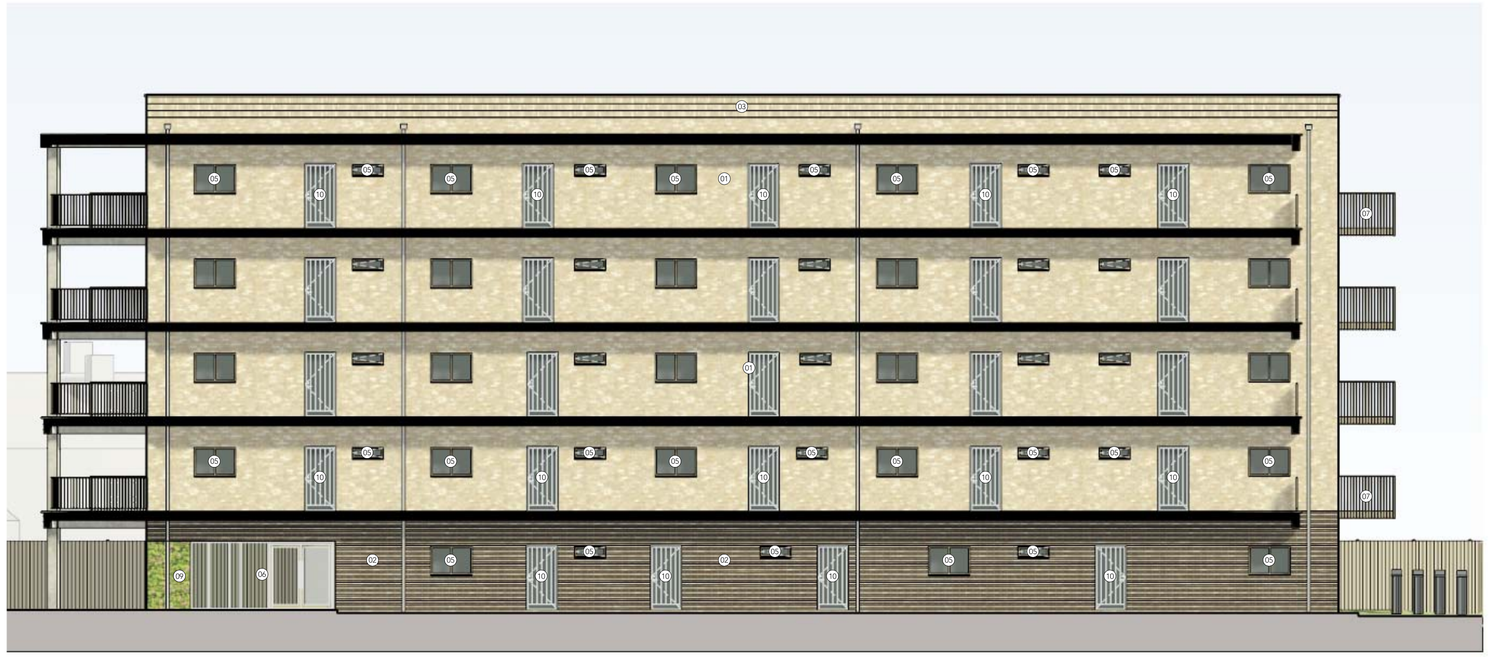
T 0161 236 3303 0113 539 7965
E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Elevations Lift Core

Date 06/04/2023 12:38:28
Scale As indicated
Checker Checker
Size A1
Job No: 9136
Status S0 Initial Status

Project	Origin	Volume	Level	Type	Role	Number	Rev
CHOBA	BUT	ZZ	ZZ	DR	A	05112	P01



B1 Block B - Courtyard (West) Elevation
1 : 100



B2 Block B - Car Park (South) Elevation
1 : 100



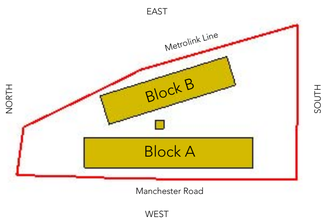
B3 Block B - Tram Line (East) Elevation
1 : 100



B4 Block B - Communal Garden (North) Elevation
1 : 100

1 0 1 2 3 4 5 m
SCALE 1:100

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.



Material Key

01 Buff facing brick
02 Black contrast facing brick banding (alternating course)
03 Soldier coursing banding (3no in total)
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14 Secure external grade steel door (RAL TBC)
15 Louvred panels to plant room (RAL TBC)

Rev	Date	Intls	Details
P02	05/04/23		Planning drawings amended
P01	31/03/23		Drawings issued for Planning Submission

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Rowlinson

Buttress

41 Bengal Street, Manchester, M4 6AF
Clockwise, Yorkshire House, Greek Street, Leeds, LS1 5SH

T 0161 236 3303 0113 539 7965
E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

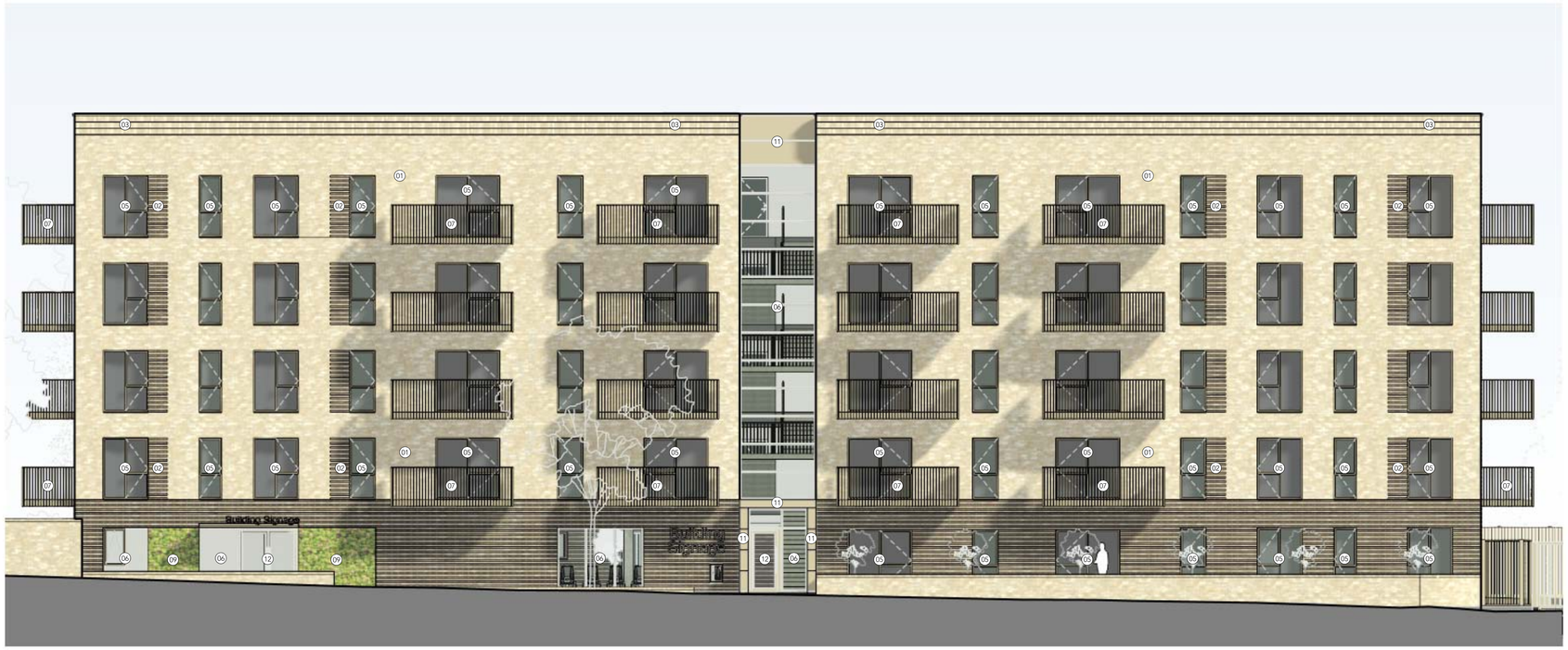
Drawing ref Proposed Elevations (Block B)

Date 05/04/2023 15:34:40
Checker DC
Job No: 9136
Scale As indicated
Size A1
Status S0 Initial Status

Project Origin Volume Level Type Role Number Rev
CHOBA-BUT-ZZ-ZZ-DR-A-05104-P02

1 0 1 2 3 4 5 m
SCALE 1:100

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
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A1 Block A - Manchester Road (West) Elevation
1 : 100



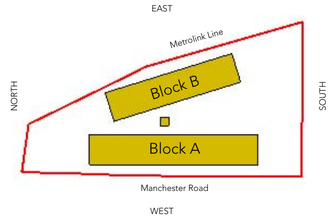
A2 Block A - Car Park (South) Elevation
1 : 100



A4 Block A - Courtyard (East) Elevation
1 : 100



A3 Block A - Communal Garden (North) Elevation
1 : 100



Material Key

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15 Louvred panels to plant room (RAL TBC)

Rev	Date	Intls	Details
P02	05/04/23		Planning drawings amended
P01	31/03/23		Drawings issued for Planning Submission

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Clockwise, Yorkshire House, Greek Street, Leeds, LS1 5SH

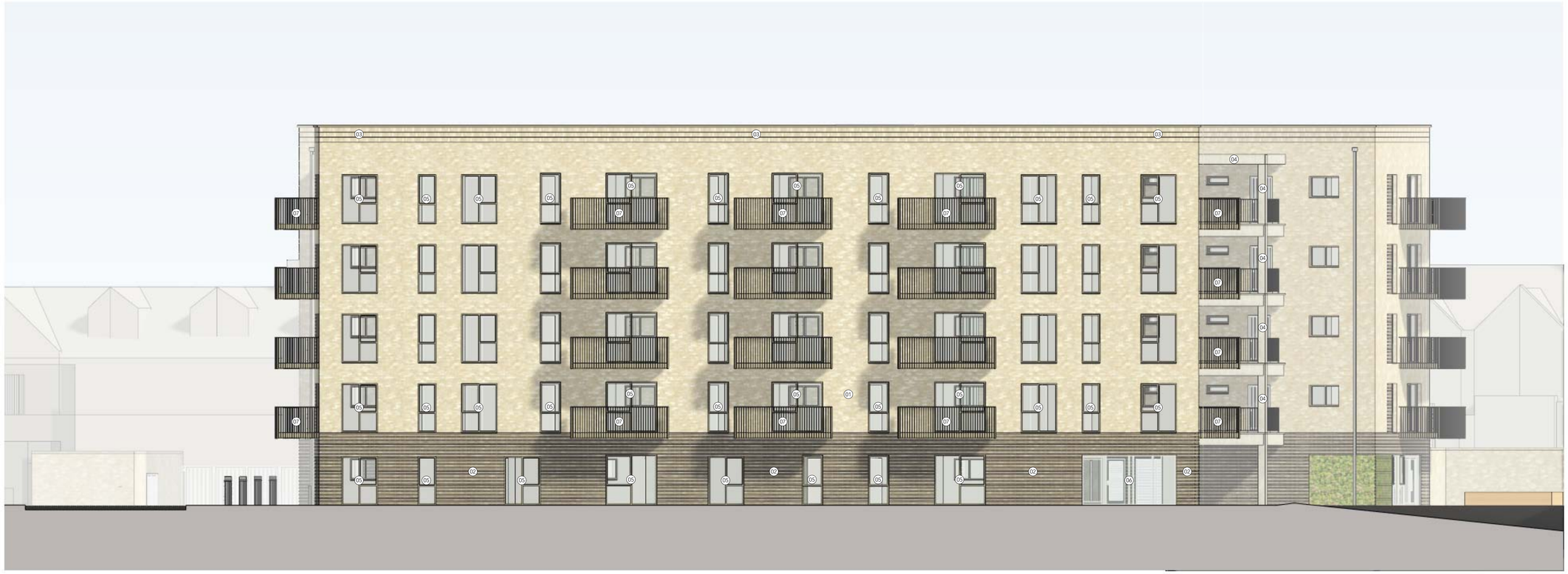
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E contact@buttress.net
W www.buttress.net

Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Elevations (Block A)

Date 05/04/2023 15:34:12 **Scale** As indicated
Checker DC **Size** A1
Job No: 9136 **Status** S0 Initial Status

Project Origin Volume Level Type Role Number Rev
CHOBA-BUT-ZZ-ZZ-DR-A-05103-P02



Proposed East Elevation

1 : 100



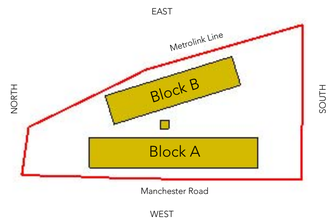
Proposed South Elevation

1 : 100

1 0 1 2 3 4 5 m

SCALE 1:100

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.



Material Key

01 Buff facing brick
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Rev	Date	Intls	Details
P02	05/04/23		Planning drawings amended
P01	31/03/23		Drawings issued for Planning Submission

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41 Bengal Street
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T 0161 236 3303 0113 539 7965
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Project Title Chorlton Baths Happi
Client Rowlinson Construction, MSV Housing
Location Manchester Road, Chorlton, Manchester

Drawing ref Proposed Elevations South and East

Date 05/04/2023 15:18:16
Scale As indicated
Checker DC
Size A1
Job No: 9136
Status S0 Initial Status

Project	Origin	Volume	Level	Type	Role	Number	Rev
CHOBA	BUT	ZZ	ZZ	DR	A	05102	P02

APPENDIX B: SAMPLING METHODOLOGIES

SAMPLING, SAMPLE TRANSPORTATION, AND FIELD MONITORING PROTOCOLS

Soil, water and gas sampling and monitoring methodologies employed by ***CC GEOTECHNICAL LTD*** are presented hereunder.

SAMPLING OF SOIL FOR CHEMICAL ANALYSIS

Soil samples may be recovered from a variety of intrusive investigation methods including *inter alia* dynamic sampling boreholes, cable percussion boreholes, machine or manual excavation of trial pits.

All equipment which has the potential to introduce extraneous materials into soils – borehole casings, sampling drilling rods, borehole sampling tools, hand tools such as trowels and spades etc. – must be cleaned by jet washing before initial use and between sampling positions.

Cable Percussion Boreholes

In this method of investigation disturbed bulk and small disturbed samples are recovered at regular depth increments throughout the length of the borehole. Each bulk/small disturbed sample is uniquely labelled with the Project Name / Project No / Borehole No / Depth / Date. Where possible, samples are immediately scanned by PID.

Light Dynamic Sampling Boreholes

In this method of investigation samples are recovered in relatively undisturbed 1m long Perspex liners. Each liner is uniquely labelled with the Project Name / Project No / Borehole No / Depth / Date. The liner tubes are sealed by air tight caps fitted at each end, and are temporarily stored out of sunlight. Where possible, samples are immediately split, scanned by PID, logged and subsampled. In the event that splitting and logging on site is not practicable, then the liners are immediately transported to the laboratory where they are immediately split, scanned by PID, logged and subsampled

Trial Pits

Samples are to be taken from the bucket of an excavator and placed in appropriate airtight containers. Each container is uniquely labelled with the Project No / Trial Pit No / Depth / Date. The samples are then immediately placed in a cool box chilled by ice packs, and the boxes are sealed for transportation to the chemical laboratory.

Sampling Containers

Containers used to store soil samples are selected dependant on the required analysis. The testing laboratory will be consulted should there be any doubt as to the correct sampling container. Typically, a minimum of 1nr 1kg plastic tub, 1nr 500g plastic tub, 1nr 250g amber glass jar and 2nr glass vials are taken at each sample depth. Samples held on site awaiting same day courier collection are stored at $4^{O}C$ in a cool box. Only in circumstances where same day collection cannot be arranged are samples held overnight, and in this event all samples are refrigerated at $4\ ^{O}C$ either on site (if a refrigerator is available) or at CC GEOTECHNICAL soil laboratory. Courier collection is then arranged for immediate pick up the following day.

Chain of Custody records

A Chain of Custody Record (CoC) is to be sent with each batch of samples submitted to the testing laboratory. A copy of the CoC will be made available for inspection by the client, their agents, or any requesting regulatory authority.

HEADSPACE ANALYSES

Duplicate subsamples of all soil samples selected for laboratory analysis may be taken for headspace analyses.

Headspace analysis is undertaken using a MiniRae 2000 Photo Ionisation Detector (PID). In the test method, an amber glass jar is half filled with soil, and the lid is sealed with aluminium foil secured by an elastic band. The jar and contents are agitated for 30 seconds and left for a minimum of 30 minutes out of direct sunlight for the headspace to achieve equilibrium. The PID then pierces the seal and the maximum reading is recorded. Prevailing weather conditions and ambient air temperature are also recorded.

The PID headspace results are recorded on the exploratory borehole or trial pit logs.

PID headspace data is then used to inform the chemical testing schedule for volatile organic compounds analyses.

SAMPLING OF GROUNDWATER FOR CHEMICAL ANALYSIS

Groundwater is sampled from standpipes or piezometers installed during borehole drilling. On completion of the construction of the standpipe, the installation is initially developed by removing up to 10 x the internal volume of the

installation. The volume of water purged is recorded. The installation is then typically left for a week for hydraulic equilibrium to be restored.

Prior to sampling the standpipe, the depth to the water table, and the depth to the base of the installation are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.

A minimum of 3 x the installation volume is then removed. The pH of the water is then monitored and the sample is taken when the change in pH between any two consecutive extracts is less than 10%. The volume of water removed is recorded.

A sample comprises of a minimum of 3 litres. Two litres are taken in amber glass bottles, and one litre in a plastic bottle.

To avoid cross-contamination one bailer is used per position.

The samples are uniquely labelled with Project Name / Project No / Borehole No / Depth / Date Sampled. They are placed in a cool box chilled by ice packs, and the containers are sealed for transportation to the laboratory.

Once the samples are received in the ***CC GEOTECHNICAL LTD*** laboratory, the samples are stored in a refrigerator and returned to the cool boxes once collected.

Water taken from the installations are taken back to the ***CC GEOTECHNICAL LTD*** laboratory and disposed.

Other data recorded in the sampling comprises:

- Volume of water removed during development of well
- Volume of water removed during purging of the well
- Results of on-site pH analyses
- Sample appearance – colour, suspended solids

MONITORING OF GAS

Prior to embarking on a gas-monitoring round, all equipment is checked for functionality and the calibration status is confirmed.

At the commencement of the monitoring round, the prevailing weather conditions, air temperature, barometric pressure and direction of movement of barometric pressure are recorded.

The flow meter is first attached to the standpipe valve, and the flow rate is measured (peak and steady flow) for 1 minute. The results are recorded in $l.hr^{-1}$. The flow meter tube is protected from the effects of wind by aligning the exhaust downwind.

Following measurement of borehole flow rate, the installation is left for a minimum of 10 minutes for the headspace to restore equilibrium.

Once the gas in the installation has regained equilibrium, the gas analyser is connected and monitoring commences. The peak and steady state readings for CH_4, CO_2, CO, H_2S and CO are recorded. The steady state is monitored for a minimum of one minute, and possibly up to a maximum of 10 minutes where fluctuations continue.

When the monitoring is complete, the depth to the water table, and the depth to the base of the well are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.

APPENDIX C: BOREHOLE LOGS

Contract Name: Chorlton Baths, Manchester			Client: Reid Jones Partnership	Borehole ID: **BH1**
Contract Number: CCG-C-24-14500	Date Started: 19/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 150 S/A Rig
Rig Crew: MW/CM	Scale: 1:50	Sheet 1 of 2		
Weather:	Termination:	SPT Hammer: N/R, Energy Ratio: N/R		

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				0.05		TARMAC		
0.30	B					Black slightly silty sandy GRAVEL. Gravel is fine to coarse angular to sub-angular brick and ash (MADE GROUND)		
0.50	B							
0.50	ES							
0.80	B			(1.55)				
		SPT(S) 1.20m, N=10 (1,2/2,3,2,3)						
1.50	B			1.60		Medium dense light brown/dark brown slightly silty sandy GRAVEL. Medium cobble content		
		SPT(S) 2.00m, N=12 (2,3/3,2,3,4)						
2.50	B			(2.00)				
		SPT(S) 3.00m, N=16 (4,5/5,4,3,4)						
3.50	B			3.60		Stiff locally firm brown slightly sandy slightly gravelly silty CLAY		
		SPT(S) 4.00m, N=14 (3,2/3,3,4,4)						
4.50	B							
		SPT(S) 5.00m, N=9 (3,2/2,2,2,3)						
5.50	B			(3.70)				
		SPT(S) 6.00m, N=24 (4,5/5,6,6,7)						
6.50 - 6.95	UT					*NO RECOVERY IN U100 SAMPLING - 6.50-6.95mbgl*		
				7.30		Stiff brown slightly sandy slightly gravelly silty CLAY with frequent sand bands. Low cobble content		
7.50	B							
		SPT(S) 8.00m, N=27 (5,6/7,7,6,7)						
9.00	B	SPT(S) 9.00m, N=30 (7,7/7,8,8,7)						
						Continued next sheet		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit

Chiselling				Installation			
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **BH1**
Contract Number: CCG-C-24-14500	Date Started: 19/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 150 S/A Rig
Rig Crew: MW/CM	Scale: 1:50	Sheet 2 of 2		
Weather:	Termination:	SPT Hammer: N/R, Energy Ratio: N/R		

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
		SPT(S) 10.00m, N=20 (4,5/5,4,6,5)				Stiff brown slightly sandy slightly gravelly silty CLAY with frequent sand bands. Low cobble content		
10.50	B							
		SPT(S) 11.50m, N=24 (4,5/6,5,6,7)						
12.00	B			(8.15)				
		SPT(S) 13.00m, N=28 (6,7/6,7,7,8)						
13.50	B							
14.50	B							
		SPT(S) 15.00m, N=35 (7,6/8,9,8,10)						
				15.45		End of Borehole at 15.45m		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **BH2**
Contract Number: CCG-C-24-14500	Date Started: 23/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
				Sheet 1 of 2
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 150 S/A Rig
				Rig Crew: MW/LM
				Scale: 1:50
Weather:	Termination:	SPT Hammer: N/R, Energy Ratio: N/R		

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				0.05		TARMAC		
0.30	B					Black/brown/grey slightly silty sandy GRAVEL. Gravel is fine to coarse angular to sub-angular brick (MADE GROUND)		
0.50	B							
0.50	ES							
0.80	B			(1.35)				
		SPT(S) 1.20m, 50 (25 for 30mm/50 for 85mm)		1.40				
1.50	B					Medium dense grey/brown slightly silty very gravelly SAND. Medium cobble content		
		SPT(S) 2.00m, N=12 (2,2/2,3,3,4)						
2.50	B			(2.50)				
		SPT(S) 3.00m, N=14 (4,3/3,3,4,4)						
3.50	B							
		SPT(S) 4.00m, N=16 (4,4/4,5,4,3)		3.90		Stiff brown/grey slightly sandy slightly gravelly silty CLAY		
4.50	B							
		SPT(S) 5.00m, N=19 (4,5/5,4,5,5)						
5.50	B							
		SPT(S) 6.00m, N=22 (6,5/5,6,5,6)		(4.60)				
		SPT(S) 7.00m, N=24 (5,5/6,7,6,5)						
7.50	B							
8.00 - 8.45	UT							
8.50	B			8.50		Stiff brown/grey slightly sandy slightly gravelly silty CLAY with frequent sand bands. Low cobble content		
		SPT(S) 9.00m, N=13 (2,1/4,3,2,4)						
9.50	B							
	UT							
						Continued next sheet		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks
1.20	1.90	01:00	

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Contract Name: Chorlton Baths, Manchester			Client: Reid Jones Partnership	Borehole ID: **BH2**
Contract Number: CCG-C-24-14500	Date Started: 23/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 150 S/A Rig
Rig Crew: MW/LM	Scale: 1:50			Sheet 2 of 2
Weather:	Termination:	SPT Hammer: N/R, Energy Ratio: N/R		

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/ Installation
10.00 - 10.45						Stiff brown/grey slightly sandy slightly gravelly silty CLAY with frequent sand bands. Low cobble content	11		
10.50	B								
		SPT(S) 11.00m, N=21 (4,5/4,5,6,6)							
11.50	B								
12.00 - 12.45	UT						12		
12.50	B								
				(6.95)					
		SPT(S) 13.00m, N=29 (4,6/6,7,8,8)					13		
		SPT(S) 14.00m, N=30 (5,5/6,8,8,8)					14		
		SPT(S) 15.00m, N=34 (7,8/8,8,9,9)					15		
				15.45		End of Borehole at 15.45m			
							16		
							17		
							18		
							19		
							20		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks
1.20	1.90	01:00	

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

	Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **WS1**
	Contract Number: CCG-C-24-14500	Date Started: 05/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Dynamic Sampling Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando Terrier Rig	Rig Crew: JG/BM
					Sheet 1 of 2
					Scale: 1:25
Weather:		Termination:		SPT Hammer: N/R, Energy Ratio: N/R	

