

CCG-C-23-13693

**GROUND INVESTIGATION REPORT
FOR LAND TO THE REAR OF NO. 309 DICKENSON ROAD
LONGSIGHT
MANCHESTER
M13 0NR
MARCH 2023**

Prepared for:

MARSTON & GRUNDY CONSULTING ENGINEERS LLP

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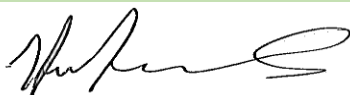
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Project Title:	Ground Investigation Report for land to the rear of No. 309 Dickenson Road, Longsight, Manchester, M13 0NR
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For and behalf of CC GEOTECHNICAL LTD	
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1.0 INTRODUCTION

CC GEOTECHNICAL LIMITED (CCG) was commissioned by **MARSTON AND GRUNDY CONSULTING ENGINEERS LLP** to provide geotechnical fieldwork investigation and laboratory testing services in connection with the proposed redevelopment of land at the rear of No. 309 Dickenson Road, Longsight, Manchester, M13.

It is understood that the site is to be redeveloped for residential use by the construction of 2nr x 3-storey residential dwellings fronting onto Honor Street, each constructed in traditional brick elevations under pitched roofs, together with associated off-road car parking facilities and front and rear private gardens.

The existing and proposed layout of the development are as annotated on **CORSTROPHINE AND WRIGHT** architectural drawings contained herein.

The proposed development falls within the administrative jurisdiction of **MANCHESTER CITY COUNCIL**.

This investigation was required to provide factual geotechnical and geochemical information, informing interpretative discussion on the selection and design of suitable foundations.

It must be borne in mind that the data and opinions contained in this report should be read in conjunction with the Notes on Limitations contained in Appendix J.

2.0 SITE LOCATION

The site is located immediately to the north of Dickenson Street, and to the east of Birch Lane, Longsight, Manchester, M13 ONR as illustrated on **CCG** Drawing No. CCG-C-23-13693-1 and Aerial Plate No. CCG-C-23-13693-2 contained herein.

The approximate **ORDNANCE SURVEY (OS)** coordinates for the overall site centre are 386502, 395440. It stands at an approximate elevation of c.47.5maOD.

3.0 DOCUMENTED GEOLOGY & HYDROGEOLOGY

3.1 Introduction

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

3.2 Solid & Drift Geology, & Hydrogeology

The **BGS** superficial drift mapping data indicates that the site is underlain by natural drift deposits comprising diamicton (boulder clay) of glacial origin (*Pleistocene Epoch - Late Quaternary - Devensian Sub Age*).

As at all previously develop sites, made ground soils of an unknown thickness composition and extent may immediately underlie parts of the site.

4.0 FIELDWORK

4.1 Introduction

The field investigation works were undertaken in February 2023, and comprised the following:

- The CAT scanning, manual excavation, and logging of 3nr borehole starter pits including subsampling of arisings for soil contamination and engineering classification testing.
- The sinking of boreholes from the base of each starter pit using light dynamic sampling methods with associated *in-situ* testing and undisturbed sampling.
- The reinstatement of borehole positions to GL using bentonite clay pellets

The works were carried out in accordance with BS10175: 2011 and BS5930: 2015, and BS1377: 1990 as far as they related to the specified scope.

The locations of the boreholes are as annotated **CORSTROPHINE AND WRIGHT** Drawing No. 19584-0302-P-01 "Existing Site Plan" contained herein.

4.2 Light Dynamic Sampling Boreholes

In accordance with the ground investigation plan, 3nr boreholes were sunk using a Dando Terrier 2000 light dynamic sampling rig and associated tools.

Each borehole location was positioned clear of known buried and overhead services and was scanned using a CAT service scanner before and during hand excavation of a starter pit extending to 1.2mbgl.

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

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 engineering classification testing were removed at appropriate intervals. Samples for 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/m²) values and standpipe construction details are presented in Appendix C.

5.0 OBSERVED STRATIGRAPHY

The observed ground conditions are consistent with the **BGS** documented geology.

Table 1: Observed Stratigraphy

Observed Stratigraphy	
WS01	Grassed topsoil overlying natural drift deposits comprising firm becoming stiff brown boulder clay, proven to 5mbgl. Borehole reported to be dry on completion
WS02	Superficial made ground deposits comprising dark brown slightly silty gravelly sand extending to 0.6mbgl. Thereafter the sequence continues in natural drift deposits comprising firm becoming stiff brown boulder clay, proven to 5mbgl. Borehole reported to be dry on completion
WS03	Grassed topsoil overlying superficial made ground deposits comprising brown very silty gravelly sand extending to 0.8mbgl. Thereafter the sequence continues in natural drift deposits comprising soft becoming stiff brown boulder clay, proven to 5mbgl. Borehole reported to be dry on completion.

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

6.0 GROUNDWATER

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

7.0 LABORATORY TESTING

7.1 Soil Classification Testing

The following analyses were undertaken at a UKAS / MCERTS accredited laboratory associated with **CCG**:

- 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
- 3nr subsamples of soil were analysed for pH and water-soluble sulphate content

The soil classification and chemical analysis test results and certificates are presented in Appendix E.

7.2 Soil Contamination Analyses

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

- 3nr subsamples of borehole recovery were analysed to a broad-spectrum suite of contaminants including metals, non-metals, heavy metals, speciated PAH's., hydrocarbons to the TPHCWG methodology, asbestos containing materials (ACM's)

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

8.0 GEOTECHNICAL ASSESSMENT

8.1 Introduction

It is understood that the site is to be redeveloped for residential land use by the construction of 2nr x 3-storey residential dwellings.

This investigation generally confirmed the presence of grassed topsoil, locally overlying superficial made ground deposits comprising firm, locally soft, becoming stiff brown

boulder clay, proven at all exploratory sampling positions to 5mbgl.

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

The appended soil classification tests results confirm the underlying clay deposits to be of 'Low-Intermediate' plasticity, hence 'Low – Intermediate' shrinkability.

8.2 Foundations & Floor Slabs

8.2.1 Foundations

Taking into account the above ground observations, traditional strip (*spread*) foundations may be adopted with foundations bearing directly on the natural firm becoming stiff clay deposits.

It is recommended that foundations should be set at a notional depth of 1.5mbgl and may be designed on a Presumed Bearing Value of 120kN/m² for a settlement of <15mm.

The appended soil engineering test results confirm the clay strata is of 'Low – Intermediate' plasticity and hence 'Low – Intermediate' shrinkability. Should tree planting/removal be planned, then foundation depths may require adjustment to comply with the guidance contained in NHBC Standards Chapter 4.2.

Where placement of structural concrete does not immediately follow trench excavation, the clay formations should be protected by placement of blinding concrete to prevent deterioration.

8.2.2 Floor Slabs

In the observed ground condition, ground bearing slabs may be adopted, subject to rigorous preparation of the subgrade: Such preparation should include as a minimum:

- Reduction in ground levels to 450mm below slab underside, ensuring all organic soils has been removed
- Thorough compaction under walking supervision at reduced level with any areas exhibiting excessive deflection being grubbed out in 200mm increments and in-filled with thoroughly compacted DTp Type 1 subbase
- Placement and compaction of 3 x 150mm layers DTp Type 1 subbase
- Construction of blinding sand, dpm, slab, screed, and finishes.

As an alternative, fully suspended, passively vented, block and beam floors may be adopted.

8.3 Groundwater Management

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

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

9.0 **BURIED CONCRETE SPECIFICATION**

Based on the appended soil pH and water soluble-sulphate content results, 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.

10.0 **HUMAN HEALTH RISK ASSESSMENT**

10.1 **Generic Quantitative Risk Assessment (Tier 2 / GQRA)**

An assessment of the soil analysis data was carried out in accordance with the guidance as presented in '*Land contamination risk management*' (LCRM) (2020)) and '*LQM/CIEH S4ULs for Human Health Risk Assessment*' (2015), and in accordance with current guidance and legislation.