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.00 - 1.00	U			(1.20)		Loose dark brown slightly sandy slightly gravelly silty CLAY with frequent pockets of gravel. Gravel is fine to coarse angular to sub-angular brick, glass and cinders (MADE GROUND)		
1.00 - 2.00	U							
		SPT(S)N=7 (1,1/2,2,1,2)		1.20				
				(0.50)		Loose dark brown silty gravelly SAND. Gravel is fine to coarse angular to sub-angular cinders and brick (MADE GROUND)		
				1.70				
				(0.50)		Very loose brown silty fine to medium grained SAND		
2.00 - 3.00	U	SPT(S)N=2 (1,1/1,0,0,1)						
				2.20				
				(1.10)		Very loose becoming loose brown slightly silty fine to medium grained SAND		
3.00 - 4.00	U	SPT(S)N=5 (1,1/1,1,1,2)						
				3.30				
				(0.90)		Very loose to loose brown very gravelly slightly silty fine to medium grained SAND. Gravel is fine to medium sub-rounded to rounded sandstone, mudstone and quartz		
4.00 - 5.00	U	SPT(S)N=4 (1,0/1,1,1,1)						
				4.20				
		HVP=70		(1.25)		Soft locally firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium sub-angular mudstone		
		HVP=70						
		SPT(S)N=4 (1,1/1,1,1,1)						
						Continued next sheet		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)
0.00	0.50	PLAIN	
0.50	5.45	SLOTTED	

Remarks:

1 hour hand excavating 1.20mbgl service avoidance pit

Borehole advanced by dynamic probing methods

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
2.00			0		

	Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **WS1**
	Contract Number: CCG-C-24-14500	Date Started: 05/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Dynamic Sampling Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando Terrier Rig	Rig Crew: JG/BM
					Sheet 2 of 2
					Scale: 1:25
Weather:		Termination:		SPT Hammer: N/R, Energy Ratio: N/R	

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				5.45		Soft locally firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium sub-angular mudstone		
						End of Borehole at 5.45m		

6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)
0.00	0.50	PLAIN	
0.50	5.45	SLOTTED	

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit
Borehole advanced by dynamic probing methods

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
2.00			0		

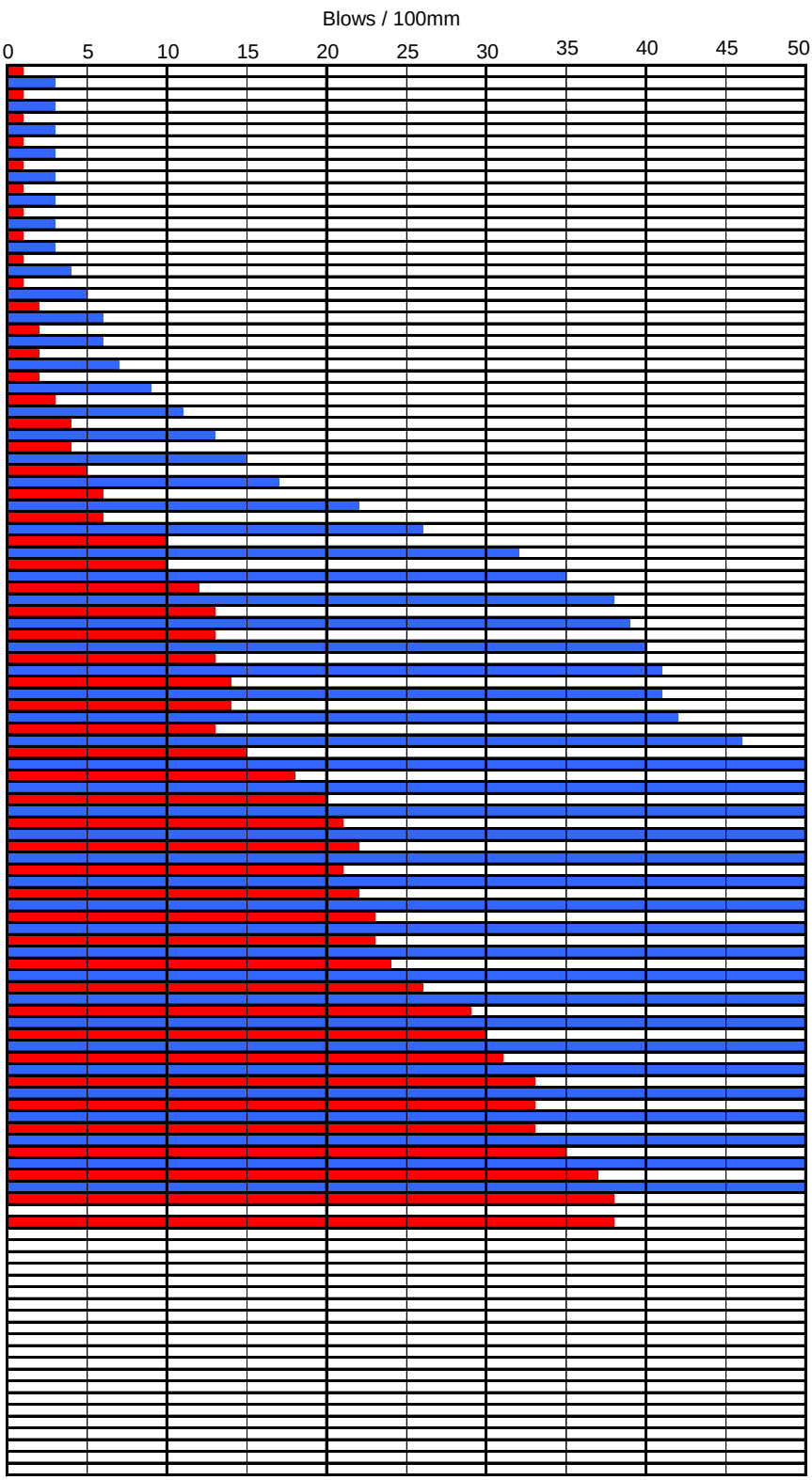
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Tel: 0151 545 2750 Fax: 0151 548 7892

DYNAMIC PROBE TEST RESULTS SHEET

SITE:	Chorlton Baths, Manchester
CLIENT:	Reid Jones Partnership
PROBE NUMBER:	DP1 (WS1)
DATE:	(Page 1 of 1)

DPSH IN ACCORDANCE WITH BS 1377: PART 9: CLAUSE 3.2
CONE BURIED:
PROBE HOLE BACKFILLED:
REMARKS:
Dynamic probing commenced at 5.00mbgl

Depth (m)	Blows / 100mm	Equivalent SPT 'N' value
5.1	1	3
5.2	1	3
5.3	1	3
5.4	1	3
5.5	1	3
5.6	1	3
5.7	1	3
5.8	1	3
5.9	1	4
6.0	1	5
6.1	2	6
6.2	2	6
6.3	2	7
6.4	2	9
6.5	3	11
6.6	4	13
6.7	4	15
6.8	5	17
6.9	6	22
7.0	6	26
7.1	10	32
7.2	10	35
7.3	12	38
7.4	13	39
7.5	13	40
7.6	13	41
7.7	14	41
7.8	14	42
7.9	13	46
8.0	15	50+
8.1	18	50+
8.2	20	50+
8.3	21	50+
8.4	22	50+
8.5	21	50+
8.6	22	50+
8.7	23	50+
8.8	23	50+
8.9	24	50+
9.0	26	50+
9.1	29	50+
9.2	30	50+
9.3	31	50+
9.4	33	50+
9.5	33	50+
9.6	33	50+
9.7	35	50+
9.8	37	50+
9.9	38	
10.0	38	



Dynamic probe value (Blows/100mm) Equivalent SPT 'N' value

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CHAS Accredited Contractor
AGS Association of Geotechnical & Geoenvironmental Specialists
UKAS TESTING 4514
BUILDER'S PROFILE

CCG	Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **WS2**
	Contract Number: CCG-C-24-14500	Date Started: 05/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
					Sheet 1 of 2
Dynamic Sampling Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando Terrier Rig	Rig Crew: JG/BM
					Scale: 1:25
Weather:	Termination:		SPT Hammer: N/R, Energy Ratio: N/R		

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.00 - 1.00	U			(0.50)		Dark brown very gravelly silty SAND. Gravel is fine to coarse angular to sub-angular brick, concrete, cinders and coal (MADE GROUND)		
				0.50		Dark brown very silty gravelly SAND with frequent inclusions of rootlets. Gravel is fine to medium angular to sub-angular coal, brick and sandstone (MADE GROUND)		
				(0.50)				
1.00 - 2.00	U			1.00		Very loose to loose brown silty fine to medium grained SAND		
		SPT(S)N=4 (1,1/1,1,1,1)		(0.50)				
				1.50		Very loose to loose light brown slightly silty fine to medium grained SAND		
				(0.50)				
2.00 - 3.00	U	SPT(S)N=4 (1,1/1,1,1,1)		2.00		Very loose to loose brown slightly gravelly slightly silty fine to medium grained SAND. Gravel is fine to coarse sub-rounded to rounded sandstone		
				(0.60)				
				2.60		Very loose brown very gravelly slightly silty fine to medium grained SAND. Gravel is fine to medium sub-angular to sub-rounded sandstone and mudstone		
3.00 - 4.00	U	SPT(S)N=3 (1,2/1,0,1,1)					▼	
				(1.20)				
				3.80		Soft locally firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium sub-angular mudstone		
4.00 - 5.00	U	SPT(S)N=6 (1,1/2,1,1,2)						
				(1.65)				
		HVP=80						
		SPT(S)N=6 (2,2/1,2,1,2)						
						Continued next sheet		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling			
From (m)	To (m)	Duration	Remarks

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:

1 hour hand excavating 1.20mbgl service avoidance pit
Borehole advanced by dynamic probing methods

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.00			0		

	Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Borehole ID: **WS2**
	Contract Number: CCG-C-24-14500	Date Started: 05/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
Dynamic Sampling Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando Terrier Rig	Rig Crew: JG/BM
					Sheet 2 of 2
					Scale: 1:25
Weather:		Termination:		SPT Hammer: N/R, Energy Ratio: N/R	

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
				5.45		Soft locally firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium sub-angular mudstone		
						End of Borehole at 5.45m		

6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Chiselling				Installation			
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)

Remarks:
1 hour hand excavating 1.20mbgl service avoidance pit
Borehole advanced by dynamic probing methods

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.00			0		

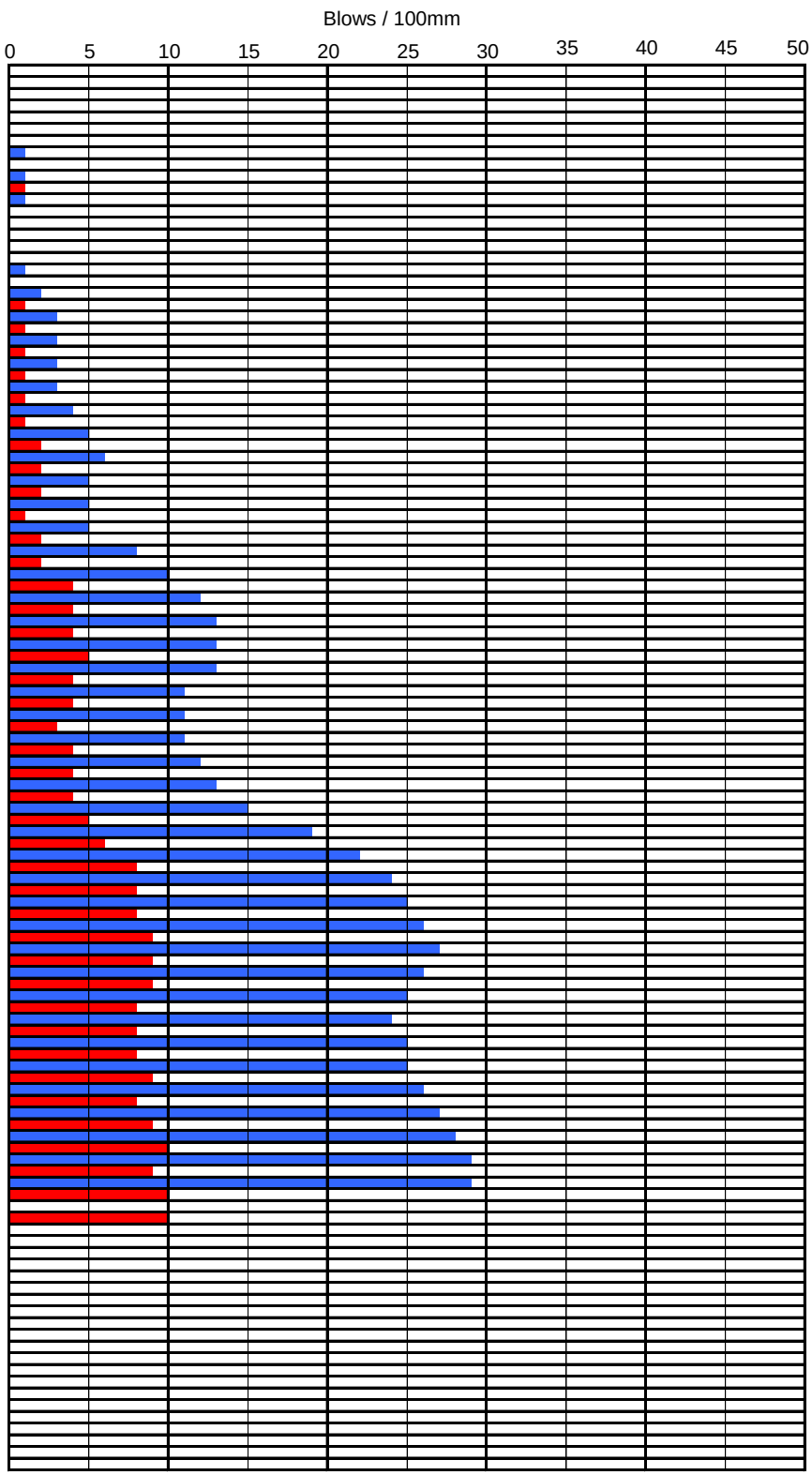
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DYNAMIC PROBE TEST RESULTS SHEET

SITE:	Chorlton Baths, Manchester
CLIENT:	Reid Jones Partnership
PROBE NUMBER:	DP2 (WS2)
DATE:	(Page 1 of 1)

DPSH IN ACCORDANCE WITH BS 1377: PART 9: CLAUSE 3.2
CONE BURIED:
PROBE HOLE BACKFILLED:
REMARKS:
Dynamic probing commenced at 5.00mbgl

Depth (m)	Blows / 100mm	Equivalent SPT 'N' value
5.1	0	0
5.2	0	0
5.3	0	0
5.4	0	1
5.5	0	1
5.6	1	1
5.7	0	0
5.8	0	0
5.9	0	1
6.0	0	2
6.1	1	3
6.2	1	3
6.3	1	3
6.4	1	3
6.5	1	4
6.6	1	5
6.7	2	6
6.8	2	5
6.9	2	5
7.0	1	5
7.1	2	8
7.2	2	10
7.3	4	12
7.4	4	13
7.5	4	13
7.6	5	13
7.7	4	11
7.8	4	11
7.9	3	11
8.0	4	12
8.1	4	13
8.2	4	15
8.3	5	19
8.4	6	22
8.5	8	24
8.6	8	25
8.7	8	26
8.8	9	27
8.9	9	26
9.0	9	25
9.1	8	24
9.2	8	25
9.3	8	25
9.4	9	26
9.5	8	27
9.6	9	28
9.7	10	29
9.8	9	29
9.9	10	
10.0	10	



Dynamic probe value (Blows/100mm) Equivalent SPT 'N' value

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UKAS TESTING 4514
BUILDER'S PROFILE

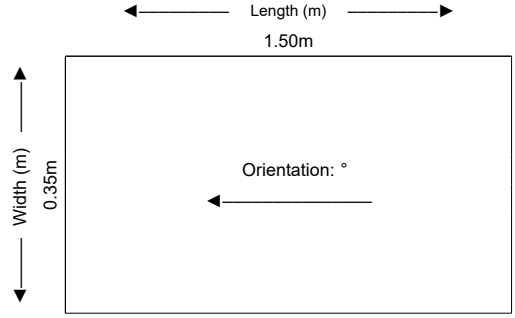
APPENDIX D: TRIAL PIT LOG

	Contract Name: Chorlton Baths, Manchester		Client: Reid Jones Partnership		Trial Pit ID: TP1
	Contract Number: CCG-C-24-14500	Date Started: 03/04/2024	Logged By: DK	Checked By: CB	Status: DRAFT
					Sheet 1 of 1
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: JCB 3CX Excavator	Date Printed: 17/04/2024
					Scale: 1:25
Weather:		Hole Termination:		Stability: Stable	

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description		
				0.10		TARMAC		
0.20	B			(0.60)		Dark brown very gravelly silty SAND. Gravel is fine to coarse angular to sub-angular brick, concrete, ceramic, cinders, slag, coal and wood (MADE GROUND)		
0.50	B			0.70				
0.90	B			(0.40)		Brown slightly silty slightly gravelly fine to coarse grained SAND. Gravel is fine to coarse sub-angular to sub-rounded brick and limestone (MADE GROUND)		
				1.10			1	
1.20	B			(0.60)		Light brown slightly silty slightly gravelly fine to medium grained SAND		
				1.70				
1.80	B			(0.30)		Light brown/brown slightly silty slightly gravelly fine to medium grained SAND		
				2.00		End of Trial Pit at 2.00m	2	
							3	

Dimensions:

Final Depth: 2.00m



Inclination: °

General Remarks:

Water Strikes					
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
			0		Dry

APPENDIX E: TRIAL PIT PHOTOGRAPHS



TP01: Soil profile
TP01: Soil arisings



APPENDIX F: SOAK-A-WAY CLACS’

CC GEOTECHNICAL LTD 0151 545 2750				
			Revision	0
	Job No:	24-14500	Page:	1 OF 1
Section: Chorlton Leisure Centre, Manchester Road, Chorlton	Prepared By:	TG	Date:	03/04/2024

SOIL INFILTRATION DATA	
allowance for infiltration through soakaway base:	100%
available on-site infiltration test results:	(●) Yes ( ) No
use soakage trial pit table below	
internal surface area of trial pit 'a_{p50}' [m^2] =	2.71
storage volume between 75-25% 'V_p' [m^3] =	0.31
time for water to fall from 75-25% 't_p' [min] =	51.19
soil infiltration rate 'f' [m/s] =	3.72E-05

SOAKAGE TRIAL PIT DATA	
soakage trial pit width 'W_t' *[m]* =	0.35
soakage trial pit length 'L_t' *[m]* =	1.50
total depth from ground level 'D_{tb}' *[m]* =	2.00
depth to pipe invert level 'D_{tp}' *[m]* =	0.82
soakage trial pit effective depth 'D_{teff}' *[m]* =	1.18
free volume in infill aggregate *[%]* =	100
NOTE: faces of excavation assumed to be vertical	

Soil Description

0.00 - 0.05mbgl - TARMAC

0.05 - 1.1mbgl - Dark brown gravelly SAND (MADE GROUND)

1.1 - 2.0mbgl - light brown SAND

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

	water level measurement N°:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Soakage Trial 1	time *[min]* =	0	1	2	3	4	5	10	20	30	40	50	60	150	180			
	depth to water *[m]* =	0.82	0.92	1.02	1.11	1.18	1.24	1.49	1.62	1.65	1.67	1.69	1.72	1.80	1.92			
Soakage Trial 2	time *[min]* =																	
	depth to water *[m]* =																	
Soakage Trial 3	time *[min]* =																	
	depth to water *[m]* =																	

calculations are based on **BRE Guidelines (Digest 365)**

APPENDIX G: GAS – GROUNDWATER MONITORING

GAS AND WATER MONITORING RESULTS

	Date:	21-May-24	28-May-24										
	Visit Number	1	2										
	Atmos Press mb	1001	1006										
	Pressure Trend	Steady	Steady										
	Air Temp °C	14	12										
	Cloud cover	Overcast	Overcast										
	Wind velocity	Light breeze	Light breeze										
	Precipitation	Rain	Rain										
	State of Ground	Wet	Wet										
WS01	CH4 (%):	Nil	Nil										
	CO2 (%):	4.2	6.9										
	O2 (%):	16.3	11.1										
	H2S (ppm):	Nil	Nil										
	CO (ppm):	Nil	Nil										
	PID (ppm):	0.0	0.0										
	Flow (l/hr):	<0.1	<0.1										
	Water Level (mbgl):	Dry	Dry										
	CH_4 (%):												
	CO_2 (%):												
	O_2 (%):												
	H_2S (ppm):												
	CO (ppm):												
	PID (ppm):												
	Flow (l/hr):												
	Water Level (mbgl):												
	CH4 (%):												
	CO2 (%):												
	O2 (%):												
	H2S (ppm):												
	CO (ppm):												
	PID (ppm):												
	Flow (l/hr):												
	Water Level (mbgl):												
	CH4 (%):												
	CO2 (%):												
	O2 (%):												
	H2S (ppm):												
	CO (ppm):												
	PID (ppm):												
	Flow (l/hr):												
	Water Level (mbgl):												

Job No: CCG-C-24-14500

Site: Chorlton Leisure Centre, Manchester Road, Chorlton

Instrument: GFM436

Ribble Enviro Ltd
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...everything gas detection

Certificate of Calibration

Customer:	CC Geotechnical
Instrument:	Minirae 3000
Job:	Service, Test & Calibration
Serial number:	592-917504
Fleet Number:	-
Certificate no:	917504/052723
Next calibration due date:	05.JUL.2024
Tested on:	05.JUL.2023
Calibrated for:	Isobutylene

Applied Gas Concentration:	Cylinder Reference:	Final Sensor Reading	Accuracy Limits	Pass / Fail
Isobutylene 100ppm	63098/1423	100ppm	±10%	Pass

The instrument has been calibrated after re-zeroing and introducing span calibration gas, using gas that is traceable to national standards and has been prepared in accordance with BS EN ISO 6145-6:2017

Calibration Engineer: [redacted]

Sign [redacted]

Quality (Print): [redacted]

Tel: 01200 445 804 **Fax**: 01200 445 809 **Email**: info@ribble-enviro.co.uk
Ribble Enviro Ltd. Unit 4, Gisburn Business Park, Gisburn, Nr Clitheroe, BB7 4JP, UK

Company Registered in England: 06140589 VAT No: GB 906 6241 34 EORI: GB906624134000

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...everything gas detection

Certificate of Calibration

Customer:	CCG
Instrument:	Tiger
Job:	Service, Test & Calibration
Serial number:	T-110194
Fleet Number:	-
Certificate no:	110194/110723
Next calibration due date:	11.JUL.2024
Tested on:	11.JUL.2023
Calibrated for:	Isobutylene

Applied Gas Concentration:	Cylinder Reference:	Final Sensor Reading	Accuracy Limits	Pass / Fail
Isobutylene 100ppm	63098/1423	100.0ppm	±10ppm	Pass

The instrument has been calibrated after re-zeroing and introducing span calibration gas, using gas that is traceable to national standards and has been prepared in accordance with BS EN ISO 6145-6:2017

Calibration Engineer: [redacted]

Sign: [redacted]

Quality Assessed by (Print):	[redacted]

Tel: 01200 445 804 **Fax**: 01200 445 809 **Email**: info@ribble-enviro.co.uk
Ribble Enviro Ltd. Unit 4, Gisburn Business Park, Gisburn, Nr Clitheroe, BB7 4JP, UK

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APPENDIX H: SOIL CLASSIFICATION REPORT

Units 1 & 2
Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

Telephone: (0151) 545 2750
Fax: (0151) 548 7892
Email: enquiries@ccgeotechnical.com
www.ccgeotechnical.com

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Consulting Geoenvironmental and Geotechnical Engineers

LABORATORY REPORT

CONTRACT NUMBER: CCG-C-24-14500

CONTRACT TITLE: CHORLTON LEISURE CENTRE, MANCHESTER ROAD, CHORLTON

CLIENT: CADDICK CONSTRUCTION

DATE RECEIVED: 29/04/24
DATE COMMENCED: 29/04/24
DATE COMPLETED: 13/05/24
REPORT DATE: 14/05/24

Test Description	Qty
Determination of Moisture Content BS 1377-2:1990 (a)	5
Determination of Liquid & Plastic Limits BS 1377-2:1990 (a)	7
Particle Size Distribution BS 1377-2:1990 (a)	4
Unconsolidated Undrained Triaxial Compression BS1377-7:1990 (a)	2

Notes: Observations and interpretations are not accredited by UKAS
All testing undertaken at laboratory permanent facilities
# denotes non-accredited test
a denotes UKAS accredited test
s denotes test undertaken by approved subcontractor
Test results only relate to the samples tested

This report is issued in accordance with the requirements of the United kingdom Accreditation Services and EN ISO/IEC 17025:2017. The results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without the prior written approval of the laboratory.
Approved Signatories: Chris Bolan (Managing Director) – Daniel Kerfoot (Laboratory Manager)