The Human Health Risk Assessment was carried out in accordance with the CCG methodology for assessing soil contamination data as contained in Appendix I, and since it is proposed that the site be developed for residential land use with associated front and rear private gardens, the assessment was based on criteria contained in publication LQM/CIEH S4UL's for Human Health Risk Assessment (2015) (CCG licence 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 published by DEFRA SP1010 Development of Category 4 Screening Levels.

10.2 **Assessment of Contamination Data**

Based on a Soil Organic Matter content of 2.5%, the assessment of the soil data is summarised in the tabulations hereunder, and presented on the worksheets in Appendix G.

10.3 **Assessment of Metal Data**

The appended soil contamination results confirm the presence of elevated concentrations of Lead and Mercury at 2nr locations. Hence a potential risk to human health is indicated. All other contaminants are shown to be below their respective soil guideline criteria.

10.4 **Assessment of Non-Metal Data**

No contaminant exceeds its respective soil guideline criteria for commercial land use. Hence no risk to human health is indicated.

10.5 **Assessment of Polycyclic Aromatic Hydrocarbon Data**

The appended contamination summary sheets confirm the presence of elevated concentrations of Dibenzo[ah]anthracene in soils recovered from borehole WS03. Hence a potential risk to human health is indicated.

All other contaminants are seen to be below their respective soil guideline criteria for residential land use.

10.6 **Assessment of Petroleum Hydrocarbon Data**

No contaminant exceeds its respective soil guideline criteria for commercial land use. Hence no risk to human health is indicated.

10.7 **Assessment of BTEX Data**

All BTEX compounds were reported to be below their limit of detection and therefore no risk to human health is indicated.

10.8 **Assessment of Asbestos Data**

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

10.9 **Summary of Human Health Risk Assessment**

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

- Lead,
- Mercury
- Dibenzo[ah]anthracene

Hence a potential risk to human health is indicated and remedial works are required within gardens to mitigate such risk.

It is recommended that site levels within all proposed gardens be reduced by 600mm below proposed finished garden level, or to the surface of undisturbed natural drift deposits, whichever is the lesser, with site levels being reconstructed by the placement of clean imported topsoil

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.

It is recommended that all imported topsoil be placed under a strict validation regime comprising 1nr analyses per 50m³, with a minimum of 4nr analyses per source material.

Cover thickness on all gardens is to be independently validated by excavation and photography for inclusion in a Validation Report.

Notwithstanding the above, as with all developments, disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination insofar 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.

11.0 **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 H. This program generates the baseline '*Hazardous / Non-Hazardous*' classification of soils.

The appended HAZWASTE report classifies soil recovered at WS03 to be '*Hazardous*' by virtue of elevated concentrations

of total 'TPHCWG' compounds (1077mg/kg) and therefore surplus spoil from the made ground horizon at this location must be disposed at a suitable 'Hazardous' waste landfill facility.

All other soils analysed classify as being 'Non-Hazardous Waste.' and accordingly may be disposed of to a Non-Hazardous landfill.

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.

12.0 **NEW WATER MAINS SUPPLY**

The specification for new water mains at this site 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 findings indicate that the worst case soil concentrations of pertinent hydrocarbon contaminant species are above the threshold concentrations permitted under the UKWIR guidance for the adoption of normal polyethylene mains, and therefore all new water mains should be specified as composite polyethylene pipe, in the form of normal PE-AL-PE barrier pipe construction.

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 PE as stated in UKWIR guidance.

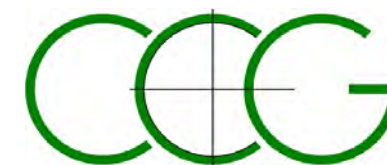
Notwithstanding the above preliminary assessment, the developer should contact the relevant water supply company (**UNITED UTILITIES**) to obtain concurrence with the recommendations given above and may be required to return a completed Risk Assessment.

APPENDIX A: DRAWINGS



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Notes: Study Site



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

Client:
Marston & Grundy

Project:
309 Dickenson Rd', Longsight, M13

Title:
Aerial Photograph

Scale: NTS	Issue: 01
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Drawn by: DG	Date: Feb' 2023
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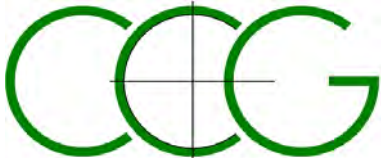
Project No. CCG-C-23-13693	Drawing No. 01
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Notes: Study Site



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

Client:
Marston & Grundy

Project:
309 Dickenson Rd', Longsight, M13

Title:
Aerial Photograph

Scale:
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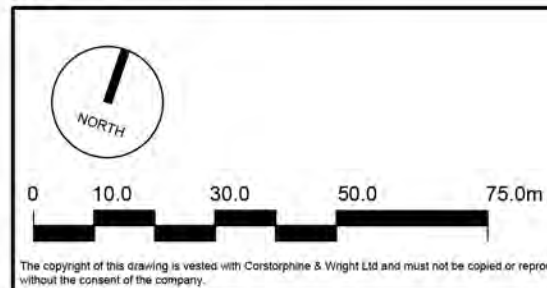
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Drawn by:
DG

Date:
Feb' 2023

Project No.
CCG-C-23-13693

Drawing No.
02



Client
ZENO LIMITED

Project
**DICKENSON ROAD
MANCHESTER**

Drawing Title
EXISTING SITE PLAN

Drawing Status
PLANNING

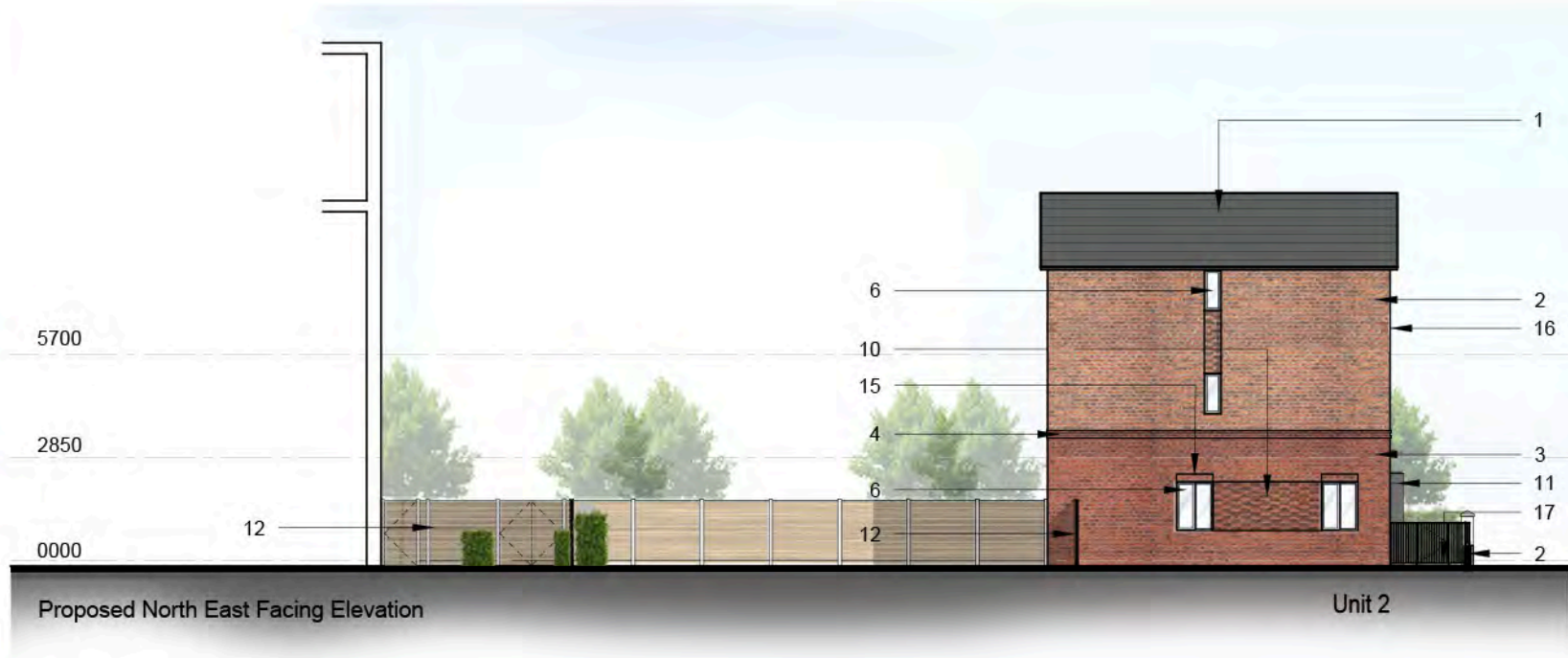
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0161 272 8100
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Drawing No. 19584-0302				Revision P-01	
Drawn JH	Checked LM	Paper Size A3	Scale 1:250/1:2500	Date 09.04.2020	

Rev.	Description	Date	Drawn	Chk
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KEY			
1	Slate finish (or similar aproved)	8	Painted Timber door - (Mid-Grey - TBA)
2	Brickwork (Type 1 - TBA)	9	Recessed brickwork detail (Type 1 - TBA)
3	Brickwork (Type 2 - TBA)	10	Recessed patterned brickwork panel
4	Projecting brick coursing (Type 2 - TBA)	11	Aluminium flashing - (Dark Grey - TBA)
5	Aluminium framed glazed doorset (colour - dark grey - TBA)	12	Timber Fence & Gates
6	Aluminium framed glazed windows (colour - dark grey - TBA)	13	Stone head/sill
7	Aluminium composite cladding panel (colour - mid-grey - TBA)	14	Curtain wall glazing
		15	Brick header course (Type 2 - TBA)
		16	Accent brick banding (Type 2 - TBA)
		17	Vertical Bar Metal Railings & Gates



0

2.0

4.0

6.0

8.0

10.0

12.5m

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Rev.	Description	Date	Drawn	Chk.

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DICKENSON ROAD
MANCHESTER

Drawing Title

PROPOSED ELEVATIONS
UNITS 1 & 2

Drawing Status

PLANNING

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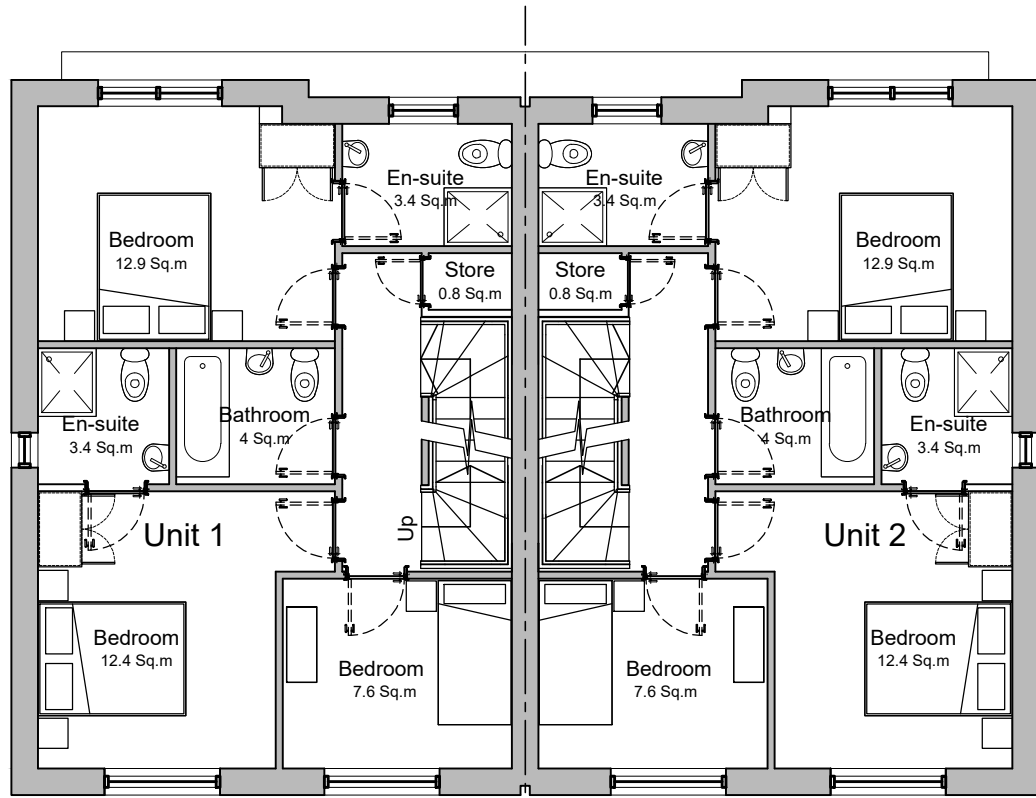
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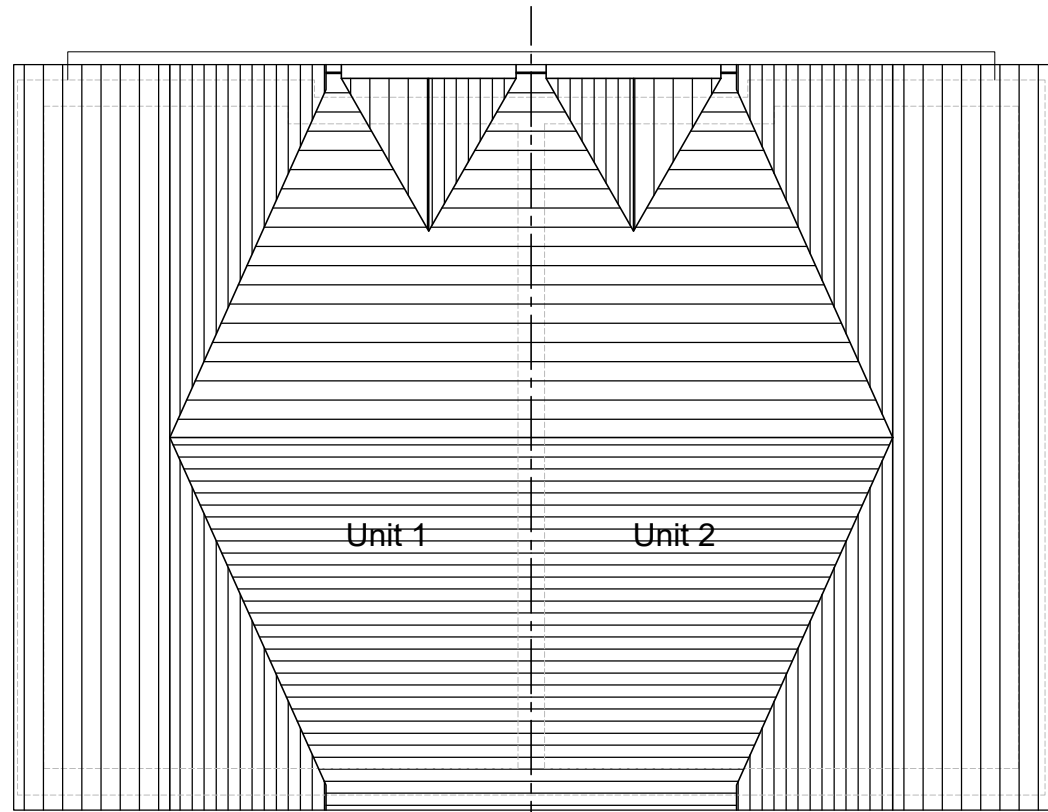
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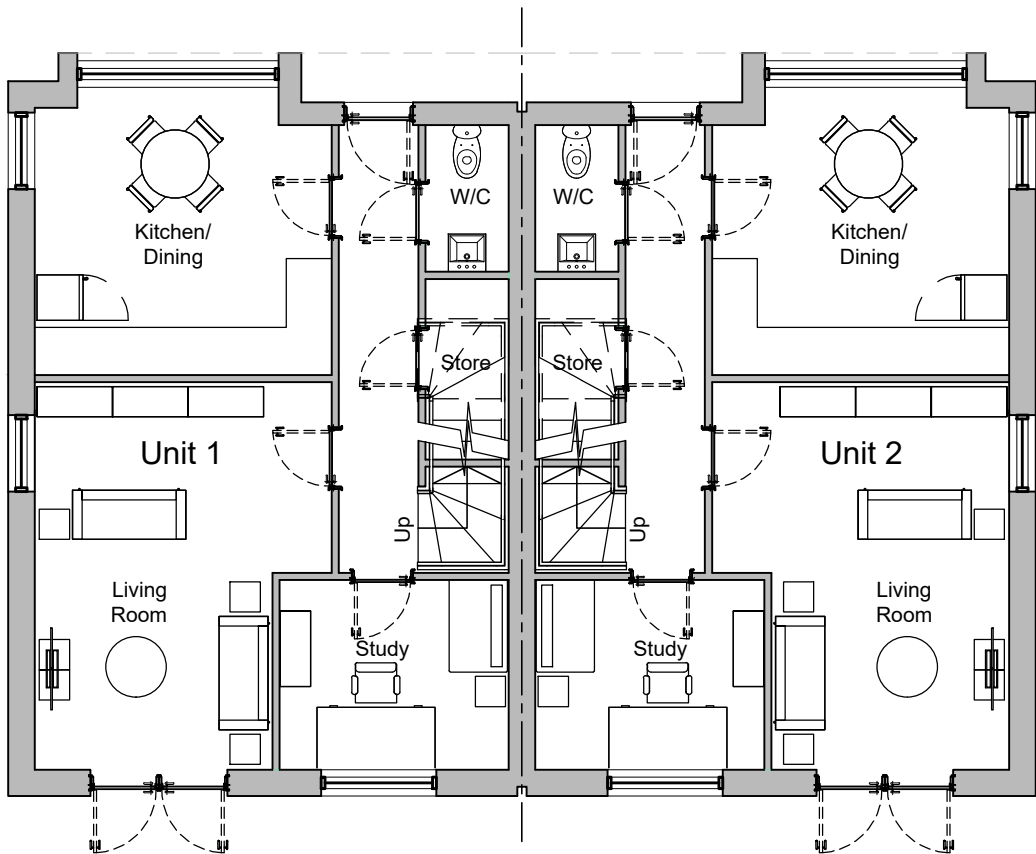
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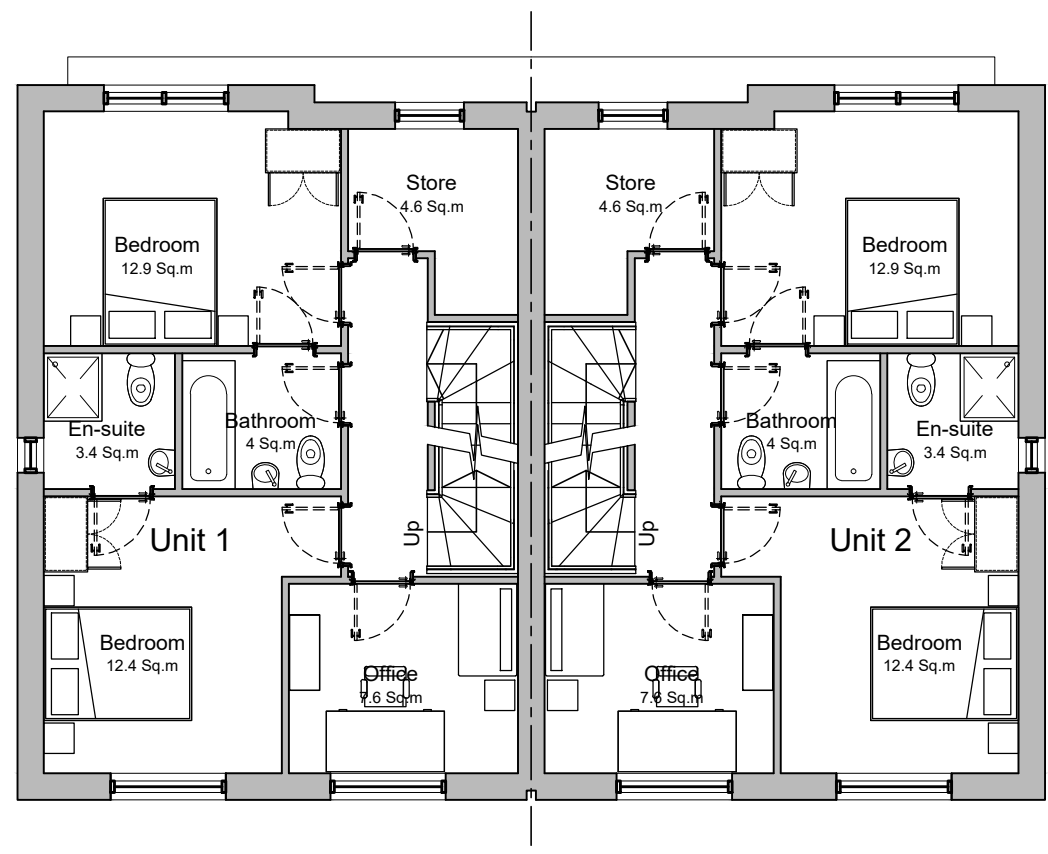
Proposed First Floor Plan



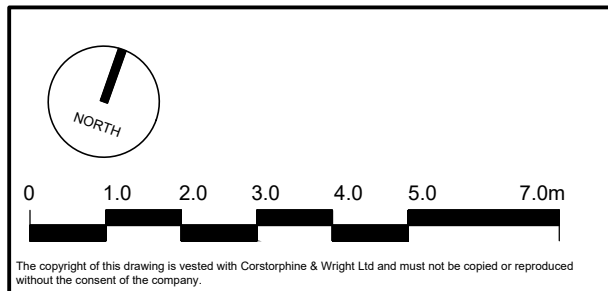
Proposed Roof Plan



Proposed Ground Floor Plan



Proposed Second Floor Plan



Rev.	Description	Date	Drawn	Chk.

				Client ZENO LIMITED		Corstorphine & Wright			
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				Drawing Title PROPOSED FLOOR PLANS UNITS 1 & 2		Drawing No. 19584-0304			Revision P-04
Drawing Status PLANNING		Drawn JAS	Checked LM	Paper Size A3	Scale 1:100	Date 17.02.2021			

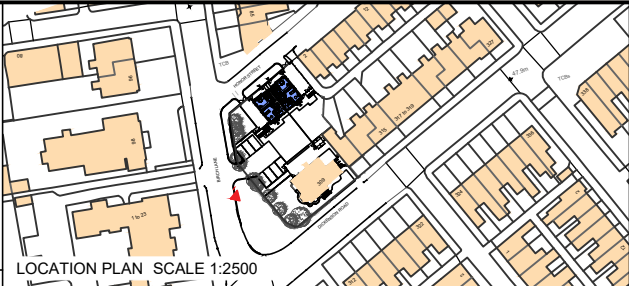


1 PROPOSED VIEW FROM BIRCH LANE
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DICKENSON ROAD
MANCHESTER
Drawing Title
VISUAL 04
Drawing Status
PLANNING