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Shear Strength (kN/m^2)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH01	B	2.50	2.50	-	-	-	-	-	-	-	-	-	Y	Brown very gravelly slightly silty fine to coarse SAND. Gravel is fine to coarse subrounded sandstone. (BS1377Pt2:9.2)
BH01	B	3.50	3.50	-	-	-	-	-	-	-	-	-	Y	Brown slightly silty SAND & GRAVEL. Gravel is fine to coarse subrounded sandstone. (BS1377Pt2:9.2)
BH01	B	4.50	4.50	21	-	-	-	42	17	25	93	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular to subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)
BH01	B	7.50	7.50	23	-	-	-	47	19	28	97	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular to subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: CHORLTON LEISURE CENTRE, MANCHESTER RD (CCG-C-24-14500) DATE: 14.05.24

CLIENT: CADDICK CONSTRUCTION

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Shear Strength (kN/m^2)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH02	B	2.50	2.50	-	-	-	-	-	-	-	-	-	Y	Greyish brown very gravelly silty fine to coarse SAND. Gravel is fine to coarse subangular to subrounded sandstone, mudstone, granite. (BS1377Pt2:9.2)
BH02	B	3.50	3.50	-	-	-	-	-	-	-	-	-	Y	Brown very sandy slightly silty GRAVEL. Gravel is fine to coarse subangular to subrounded sandstone, mudstone, quartz. (BS1377Pt2:9.2)
BH02	B	4.50	4.50	23	-	-	-	39	15	24	88	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular to subrounded mudstone. (BS1377Pt2:3.2,4.4,5)
BH02	B	6.50	6.50	18	-	-	-	35	14	21	93	CL / CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular to subrounded mudstone. (BS1377Pt2:3.2,4.4,5)
BH02	UT	8.00	8.45	24	2.17	1.75	76	48	20	28	96	CI	Y	Brown slightly sandy slightly gravelly silty CLAY of high undrained shear strength. Gravel is fine to medium subangular mudstone and sandstone. (BS1377Pt2:3.2,4.4,5,Pt7:8)
BH02	UT	10.00	10.45	11	2.32	2.09	109	25	13	12	90	CL	Y	Brown slightly sandy slightly gravelly silty CLAYof high undrained shear strength with occasional sand lamination. Gravel is fine to medium subangular to subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)
BH02	UT	12.00	12.45	11	-	-	>110*	27	14	13	89	CL	Y	Brown slightly sandy slightly gravelly silty CLAY with rare sand lamination. Gravel is fine to medium subangular to subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: CHORLTON LEISURE CENTRE, MANCHESTER RD (CCG-C-24-14500) DATE: 14.05.24

CLIENT: CADDICK CONSTRUCTION

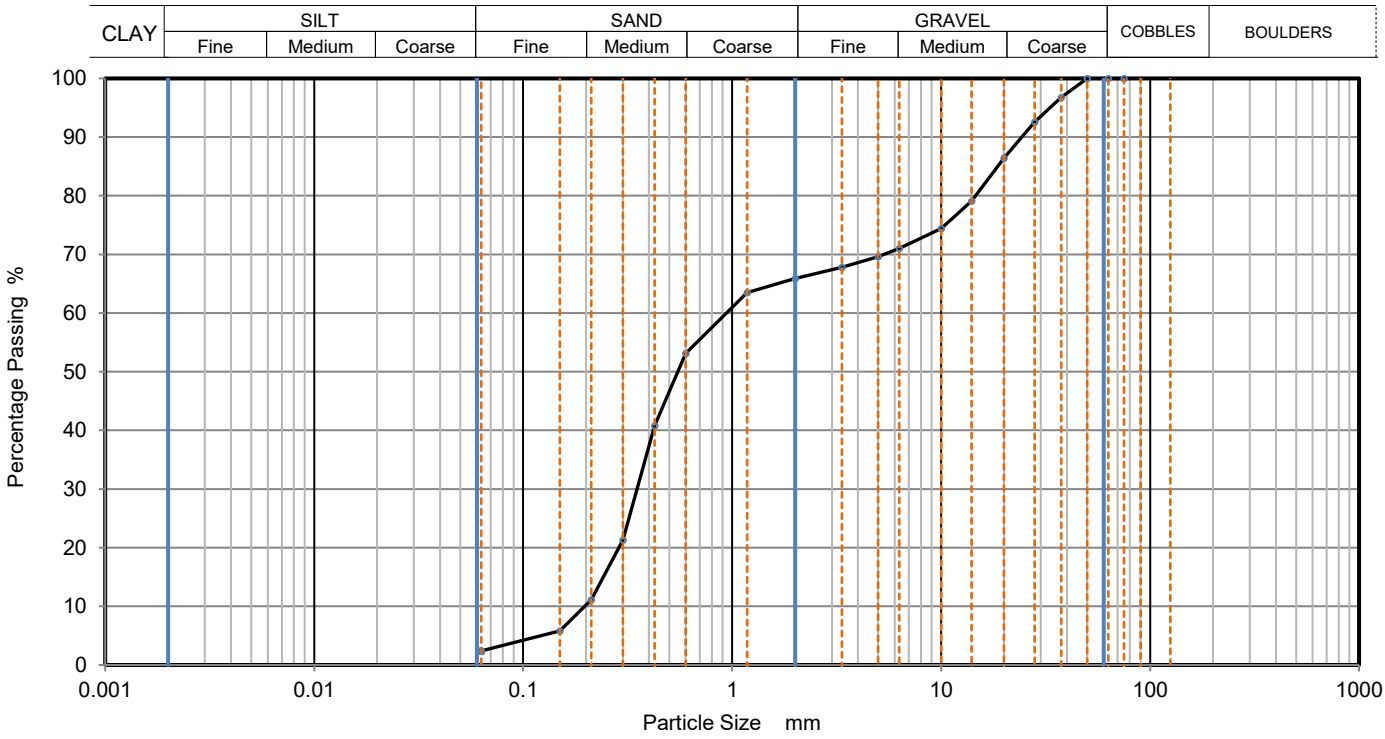
UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

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e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref	CCG-C-24-14500		
Borehole/Pit No.	BH01		
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD	Sample No.	1
Specimen Description	Brown very gravelly slightly silty fine to coarse SAND	Depth, m	2.50
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2	KeyLAB ID	CCGL202405140



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	97		
28	93		
20	86		
14	79		
10	74		
6.3	71		
5	70		
3.35	68		
2	66		
1.18	64		
0.6	53		
0.425	41		
0.3	21		
0.212	11		
0.15	6		
0.063	2		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	34
Sand	64
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	0.941
D30	mm	0.35
D10	mm	0.197
Uniformity Coefficient		4.8
Curvature Coefficient		0.66

Remarks

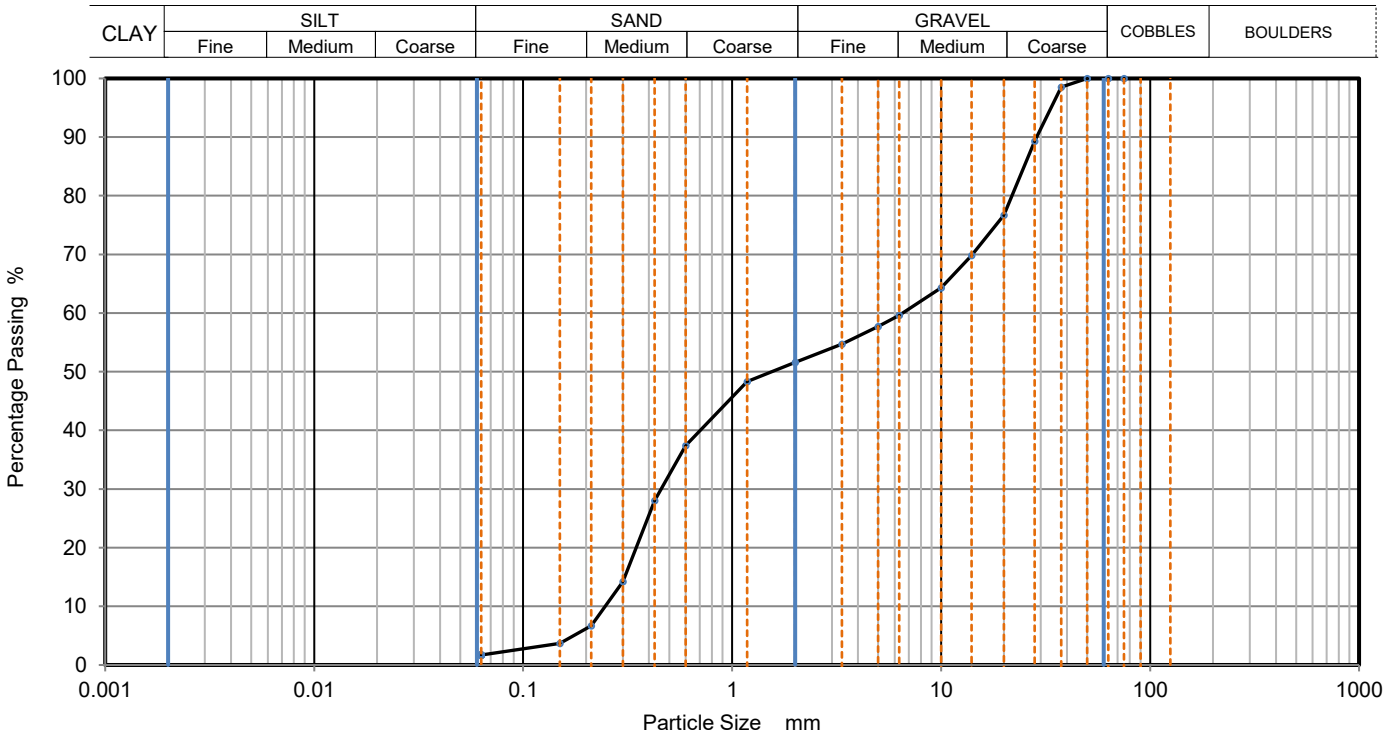
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
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PARTICLE SIZE DISTRIBUTION

Job Ref	CCG-C-24-14500		
Borehole/Pit No.	BH01		
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD	Sample No.	1
Specimen Description	Brown slightly silty SAND & GRAVEL	Depth, m	3.50
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2	KeyLAB ID	CCGL202405141



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	99		
28	89		
20	77		
14	70		
10	64		
6.3	60		
5	58		
3.35	55		
2	52		
1.18	48		
0.6	37		
0.425	28		
0.3	14		
0.212	7		
0.15	4		
0.063	2		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	48
Sand	50
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	6.55
D30	mm	0.457
D10	mm	0.247
Uniformity Coefficient		27
Curvature Coefficient		0.13

Remarks

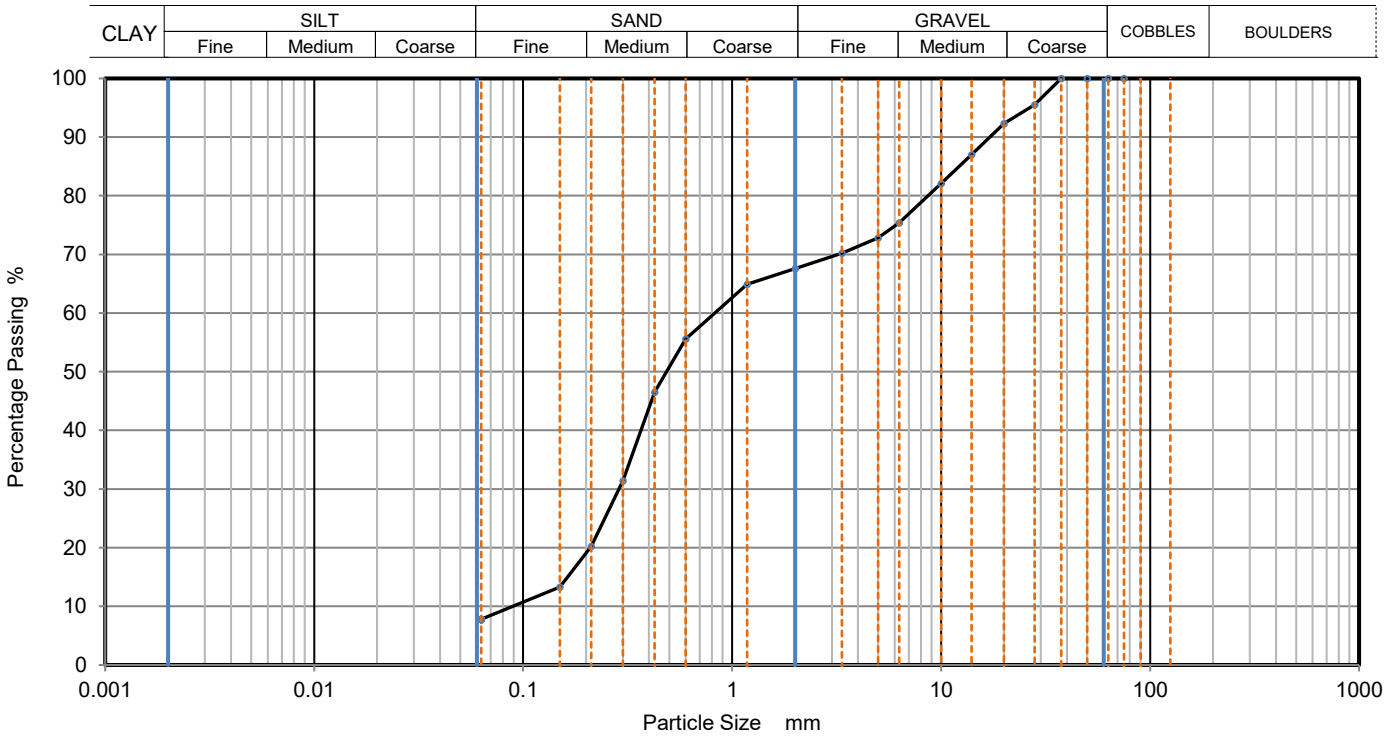
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PARTICLE SIZE DISTRIBUTION

Job Ref	CCG-C-24-14500		
Borehole/Pit No.	BH02		
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD	Sample No.	1
Specimen Description	Greyish brown very gravelly silty fine to coarse SAND	Depth, m	2.50
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2	KeyLAB ID	CCGL202405142



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	96		
20	92		
14	87		
10	82		
6.3	75		
5	73		
3.35	70		
2	68		
1.18	65		
0.6	56		
0.425	47		
0.3	31		
0.212	20		
0.15	13		
0.063	8		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	32
Sand	60
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.827
D30	mm	0.287
D10	mm	0.0896
Uniformity Coefficient		9.2
Curvature Coefficient		1.1

Remarks

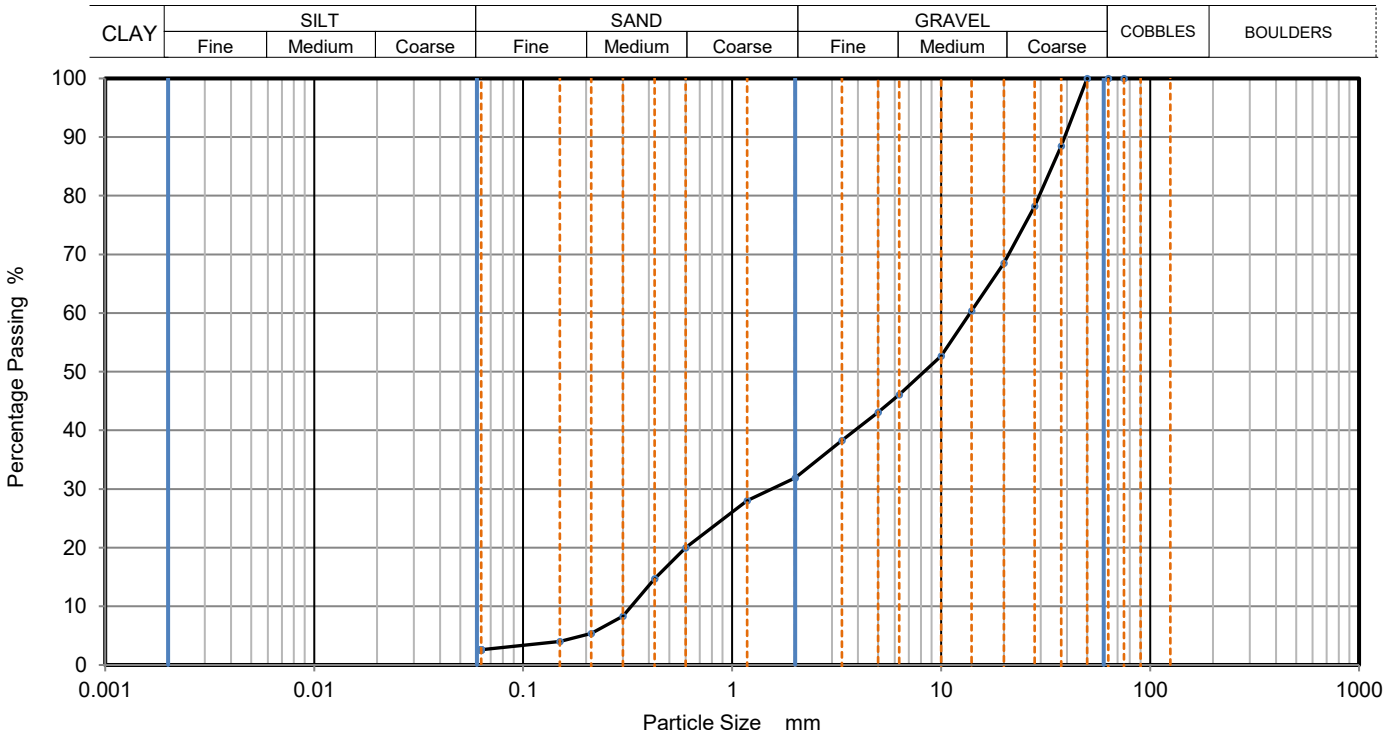
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PARTICLE SIZE DISTRIBUTION

Job Ref	CCG-C-24-14500		
Borehole/Pit No.	BH02		
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD	Sample No.	1
Specimen Description	Brown very sandy slightly silty GRAVEL	Depth, m	3.50
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2	KeyLAB ID	CCGL202405143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	89		
28	78		
20	69		
14	60		
10	53		
6.3	46		
5	43		
3.35	38		
2	32		
1.18	28		
0.6	20		
0.425	15		
0.3	8		
0.212	5		
0.15	4		
0.063	3		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	68
Sand	29
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	13.7
D30	mm	1.55
D10	mm	0.329
Uniformity Coefficient		42
Curvature Coefficient		0.53

Remarks

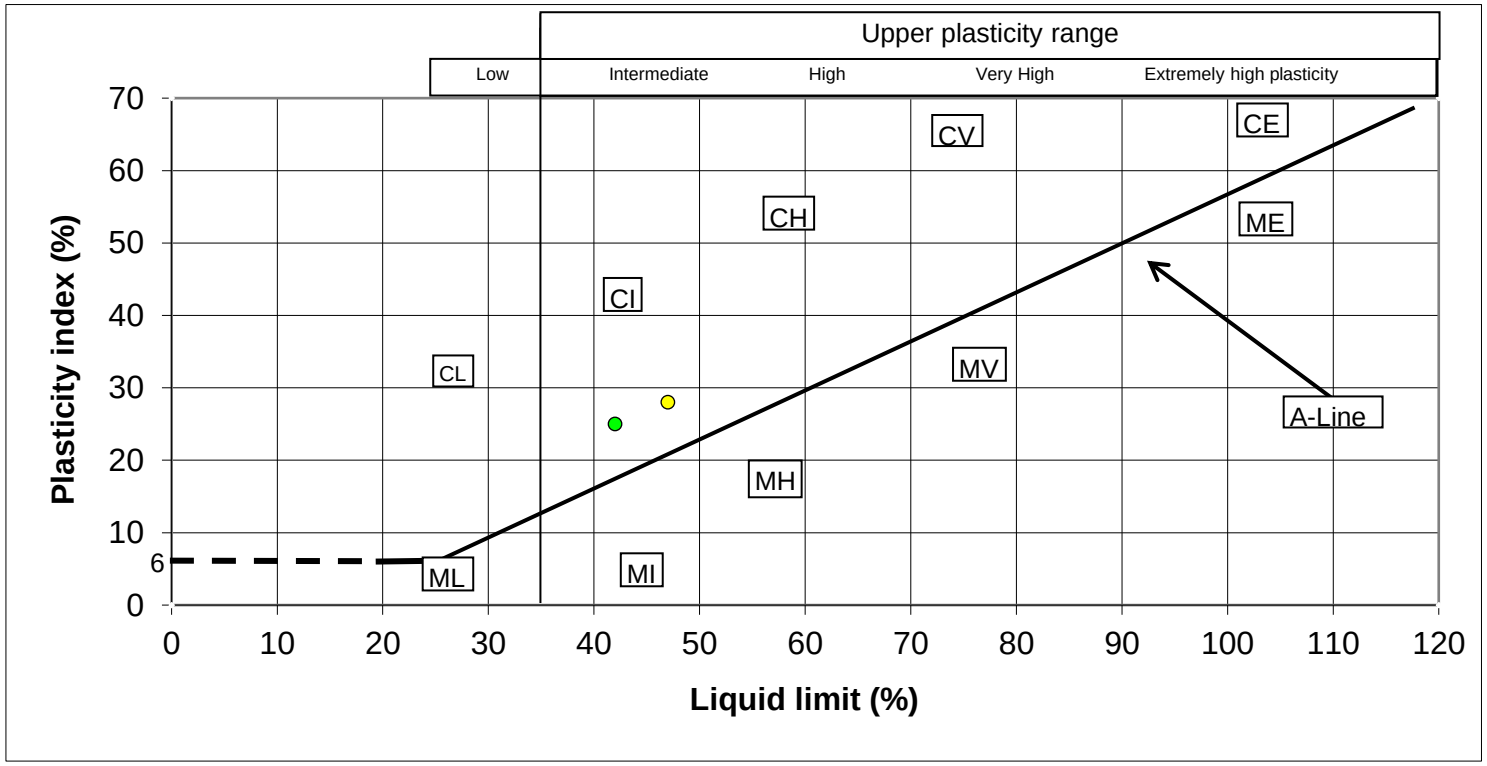
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Operator	Checked	Approved	Sheet printed	Fig 1
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ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
BH01	4.50	42.0	25.0
BH01	7.50	47.0	28.0

UKAS TESTING
4514

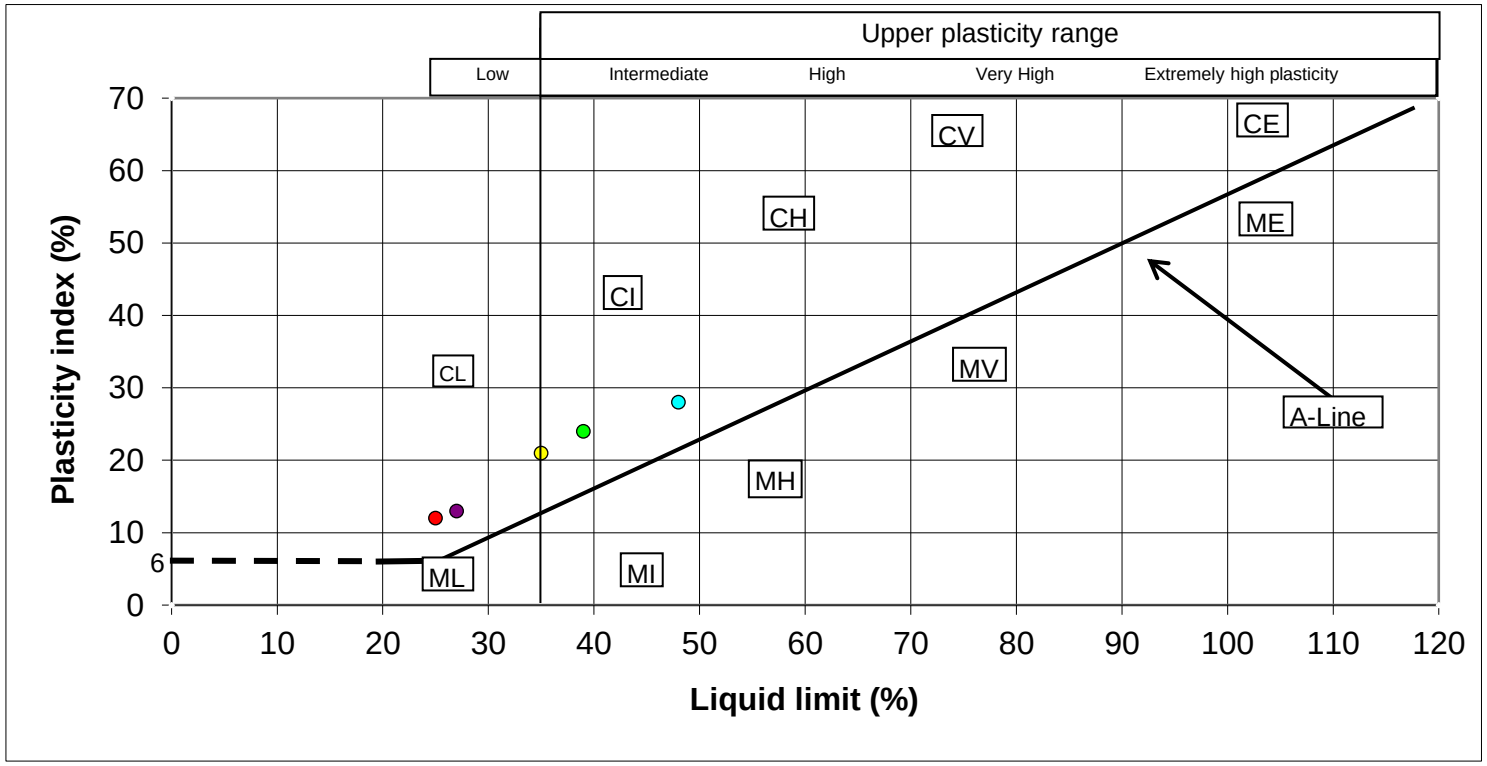
APPROVED BY	DK

CLIENT: CADDICK CONSTRUCTION	SITE: CHORLTON LEISURE CENTRE (CCG-C-24-14500)

ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
BH02	4.50	39.0	24.0
BH02	6.50	35.0	21.0
BH02	8.00	48.0	28.0
BH02	10.00	25.0	12.0
BH02	12.00	27.0	13.0

UKAS TESTING
4514

APPROVED BY	DK

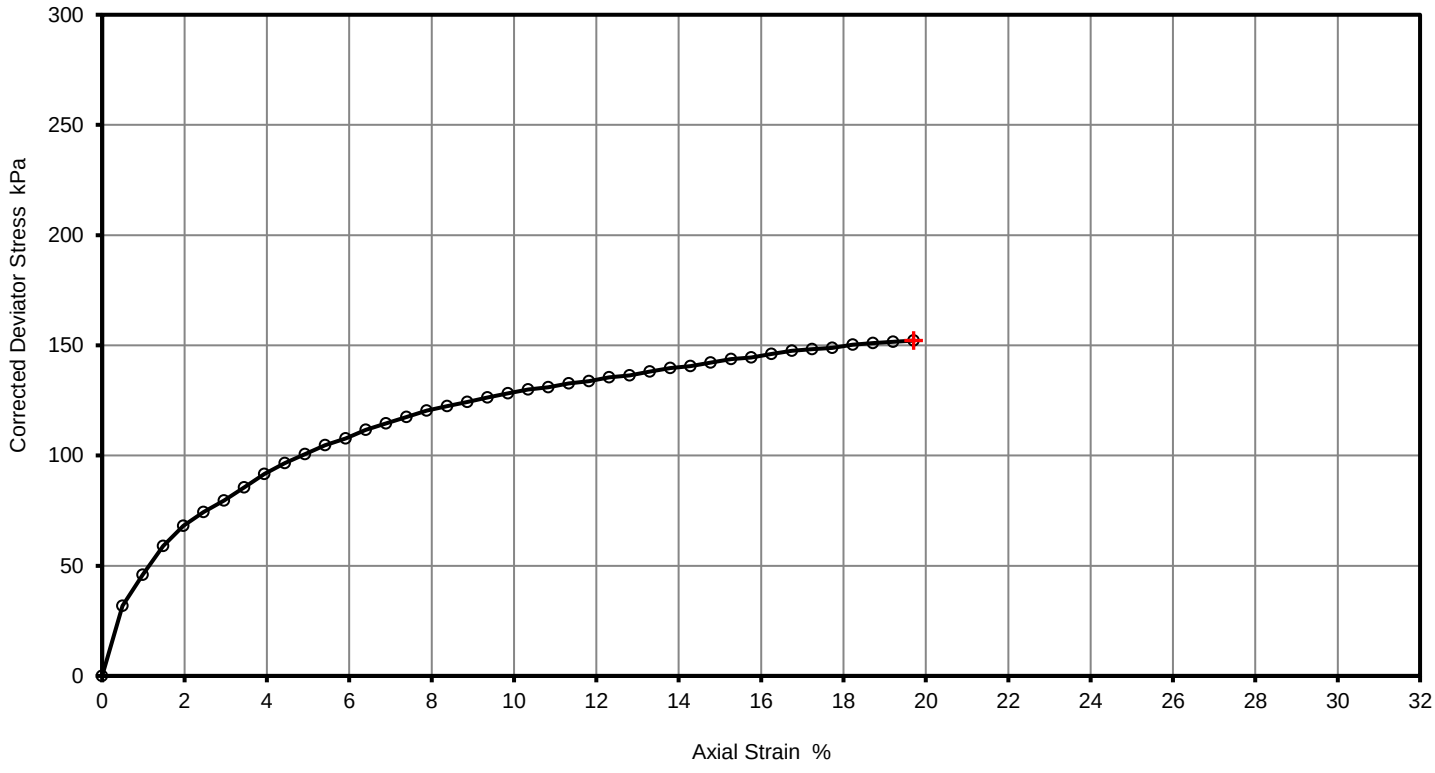
CLIENT: CADDICK CONSTRUCTION	SITE: CHORLTON LEISURE CENTRE (CCG-C-24-14500)

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	CCG-C-24-14500
				Borehole/Pit No.	BH02
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD			Sample No.	1
Soil Description				Depth	8.00
Specimen Reference		Specimen Depth	m	Sample Type	UT
Specimen Description	Brown slightly sandy slightly gravelly silty CLAY			Date of test	03/05/2024
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen				

UKAS TESTING 4514

Test Number		1	
Length		203.0	mm
Diameter		102.2	mm
Bulk Density		2.17	Mg/m3
Moisture Content		23.5	%
Dry Density		1.75	Mg/m3
Rate of Strain		2.0	%/min
Cell Pressure		160	kPa
At failure	Axial Strain	19.7	%
	Deviator Stress, (σ1 - σ3)f	152	kPa
	Undrained Shear Strength, cu	76	kPa ½(σ1 - σ3)f
	Mode of Failure	Plastic	

Deviator Stress v Axial Strain



Remarks

0.5mm membrane, correction factor = 1.86

Approved: DanielKerfoot

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Fig. No. 1

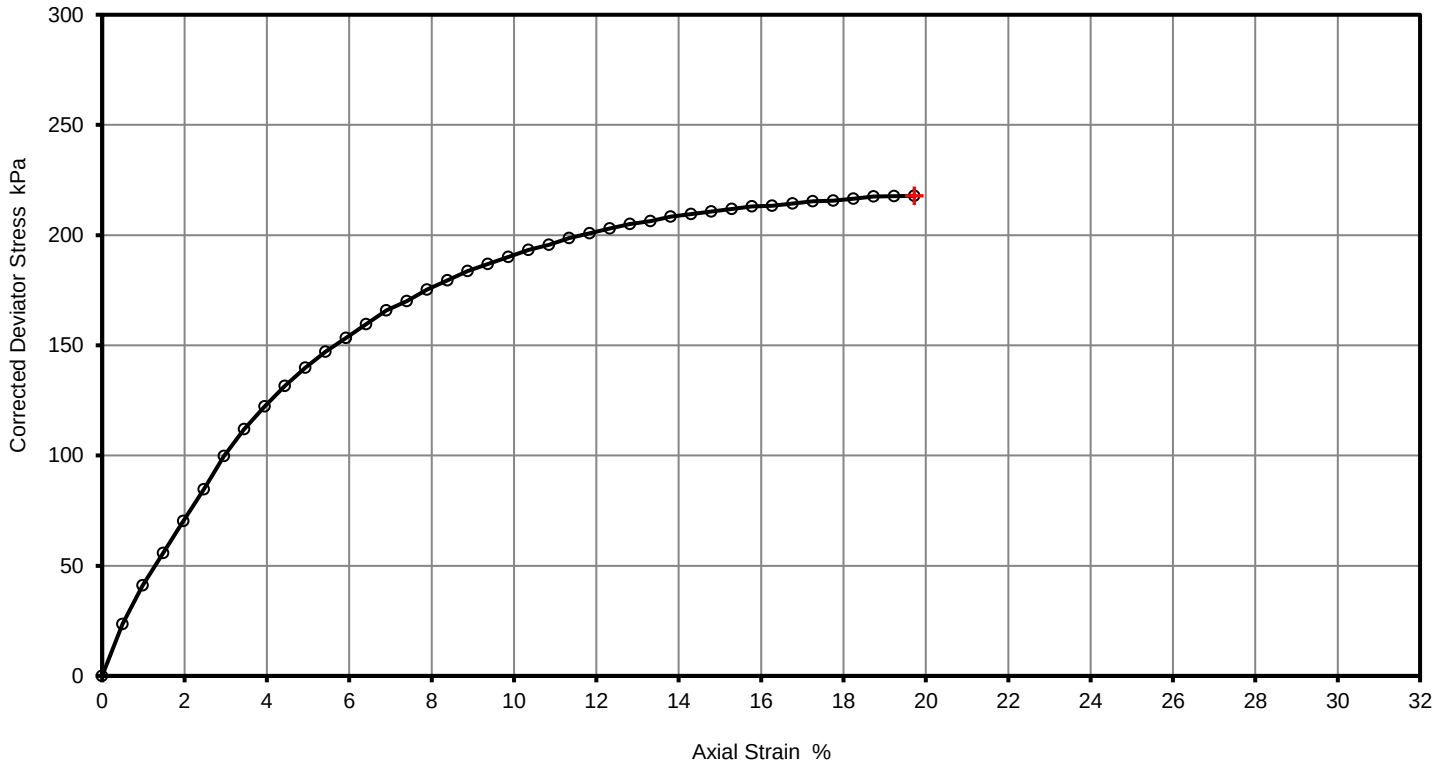
Sheet 1

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	CCG-C-24-14500
				Borehole/Pit No.	BH02
Site Name	CHORLTON LEISURE CENTRE, MANCHESTER ROAD			Sample No.	1
Soil Description				Depth	10.00
Specimen Reference		Specimen Depth	m	Sample Type	UT
Specimen Description	Brown slightly sandy slightly gravelly silty CLAY with occasional sand lamination			Date of test	03/05/2024
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen				

UKAS TESTING 4514

Test Number		1	
Length		202.8	mm
Diameter		103.4	mm
Bulk Density		2.32	Mg/m3
Moisture Content		11.4	%
Dry Density		2.09	Mg/m3
Rate of Strain		2.0	%/min
Cell Pressure		200	kPa
At failure	Axial Strain	19.7	%
	Deviator Stress, (σ1 - σ3)f	218	kPa
	Undrained Shear Strength, cu	109	kPa ½(σ1 - σ3)f
	Mode of Failure	Plastic	

Deviator Stress v Axial Strain



Remarks

0.5mm membrane, correction factor = 1.84

Approved: DanielKerfoot

Printed: 14/05/2024 09:22

Fig. No. 1

Sheet 2

APPENDIX I: SOIL CONTAMINATION REPORT

CC Geotechnical
Unit 1-2 Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

t: 0151 545 2750

e: tony.gerrard@ccgeotechnical.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-015835

Replaces Analytical Report Number: 24-015835, issue no. 1
Additional analysis undertaken.
SVOC & VOC added as per client's requested.

Project / Site name:	Chorlton LC	Samples received on:	24/04/2024
Your job number:	CCG C 24 14500	Samples instructed on/ Analysis started on:	24/04/2024
Your order number:	CCG PO 14500	Analysis completed by:	13/05/2024
Report Issue Number:	2	Report issued on:	13/05/2024
Samples Analysed:	1 soil sample		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-015835
Project / Site name: Chorlton LC
Your Order No: CCG PO 14500

Lab Sample Number				179099
Sample Reference				BH01
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				19/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	16
Total mass of sample received	kg	0.1	NONE	1.4

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.2
Free Cyanide	mg/kg	1	MCERTS	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.041
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	51
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	25.3
Sulphide	mg/kg	1	MCERTS	< 1.0
Organic Matter (automated)	%	0.1	MCERTS	2.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.1
Acenaphthylene	mg/kg	0.05	MCERTS	0.25
Acenaphthene	mg/kg	0.05	MCERTS	3.9
Fluorene	mg/kg	0.05	MCERTS	2.5
Phenanthrene	mg/kg	0.05	MCERTS	25
Anthracene	mg/kg	0.05	MCERTS	5.6
Fluoranthene	mg/kg	0.05	MCERTS	31
Pyrene	mg/kg	0.05	MCERTS	29
Benzo(a)anthracene	mg/kg	0.05	MCERTS	14
Chrysene	mg/kg	0.05	MCERTS	15
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	16
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	5.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	14
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	6.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.9
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	7.6

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	179

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-015835
Project / Site name: Chorlton LC
Your Order No: CCG PO 14500

Lab Sample Number				179099
Sample Reference				BH01
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				19/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Heavy Metals / Metalloids				
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	1.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110
Petroleum Hydrocarbons				
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	1.7
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	3.6
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	28
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	< 10
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	33
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	6
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	35
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	170
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	200
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	24
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	430
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	470

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Analytical Report Number: 24-015835
Project / Site name: Chorlton LC
Your Order No: CCG PO 14500

Lab Sample Number				179099
Sample Reference				BH01
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				19/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
VOCs				
Chloromethane	µg/kg	5	ISO 17025	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0
1,1-Dichloroethene	µg/kg	5	NONE	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
1,1-Dichloroethane	µg/kg	5	ISO 17025	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0
Chloroform	µg/kg	5	ISO 17025	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0
1,2-Dichloroethane	µg/kg	5	ISO 17025	< 5.0
1,1-Dichloropropene	µg/kg	5	ISO 17025	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0
1,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0 ##
Dibromomethane	µg/kg	5	ISO 17025	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0
Bromoform	µg/kg	5	NONE	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0
n-Propylbenzene	µg/kg	5	ISO 17025	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
p-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0

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Analytical Report Number: 24-015835
Project / Site name: Chorlton LC
Your Order No: CCG PO 14500

Lab Sample Number				179099
Sample Reference				BH01
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				19/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Butylbenzene	µg/kg	5	NONE	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0

SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3
Hexachloroethane	mg/kg	0.05	ISO 17025	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	NONE	< 0.1
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	1.4
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2
Azobenzene	mg/kg	0.3	NONE	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.30
Carbazole	mg/kg	0.3	MCERTS	1.6
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2
Anthraquinone	mg/kg	0.3	NONE	2
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 24-015835
Project / Site name: Chorlton LC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
179099	BH01	None Supplied	0.5	Brown clay and sand with gravel

Analytical Report Number : 24-015835
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

Analytical Report Number : 24-015835
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

CC Geotechnical
Unit 1-2 Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

t: 0151 545 2750

e: tony.gerrard@ccgeotechnical.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-016005

Replaces Analytical Report Number: 24-016005, issue no. 2
Additional analysis undertaken.
CCG Leachate Suite added to sample as per client's request.

Project / Site name:	Chorlton LC	Samples received on:	25/04/2024
Your job number:	CCG-C-24-14500	Samples instructed on/ Analysis started on:	25/04/2024
Your order number:	CCG-PO-14500	Analysis completed by:	29/05/2024
Report Issue Number:	3	Report issued on:	30/05/2024
Samples Analysed:	1 soil sample - 1 leachate sample		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-016005
Project / Site name: Chorlton LC
Your Order No: CCG-PO-14500

Lab Sample Number				179894
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	14
Total mass of sample received	kg	0.1	NONE	1.4

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KSZ

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.6
Free Cyanide	mg/kg	1	MCERTS	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.124
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	300
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	149
Sulphide	mg/kg	1	MCERTS	23
Organic Matter (automated)	%	0.1	MCERTS	3.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.1
Acenaphthylene	mg/kg	0.05	MCERTS	0.29
Acenaphthene	mg/kg	0.05	MCERTS	3.6
Fluorene	mg/kg	0.05	MCERTS	3.1
Phenanthrene	mg/kg	0.05	MCERTS	30
Anthracene	mg/kg	0.05	MCERTS	7.9
Fluoranthene	mg/kg	0.05	MCERTS	42
Pyrene	mg/kg	0.05	MCERTS	40
Benzo(a)anthracene	mg/kg	0.05	MCERTS	20
Chrysene	mg/kg	0.05	MCERTS	23
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	23
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	8.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	21
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	11
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	2.6
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	12

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	249

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Analytical Report Number: 24-016005
Project / Site name: Chorlton LC
Your Order No: CCG-PO-14500

Lab Sample Number				179894
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Heavy Metals / Metalloids				
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	8
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	20
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110
Lead (aqua regia extractable)	mg/kg	1	MCERTS	370
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	3.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180
Petroleum Hydrocarbons				
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	2.5
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	13
TPHCWG - Aliphatic >C35 - C40 EH_CU_1D_AL	mg/kg	10	NONE	< 10
TPHCWG - Aliphatic >C5 - C40 EH_CU+HS_1D_AL	mg/kg	10	NONE	16
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	1.2
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	16
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	130
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	190
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	18
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	350
TPH Total >C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	370
VOCs				
Chloromethane	µg/kg	5	ISO 17025	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0
1,1-Dichloroethene	µg/kg	5	NONE	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
1,1-Dichloroethane	µg/kg	5	ISO 17025	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0
Chloroform	µg/kg	5	ISO 17025	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0

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Analytical Report Number: 24-016005
Project / Site name: Chorlton LC
Your Order No: CCG-PO-14500

Lab Sample Number				179894
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
1,2-Dichloroethane	µg/kg	5	ISO 17025	< 5.0 ##
1,1-Dichloropropene	µg/kg	5	ISO 17025	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0
1,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0 ##
Dibromomethane	µg/kg	5	ISO 17025	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0
Bromoform	µg/kg	5	NONE	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0
n-Propylbenzene	µg/kg	5	ISO 17025	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
p-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
Butylbenzene	µg/kg	5	NONE	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0

SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2

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Analytical Report Number: 24-016005
Project / Site name: Chorlton LC
Your Order No: CCG-PO-14500

Lab Sample Number				179894
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/04/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3
Hexachloroethane	mg/kg	0.05	ISO 17025	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	0.9
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	NONE	< 0.1
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2
Azobenzene	mg/kg	0.3	NONE	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.30
Carbazole	mg/kg	0.3	MCERTS	2.5
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2
Anthraquinone	mg/kg	0.3	NONE	2
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-016005
Project / Site name: Chorlton LC

Your Order No: CCG-PO-14500

Lab Sample Number	179894
Sample Reference	BH02
Sample Number	None Supplied
Depth (m)	0.50
Date Sampled	23/04/2024
Time Taken	None Supplied

Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	
General Inorganics				
pH (automated)	pH Units	N/A	ISO 17025	8
Free Cyanide (Low Level 1 µg/l)	µg/l	1	NONE	< 1
Sulphate as SO_4	mg/l	0.045	ISO 17025	43.4
Sulphide	µg/l	5	NONE	11
Hardness - Total	mgCaCO3/l	1	ISO 17025	113
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01
Total PAH				
Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16
Heavy Metals / Metalloids				
Arsenic (dissolved)	µg/l	1	ISO 17025	5.7
Boron (dissolved)	µg/l	10	ISO 17025	19
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.1
Copper (dissolved)	µg/l	0.7	ISO 17025	18
Lead (dissolved)	µg/l	1	ISO 17025	8
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.4
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	16

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Analytical Report Number: 24-016005
Project / Site name: Chorlton LC

Your Order No: CCG-PO-14500

Lab Sample Number				179894
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/04/2024
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	
Petroleum Hydrocarbons				
TPH - Aliphatic >C5 - C6 $_{HS_1D_AL}$	µg/l	1	NONE	< 1.0
TPH - Aliphatic >C6 - C8 $_{HS_1D_AL}$	µg/l	1	NONE	< 1.0
TPH - Aliphatic >C8 - C10 $_{HS_1D_AL}$	µg/l	1	NONE	< 1.0
TPH - Aliphatic >C10 - C12 $_{EH_1D_AL_MS}$	µg/l	10	NONE	< 10
TPH - Aliphatic >C12 - C16 $_{EH_1D_AL_MS}$	µg/l	10	NONE	< 10
TPH - Aliphatic >C16 - C21 $_{EH_1D_AL_MS}$	µg/l	10	NONE	< 10
TPH - Aliphatic >C21 - C35 $_{EH_1D_AL_MS}$	µg/l	10	NONE	< 10
TPH - Aliphatic >C5 - C35 $_{HS+EH_1D_AL_MS}$	µg/l	10	NONE	< 10
TPH - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	µg/l	1	NONE	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	µg/l	1	NONE	< 1.0
TPH - Aromatic >EC8 - EC10 $_{EH_1D_AR_MS}$	µg/l	1	NONE	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH_1D_AR_MS}$	µg/l	10	NONE	< 10
TPH - Aromatic >EC12 - EC16 $_{EH_1D_AR_MS}$	µg/l	10	NONE	< 10
TPH - Aromatic >EC16 - EC21 $_{EH_1D_AR_MS}$	µg/l	10	NONE	< 10
TPH - Aromatic >EC21 - EC35 $_{EH_1D_AR_MS}$	µg/l	10	NONE	< 10
TPH - Aromatic >EC6 - EC35 $_{HS+EH_1D_AR_MS}$	µg/l	10	NONE	< 10
VOCs				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	NONE	< 3.0
Benzene	µg/l	3	NONE	< 3.0
Toluene	µg/l	3	NONE	< 3.0
Ethylbenzene	µg/l	3	NONE	< 3.0
p & m-xylene	µg/l	3	NONE	< 3.0
o-xylene	µg/l	3	NONE	< 3.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 24-016005
Project / Site name: Chorlton LC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
179894	BH02	None Supplied	0.5	Brown loam and sand with gravel and vegetation

Analytical Report Number : 24-016005
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode	In-house method	L029	W	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Total Hardness of leachates	Determination of hardness in leachates by calculation from calcium and magnesium	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-MS/GC-MS HS in leachate	Determination of total petroleum hydrocarbons in leachate by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B/L088	W	NONE
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
BTEX and/or Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	NONE

Analytical Report Number : 24-016005
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
Free cyanide (low level) in leachate	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS
pH at 20°C in leachate (automated)	Determination of pH in leachate by electrometric measurement	In-house method	L099	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in leachate	SVOCs and PAHs in leachate	In-house method	L102B		ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

CC Geotechnical
Unit 1-2 Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

t: 0151 545 2750

e: tony.gerrard@ccgeotechnical.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-017742

Project / Site name:	Chorlton LC	Samples received on:	24/04/2024
Your job number:	CCG C 24 14500	Samples instructed on/ Analysis started on:	07/05/2024
Your order number:	CCG PO 14500	Analysis completed by:	10/05/2024
Report Issue Number:	1	Report issued on:	13/05/2024
Samples Analysed:	10:1 WAC sample		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	24-017742						
					Client: CCGEO		
Location	Chorlton LC						
Lab Reference (Sample Number)	188818				Landfill Waste Acceptance Criteria Limits		
Sampling Date	19/04/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH01						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	4.2				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	205				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	11				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00212			0.0212	0.5	2	25
Barium *	0.0133			0.133	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.010			0.10	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00448			0.0448	0.5	10	30
Nickel *	0.0012			0.012	0.4	10	40
Lead *	0.0017			0.017	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0093			0.093	4	50	200
Chloride *	1.7			17	800	15000	25000
Fluoride*	0.75			7.5	10	150	500
Sulphate *	3.4			34	1000	20000	50000
TDS*	35			350	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	11.4			114	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.4						
Dry Matter (%)	83						
Moisture (%)	17						

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

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 24-017742
Project / Site name: Chorlton LC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
188818	BH01	None Supplied	0.5	Brown clay and sand with gravel

Analytical Report Number : 24-017742
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025

Analytical Report Number : 24-017742
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 24-017742
Project / Site name: Chorlton LC

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	N/A	S	188818	c	BTEX and/or Volatile organic compounds in soil	L073B	c
BH01	N/A	S	188818	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c

CC Geotechnical
Unit 1-2 Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

t: 0151 545 2750

e: tony.gerrard@ccgeotechnical.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-017747

Project / Site name:	Chorlton LC	Samples received on:	25/04/2024
Your job number:	CCG-C-24-14500	Samples instructed on/ Analysis started on:	07/05/2024
Your order number:	CCG-PO-14500	Analysis completed by:	10/05/2024
Report Issue Number:	1	Report issued on:	13/05/2024
Samples Analysed:	10:1 WAC sample		

[redacted]

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	24-017747						
					Client: CCGEO		
Location	Chorlton LC						
Lab Reference (Sample Number)	188832				Landfill Waste Acceptance Criteria Limits		
Sampling Date	23/04/2024				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH02						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	2.4				3%	5%	6%
Loss on Ignition (%) **	4.9				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	150				500	--	--
Total PAH (WAC-17) (mg/kg)	288				100	--	--
pH (units)**	7.9				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	26				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00227			0.0227	0.5	2	25
Barium *	0.0512			0.512	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0020			0.020	0.5	10	70
Copper *	0.023			0.23	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.0125			0.125	0.5	10	30
Nickel *	0.0021			0.021	0.4	10	40
Lead *	0.024			0.24	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.037			0.37	4	50	200
Chloride *	1.9			19	800	15000	25000
Fluoride*	0.67			6.7	10	150	500
Sulphate *	45			450	1000	20000	50000
TDS*	97			970	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.28			62.8	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.4						
Dry Matter (%)	89						
Moisture (%)	11						

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

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 24-017747
Project / Site name: Chorlton LC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
188832	BH02	None Supplied	0.5	Brown loam and sand with gravel and vegetation

Analytical Report Number : 24-017747
Project / Site name: Chorlton LC

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025

Analytical Report Number : 24-017747
Project / Site name: Chorlton LC

Water matrix abbreviations:
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Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
WAC Leachate 10:1		In-house method	L043B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX J: SOIL SUMMARY TABLES

SOIL ASSESSMENT CRITERIA FOR RESIDENTIAL LAND USE (WITH HOMEGROWN PRODUCE)

(Updated: January 2023)

Contaminant	Assessment Criteria for Residential at 1% SOM (mg/kg)	Assessment Criteria for Residential at 2.5% SOM (mg/kg)	Assessment Criteria for Residential at 6% SOM (mg/kg)
Metals			
Arsenic	37	37	37
Boron	290	290	290
Cadmium	11	11	11
Chromium III	910	910	910
Chromium VI	6	6	6
Copper	2400	2400	2400
*Lead	200	200	200
Mercury	1.2	1.2	1.2
Nickel	130	130	130
Selenium	250	250	250
Vanadium	410	410	410
Zinc	3700	3700	3700
Non-Metals			
Phenol	120	200	380
Polyaromatic Hydrocarbons (PAH)			
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Anthracene	2400	5400	11000
Benz[a[anthracene	7.2	11	13
Benzo[a]pyrene	2.2	2.7	3.0
Benzo[b]fluoranthene	2.6	3.3	3.7
Benzo[ghi]perylene	320	340	350
Benzo[k]fluoranthene	77	93	100
Chrysene	15	22	27
Dibenz[ah]anthracene	0.24	0.28	0.3
Fluoranthene	280	560	890
Fluorene	170	400	860
Indeno[123-cd]pyrene	27	36	41
Naphthalene	2.3	5.6	13
Phenanthrene	95	220	440
Pyrene	620	1200	2000
Coal Tar [Bap as surrogate marker)	0.79	0.98	1.1
Petroleum Hydrocarbons			
Aliphatic EC 5-6	42	78	160
Aliphatic EC >6-8	100	230	530
Aliphatic EC>8-10	27	65	150
Aliphatic EC>10-12	130	330	760
Aliphatic EC>12-16	1100	2400	4300
Aliphatic EC>16-35	65000	92000	110000
Aliphatic EC>35-44	65000	92000	110000
Aromatic EC5-7 (Benzene)	70	140	300
Aromatic EC>7-8 (Toluene)	130	290	660
Aromatic EC>8-10	34	83	190
Aromatic EC>10-12	74	180	380
Aromatic EC>12-16	140	330	660
Aromatic EC>16-21	260	540	930
Aromatic EC>21-35	1100	1500	1700
Aromatic EC>35-44	1100	1500	1700
Aliphatic – Aromatic EC>44-70	1600	1800	1900
Other			
Asbestos Containing Materials (ACM)	No Detection	No Detection	No Detection

Copyright: Land Quality Management Limited (LQM)

The above is based on criteria contained in publication LQM/CIEH S4UL`s for Human Health Risk Assessment (2015) (***CCG*** Licence No. S4UL3233), applicable to the "Residential" land use (**with** home grown produce) scenario for soil organic matter (SOM) content of 1% - 6%.