Corstorphine & Wright

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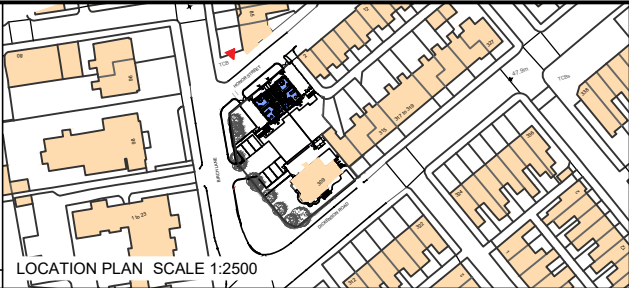


1 PROPOSED VIEW FROM BIRCH LANE APPROACHING HONOR STREET
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Project
**DICKENSON ROAD
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Drawing Title
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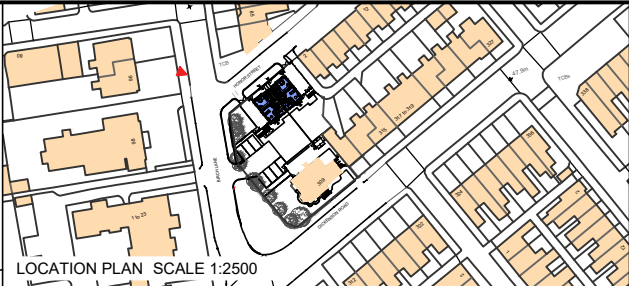


1 PROPOSED VIEW FROM JUNCTION OF BIRCH LANE-HONOR STREET
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DICKENSON ROAD
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Drawing Title
VISUAL 02
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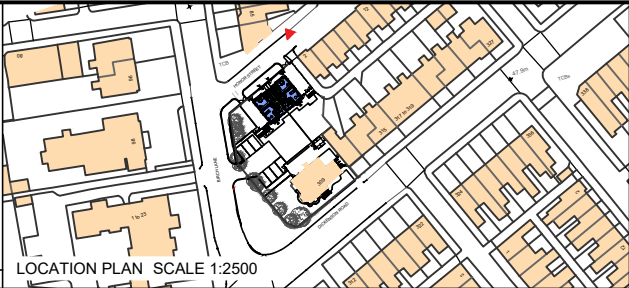


1 PROPOSED VIEW ALONG HONOR STREET
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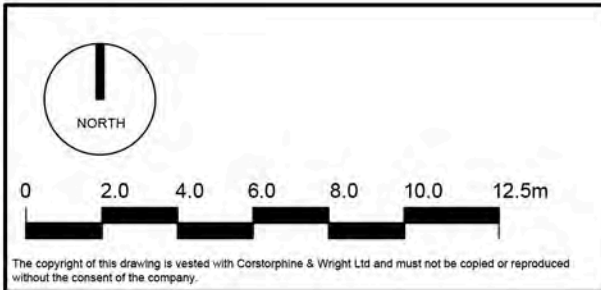
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Revision
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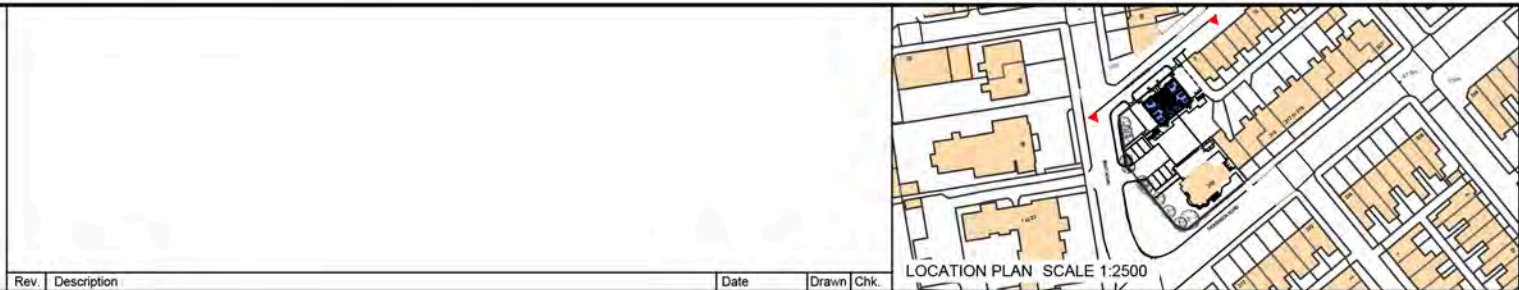


1 PROPOSED STREET SCENE - HONOR STREET
SCALE 1:200

KEY			
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2	Brickwork (Type 1 - TBA)	9	Recessed brickwork detail (Type 1 - TBA)
3	Brickwork (Type 2 - TBA)	10	Recessed patterned brickwork panel
4	Projecting brick coursing (Type 2 - TBA)	11	Aluminium flashing - (Dark Grey - TBA)
5	Aluminium framed glazed doorset (colour - dark grey - TBA)	12	Timber Fence & Gates
6	Aluminium framed glazed windows (colour - dark grey - TBA)	13	Stone head/sill
7	Aluminium composite cladding panel (colour - mid-grey - TBA)	14	Curtain wall glazing
		15	Brick header course (Type 2 - TBA)
		16	Accent brick banding (Type 2 - TBA)
		17	Vertical Bar Metal Railings & Gates



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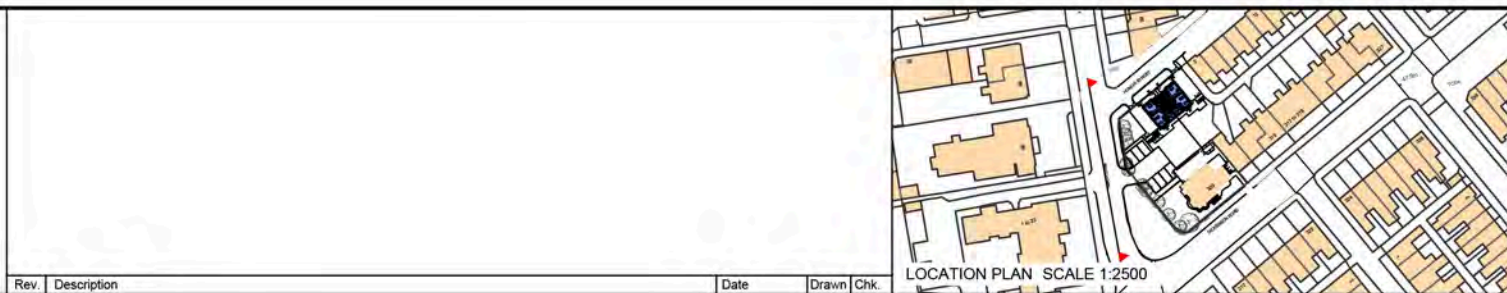
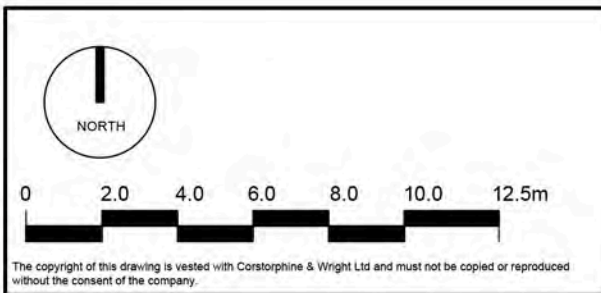


Client ZENO LIMITED		Corstorphine & Wright			
Project DICKENSON ROAD MANCHESTER					
Drawing Title PROPOSED STREET SCENE HONOR STREET		Manchester Studio The Stables, Paradise Wharf, Ducie Street, Manchester, M1 2JN 0161 272 8100 corstorphine-wright.com			
Drawing Status PLANNING		Drawing No. 19584-0313		Revision P-03	
Drawn NI	Checked JS	Paper Size A3	Scale 1:200/1:2500	Date 20.04.2021	

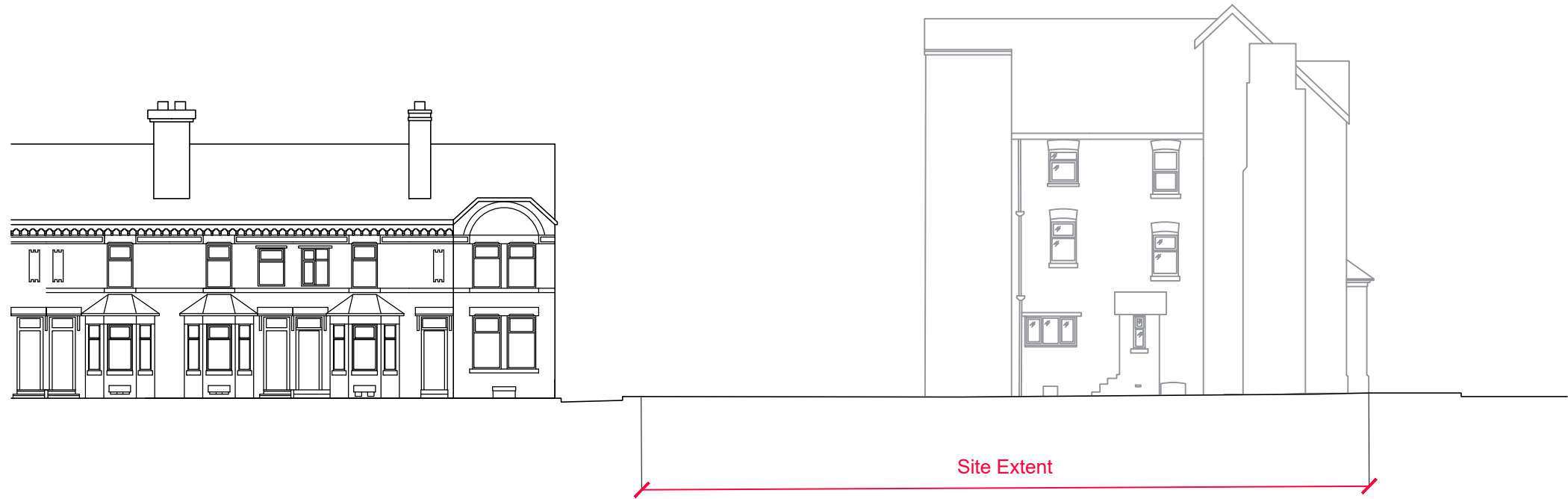


1 PROPOSED STREET SCENE - BIRCH LANE
SCALE 1:200

KEY	
1	Slate finish (or similar aproved)
2	Brickwork (Type 1 - TBA)
3	Brickwork (Type 2 - TBA)
4	Projecting brick coursing (Type 2 - TBA)
5	Aluminium framed glazed doorset (colour - dark grey - TBA)
6	Aluminium framed glazed windows (colour - dark grey - TBA)
7	Aluminium composite cladding panel (colour - mid-grey - TBA)
8	Painted Timber door - (Mid-Grey - TBA)
9	Recessed brickwork detail (Type 1 - TBA)
10	Recessed patterned brickwork panel
11	Aluminium flashing - (Dark Grey - TBA)
12	Timber Fence & Gates
13	Stone head/sill
14	Curtain wall glazing
15	Brick header course (Type 2 - TBA)
16	Accent brick banding (Type 2 - TBA)
17	Vertical Bar Metal Railings & Gates



Client ZENO LIMITED		Corstorphine & Wright			
Project DICKENSON ROAD MANCHESTER					
Drawing Title PROPOSED STREET SCENE BIRCH LANE		Manchester Studio The Stables, Paradise Wharf, Ducie Street, Manchester, M1 2JN 0161 272 8100 corstorphine-wright.com			
Drawing Status PLANNING		Drawing No. 19584-0312			Revision P-03
Drawn NI	Checked JS	Paper Size A3	Scale 1:200/1:2500	Date 20.04.2021	



1 EXISTING STREET ELEVATIONS - HONOR STREET
SCALE 1:200

NORTH

0

2.0

4.0

6.0

8.0

10.0

12.5m

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Rev.	Description	Date	Drawn	Chk.

Garage

North House School (opposite school)

14-22 Birch Court

15-17 Birch Court

18-20 Birch Court

21-23 Birch Court

24-26 Birch Court

27-29 Birch Court

30-32 Birch Court

33-35 Birch Court

36-38 Birch Court

39-41 Birch Court

42-44 Birch Court

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48-50 Birch Court

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977-979 Birch Court

980-982 Birch Court

983-985 Birch Court

986-988 Birch Court

989-991 Birch Court

992-994 Birch Court

995-997 Birch Court

998-1000 Birch Court

LOCATION PLAN SCALE 1:2500

Client
ZENO LIMITED

Project
DICKENSON ROAD
MANCHESTER

Drawing Title
EXISTING STREET ELEVATION
HONOR STREET

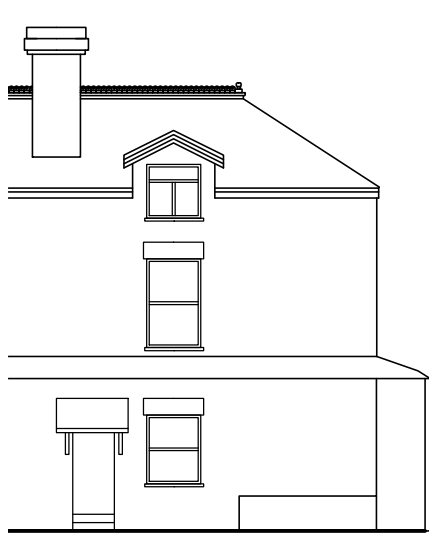
Drawing Status
PLANNING

Manchester Studio
The Stables, Paradise Wharf, Ducie Street, Manchester, M1 2JN
0161 272 8100
corstorphine-wright.com

Drawing No.
19584-0203

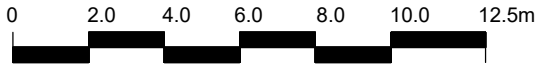
Revision
P-01

Drawn	Checked	Paper Size	Scale	Date
JH	LM	A3	1:200/1:2500	20.04.2020



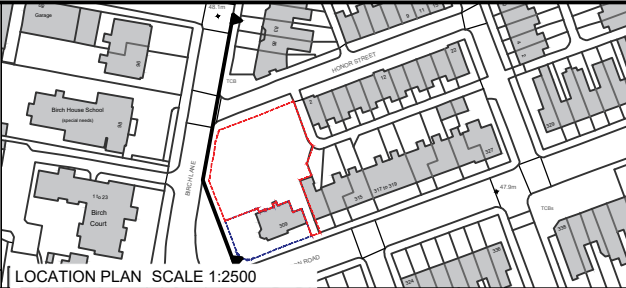
Site Extent

1 EXISTING STREET ELEVATIONS - BIRCH LANE
SCALE 1:200



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Rev.	Description	Date	Drawn	Chk.
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LOCATION PLAN SCALE 1:2500

Client
ZENO LIMITED

Project
DICKENSON ROAD
MANCHESTER

Drawing Title
EXISTING STREET ELEVATION
BIRCH LANE

Drawing Status
PLANNING

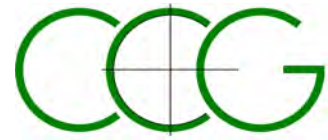
Corstorphine & Wright

Manchester Studio
The Stables, Paradise Wharf, Ducie Street, Manchester, M1 2JN
0161 272 8100
corstorphine-wright.com

Drawing No. 19584-0202				Revision P-01	
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Drawn JH	Checked LM	Paper Size A3	Scale 1:200/1:2500	Date 20.04.2020
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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°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 °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.