*This document does not provide criteria for Lead, for which the results were compared to the C4SL published by DEFRA SP1010 Development of Category 4 Screening Levels.

CC GEOTECHNICAL LIMITED
Consulting Geotechnical and Geoenvironmental Engineers

METALS DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 24-14500
Site name: Chorlton LC

Prepared by: TG
Authorised by: CB
Proposed land use: Residential with plant uptake
SOM % used: 2.5

= Threshold exceeded
= Below Limit of detection
n/t = Not tested

Contaminants			Metals							
			Cadmium	Chromium III	Chromium VI	Copper	Lead	Mercury (elemental)	Nickel	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Detection			0.5	5.0	0.8	5.0	5.0	0.5	5.0	5.0
Human Health Risk Assessment (GAC)			11	910	6	2400	200	1.2	180	3700
Sample Location	Sample Depth (m)	Sample type								
TP01	0.50	Soil	**0.8**	**22**	< 1.8	**140**	280	**0.9**	**26**	430
WS01	0.50	Soil	< 0.2	**22**	< 1.8	44	95	0.5	25	75
WS02	0.50	Soil	0.6	12	< 1.8	62	200	< 0.3	14	**440**
BH01	0.50	Soil	< 0.2	21	< 1.8	49	110	< 0.3	19	110
BH02	0.50	Soil	< 0.2	17	< 1.8	110	**370**	0.4	21	180
Human Health Risk Assessment (GAC)			11	910	6	2400	200	1.2	180	3700

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SEMI-METALS, NON-METALS, INORGANICS AND OTHER DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 24-14500
Site name: Chorlton LC
Prepared by: TG
Authorised by: CB
Proposed land use: Residential with plant uptake
SOM % used: 2.5

=
=
n/t =

			Semi/non-metals			Inorganics		Other	
Contaminants			Arsenic	Boron	Selenium	Cyanide (free)	Sulphate (water soluble)	pH (units)	Soil Organic Matter %
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/l	units	units
Limit of Detection			1.0	0.5	1.0	1.0	20.0	0.1	0.1
Human Health Risk Assessment (GAC)			37	290	250	22	NA	NA	NA
Sample Location	Sample Depth (m)	Sample type							
TP01	0.50	Soil	19	0.3	< 1.0	< 1.0	38.5	**10.2**	**6.3**
WS01	0.50	Soil	14	**0.5**	< 1.0	< 1.0	20.2	8.4	1.6
WS02	0.50	Soil	16	**0.5**	< 1.0	< 1.0	20.3	8.1	3.6
BH01	0.50	Soil	16	0.4	< 1.0	< 1.0	25.3	8.2	2.4
BH02	0.50	Soil	**20**	< 0.2	< 1.0	< 1.0	149	8.6	3.4
Human Health Risk Assessment (GAC)			37	290	11	22	NA	NA	NA

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SPECIATED PAH'S DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 24-14500
Site name: Chorlton LC

Prepared by: TG
Authorised by: CB
Proposed land use: Residential with plant uptake
SOM % used: 2.5

= Threshold exceeded
= Below Limit of detection
n/t = Not tested

			PAH's															
Contaminants			Acenapthene	Acenapthylene	Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[ghi]perylene	Benzo[k]fluoranthene	Chrysene	Dibenzo[ah]anthracene	fluoranthene	fluorene	Indeno[123-cd]pyrene	Napthalene	Pheanthrene	Pyrene	Total PAH's
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Detection			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
Human Health Risk Assessment (GAC)			510	420	5400	11	2.7	3.3	340	93	22	0.28	560	400	36	5.6	220	1200	NA
Sample Location	Sample Depth (m)	Sample type																	
TP01	0.50	Soil	**75**	**1.6**	**120**	**210**	**180**	**200**	**100**	**79**	**210**	**23**	**480**	**62**	**86**	**38**	**470**	**440**	**2780**
WS01	0.50	Soil	0.69	< 0.05	1.3	1.7	1.2	1.4	0.93	0.63	1.7	0.22	3.8	0.78	0.66	0.19	5.1	3.7	23.9
WS02	0.50	Soil	3.6	0.2	5.5	16	15	17	9.1	6.7	16	2.1	32	2.3	7.3	0.72	23	31	188
BH01	0.50	Soil	3.9	0.25	5.6	14	14	16	7.6	5.9	15	1.9	31	2.5	6.5	1.1	25	29	179
BH02	0.50	Soil	3.6	0.29	7.9	20	21	23	12	8.5	23	2.6	42	3.1	11	1.1	30	40	249
Human Health Risk Assessment (GAC)			510	420	11	11	2.7	3.3	340	93	22	0.28	560	400	36	5.6	220	1200	NA

CC GEOTECHNICAL LIMITED
Consulting Geotechnical and Geoenvironmental Engineers

SPECIATED TPH'S DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 24-14500
Site name: Chorlton LC

Prepared by: TG
Authorised by: CB
Proposed land use: Residential with plant uptake
SOM % used: 2.5

= Threshold exceeded
= Below Limit of detection
n/t = Not tested

			Speciated TPH's														
			Aromatics							Aliphatics							
Contaminants			EC5-7	EC7-8	EC8-10	EC10-12	EC12-16	EC16-21	EC21-35	EC35-44	EC5-6	EC6-8	EC8-10	EC10-12	EC12-16	EC16-35	EC35-44	TOTAL TPH'S
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Detection			0.01	0.01	1.0	1.0	1.0	1.0	1.0	1.0	0.01	0.01	1.0	1.0	1.0	1.0	1.0	1.0
Human Health Risk Assessment (GAC)			140	290	83	180	330	540	1500	1500	78	230	65	330	2400	92000	92000	NA
Sample Location	Sample Depth (m)	Sample type																
TP01	0.50	Soil	< 0.010	< 0.010	< 0.050	**30**	**270**	**2000**	**2500**	**100**	< 0.020	< 0.020	< 0.050	**4.4**	**40**	**79**	< 10	**5000**
WS01	0.50	Soil	< 0.010	< 0.010	< 0.050	< 1.0	< 2.0	< 10	< 10	< 10	< 0.020	< 0.020	< 0.050	< 1.0	< 2.0	<8	< 10	< 10
WS02	0.50	Soil	< 0.010	< 0.010	< 0.050	2.3	21	120	250	25	< 0.020	< 0.020	< 0.050	< 1.0	6.6	34	< 10	420
BH01	0.50	Soil	< 0.010	< 0.010	< 0.050	6	35	170	200	24	< 0.020	< 0.020	< 0.050	1.7	3.6	28	< 10	470
BH02	0.50	Soil	< 0.010	< 0.010	< 0.050	1.2	16	130	190	18	< 0.020	< 0.020	< 0.050	< 1.0	2.5	13	< 10	370
Human Health Risk Assessment (GAC)			140	290	11	180	330	540	1500	1500	78	230	65	330	2400	92000	92000	NA

CC GEOTECHNICAL LIMITED
Consulting Geotechnical and Geoenvironmental Engineers

BTEX DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 24-14500
Site name: Chorlton LC

Prepared by: TG
Authorised by: CB
Proposed land use: Residential with plant uptake
SOM % used: 2.5

= Threshold exceeded

= Below Limit of detection

n/t = Not tested

			BTEX			
Contaminants			Benzene	Toluene	Ethylbenzene	Total Xylenes
Units			µg/kg	µg/kg	µg/kg	µg/kg
Limit of Detection			10	10	10	10
Human Health Risk Assessment (GAC)			170	290000	110000	130000
Sample Location	Sample Depth (m)	Sample type				
TP01	0.50	Soil	< 5.0	< 5.0	< 5.0	< 5.0
WS01	0.50	Soil	< 5.0	< 5.0	< 5.0	< 5.0
WS02	0.50	Soil	< 5.0	< 5.0	< 5.0	< 5.0
BH01	0.50	Soil	< 5.0	< 5.0	< 5.0	< 5.0
BH02	0.50	Soil	< 5.0	< 5.0	< 5.0	< 5.0
Human Health Risk Assessment (GAC)			170	11	110000	130000

Job Number:	24-14500	Site Name:	Chorlton LC
Prepared by:	TG	Approved by:	CB

Sample Location	Sample Depth (m)	Sample type	Sulphate (water soluble) (mg/l)	Sulphate (water soluble) (mg/l)	pH (units)	pH (units)
			Soil	Water	Soil	Water
TP01	0.50	Soil	38.5	n/t	10.2	n/t
WS01	0.50	Soil	20.2	n/t	8.4	n/t
WS02	0.50	Soil	20.3	n/t	8.1	n/t
BH01	0.50	Soil	25.3	n/t	8.2	n/t
BH02	0.50	Soil	149	n/t	8.6	n/t
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Soil Concrete Specification Data Sheet	
Is the site Brownfield or Greenfield?	Brownfield
Is the water table Static or Mobile	Static
Highest water-soluble Sulphate results	149
Lowest pH result	8.1
Design Sulphate Class	DS-1
ACEC Class	AC-1s
Intended Working Life	50 Years
Design Chemical Classification	DC-1

Water Concrete Specification Data Sheet	
Is the site Brownfield or Greenfield?	N/a
Is the water table Static or Mobile	N/a
Highest water-soluble Sulphate results	
Lowest pH result	
Design Sulphate Class	
ACEC Class	
Intended Working Life	N/a
Design Chemical Classification	

Conclusions
Based on the soil data, concrete should be specified to conform to the compositional requirements of DC-1 as defined in BRE Special Digest 1: 2005.
Based on the water data, concrete should be specified to conform to the compositional requirements of as defined in BRE Special Digest 1: 2005.

APPENDIX K: PRELIMINARY WASTE CLASSIFICATION REPORT

HazWasteOnline™

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:

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

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

7GTO4-D07V2-P6P82

Job name

CHORLTON BATHS, MANCHESTER

Description/Comments

Project

CCG-C-24-14500

Site

CHORLTON BATHS, MANCHESTER

Classified by

Name:
Michael Hartley
Date:
14 May 2024 13:47 GMT
Telephone:
0151 545 2750

Company:
CC Geotechnical Ltd
Units 1 & 2 Deltic Way
Knowsley Industrial Estate
Kirkby
L33 7BU

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	Date
Hazardous Waste Classification	06 Apr 2023

Next 3 year Refresher due by Apr 2026

Purpose of classification

7 - Disposal of Waste

Address of the waste

Manchester Road, Chorlton, Manchester **Post Code** M21 9PQ

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

redevelopment of land for building

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

Waste created during construction preparation

Description of the waste

made ground soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results			Page
					Inert	SNRHW	Hazardous	
1	BH01	0.5	Non Hazardous		Fail	Pass	N/A	3
2	BH02	0.5	Non Hazardous		Fail	Pass	N/A	10
3	TP01	0.5	Hazardous	HP 7, HP 11	-	-	-	17
4	WS01	0.5	Non Hazardous		-	-	-	20
5	WS02	0.5	Non Hazardous		-	-	-	23

Related documents

#	Name	Description
1	14500 COMBINED.BATCH	i2 Analytical .batch file used to populate the Job
2	24-015835_HWOL.hwol	i2 Analytical .hwol file used to populate the Job
3	24-016005_HWOL.hwol	i2 Analytical .hwol file used to populate the Job
4	24-017742_HWOL.hwol	i2 Analytical .hwol file used to populate the Job
5	24-017747_HWOL.hwol	i2 Analytical .hwol file used to populate the Job
6	CCG Soil A 2023	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job do not constitute a single population.

WAC limits used to evaluate the samples in this Job: "UK"
The WAC used in this report are the WAC defined for the inert, stable non-reactive hazardous and hazardous classes of landfill in the UK. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report

Created by: Michael Hartley

Created date: 14 May 2024 13:47 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	26
Appendix B: Rationale for selection of metal species	30
Appendix C: Version	31

Classification of sample: BH01

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

Sample details

Sample name:
BH01
Sample Depth:
0.5 m
Moisture content:
17%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<1 mg/kg	1.197	<1.197 mg/kg	<0.00012 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	17.534 mg/kg	0.00175 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<**LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		49 mg/kg	1.126	45.79 mg/kg	0.00458 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	110 mg/kg		91.3 mg/kg	0.00913 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.6 mg/kg	1.5	1.992 mg/kg	0.000199 %	✓	
9	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		19 mg/kg	2.637	41.581 mg/kg	0.00416 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
11	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]		110 mg/kg	4.398	401.531 mg/kg	0.0402 %	✓	
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
14		boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.4	mg/kg	3.22	1.069	mg/kg	0.000107 %	✓	
15		pH			PH		8.2	pH		8.2	pH	8.2 pH		
16		phenol	604-001-00-2	203-632-7	108-95-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
17		naphthalene	601-052-00-2	202-049-5	91-20-3		1.6	mg/kg		1.328	mg/kg	0.000133 %	✓	
18		acenaphthylene		205-917-1	208-96-8		0.29	mg/kg		0.241	mg/kg	0.0000241 %	✓	
19		acenaphthene		201-469-6	83-32-9		4	mg/kg		3.32	mg/kg	0.000332 %	✓	
20		fluorene		201-695-5	86-73-7		2.9	mg/kg		2.407	mg/kg	0.000241 %	✓	
21		phenanthrene		201-581-5	85-01-8		26	mg/kg		21.58	mg/kg	0.00216 %	✓	
22		anthracene		204-371-1	120-12-7		5.7	mg/kg		4.731	mg/kg	0.000473 %	✓	
23		fluoranthene		205-912-4	206-44-0		36	mg/kg		29.88	mg/kg	0.00299 %	✓	
24		pyrene		204-927-3	129-00-0		34	mg/kg		28.22	mg/kg	0.00282 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		15	mg/kg		12.45	mg/kg	0.00125 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		18	mg/kg		14.94	mg/kg	0.00149 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		19	mg/kg		15.77	mg/kg	0.00158 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		6.5	mg/kg		5.395	mg/kg	0.00054 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		16	mg/kg		13.28	mg/kg	0.00133 %	✓	
30		indeno[123-cd]pyrene		205-893-2	193-39-5		6.7	mg/kg		5.561	mg/kg	0.000556 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		1.9	mg/kg		1.577	mg/kg	0.000158 %	✓	
32		benzo[ghi]perylene		205-883-8	191-24-2		9.1	mg/kg		7.553	mg/kg	0.000755 %	✓	
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
36		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
37		TPH (C6 to C40) petroleum group			TPH		468.3	mg/kg		388.689	mg/kg	0.0389 %	✓	
38		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**
39		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<**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									
40		1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			203-458-1, 200-863-5	107-06-2, 75-34-3									
41		tetrachloroethylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-028-00-4	204-825-9	127-18-4									
42		carbon tetrachloride; tetrachloromethane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-008-00-5	200-262-8	56-23-5									
43		trichloroethylene; trichloroethene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-027-00-9	201-167-4	79-01-6									
44		vinyl chloride; chloroethylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-023-00-7	200-831-0	75-01-4									
45		1,1,1-trichloroethane; methyl chloroform				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-013-00-2	200-756-3	71-55-6									
46		1,1,2-trichloroethane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-014-00-8	201-166-9	79-00-5									
47		1,1-dichloroethylene; vinylidene chloride				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-025-00-8	200-864-0	75-35-4									
48		1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]									
49		hexachlorobenzene				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		602-065-00-6	204-273-9	118-74-1									
50		chloroform; trichloromethane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-006-00-4	200-663-8	67-66-3									
51		aniline				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		612-008-00-7	200-539-3	62-53-3									
52		anthraquinone				2	mg/kg		1.66	mg/kg	0.000166 %	✓	
		606-151-00-4	201-549-0	84-65-1									
53		azobenzene				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		611-001-00-6	203-102-5	103-33-3									
54		BBP; benzyl butyl phthalate				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		607-430-00-3	201-622-7	85-68-7									
55		bis(2-chloroethyl) ether				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		603-029-00-2	203-870-1	111-44-4									
56		bis(2-chloroethoxy)methane				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
			203-920-2	111-91-1									
57		4-bromophenylphenylether				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
			202-952-4	101-55-3									
58		carbazole				1.6	mg/kg		1.328	mg/kg	0.000133 %	✓	
			201-696-0	86-74-8									
59		chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-014-00-3	200-431-6	59-50-7									
60		2-chloronaphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			202-079-9	91-58-7									
61		dibenzofuran				1.4	mg/kg		1.162	mg/kg	0.000116 %	✓	
			205-071-3	132-64-9									
62		2,4-dichlorophenol				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		604-011-00-7	204-429-6	120-83-2									
63		diethyl phthalate				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
			201-550-6	84-66-2									
64		dibutyl phthalate; DBP				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		607-318-00-4	201-557-4	84-74-2									
65		dimethyl phthalate				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-011-6	131-11-3									

#		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							
66		3,4-xylenol; [1] 2,5-xylenol; [2] 2,4-xylenol; [3] 2,3-xylenol; [4] 2,6-xylenol; [5] xylenol; [6] 2,4(or 2,5)-xylenol [7]				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<**LOD**
		604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]							
67		2,4-dinitrotoluene; [1] dinitrotoluene [2]				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
		609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]							
68		hexachloroethane				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
			200-666-4	67-72-1							
69		3,5,5-trimethylcyclohex-2-enone; isophorone				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
		606-012-00-8	201-126-0	78-59-1							
70		2-methyl naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
			202-078-3	91-57-6							
71		nitrobenzene				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<**LOD**
		609-003-00-7	202-716-0	98-95-3							
72		2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
		604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
73		2-nitrophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<**LOD**
			201-857-5	88-75-5							
74		4-chloroaniline				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
		612-137-00-9	203-401-0	106-47-8							
75		4-chlorophenylphenylether				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<**LOD**
			230-281-7	7005-72-3							
76		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
		612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]							
77		2,4,5-trichlorophenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<**LOD**
		604-017-00-X	202-467-8	95-95-4							
78		2,4,6-trichlorophenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
		604-018-00-5	201-795-9	88-06-2							
79		2,6-dinitrotoluene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
		609-049-00-8	210-106-0	606-20-2							
80		bromodichloromethane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
			200-856-7	75-27-4							
81		bromobenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-060-00-9	203-623-8	108-86-1							
82		bromomethane; methylbromide				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-002-00-2	200-813-2	74-83-9							
83		1,2,4-trichlorobenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-087-00-6	204-428-0	120-82-1							
84		mesitylene; 1,3,5-trimethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		601-025-00-5	203-604-4	108-67-8							
85		n-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
			203-209-7	104-51-8							
86		1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
87		chlorobenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-033-00-1	203-628-5	108-90-7							
88		chloroethane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
		602-009-00-0	200-830-5	75-00-3							

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
89		chloromethane; methyl chloride	602-001-00-7	200-817-4	74-87-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
90		1,2-dibromoethane	602-010-00-6	203-444-5	106-93-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
91		dibromochloromethane		204-704-0	124-48-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
92		1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
93		dibromomethane	602-003-00-8	200-824-2	74-95-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
94		2,2-dichloropropane		209-832-0	594-20-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
95		1,1-dichloropropene	602-031-00-0	209-253-3	563-58-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
96		1,3-dichloropropane		205-531-3	142-28-9		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
97		hexachlorobutadiene		201-765-5	87-68-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
98		cumene	601-024-00-X	202-704-5	98-82-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
99		4-isopropyltoluene		202-796-7	99-87-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
100		1,3-dichlorbenzene	602-067-00-7	208-792-1	541-73-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
101		1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
102		1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
103		1,2-dichloropropane; propylene dichloride	602-020-00-0	201-152-2	78-87-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
104		sec-butylbenzene		205-227-0	135-98-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
105		styrene	601-026-00-0	202-851-5	100-42-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
106		tert-butylbenzene		202-632-4	98-06-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
107		bromoform; tribromomethane	602-007-00-X	200-854-6	75-25-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
108		1,2,3-trichlorobenzene		201-757-1	87-61-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
109		trichlorofluoromethane		200-892-3	75-69-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
110		1,1,2,2-tetrachloroethane	602-015-00-3	201-197-8	79-34-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
111		trans-1,3-dichloropropene		431-460-4	10061-02-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
112		1,1,1,2-tetrachloroethane		211-135-1	630-20-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
113		1,2,4-trimethylbenzene	601-043-00-3	202-436-9	95-63-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
114		coronene		205-881-7	191-07-1		2.9	mg/kg		2.407	mg/kg	0.000241 %	✓	
115		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<**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							
116		2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
		602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]							
								Total:	0.121 %		

Key

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

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 Insufficient concentration to be considered flammable risk. No liquid free phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0389%)

WAC results for sample: BH01

WAC Settings: samples in this Job do not constitute a single population.

WAC limits used to evaluate this sample: "UK"
The WAC used in this report are the WAC defined for the inert, stable non-reactive hazardous and hazardous classes of landfill in the UK. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the SNRHW (Stable non-reactive hazardous waste in non-hazardous landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits		
#	Determinand		User entered data	Inert waste landfill	Stable non-reactive hazardous waste in non-hazardous landfill	Hazardous waste landfill
1	TOC (total organic carbon)	%	1.4	3	5	6
2	LOI (loss on ignition)	%	4.2	-	-	10
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.005	6	-	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.007	1	-	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	205	100	-	-
7	pH	pH	8.1	-	>6	-
8	ANC (acid neutralisation capacity)	mol/kg	11	-	-	-
Eluate Analysis 10:1						
9	arsenic	mg/kg	0.0212	0.5	2	25
10	barium	mg/kg	0.133	20	100	300
11	cadmium	mg/kg	<0.001	0.04	1	5
12	chromium	mg/kg	<0.004	0.5	10	70
13	copper	mg/kg	0.1	2	50	100
14	mercury	mg/kg	<0.005	0.01	0.2	2
15	molybdenum	mg/kg	0.0448	0.5	10	30
16	nickel	mg/kg	0.012	0.4	10	40
17	lead	mg/kg	0.017	0.5	10	50
18	antimony	mg/kg	<0.017	0.06	0.7	5
19	selenium	mg/kg	<0.04	0.1	0.5	7
20	zinc	mg/kg	0.093	4	50	200
21	chloride	mg/kg	17	800	15,000	25,000
22	fluoride	mg/kg	7.5	10	150	500
23	sulphate	mg/kg	34	1,000	20,000	50,000
24	phenol index	mg/kg	<0.1	1	-	-
25	DOC (dissolved organic carbon)	mg/kg	114	500	800	1,000
26	TDS (total dissolved solids)	mg/kg	350	4,000	60,000	100,000

Key

	User supplied data
	Not applicable
	Inert WAC criteria fail

Classification of sample: BH02

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

Sample details

Sample name:
BH02
Sample Depth:
0.5 m
Moisture content:
14%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		8 mg/kg	1.197	8.236 mg/kg	0.000824 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20 mg/kg	1.32	22.71 mg/kg	0.00227 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<**LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		17 mg/kg	1.462	24.846 mg/kg	0.00248 %		
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		110 mg/kg	1.126	106.509 mg/kg	0.0107 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	370 mg/kg		318.2 mg/kg	0.0318 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.4 mg/kg	1.353	0.466 mg/kg	0.0000466 %	✓	
8	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.5 mg/kg	1.5	4.516 mg/kg	0.000452 %	✓	
9	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		21 mg/kg	2.637	47.619 mg/kg	0.00476 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
11	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]		180 mg/kg	4.398	680.799 mg/kg	0.0681 %	✓	
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
14		boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		<0.2	mg/kg	3.22	<0.644	mg/kg	<0.0000644 %		<**LOD**
15		pH			PH		8.6	pH		8.6	pH	8.6 pH		
16		phenol	604-001-00-2	203-632-7	108-95-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
17		naphthalene	601-052-00-2	202-049-5	91-20-3		1.2	mg/kg		1.032	mg/kg	0.000103 %	✓	
18		acenaphthylene		205-917-1	208-96-8		0.29	mg/kg		0.249	mg/kg	0.0000249 %	✓	
19		acenaphthene		201-469-6	83-32-9		5.7	mg/kg		4.902	mg/kg	0.00049 %	✓	
20		fluorene		201-695-5	86-73-7		4.9	mg/kg		4.214	mg/kg	0.000421 %	✓	
21		phenanthrene		201-581-5	85-01-8		39	mg/kg		33.54	mg/kg	0.00335 %	✓	
22		anthracene		204-371-1	120-12-7		10	mg/kg		8.6	mg/kg	0.00086 %	✓	
23		fluoranthene		205-912-4	206-44-0		49	mg/kg		42.14	mg/kg	0.00421 %	✓	
24		pyrene		204-927-3	129-00-0		46	mg/kg		39.56	mg/kg	0.00396 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		22	mg/kg		18.92	mg/kg	0.00189 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		23	mg/kg		19.78	mg/kg	0.00198 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		25	mg/kg		21.5	mg/kg	0.00215 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		8.8	mg/kg		7.568	mg/kg	0.000757 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		23	mg/kg		19.78	mg/kg	0.00198 %	✓	
30		indeno[123-cd]pyrene		205-893-2	193-39-5		11	mg/kg		9.46	mg/kg	0.000946 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		2.7	mg/kg		2.322	mg/kg	0.000232 %	✓	
32		benzo[ghi]perylene		205-883-8	191-24-2		13	mg/kg		11.18	mg/kg	0.00112 %	✓	
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
36		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
37		TPH (C6 to C40) petroleum group			TPH		370.7	mg/kg		318.802	mg/kg	0.0319 %	✓	
38		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**
39		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
40	●	1,1-dichloroethane and 1,2-dichloroethane (combined)		203-458-1, 200-863-5	107-06-2, 75-34-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
41		tetrachloroethylene	602-028-00-4	204-825-9	127-18-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
42		carbon tetrachloride; tetrachloromethane	602-008-00-5	200-262-8	56-23-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
43		trichloroethylene; trichloroethene	602-027-00-9	201-167-4	79-01-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
44		vinyl chloride; chloroethylene	602-023-00-7	200-831-0	75-01-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
45		1,1,1-trichloroethane; methyl chloroform	602-013-00-2	200-756-3	71-55-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
46		1,1,2-trichloroethane	602-014-00-8	201-166-9	79-00-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
47		1,1-dichloroethylene; vinylidene chloride	602-025-00-8	200-864-0	75-35-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
48		1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
49		hexachlorobenzene	602-065-00-6	204-273-9	118-74-1		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
50		chloroform; trichloromethane	602-006-00-4	200-663-8	67-66-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
51		aniline	612-008-00-7	200-539-3	62-53-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
52		anthraquinone	606-151-00-4	201-549-0	84-65-1		2	mg/kg		1.72	mg/kg	0.000172 %	✓	
53		azobenzene	611-001-00-6	203-102-5	103-33-3		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
54		BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
55		bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
56	●	bis(2-chloroethoxy)methane		203-920-2	111-91-1		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
57	●	4-bromophenylphenylether		202-952-4	101-55-3		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
58	●	carbazole		201-696-0	86-74-8		2.5	mg/kg		2.15	mg/kg	0.000215 %	✓	
59		chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
60	●	2-chloronaphthalene		202-079-9	91-58-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
61	●	dibenzofuran		205-071-3	132-64-9		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
62		2,4-dichlorophenol	604-011-00-7	204-429-6	120-83-2		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
63	●	diethyl phthalate		201-550-6	84-66-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
64		dibutyl phthalate; DBP	607-318-00-4	201-557-4	84-74-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
65	●	dimethyl phthalate		205-011-6	131-11-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
66		3,4-xylenol; [1] 2,5-xylenol; [2] 2,4-xylenol; [3] 2,3-xylenol; [4] 2,6-xylenol; [5] xylenol; [6] 2,4(or 2,5)-xylenol [7]				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		604-006-00-X	202-439-5 [1] 202-461-5 [2] 203-321-6 [3] 208-395-3 [4] 209-400-1 [5] 215-089-3 [6] 276-245-4 [7]	95-65-8 [1] 95-87-4 [2] 105-67-9 [3] 526-75-0 [4] 576-26-1 [5] 1300-71-6 [6] 71975-58-1 [7]									
67		2,4-dinitrotoluene; [1] dinitrotoluene [2]				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]									
68	●	hexachloroethane				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			200-666-4	67-72-1									
69		3,5,5-trimethylcyclohex-2-enone; isophorone				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		606-012-00-8	201-126-0	78-59-1									
70	●	2-methyl naphthalene				0.9	mg/kg		0.774	mg/kg	0.0000774 %	✓	
			202-078-3	91-57-6									
71		nitrobenzene				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
		609-003-00-7	202-716-0	98-95-3									
72		2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]									
73	●	2-nitrophenol				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
			201-857-5	88-75-5									
74		4-chloroaniline				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		612-137-00-9	203-401-0	106-47-8									
75	●	4-chlorophenylphenylether				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
			230-281-7	7005-72-3									
76		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		612-012-00-9	201-855-4 [1] 202-729-1 [2] 202-810-1 [3]	88-74-4 [1] 99-09-2 [2] 100-01-6 [3]									
77		2,4,5-trichlorophenol				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		604-017-00-X	202-467-8	95-95-4									
78		2,4,6-trichlorophenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-018-00-5	201-795-9	88-06-2									
79		2,6-dinitrotoluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		609-049-00-8	210-106-0	606-20-2									
80	●	bromodichloromethane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
			200-856-7	75-27-4									
81		bromobenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-060-00-9	203-623-8	108-86-1									
82		bromomethane; methylbromide				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-002-00-2	200-813-2	74-83-9									
83		1,2,4-trichlorobenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-087-00-6	204-428-0	120-82-1									
84		mesitylene; 1,3,5-trimethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-025-00-5	203-604-4	108-67-8									
85	●	n-butylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
			203-209-7	104-51-8									
86		1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]									
87		chlorobenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-033-00-1	203-628-5	108-90-7									
88		chloroethane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		602-009-00-0	200-830-5	75-00-3									

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
89		chloromethane; methyl chloride	602-001-00-7	200-817-4	74-87-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
90		1,2-dibromoethane	602-010-00-6	203-444-5	106-93-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
91	●	dibromochloromethane		204-704-0	124-48-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
92		1,2-dibromo-3-chloropropane	602-021-00-6	202-479-3	96-12-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
93		dibromomethane	602-003-00-8	200-824-2	74-95-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
94	●	2,2-dichloropropane		209-832-0	594-20-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
95		1,1-dichloropropene	602-031-00-0	209-253-3	563-58-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
96	●	1,3-dichloropropane		205-531-3	142-28-9		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
97	●	hexachlorobutadiene		201-765-5	87-68-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
98		cumene	601-024-00-X	202-704-5	98-82-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
99	●	4-isopropyltoluene		202-796-7	99-87-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
100		1,3-dichlorbenzene	602-067-00-7	208-792-1	541-73-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
101		1,2-dichlorobenzene; o-dichlorobenzene	602-034-00-7	202-425-9	95-50-1		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
102		1,4-dichlorobenzene; p-dichlorobenzene	602-035-00-2	203-400-5	106-46-7		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
103		1,2-dichloropropane; propylene dichloride	602-020-00-0	201-152-2	78-87-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
104	●	sec-butylbenzene		205-227-0	135-98-8		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
105		styrene	601-026-00-0	202-851-5	100-42-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
106	●	tert-butylbenzene		202-632-4	98-06-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
107		bromoform; tribromomethane	602-007-00-X	200-854-6	75-25-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
108	●	1,2,3-trichlorobenzene		201-757-1	87-61-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
109	●	trichlorofluoromethane		200-892-3	75-69-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
110		1,1,2,2-tetrachloroethane	602-015-00-3	201-197-8	79-34-5		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
111	●	trans-1,3-dichloropropene		431-460-4	10061-02-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
112	●	1,1,1,2-tetrachloroethane		211-135-1	630-20-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
113		1,2,4-trimethylbenzene	601-043-00-3	202-436-9	95-63-6		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
114	●	coronene		205-881-7	191-07-1		4	mg/kg		3.44	mg/kg	0.000344 %	✓	
115		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<**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							
116		2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
		602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]							
								Total:	0.18 %		

Key

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

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 Insufficient concentration to be considered flammable risk. No liquid free phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0319%)

WAC results for sample: BH02

WAC Settings: samples in this Job do not constitute a single population.

WAC limits used to evaluate this sample: "UK"
The WAC used in this report are the WAC defined for the inert, stable non-reactive hazardous and hazardous classes of landfill in the UK. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the SNRHW (Stable non-reactive hazardous waste in non-hazardous landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits		
#	Determinand		User entered data	Inert waste landfill	Stable non-reactive hazardous waste in non-hazardous landfill	Hazardous waste landfill
1	TOC (total organic carbon)	%	2.4	3	5	6
2	LOI (loss on ignition)	%	4.9	-	-	10
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.005	6	-	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.007	1	-	-
5	Mineral oil (C10 to C40)	mg/kg	150	500	-	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	288	100	-	-
7	pH	pH	7.9	-	>6	-
8	ANC (acid neutralisation capacity)	mol/kg	26	-	-	-
Eluate Analysis 10:1						
9	arsenic	mg/kg	0.0227	0.5	2	25
10	barium	mg/kg	0.512	20	100	300
11	cadmium	mg/kg	<0.001	0.04	1	5
12	chromium	mg/kg	0.02	0.5	10	70
13	copper	mg/kg	0.23	2	50	100
14	mercury	mg/kg	<0.005	0.01	0.2	2
15	molybdenum	mg/kg	0.125	0.5	10	30
16	nickel	mg/kg	0.021	0.4	10	40
17	lead	mg/kg	0.24	0.5	10	50
18	antimony	mg/kg	<0.017	0.06	0.7	5
19	selenium	mg/kg	<0.04	0.1	0.5	7
20	zinc	mg/kg	0.37	4	50	200
21	chloride	mg/kg	19	800	15,000	25,000
22	fluoride	mg/kg	6.7	10	150	500
23	sulphate	mg/kg	450	1,000	20,000	50,000
24	phenol index	mg/kg	<0.1	1	-	-
25	DOC (dissolved organic carbon)	mg/kg	62.8	500	800	1,000
26	TDS (total dissolved solids)	mg/kg	970	4,000	60,000	100,000

Key

	User supplied data
	Not applicable
	Inert WAC criteria fail

Classification of sample: TP01

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

Sample details

Sample name:
TP01
Sample Depth:
0.5 m
Moisture content:
9.6%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.461%)

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

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.461%)

Determinands

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

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		3.5 mg/kg	1.197	3.788 mg/kg	0.000379 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		19 mg/kg	1.32	22.678 mg/kg	0.00227 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.8 mg/kg	1.142	0.826 mg/kg	0.0000826 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		140 mg/kg	1.126	142.492 mg/kg	0.0142 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	280 mg/kg		253.12 mg/kg	0.0253 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.9 mg/kg	1.353	1.101 mg/kg	0.00011 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
8		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.3	mg/kg	1.5	4.475	mg/kg	0.000448 %	✓	
9		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		26	mg/kg	2.637	61.973	mg/kg	0.0062 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11		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]		430	mg/kg	4.398	1709.562	mg/kg	0.171 %	✓	
12		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
13		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
14		boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.3	mg/kg	3.22	0.873	mg/kg	0.0000873 %	✓	
15		pH			PH		10.2	pH		10.2	pH	10.2 pH		
16		naphthalene	601-052-00-2	202-049-5	91-20-3		38	mg/kg		34.352	mg/kg	0.00344 %	✓	
17		acenaphthylene		205-917-1	208-96-8		1.6	mg/kg		1.446	mg/kg	0.000145 %	✓	
18		acenaphthene		201-469-6	83-32-9		75	mg/kg		67.8	mg/kg	0.00678 %	✓	
19		fluorene		201-695-5	86-73-7		62	mg/kg		56.048	mg/kg	0.0056 %	✓	
20		phenanthrene		201-581-5	85-01-8		470	mg/kg		424.88	mg/kg	0.0425 %	✓	
21		anthracene		204-371-1	120-12-7		120	mg/kg		108.48	mg/kg	0.0108 %	✓	
22		fluoranthene		205-912-4	206-44-0		480	mg/kg		433.92	mg/kg	0.0434 %	✓	
23		pyrene		204-927-3	129-00-0		440	mg/kg		397.76	mg/kg	0.0398 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		210	mg/kg		189.84	mg/kg	0.019 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		210	mg/kg		189.84	mg/kg	0.019 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		200	mg/kg		180.8	mg/kg	0.0181 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		79	mg/kg		71.416	mg/kg	0.00714 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		180	mg/kg		162.72	mg/kg	0.0163 %	✓	
29		indeno[123-cd]pyrene		205-893-2	193-39-5		86	mg/kg		77.744	mg/kg	0.00777 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		23	mg/kg		20.792	mg/kg	0.00208 %	✓	
31		benzo[ghi]perylene		205-883-8	191-24-2		1000	mg/kg		904	mg/kg	0.0904 %	✓	
32		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
33		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**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									
34		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
35		xylene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
36		TPH (C6 to C40) petroleum group				5100	mg/kg		4610.4	mg/kg	0.461 %	✓	
				TPH									
										Total:	1.017 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

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 Insufficient concentration to be considered flammable risk. No liquid free phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.461%)

Classification of sample: WS01

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

Sample details

Sample name:
WS01
Sample Depth:
0.5 m
Moisture content:
13%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.6 mg/kg	1.197	2.708 mg/kg	0.000271 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14 mg/kg	1.32	16.082 mg/kg	0.00161 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<**LOD**
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		44 mg/kg	1.126	43.099 mg/kg	0.00431 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	95 mg/kg		82.65 mg/kg	0.00827 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.5 mg/kg	1.353	0.589 mg/kg	0.0000589 %	✓	
8	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.4 mg/kg	1.5	1.827 mg/kg	0.000183 %	✓	
9	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		25 mg/kg	2.637	57.348 mg/kg	0.00573 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
11	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]		75 mg/kg	4.398	286.965 mg/kg	0.0287 %	✓	
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
14		boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.5	mg/kg	3.22	1.401	mg/kg	0.00014 %	✓	
15		pH			PH		8.4	pH		8.4	pH	8.4 pH		
16		naphthalene	601-052-00-2	202-049-5	91-20-3		0.19	mg/kg		0.165	mg/kg	0.0000165 %	✓	
17		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
18		acenaphthene		201-469-6	83-32-9		0.69	mg/kg		0.6	mg/kg	0.00006 %	✓	
19		fluorene		201-695-5	86-73-7		0.78	mg/kg		0.679	mg/kg	0.0000679 %	✓	
20		phenanthrene		201-581-5	85-01-8		5.1	mg/kg		4.437	mg/kg	0.000444 %	✓	
21		anthracene		204-371-1	120-12-7		1.3	mg/kg		1.131	mg/kg	0.000113 %	✓	
22		fluoranthene		205-912-4	206-44-0		3.8	mg/kg		3.306	mg/kg	0.000331 %	✓	
23		pyrene		204-927-3	129-00-0		3.7	mg/kg		3.219	mg/kg	0.000322 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.7	mg/kg		1.479	mg/kg	0.000148 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		1.7	mg/kg		1.479	mg/kg	0.000148 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.4	mg/kg		1.218	mg/kg	0.000122 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.63	mg/kg		0.548	mg/kg	0.0000548 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
29		indeno[123-cd]pyrene		205-893-2	193-39-5		0.66	mg/kg		0.574	mg/kg	0.0000574 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.22	mg/kg		0.191	mg/kg	0.0000191 %	✓	
31		benzo[ghi]perylene		205-883-8	191-24-2		0.93	mg/kg		0.809	mg/kg	0.0000809 %	✓	
32		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
33		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
34		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
35		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
36		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
											Total:	0.0563 %		

Key

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

Classification of sample: WS02

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

Sample details

Sample name:
WS02
Sample Depth:
0.5 m
Moisture content:
9.3%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 9.3% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.7 mg/kg	1.197	2.932 mg/kg	0.000293 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	19.161 mg/kg	0.00192 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.6 mg/kg	1.142	0.622 mg/kg	0.0000622 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12 mg/kg	1.462	17.539 mg/kg	0.00175 %		
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		62 mg/kg	1.126	63.313 mg/kg	0.00633 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	200 mg/kg		181.4 mg/kg	0.0181 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.5 mg/kg	1.5	2.041 mg/kg	0.000204 %	✓	
9	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		14 mg/kg	2.637	33.481 mg/kg	0.00335 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
11	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]		440 mg/kg	4.398	1755.124 mg/kg	0.176 %	✓	
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
14		boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.6	mg/kg	3.22	1.752	mg/kg	0.000175 %	✓	
15		pH			PH		8.1	pH		8.1	pH	8.1 pH		
16		naphthalene	601-052-00-2	202-049-5	91-20-3		0.72	mg/kg		0.653	mg/kg	0.0000653 %	✓	
17		acenaphthylene		205-917-1	208-96-8		0.2	mg/kg		0.181	mg/kg	0.0000181 %	✓	
18		acenaphthene		201-469-6	83-32-9		3.6	mg/kg		3.265	mg/kg	0.000327 %	✓	
19		fluorene		201-695-5	86-73-7		2.3	mg/kg		2.086	mg/kg	0.000209 %	✓	
20		phenanthrene		201-581-5	85-01-8		23	mg/kg		20.861	mg/kg	0.00209 %	✓	
21		anthracene		204-371-1	120-12-7		5.5	mg/kg		4.989	mg/kg	0.000499 %	✓	
22		fluoranthene		205-912-4	206-44-0		32	mg/kg		29.024	mg/kg	0.0029 %	✓	
23		pyrene		204-927-3	129-00-0		31	mg/kg		28.117	mg/kg	0.00281 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		16	mg/kg		14.512	mg/kg	0.00145 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		16	mg/kg		14.512	mg/kg	0.00145 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		17	mg/kg		15.419	mg/kg	0.00154 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		6.7	mg/kg		6.077	mg/kg	0.000608 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		15	mg/kg		13.605	mg/kg	0.00136 %	✓	
29		indeno[123-cd]pyrene		205-893-2	193-39-5		7.3	mg/kg		6.621	mg/kg	0.000662 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		21	mg/kg		19.047	mg/kg	0.0019 %	✓	
31		benzo[ghi]perylene		205-883-8	191-24-2		9.1	mg/kg		8.254	mg/kg	0.000825 %	✓	
32		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
33		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
34		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
35		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
36		TPH (C6 to C40) petroleum group			TPH		460	mg/kg		417.22	mg/kg	0.0417 %	✓	
											Total:	0.269 %		

Key

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

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 Insufficient concentration to be considered flammable risk. No liquid free phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0417%)

Appendix A: Classifier defined and non GB MCL determinands

- **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

- **lead compounds with the exception of those specified elsewhere in this Annex**

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
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 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **pH** (CAS Number: PH)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: Combines the hazard statements and risk phrases for 1,1-dichloroethane and 1,2-dichloroethane
Data source: N/a
Data source date: 14 Oct 2016
Hazard Statements: Flam. Liq. 2; H225 , Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 1B; H350 , Aquatic Chronic 3; H412

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , STOT RE 2; H373

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

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

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

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

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

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 1A; H360

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT SE 3; H336 , Muta. 2; H341 , Aquatic Chronic 2; H411

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Acute Tox. 4; H302 , Acute Tox. 4; H312 , Eye Irrit. 2; H319

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335

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

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 2; H310 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 2; H330 , Carc. 2; H351 , Repr. 2; H361 , STOT SE 2; H371 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Chronic 2; H411

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Chronic 2; H411

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Acute Tox. 4; H332 , STOT SE 3; H335 , Asp. Tox. 1; H304 , Aquatic Chronic 2; H411

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

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

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H312 , Ozone 1; H420

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

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Acute Tox. 3; H301 , Asp. Tox. 1; H304 , Acute Tox. 3; H311 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , Aquatic Chronic 1; H410

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

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , Carc. 2; H351 , Acute Tox. 4; H312 , Aquatic Chronic 3; H412 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

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

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

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

copper {dicopper oxide; copper (I) oxide}

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

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Insufficient concentration of chromium(VI) to be present. Low Solubility

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel sulfate}

Insufficient concentration of chromium(VI) to be present. Low Solubility

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

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

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

Insufficient concentration of chromium(VI) to be present. Low Solubility

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

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

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

boron {diboron trioxide}

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2024.134.6050.11205 (13 May 2024)
HazWasteOnline Database: 2024.134.6050.11205 (13 May 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 v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024

APPENDIX L: CURRENT GUIDANCE & LEGISLATIONS

CURRENT CONTAMINATED LAND LEGISLATION / GUIDANCE & ENVIRONMENTAL RISK ASSESSMENT METHODOLOGY

LEGISLATION OVERVIEW

This report includes hazard identification and risk assessment in line with the risk-based methods referred to in relevant UK legislation and guidance. Government environmental policy is based upon a "suitable for use approach". When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment given the current use and circumstances of the land.

Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

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

(a) Significant harm is being caused or there is a significant possibility of such harm being caused;
or
(b) Pollution of controlled waters is being, or is likely to be, caused."

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

"the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter".

In order to assist in establishing if there is a "significant possibility of significant harm" there must be a "significant pollutant linkage" for potential harm to exist. That means there must be a source(s) of contamination, sensitive receptors present and a connection or pathway between the two. This combination of source-pathway-receptor is termed a "pollutant linkage or SPR linkage."

Part IIA of The Environmental Protection Act 1990 is supported by a substantial quantity of guidance and other Regulations, especially DEFRA Circular 01/2006 Contaminated Land (this replaces DETR Circular 02/2000). Part IIA defines the duties of Local Authorities in dealing with it. With the exception of situations of very high pollution risk, Part IIA places contaminated land responsibility on thee planning and redevelopment process. In situations where there is very high pollution risk direct action from the Local Authority is usually necessary. Planning Policy Statement 23 (PPS23) provides guidance on the planning process and requires that sites which have been developed shall not be capable of being determined "contaminated land" under Part IIA.

The criteria for assessing levels of pollutants and hence determining whether a site represents a hazard are based on a range of techniques, models and guidance. Within this context it is relevant to note that Government objectives are:

(a) to identify and remove unacceptable risks to human health and the environment;
(b) to seek to bring damaged land back into beneficial use;
(c) to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

These three objectives underlie the "suitable for use" approach to remediation of contaminated land. The "suitable for use" approach focuses on the risks caused by land contamination. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore should be assessed on a site-by-site basis.

The "suitable for use" approach then consists of three elements:

(a) ensuring that land is suitable for its current use - in other words, identifying any land where contamination is causing unacceptable risks to human health and the environment, assessed on the basis of the current use and circumstances of the land, and returning such land to a condition where such risks no longer arise; the contaminated land regime provides the regulatory mechanisms to achieve this;

(b) ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before official permission is given for the development and, where necessary to avoid unacceptable risks to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes; and

(c) limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactory assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses is likely to result either in premature work (thereby running the risk of distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

The mere presence of pollutants does not therefore necessarily warrant action, and consideration must be given to the scale of risk involved for the current and proposed end use of the site.