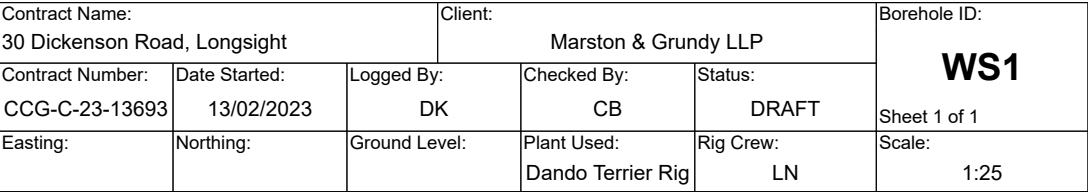
The flow meter is first attached to the standpipe valve, and the flow rate is measured (peak and steady flow) for 1 minute. The results are recorded in l.hr^{-1} . The flow meter tube is protected from the effects of wind by aligning the exhaust downwind.

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.

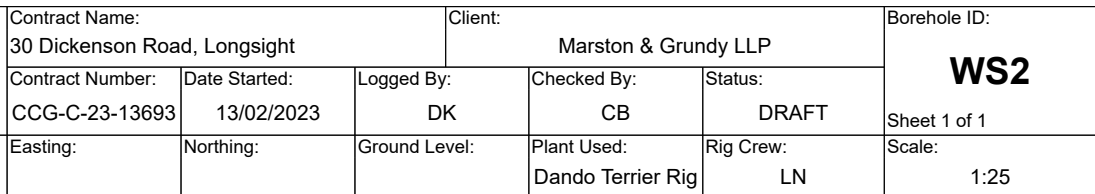
APPENDIX C: BOREHOLE LOGS



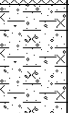
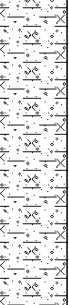
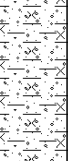
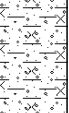
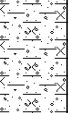
Samples & In Situ Testing	Strata Details	Groundwater
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Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.00 - 1.00	U			(0.30)		TOPSOIL. Recovered as dark brown slightly sandy slightly gravelly silty organic CLAY. Gravel is fine to medium sub-angular brick and coal with inclusions of wood		
0.40	ES			0.30		Greyish brown slightly andy slightly gravelly silty CLAY. Gravel is fine to coarse sub-rounded mudstone		
				(0.70)				
1.00 - 2.00	U	SPT(S)N=8 (1,2/2,2,2,2)		1.00		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse sub-rounded mudstone	1	
		HVP=100						
2.00 - 3.00	U	SPT(S)N=11 (2,3/2,3,3,3)					2	
		HVP=90						
		HVP=100						
3.00 - 4.00	U	SPT(S)N=27 (4,4/5,6,8,8)		(4.00)			3	
		HVP=100						
		HVP=110						
4.00 - 5.00	U	SPT(S)N=19 (2,4/4,4,5,6)					4	
		HVP=110						
		HVP=90						
		HVP=90						
				5.00		End of Borehole at 5.00m	5	

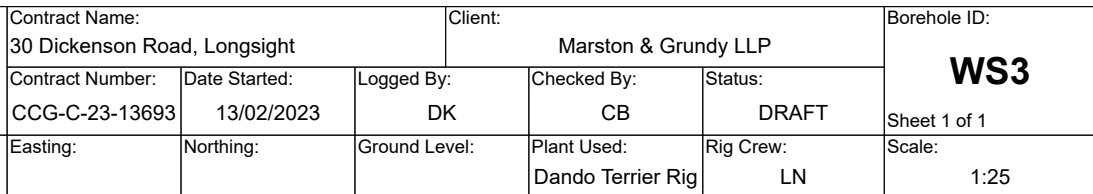
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	1 hour hand excavating 1.20mbgl service avoidance pit					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														



Weather:	Termination:	SPT Hammer: N/R, Energy Ratio: N/R
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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			(0.60)		Dark brown very gravelly silty SAND. Gravel is fine to coarse sub-angular to sub-rounded brick, coal, sandstone and mudstone with frequent inclusions of roots (MADE GROUND)		
0.50	ES			0.60		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse sub-angular to sub-rounded mudstone and sandstone		
1.00 - 2.00	U	SPT(S)N=8 (1,1/2,2,2,2)					1	
		HVP=100						
2.00 - 3.00	U	SPT(S)N=16 (2,2/3,3,4,6)					2	
		HVP=110						
		HVP=110		(4.40)				
3.00 - 4.00	U	SPT(S)N=21 (3,3/4,5,6,6)					3	
		HVP=110						
		HVP=110						
4.00 - 5.00	U	SPT(S)N=18 (3,3/4,4,5,5)					4	
		HVP=110						
		HVP=110		5.00		End of Borehole at 5.00m	5	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
1 hour hand excavating 1.20mbgl service avoidance pit														
Water Strikes														
Chiselling				Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)						
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														



Samples & In Situ Testing	Strata Details	Groundwater
---------------------------	----------------	-------------

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit Water Strikes <table><thead><tr><th>Strike (m)</th><th>Casing (m)</th><th>Sealed (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table> CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks						
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																
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)													

APPENDIX D: GAS – GROUNDWATER MONITORING

APPENDIX E: SOIL CLASSIFICATION

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

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Email: enquiries@ccgeotechnical.com
www.ccgeotechnical.com



LABORATORY REPORT

CONTRACT NUMBER: CCG-C-23-13693

CONTRACT TITLE: 309 DICKENSON ROAD, LONGSIGHT

CLIENT: MARSTON & GRUNDY LLP

DATE RECEIVED: 15/02/23
DATE COMMENCED: 15/02/23
DATE COMPLETED: 02/03/23
REPORT DATE: 03/03/23

Test Description	Qty
Determination of Moisture Content BS 1377-2:1990 (a)	6
Determination of Liquid & Plastic Limits BS 1377-2:1990 (a)	6

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
WS01	WS	1.30	1.30	18	-	-	-	38	17	21	94	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone. (BS1377Pt2:3.2,4.4,5)
WS01	WS	2.60	2.60	13	-	-	-	29	14	15	89	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone. (BS1377Pt2:3.2,4.4,5)
WS02	WS	1.40	1.40	18	-	-	-	39	16	23	95	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone & sandstone. (BS1377Pt2:3.2,4.4,5)
WS02	WS	2.60	2.60	16	-	-	-	36	16	20	93	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone & sandstone. (BS1377Pt2:3.2,4.4,5)
WS03	WS	1.30	1.30	15	-	-	-	35	16	19	91	CL / CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone & sandstone. (BS1377Pt2:3.2,4.4,5)
WS03	WS	2.60	2.60	11	-	-	-	29	15	14	92	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone & sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: 309 DICKENSON ROAD, LONGSIGHT (CCG-C-23-13693)
 CLIENT: MARSTON & GRUNDY LLP

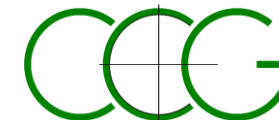
DATE: 03.03.23

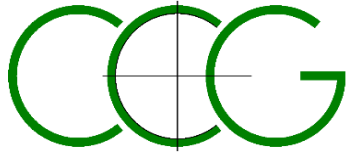
Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