RISK ASSESSMENT METHODOLOGY

Current practice recommends that the determination of potential liabilities that could arise from land contamination be carried out using the process of risk assessment, whereby "risk" is defined as:

"(a) The probability, or frequency, or occurrence of a defined hazard; and
(b) The magnitude (including the seriousness) of the consequences."

The UK's approach to the assessment of environmental risk is set out in by the Department of the Environment (2000) publication "A Guide to Risk Assessment and Risk Management for Environmental Protection." This established an iterative, systematic staged process which comprises:

(a) Hazard identification
(b) Hazard assessment
(c) Risk estimation
(d) Risk evaluation
(e) Risk Assessment

At each stage during the investigation process the above steps are repeated as more detailed information becomes available for the site.

Land contamination risk management' (LCRM) (2020)), a document published by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) outlines a tiered approach to the assessment of risks posed by contaminated land, as summarised hereunder:

Tier 1: Preliminary Risk Assessment

A Preliminary Risk Assessment is usually undertaken as part of a desk study, outlines potential risks posed by potential contamination to all receptors by defining plausible "pollution linkages" and developing a preliminary conceptual model (PCM). The purpose of this model is to define all possible complete pollution linkages, where the requisite source – pathway – target elements are present, and these elements being defined as:

- a contaminant (source) is a hazardous substance or agent, present at levels that have the potential to cause harm or damage a receptor
- a pathway is the means by or through which a contaminant comes into contact with, or otherwise affects, the receptor
- a receptor (target) is an entity (human being, aquatic environment, flora and fauna etc) that is vulnerable to the adverse effects of the contaminant

This relationship is termed a "pollution linkage". It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, i.e.

- if there is no contaminant, or contaminant present at levels below those considered to be harmful or damaging to a receptor, then there can be no adverse effect on a receptor
- if there is no receptor present that can be adversely affected by a contaminant, no harm or damage can arise
- even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which a linkage between the two can be established

The absence of one or more of each component (source, pathway, receptor) would prevent a pollutant linkage being established and there would be no significant environmental risk.

The PCM is subject to continual refinement as additional data becomes available. As part of a Phase I Investigation (Desk Study and site walk over) a PCM is formed. Based on the PCM, potential pollutant linkages can be assessed. If the PCM and hazard assessment indicate that a pollution linkage is not of significance then no further assessment or action is required due to this linkage. For each significant and possible linkage a risk assessment is carried out. The linkages which potentially pose significant risks may require a variety of responses ranging from immediate remedial action or risk management or, more commonly, further investigation and risk assessment. This next stage is usually termed a Phase II Main Site Investigation and should provide additional data to allow refinement of the PCM and assess the level of risk from each pollutant linkage. Risk assessment will usually include Tier 2 Generic Quantitative Risk Assessment and / or, if necessary, a Tier 3 Detailed Quantitative Risk Assessment.

Tier 2: Generic Quantitative Risk Assessment (GQRA)

GQRA requires an intrusive investigation in order to characterise the site assisting in the re-assessment of the source-pathway receptor linkage. The conceptual model should be refined accordingly.

Upon completion of an intrusive investigation it must be decided whether Generic Assessment Criteria (GAC) are suitable for assessing the risk posed by observed contaminantion at the site. If GAC are deemed unacceptable for risk assessment purposes or cannot be developed, a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is required.

If GQRA reveals that unnacceptable risks are not present then no further action is required. If GQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not required an Options Appraisal should be undertaken. If further risk assessment is required, the scope nature of further risk assessment must be decided – it is possible that a Tier 3 DQRA will be undertaken in this scenario.

Where the Environment Agency have published an SGV for a contaminant, this will be used in the GQRA. For contaminants where an SGV has not been published and an S4UL has been published by LQM/CIEH S4UL`s, then this S4UL will be used.

Where an SGV or an S4UL is not available, and a DEFRA C4SL is available, then this C4SL will be used. In house derived GAC's will only be used for contaminants where there is no SGV or LQM S4UL or DEFRA C4SL.

Tier 3: Detailed Quantitative Risk Assessment (DQRA)
DQRA is used when pollutant linkages require further assessment. DQRA is often undertaken for pollutant linkages where GAC are unavailable or inappropriate for or more conservative than the actual circumstances of the site. Site specific data is used to create Site Specific Assessment Criteria (SSAC) and enable a more accurate assessment of the risks. Further investigation may or may not be required to formulate SSAC depending on the site specific conditions and information alrerady obtained.

If DQRA reveals that unnacceptable risks are not present then no further action is required. If DQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not required an Options Appraisal should be undertaken. If further risk assessment is required, the scope and nature of further risk assessment must be decided at this point.

NOTE: A Tier 1 Preliminary Risk Assessment is undertaken as part of a Desk Study Report and a Preliminary Conceptual Model is devloped for all pollutant linkages. However, the methodologies for assessing the risks to human health, risks to controlled waters and risk posed by ground gas using quantative techniques vary considerably, therefore GQRA and DQRA for human health, controlled waters and ground gas must be undertaken seperately. The risk assessment methodologies where quantative assessment is used for risks to human health, risks to controlled waters and risks posed by ground gas, if relevant, are described hereunder.

BACKGROUND INFROMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO HUMAN HEALTH

Background
In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the EA published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. These reports (CLR7-10) together with associated "SGV" documents have since been withdrawn (August 2008) and the following documents have been published as revised guidance to the CLEA assessment:

- Environment Agency : 2008: Updated Technical Background to the CLEA model Science Report SC050021/SR3
- Environment Agency : 2008: Human Health Toxicological Assessment of Contaminants in Soil SC050021/SR2

Additional guidance on statistical assessment replacing CLR 7 is provided in:

- CL:AIRE :2008 Guidance on Comparing Data With a Critical Concentration

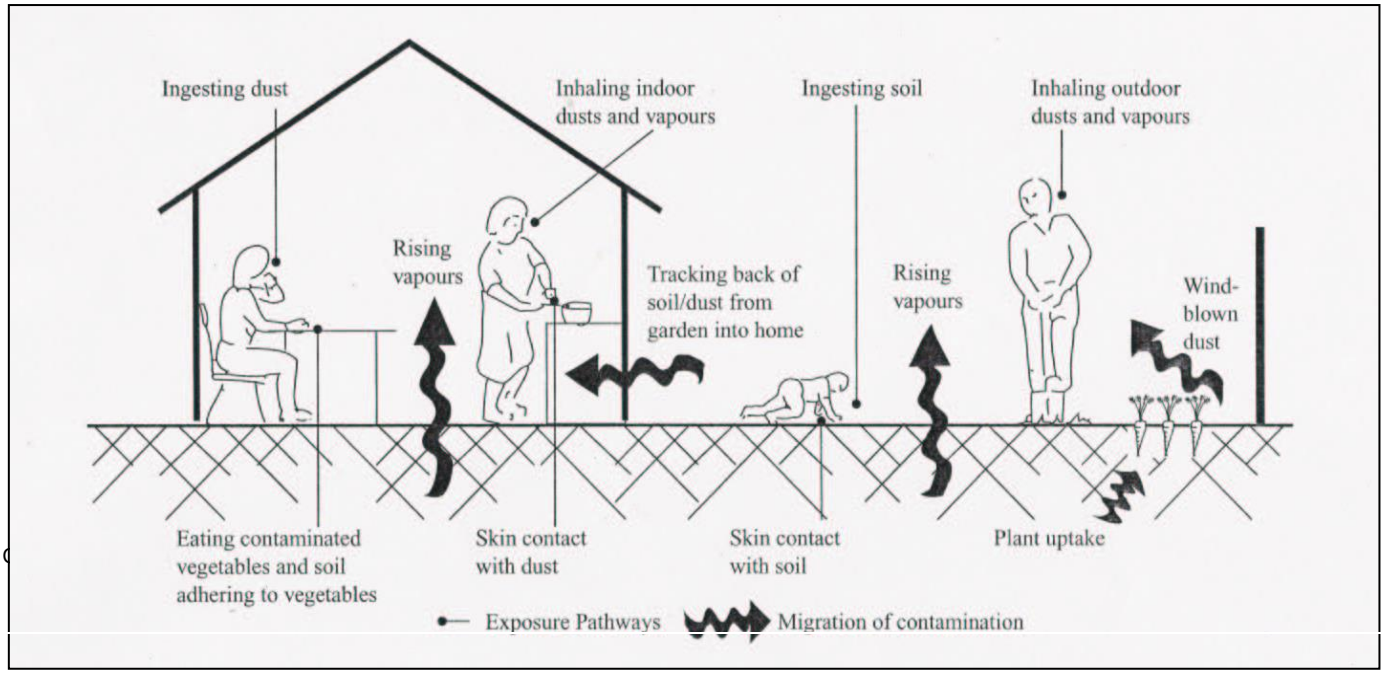
Other guidance/software used in spatial / statistical assessment is provided in:

- USEPA 2006: Data Quality Assessment: Statistical Methods for Practitioners
- Spatial Analysis and Decision Assistance (SADA) – The University of Tennessee

A different approach to the statistical appraisal of data is required depending on whether the assessment of risk is to assess whether land is Contaminated Land in accordance with regulations, or whether the assessment is to determine whether the site is suitable for new development in according with Planning guidance. This is discussed further in CL:AIRE :2008 "Guidance on Comparing Data With a Critical Concentration".

A program for the derivation of GAC`s based on the above guidance is provided by the Environment Agency and is entitled "CLEA Software Version 1.06".

The CLEA model has been developed to calculate an estimated tolerable daily soil intake (TDSI) for site users given a set 'default' exposure pathways. Ten human exposure pathways are covered in the CLEA model as presented below:



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Ingestion

- ingestion of outdoor soil
- ingestion of indoor dust
- ingestion of home grown produce
- ingestion of soil attached to home grown produce

Dermal Contact

- dermal contact with outdoor soil
- dermal contact with indoor dust

Inhalation

- inhalation of outdoor dust
- inhalation of indoor dust
- inhalation of outdoor soil vapour
- inhalation of indoor soil vapour

It should be noted that there are other potential exposure pathways on some sites not included in the CLEA model e.g. certain organic compounds can pass through plastic water pipes into drinking water supply.

Where contaminated water is present at a depth less than 2mbgl and there is a potential risk of inhalation of vapours (only when volatile compounds are present) the risk from inhalation of vapours from soil water will be assessed using a UK compliant version of BP Risc v4.02.

The presence and/or significance of each of the above exposure pathways are dependent on the type of land use being considered and the nature of the contaminant under scrutiny. Accordingly, the CLEA model considers for principle 'default' land use types and makes a series of 'default' assumptions with regard to human exposure frequency, duration and critical human target groups for each land use considered:

- residential
- allotments
- commercial / industrial land use

The above land use categories defined in the CLEA are detailed below:

Residential: This generic scenario assumes a typical residential property consisting of a two-storey house built on a ground-bearing slab with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden area.

Allotments: This generic scenario assumes a plot of open space (about 250 m2), commonly made available by the local authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than a hectare. The tenants are assumed to be parents or grandparents and that young children make occasional accompanied visits to the plot.

Commercial/Industrial: There are many different kinds of workplace and work-related activities. This generic scenario assumes a typical commercial or light industrial property consisting of a threestorey building at which employees spend most time indoors and are involved in officebased or relatively light physical work.

Human Health Risk Assessment Methodolgy

Assessment of risk for the protection of human health is undertaken using the methodology as outlined previously, and summarised hereunder:

- Tier 1 Preliminary Risk Assessmnent
- Tier 2 Generic Quantitative Risk Assessment
- Tier 3 Detailed Quantitative Risk Assessment

The Tier 1 Preliminary Risk Assessment is undertaken as part of the desk study report and includes the development of a Preliminary Conceptuel Model. Tier 2 and Tier 3 Quantitative Risk Assessments are undertaken in order to develop and refine the Preliminary Conceptual Model aiding a more detailed assessment of the risk posed by contaminants revelaed by site investigation and soil / soil water chemical analyses.

The methods used by *CC GEOTECHNICAL LTD* to derive assessment criteria, to statistically analyse chemical data and to compare chemical data to the derived assessment criteria are discussed herunder.

Derivation of Generic Assessment Criteria (GAC) and Site Specific Assessment Criteria (SSAC)

GAC`s are derived on the basis of the proposed land use and the associated applicable exposure pathways. It should be noted that there are difficulties in establishing soil concentrations of contaminants beyond which risks from exposure to these contaminants would be 'unacceptable' and the GAC value does not necessarily equate to the level for "significant possibility of significant harm" as defined in Part IIA of The Environmental Protection Act (1990) to determine whether land is "contaminated." This ultimately requires detailed 'toxicological' information of the health effects of individual contaminants and also a scientific judgement on what constitutes an 'unacceptable' risk. The primary purpose of the CLEA derived GAC's are as 'minimal risk thresholds' for the assessment of human health risks in relation to land use.

Minimal risk thresholds calculated using generic input parameters for each of the above land uses are termed Generic Assessment Criteria (GAC) and are used for Generic Quanatative Risk Assessment (GQRA). However, further assessment may be required taking into consideration site specific factors such as the way the land is used, the soil type, the building

characteristics and the exact nature of the receptor, to determine whether there is a significant possibility of risk to human health to site users. Such an assessment is known as a Detailed Quantitative Risk Assessment (DQRA) and the resultant threshold concentrations are known as Site Specific Assessment Criteria (SSAC). Such assessments should be conducted with the agreement of the local authority (or the Environment Agency) since it is the authority that determines whether land is Contaminated Land or whether Planning Permission for a new development may be granted.

For the purposes of this report, assessment criteria have been derived in accordance with current guidance based on the conceptual model for the proposed land use using the CLEA v1.06 software. These criteria are not intended to indicate whether the site may be contaminated land nor do they replace any published soil guideline values. However, the values are intended to provide guidance for the local authority on whether the site may be considered uncontaminated. If, based on the site's proposed future use, the site would be considered by the local authority to be uncontaminated and therefore, on the basis of soil concentrations, fit for purpose, then no further risk assessment based on soil concentrations and the risk to human health would be necessary. However, should these criteria be exceeded or the conceptual site model vary from the model used in the risk assessment to derive these values then the risk assessment should be updated accordingly.

For contaminants routinely analysed where inhalation is a significant pathway (naphthalene, phenanthrene, Aromatic EC5-EC7, Aromatic EC7-EC8, Aromatic EC8-EC10, Aromatci EC10-EC12, Aromatic EC12-EC16, Aliphatic EC5-EC6, Aliphatic EC8_EC10, Aliphatic EC10-EC12, Aliphatic EC12-EC16), plots of the GAC as a function of Soil Organic Matter (SOM) are used to determine if they pose a potential risk to human health, which are presented hereunder. Where there is an exceedance further assessment may be undertaken.

Statistical Assessment of Soil Contamination Data & Comparison of Contamination Data to Threshold Values

In any site investigation only a small fraction of the soil on the site is analysed. Therefore the mean derived from the contamination data for a contaminant may not be the same as the true mean for the contaminant distribution on the site. To improve the reliability of any assessment a statistical analyses is undertaken in line with the CL:AIRE document "Guidance on Comparing Soil Contamination Data with a Critical Concentration".

Statistical assessment of soil data is undertaken using programs based on the guidance in the CL:AIRE document or the USEPA software ProUCL v4.0.

Where the number of results in a dataset is less than four, a statistical assessment is not undertaken, and the assessment is performed by comparison of the maximum value(s) with a Health Criteria Value (HCV), such as Generic Assessement Criteria value(s).

For the Planning situation, the regulator needs to check whether the concentration of contaminants is low compared to the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is lower than the HCV.

For the Part IIA scenario the regulator needs to determine whether the concentration of contaminants is greater than the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is higher than the HCV. However, the regulator may proceed with determination if there is just a 51% probability, "on the balance of probabilities".

The Outlier Test used in the statistical assessment may not be able identify separate populations if numerous populations are present. Inorder to ensure that this is not the case a spatial assessment of the data will be undertaken using SADA.

If the screening levels are exceeded then more sophisticated quantitative risk assessment or remedial action may be undertaken. The benefits of undertaking a quantitative risk assessment must be weighed against the likelihood that it will bring about cost savings in the proposed remediation.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO CONTROLLED WATER

Definition of Controlled Waters

The term 'controlled waters' is defined in Section 104 of the Water Resources Act 1991 as:

"Territorial Waters…which extend seawards for three miles…, coastal waters…, inland freshwaters, waters in any relevant lake or pond or of so much of any relevant river or watercourse as is above the freshwater limit, and ground waters, that is to say, any waters contained in underground strata."

Note that the definition of groundwater under the Water Resources Act 1991 includes all water within underground strata (including soil / pore water in the unsaturated zone). The definition of groundwater under the Groundwater Directive however is limited to water in the saturated zone. For the purposes of Part IIA of the Environmental Protection Act 1990, the Environment Agency recommends that the groundwater within the saturated zone only is considered as the receptor (rather than soil / pore water).

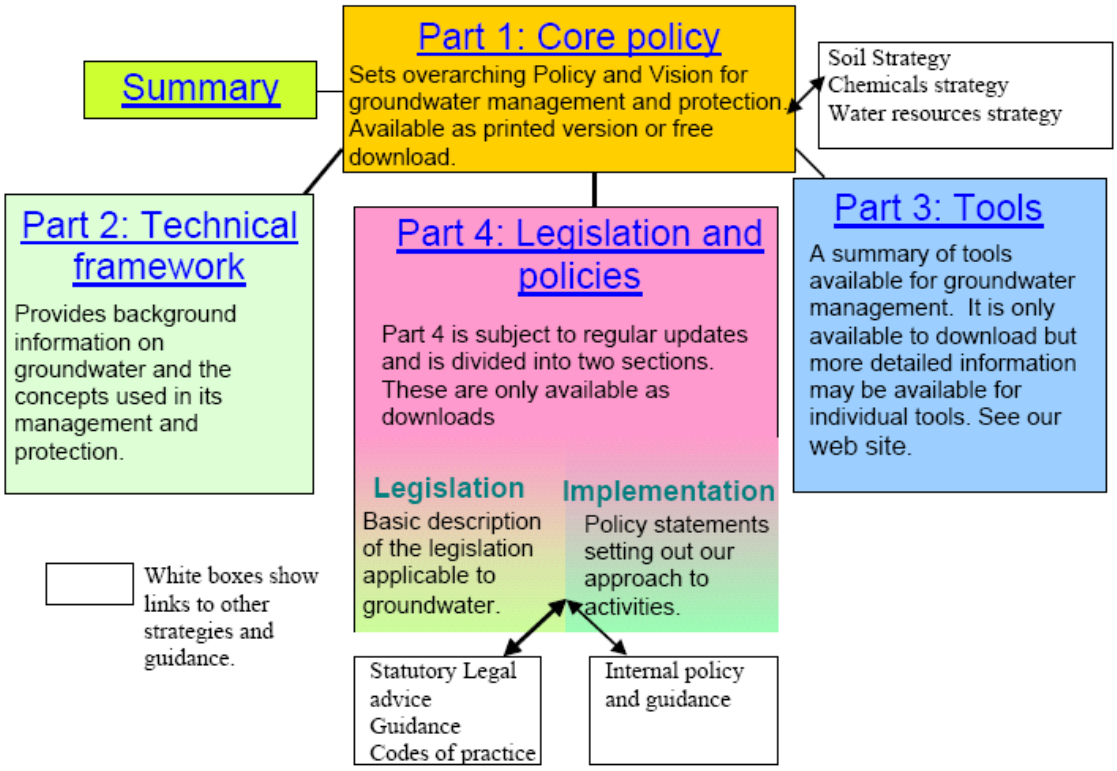
Environment Agency Guidance

Legislation and guidance surrounding the protection of controlled waters in the UK is abundant and can be complex. The Environment Agency's overall position on groundwater is *"To protect and manage groundwater resources for present and future generation in ways that are appropriate for the risks that we identify"* (Groundwater Protection : Policy and Practice GP3, 2006). In brief, the core objectives of the existing legislation serve to enforce this position.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document was influential as it provided a focus for key developments such as Source Protection Zones (SPZs) and

Groundwater Vulnerability Maps. The Policy was then revised in 1998, since which there have been substantial changes in legislation, driven by Europe. Key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991. Further to legislative changes, gaps identified in the 1998 PPPG required addressing. These changes are reflected in the forthcoming Environment Agency Policy document entitled *Groundwater Protection : Policy and Practice (GP3)*, a draft version of which was available for public consultation (Parts 1 to 3) ending July 2006 with Part 4 issued in March 2008. Part 4 includes a section on key groundwater legislation and the Environment Agency's interpretation of it.

The following gives a breakdown of the structure of the document (taken from the Environment Agency GP3 draft consultation document, 2006)



Controlled Water Risk Assessment Methodology

The risk posed to controlled water is assessed by *CC GEOTECHNICAL* in accordance with current guidance as outlined hereunder.

In order for a developer of a potentially contaminated site to fulfil their obligations under the legislation, a site assessment would be required to be undertaken in order to identify any potential risks to controlled waters and to derive suitable clean-up criteria if necessary to ensure the protection of controlled waters. The general approach for Groundwater Protection is detailed further in Part 3 of GP3.

When assessing groundwater impact the Environment Agency advocate the application of their framework methodology "Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination" Environment Agency (2006). The methodology has four levels of assessment as described below:

- Level 1 considers whether contaminant concentrations in "pore water" in contaminated soil are sufficient to impact on the receptor, ignoring dilution, dispersion and attenuation along the pathway. The "pore water" concentration is determined from:

  i) measured "pore water" concentrations or perched water quality
  ii) soil leaching tests
  iii) theoretical calculations based on soil/water partitioning equations

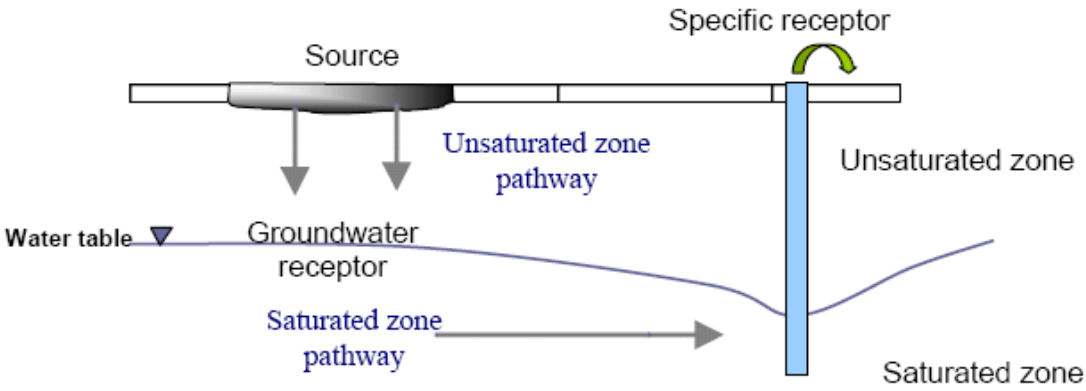
- Level 2 considers dilution by the receiving groundwater or surface water body and whether this is sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as the target concentration multiplied by a dilution factor (DF).

- Levels 3 and 4 consider whether natural attenuation (including dispersion, retardation and degradation) of the contaminant as it moves through the unsaturated and saturated zones to the receptor are sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as target concentration multiplied by a dilution factor (DF) and attenuation factor (AF). In Level 3 simple analytical models are used to calculate the significance of attenuation. The Environment Agency has released a "Remedial targets worksheet v3.1" to carry out basic calculations using a conservative approach up to Level 3 using basic principles assuming a simple migration of contaminants from the

source zone into the aquifer receptor. Level 4 assessment uses more sophisticated numerical models, and allows for the introduction of additional geological horizons and is used mainly to determine whether soil contaminants will reach their target within a specified timeframe. Use of such software should only be used once agreement has been obtained from the Environment Agency.

Three main stages apply to any risk assessment of controlled waters, these are:

1. Risk Screening (Tier 1 Preliminary Risk Assessment): The understanding of the Conceptual Site Model (CSM) is the key to assessing any site. Using a robust CSM, potential pathways or receptors may be screened out from any further assessment at an early stage. For example if the pathway through the unsaturated zone is blocked by the presence of a significant thickness of low permeability clay. A greater understanding of the CSM is achieved with each tier of risk assessment. An example of a basic CSM is given below (taken from the Environment Agency GP3 draft consultation document, 2006):



2. Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Level 1): When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with screening criteria. Published values of screening criteria with which chemical test results can be compared are published in the following guidance:

   - Water Supply (Water Quality) Regulations 2000
   - The Private Water Supplies Regulations 1991
   - Environmental Quality Standards for surface waters based on The EC Dangerous Substnaces Directive (76/464/EEC and Daughter Directives)
   - The Surface Waters(Abstraction for Drinking Water Classification) Reguslations 1996
   - World Health Organisation Drinking Water Standards 2004

   Should the Level 1 assessment indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

   - To devise suitable remedial solutions
   - To carry out more investigation, sampling and analysis
   - To conduct a site specific Detailed Quantitative Risk Assessment (DQRA) to determine determine if the materials are suitable for thair proposed use, or devise site specific clean-up level

3. Detailed Quantitative Risk Assessment (EA Remedial Targets Methodology Levels 2 to 4): The decision to carry out a DQRA will be dependant on the extent and implications of the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the previous levels of assessment. The conceptual model will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment, the remainder having been screened out.

   Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

   Remediation criteria, if derived, will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or *compliance point*. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED BY GROUND GAS

Background

Origin of Ground and Landfill Gases

When carrying out a ground gas risk assessment, the origin or source of the gases is important as potential risks will vary depending on the source. This Appendix relates to the risk of the two main ground gases of concern; methane and carbon dioxide, and does not apply to other ground gases (e.g. radon or vapours from hydrocarbon spills). Methane and carbon dioxide are major constituents of landfill gas but can also occur from a variety of anthropogenic and natural sources, as summarised in Table 5 below:

Gas	Source	Comments
Landfill Gas	Anaerobic decomposition of degradable waste within landfill sites. Typically 60% methane and 40% carbon dioxide during methanogenic phase.	Composition varies over time, particularly in early stages. Contains a range of minor constituents (particularly carbon monoxide and hydrogen sulphide).
Landfill Associated Gases	- Anaerobic degradation of leachate external to the site; - Degassing of dissolved gases in groundwater; - Evolution of gases following interaction between leachate and groundwater	Can result in secondary (external) production of methane or carbon dioxide.
Made Ground	Anaerobic degradation of organic components	Very variable depending on source
Sewer Gas, Cess Pits	Anaerobic degradation of organic components of sewage producing methane and carbon dioxide.	Often characterised by hydrogen sulphide odour.
Mains Gas	Leakage from underground pipework or storage tanks. Mainly methane but often contains higher alkanes.	An odouriser is added to permit detection of leaks. Typically 90% CH_4, but 1 to 27% C_2-C_4 alkanes, May also contain other trace gases e.g. CO, helium and CO_2 (from degradation of CH_4 in the ground).
Other Anthropogenic Sources	- Degradation of leaked or spilled hydrocarbons or other industrial chemicals; - Anaerobic degradation of organic contaminants in groundwaters (e.g. silage liquor); - Reactions between monitoring well construction components and environment; - Burial grounds/cemeteries.	Hydrocarbon spillages often have an 'oily' odour. Fuel spillages common – Petrol or Diesel and can contain a wide range of VOC's. Can degrade to produce methane / carbon dioxide.
Alluvium / Marsh / Peat Gas	Anaerobic microbial degradation of organic material (usually waterlogged vegetation / peat). Often associated with the presence of alluvial deposits or dredgings.	
Geogenic Gas	Natural seepages of carbon dioxide and hydrocarbon gases derived from geologic sources such as coal seams and deep oil / gas source formations. Can be present in solution in groundwaters.	Methane most common but can contain carbon dioxide and higher alkanes.
Mine Gases	Various types. Most common is "fire damp" with high methane, produced by the desorption of gas trapped in coal. "Black damp" (Stythe gas) with high carbon dioxide and denser than air. "White damp" is high in carbon monoxide.	Methane most common. Can contain higher alkanes, carbon dioxide and carbon monoxide. Often low in oxygen.
Natural Shallow Ground Gas	Various types - high carbon dioxide formed by subsurface aerobic activity leading to depleted oxygen and elevated carbon dioxide; - chemical degradation of rocks (e.g. carbonates) producing carbon dioxide; - carbon dioxide production in root zone of soils by plants.	Gases can be emitted from ground under falling barometric pressure conditions.

Table 5. Potential Sources of Ground Gases

This Appendix does not provide guidance for the assessment of risk when other gases are present due to 'Other Sources' from the above table (particularly organic compounds such as BTEX and VOC's or for the risk from radon or hydrogen sulphide).

To determine the origin of the gas a range of factors must be considered together, including;

1. Proximity of likely sources
2. Ground conditions (geology, hydrogeology, anthropogenic pathways etc)
3. Properties of gases present including:
   - Chemical composition
   - Physical properties
   - Ratios of components e.g. methane : carbon dioxide
4. Timeframe of activities such as infilling periods, capping works, installation of gas control systems etc

Identification of the originating source may be problematic given that there may be more than one source present and trace gas analysis may be required. Identification of the sources of the gases encountered during monitoring is usually carried out through a process of eliminating the most unlikely potential sources (given the site setting) and selecting those which are most likely.

Hazards Associated with Presence of Methane

Methane gas is combustible and potentially explosive. When the concentration of methane in air is between the limits of 5.0%v/v and 15.0%v/v an explosive mixture is formed. The Lower Explosive Limit (LEL) of methane is 5.0%v/v, which is equivalent to 100% LEL. The 15.0%v/v limit is known as the Upper Explosive Limit (UEL), but concentrations above this level cannot be assumed to represent safe concentrations. Further, the LEL and UEL will vary (up and down) depending upon the proportion of other gases (including oxygen). However, the fact that methane is a colourless, odourless gas means that there

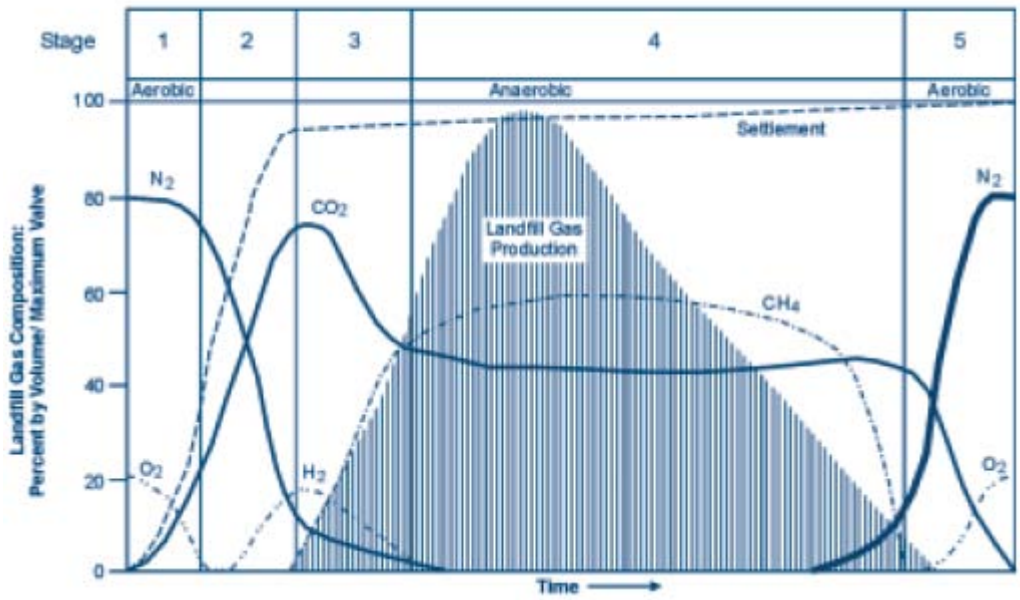
is no simple indicator of the presence of the gas until such a time as explosive limits are reached and an incident occurs. Methane is lighter than air and has a low toxicity. However, at high concentrations it can result in asphyxiation due to oxygen displacement.

Hazards Associated with Presence of Carbon Dioxide

Carbon dioxide is a colourless, odourless gas, which, although non-flammable, is both toxic and an asphyxiant. As carbon dioxide is denser than air, it will collect in low points and depressions. The UK Health & Safety Executive (HSE) has published information relating to concentrations of carbon dioxide that humans may be exposed to, which uses concentrations contained in the Control of Substances Hazardous to Health Regulations 2002 (as amended). These are the Long Term Occupational Exposure Limit (LTOEL, 8 hour period) and the Short Term Occupational Exposure Limit (STOEL, 15 minute period), which are 0.5% and 1.5% carbon dioxide, respectively.

Parameters Influencing the Rate of Ground Gas Production

The figure below is taken from EA guidance document LFTGN 03 illustrates typical ground gas generation curves from biodegradable materials:



The production of methane and carbon dioxide at a landfill site may be expected to be considerable and ongoing. Concentrations of methane will eventually decrease, followed by concentrations of carbon dioxide, but the duration and rate of gas production can vary markedly between sites. Five distinct phases of gas production occur during the process which are, in order of event as marked above, as follows:

1. An aerobic phase involving oxygen depletion and temperature increase through aerobic respiration;
2. The establishment of anaerobic conditions and the evolution of carbon dioxide and hydrogen through acidogenic activity;
3. Commencement of methanogenic activity; the establishment of populations of methanogenic bacteria;
4. A phase of stable methanogenic activity, which may go on for many tens of years;
5. A phase of decreasing methanogenic activity, representing depletion of the organic material and a return to aerobic conditions.

The time scale for the return to the normal ground gas concentrations will be highly variable, depending upon the types and quantities of materials present. In addition, the optimum parameters influencing the rate of decomposition and ground gas production within the ground at a site are as follows:

- High water content with adequate rainfall and water infiltration to provide moisture content between approximately 20 to 26%;
- Conditions that either are or are very close to anaerobic;
- High proportion of biodegradable materials;
- A pH between 6.5 and 8.5, ideally verging slightly on the acidic between pH 6 to 7;
- Temperature between 25°C and 55°C;
- The ratio of the biochemical and chemical oxygen demands (BOD:COD);
- High permeability;
- Small particle size, as finer subsurface materials possess a greater surface area to provide a growing 'face' for the micro-organisms but high fines levels reduces permeability and reduces decomposition rate.

For this reason, it is vital that sources of methane and carbon dioxide are identified prior to the commencement of any work on a construction site, and that the ground gas regime is characterised at the worst temporal conditions a site may experience. From this, a risk assessment is carried out to identify the risk at the site from ground gases so that suitable protection measures can be designed and incorporated into a development to prevent a dangerous build-up of gas occurring.

Factors Influencing the Migration and Behaviour of Ground Gases

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There are many factors that influence the migration of ground gases which can effect the risk from a gassing source:

- driving force − pressure differential along a pathway, diffusion and dissolved in solution;
- meteorological conditions − short term and seasonal conditions including atmospheric pressure changes (e.g. rapidly falling pressure causes gas to expand increasing emission rates), rainfall, frozen ground and thawing, temperature;
- geological and groundwater conditions − these can have the over riding influence on the direction/pathways and quantity of migrating gas;
- anthropogenic influences − man-made pathways include mine shafts, service runs/drains, foundation piles, underground voids/pits/basements, foundation/building design/construction

Current Guidance
Previous versions of Building Regulations Approved Document C provided statutory guidance stating that consideration should be given to appropriate action and / or specific solutions in situations where methane concentration exceeded 1%v/v or carbon dioxide concentrations exceeded 5%v/v. The latest Building Regulations Approved Document C (DoE 2004) no longer endorses this approach and recommends the use of a risk based approach to interpreting a gas monitoring survey. This is in line with current EA guidance for landfill gas (LFTGN 03, 2004) which recommends the use of a structured risk based approach similar to that outlined in CLR 11. On this basis, recent guidance has been produced in 2006 and 2007 with the aim of providing up to date advice in relation to residential and commercial development. The guidance does not address issues associated with gas derived from landfills, for this refer to *"Guidance on the Management of Landfill Gas"* (Environment Agency 2004) for an overview.

Recent guidance relevant to gas assessments for residential and commercial development includes;

- Wilson *et al.* (CIRIA C665, December 2007) ***"Assessing Risks Posed by Hazardous Ground Gases for Buildings."***
  This document provides up to date advice on all aspects of ground gas risk assessment such as investigation, monitoring programmes, data collection and interpretation. The guidance presents separate methodologies for the characterisation of:
  - All development types except low rise housing with gardens (Situation A)
  - Low rise housing with gardens (Situation B)

- Boyle and Witherington (NHBC / RSK Group, Report 10627-R01(04) January 2007) ***"Guidance on the Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present."***
  This document presents the "Traffic Lights System" detailed below and is relevant only for low rise properties (e.g. bungalows and town houses) that have a ventilated sub-floor void (i.e. Situation B as described in CIRIA C665).

- British Standard (BS 8485 2015 +A1 2019) ***"****Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings"***
  This document provides an overview of gas characterisation and assessment. The Standard is intended to be used by designers of gas protection measures and regulators involved in the assessment of design solutions.

Further guidance, Wilson and Card (CIEH) ***"Ground Gas Handbook for Designers and Regulators"*** providing practical guidance on ground gas assesments and the design and evaluation of protection measures, is expected to be published in March 2009.

Each of these documents continues to highlight the importance of, and give further guidance towards, carrying out a tiered risk-based decision-making process in accord with government policy on dealing with contamination from historic or natural sources and highlight the importance of the Conceptual Model in site characterisation.

Ground Gas Risk Assessment Methodology
Assessment of risk posed by ground gas is undertaken using the methodology as outlined previously, and summarised hereunder:

- Tier 1 Preliminary Risk Assessmnent
- Tier 2 Generic Quantitative Risk Assessment
- Tier 3 Detailed Quantitative Risk Assessment

The methodology used in each of the above assessments with concern to ground gas is discussed hereunder.

<u>Tier 1 Preliminary Risk Assessment</u>
All potential sources of methane and carbon dioxide are identified in the Preliminary Conceptual Model and the generation potential determined. The background information discussed earlier is referred to in order to determine the potential for a source to generate ground gas.

CIRIA C665 provides idealised monitoring frequency / period dependant upon generation potential of gas source and sensitivity of the proposed land use as below:

Idealised Frequency and Period of Monitoring (after Table 5.5a and 5.5b, CIRIA C665)

		Generation Potential of Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4/1	6/2	6/3	12/6	12/12
	Moderate (Flats)	6/2	6/3	9/6	12/12	24/24
	High (Residential with Gardens)	6/3	9/6	12/6	24/12	24/24

Notes
1. First number is the number of readings and the second is the minimum period in months (e.g. 6/2 − six sets of readings over two months).
2. At least two sets of readings must be at low (preferably under 1,000 mb) and falling pressure.

The monitoring programme is decided using the above table prior to the intrusive site investigation. However, if the intrusive investigation reveals that a the potential source is better or worse than anticipated the monitoring programme should be modified accordingly. For example, if the made ground contains no evidence of organic material and comprises entirely granular brick fill, the potential for that made ground to generate ground gas is reduced considerably.

Tier 2 Generic Quantitative Risk Assessment
Generic Quantitiative Risk Assessment is undertaken upon completion of the required gas monitoring period.

All three current guidance documents propose that both ground gas concentrations and flow rates are used to calculate the limiting gas well gas volume flow rates for methane and carbon dioxide, based on the ground gas conditions monitored for during the worse-case temporal conditions. This limiting gas well volume flow rate is termed the Gas Screening Value (GSV, note that this was termed borehole gas volume flow), and is calculated as follows:

$$GSV\ (l/hr) = \frac{[\text{gas well gas concentration } (\%v/v)] \times [\text{gas well flow rate } (l/hr)]}{100}$$

GSV's are compared to typical max concentrations and limiting gas screening values derived for either Situation A - All development except low rise housing with gardens, or Situation B low rise housing with gardens (NHBC Traffic Light System). Table 8.5 from CIRIA C665 is used for comparison of gas screening values for "Situation A Developments" and is presented hereunder:

Characteristic Situation (CIRIA R149)	Comparable Partners in Technology gas Regime (see Box 8.2)	Risk Classification	Gas Screening Value (CH_4 or CO_2) (l/hr)[1]	Additional Factors	Typical Source of Generation
1	A	Very low risk	<0.07	Typically methane ≤ 1% and/or carbon dioxide ≤ 5%. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
6	F	Very high risk	>70		Recent landfill site

Table 8.5 from CIRIA C665 Modified Wilson and Card Classification

Table 8.7 is used for comparison of gas screening values for "Situation B Developments" and is presented herunder:

Traffic Light	Methane[1]		Carbon Dioxide[2]	
	Typical max concentration[3] (% by volume)	Gas screening value[2,4] (litres/hour)	Typical max concentration[3] (% by volume)	Gas screening value[2,4] (litres/hour)
Green				
Amber 1	1	0.13	5	0.78
Amber 2	5	0.63	10	1.60
Red	20	1.60	30	3.10

Notes:
1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decoder as to what Traffic Light is allocated;
2. Borehole Gas Volume Flow Rate, in litres per hour as defined in Wilson and Card (1999), is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentration can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

Table 8.7 from CIRIA C665 - NHBC Traffic light system for 150 mm void

Dependant on the outcome of the assessment of risk posed by ground gas it is determined whether gas protection measures are required for the proposed development, and or whether a detailed quantitative risk assessment is required for the site.

Selection & Design of Protective Measures
Table 8.6 and Box 8.4 of CIRIA C665 contain information on the detailed design of protection measures and were initially intended for the purposes of determining then level of protection measures a development requires. These tables and related text include some useful information on the design of gas protection measures, however BS84845:2007, which supersedes the guidance included within CIRIA C665, is used for selection of gas protection measures.

BS8485:2015 +A1 2019 uses a scoring system dependant on the Characteristic Situation / NHBC Traffic Light and proposed end use of the site. The scoring system is summarised in BS8485:2015 + A1 2019 Table 2 as presented hereunder:

Characteristic gas situation, CS	NHBC traffic light	Required gas protection			
		Non-managed property e.g. private housing	Public building (a)	Commercial buildings	Industrial buildings (b)
1	*Green*	0	0	0	0
2	*Amber 1*	3	3	2	1 (c)
3	*Amber 2*	4	3	2	2
4	*Red*	6 (d)	5(d)	4	3
5			6(e)	5	4
6				7	6

NOTE Traffic light indications are taken from NHBC Report no.:10627-RO1 (04) and are mainly applicable to low-rise residential housing[1]. These are for comparative purposes but the boundaries between the traffic light indications and CS values do not coincide.

a) Public buildings include, for example, managed apartments, schools and hospitals.
b) Industrial buildings are generally open and well ventilated. However, areas such as office pods might require a separate assessment and may be classified as commercial buildings and require a different scope of gas protection to the main building.
c) Maximum methane concentration 20% otherwise consider and increase to CS3.
d) Residential building on higher traffic light/CS sites is not recommended unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.
e) Consideration of issues such as ease of evacuation and how false alarms will be handled are needed when completing the design specification of any gas protection scheme

[1] The NHBC guidance and CIRIA C665 guidance refers to low rise housing (which is up to three storeys without lifts) that is constructed with a 150mm ventilated sub-floor void.

BS8485:2015 A1 +2019 Table 2 Required gas protection by characteristic gas situation and type of building

Once a score is assigned, a combination of protection systems / elements is chosen from BS8485:2015 +A1 2019 Table 3 shown below:

PROTECTION ELEMENT/SYSTEM		SCORE	COMMENTS
a) Venting/dilution (See Annex A BS8485)			
Passive sub floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)[A]	Very good performance	2.5	*Ventilation performance in accordance with Annex A (BS8485)*
	Good performance	1	*If passive ventilation is poor this is generally unacceptable and some form of active system will be required.*
Subfloor ventilation with active abstraction/pressurization (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)[A]		2.5	*There have to be robust management systems in place to ensure the continued maintenance of any ventilation system. Active ventilation can always be designed to meet good performance.*
Ventilated car park (basement or undercroft)		4	*Mechanically assisted systems come in two forms: extraction and positive pressurization.*
b) Barriers			
Floor slabs			
Block and beam floor slab		0	*It is good practice to install ventilation in all foundation systems to effect pressure relief as a minimum. Breaches in floor slabs such as joints have to be effectively sealed against gas ingress in order to maintain these performances.*
Reinforced concrete ground bearing slab		0.5	
Reinforced concrete ground bearing foundation raft with limited service penetrations that are cast into slab		1.5	
Reinforced concrete cast in situ suspended floor slab with minimal service penetrations and water bars around all slab penetrations and at joints		1.5	
Fully tanked basement		2	
c) Membranes			
Taped and sealed membrane to reasonable levels of workmanship/in line with current good practice with validation [B,C]		0.5	*The performance of membranes is heavily dependent on the quality of design of the installation, resistance to damage after installation, and the integrity of joints.*
Proprietary gas resistant membrane to reasonable levels of workmanship /in line with good practice under independent inspection (CQA)[B,C]		1	
Proprietary gas resistant membrane installed to reasonable levels of workmanship/in line with current good practice under CQA with integrity testing and independent validation		2	
d) Monitoring and detection (not applicable to non-managed property, or in isolation)			
Intermittent monitoring using hand held equipment		0.5	*Where fitted, permanent monitoring systems ought to be installed in the underfloor venting/dilution system in the first instance but can also be provided within the occupied space as a fail safe.*
Permanent monitoring and alarm system [A]	Installed in the underfloor venting/dilution system	2	
	Installed in the building	1	
e) Pathway Intervention			
Pathway intervention		-	*This can consist of site protection measures for off-site or on-site sources (see Annex A, BS8485)*
NOTE In practice the choice of materials might well rely on factors such as construction method and the risk of damage after installation. It is important to ensure that the chosen combination gives an appropriate level of protection			
A) It is possible to test ventilation systems by installing monitoring probes for post installation validation. *B) If a 1 200g DPM material is to function as a gas barrier it should be installed according to BRE 212 /BRE 414 being taped and sealed to all penetrations* *C) Polymeric Materials> 1200 g (proportional to thickness) but their physical properties mean that they are more robust and resistant to damage.*			

BS8485:2015 + A1 2019 Table 3 Solution Scores

Where the gas situation is 4 or more (and for NHBC Red situations) the site requires a comprehensive risk assessment to confirm the scope of protection measures. These are higher risk sites and reliance on Table 2 and 3 alone is not sufficient.

For a site which is impacted by migratory gases from an off site source, the development may be protected by imposing pathway intervention methods, which if successfully validated, could also remove the need for further analysis. It is essential that the gas regime in these circumstances has been fully characterised and that the only source impacting the site is located off site and that the pathway is clearly defined and its interception equally proven before construction commences. Pathway intervention methods may include vertical membrane installations, venting trenches, rows of stone columns, activated trenches and various proprietary systems. These systems are particularly relevant to domestic housing where there is limited scope for foundation type solutions.

CURRENT GUIDANCE ON REMEDIATION

When risk assessment of the site has been completed and it indicates that remedial works are required, the main guidance in managing this process is set out in the DEFRA/EA publication LCRM (2020)) "*Model Procedures for the Management of Land Contamination*." The stages of managing remediation are as follows:

(a) Options Appraisal and develop Remediation Strategy;
(b) Develop Implementation Plan and Verification Plan;
(c) Remediation, Verification and Monitoring.

The Remediation Strategy sets out the remediation targets, identifies technically feasible remedial solutions and presents an evaluation of the options so that these can be assessed enabling that the most suitable solution is adopted. An outline of the proposed remedial method should be presented. Agreement should be sought of the appropriate statutory bodies for the Remediation Strategy before proceeding to the next stage.

The Implementation Plan is a detailed method statement setting out how the remediation is to be carried out including stating how the site will be managed, welfare procedures, health and safety considerations together with practical measures such as details of temporary works, programme of works, waste management licences and regulatory consents required. Agreement should again be sought of the appropriate statutory bodies for this Plan.

The Verification Plan sets out the requirements for gathering data to demonstrate that the remediation has met the required remediation objectives and criteria. The Verification Plan presents the requirements for a wide range of issues including the level of supervision, sampling and testing regimes for treated materials, waste and imported materials, required monitoring works during and post remediation, how compliance with all licenses and consents will be checked etc. Agreement should again be sought of the appropriate statutory bodies for the Verification Plan. On completion of the remediation a Verification Report should be produced to provide a complete record of all remediation activities on site and the data collected as required in the Verification Plan. The Verification Report should demonstrate that the remediation has met the remedial targets to show that the site is suitable for the proposed use.

APPENDIX M: NOTES ON LIMITATIONS

`Notes on Limitations
For
Geoenvironmental and Geotechnical Consultancy Services

General

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Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Factual Ground Investigations

The investigation of the site has been carried out in accordance with the scope and specification instructed by the Client. No interpretations of the data generated by the investigation have been provided or implied. The exploratory holes undertaken in this commission, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. Conditions may exist on the site which have not been detected by the works undertaken. Furthermore, the number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” or more widespread contamination where concentrations may be significantly higher than those actually encountered.

Interpretative Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by factors including inter alia the Clients budget, the available timescale, access to all parts of the site, the existence of buried services etc., and where this is the case, a more comprehensive investigation may be required if the site is to be redeveloped, since a number of important engineering and environmental issues may need further assessment.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

It must be borne in mind, that the exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” or more widespread contamination where concentrations may be significantly higher than those actually encountered. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out within the constraints of Client budget, available timeframe, access to all parts of the site, the existence of buried services and a more comprehensive investigation may be required to provide sufficient information regarding the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to formulate a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations and no liability can be accepted for the retrospective effects of any future changes or amendments to these values.