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

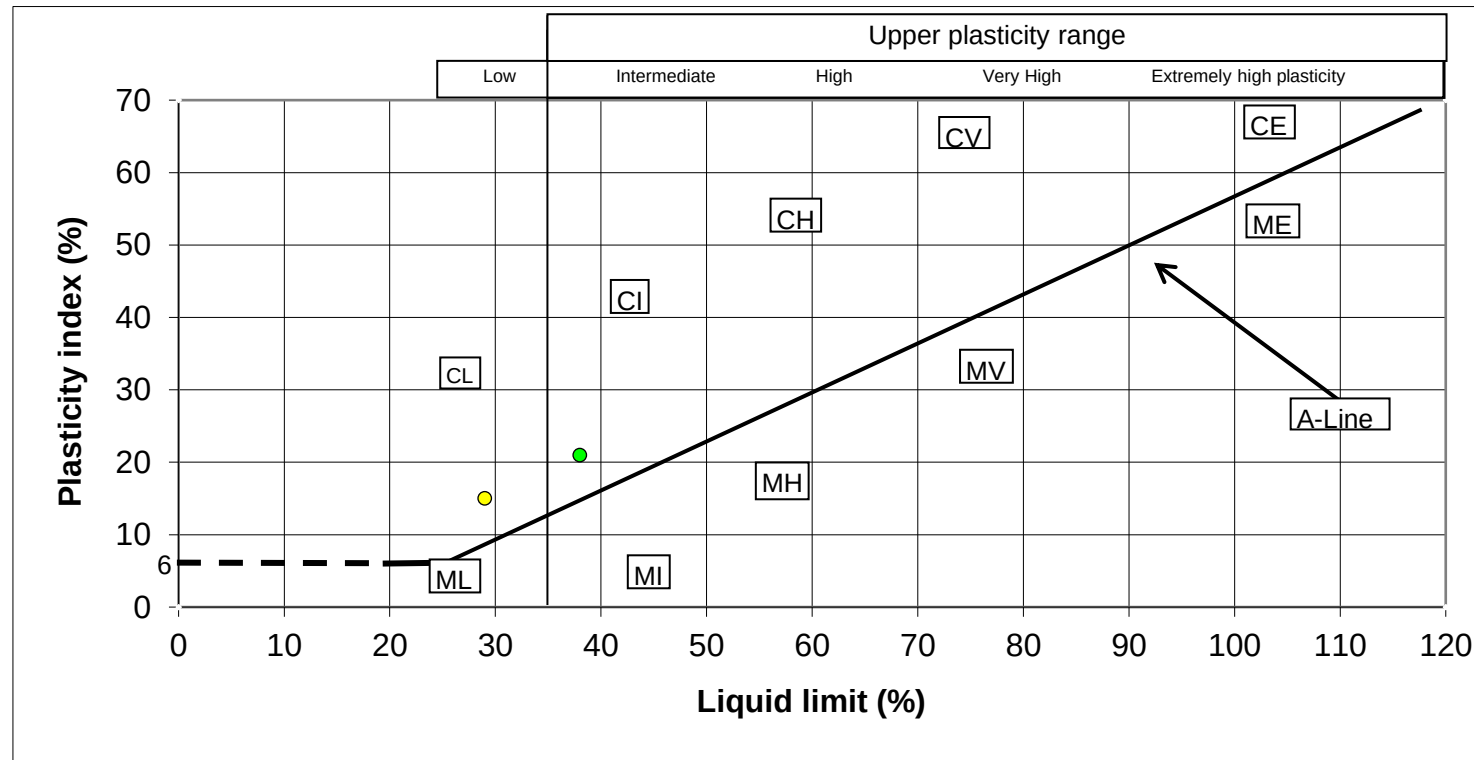




ATTERBERG TEST RESULT SHEET

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.

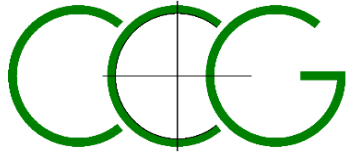


BH	Sample Depth	Liquid limit	Plasticity index
WS01	1.30	38.0	21.0
WS01	2.60	29.0	15.0



APPROVED BY DK

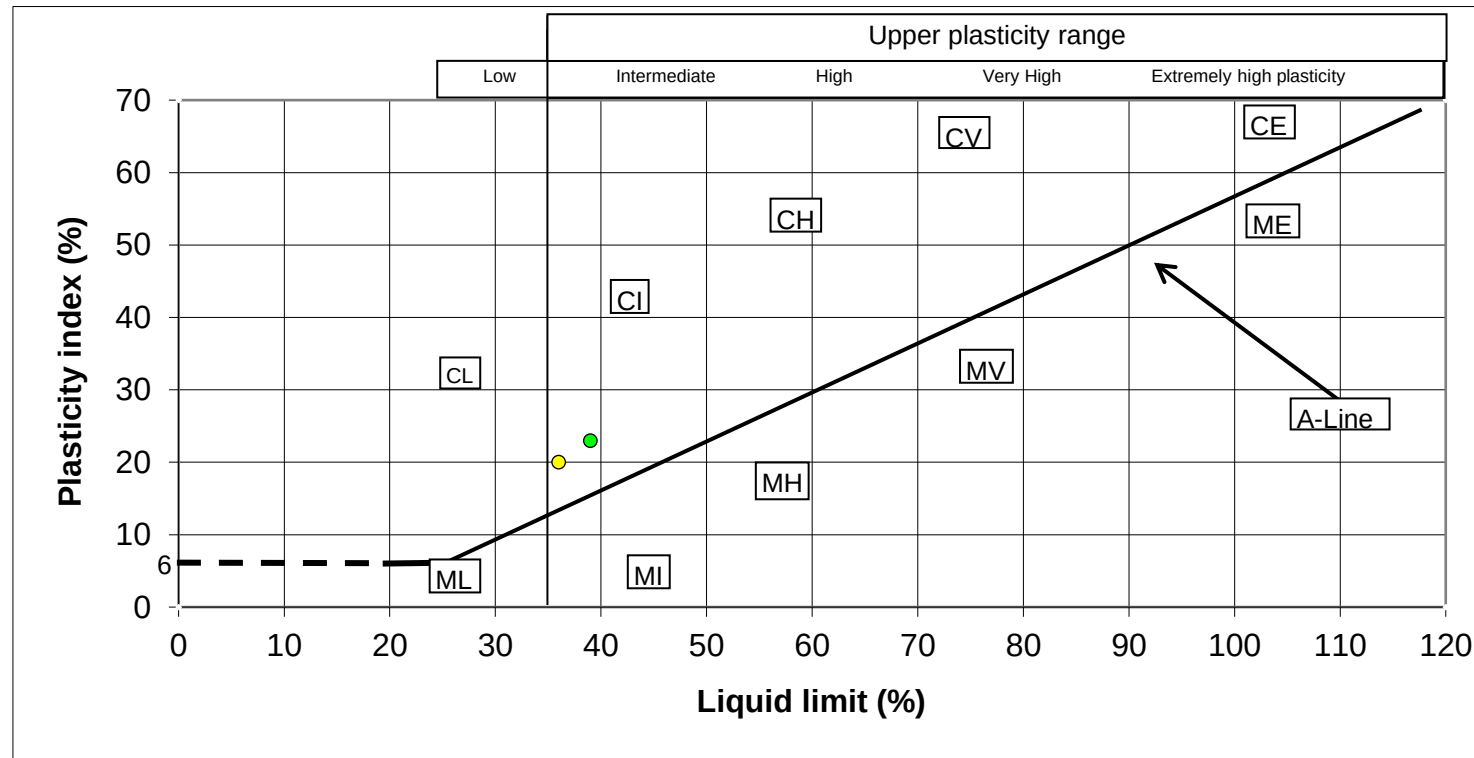
CLIENT: MARSTON & GRUNDY LLP SITE: 309 DICKENSON ROAD, LONGSIGHT (CCG-C-23-13693)



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.

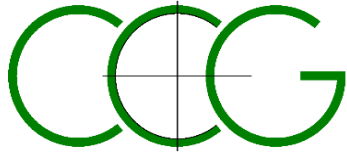


BH	Sample Depth	Liquid limit	Plasticity index
WS02	1.40	39.0	23.0
WS02	2.60	36.0	20.0



APPROVED BY DK

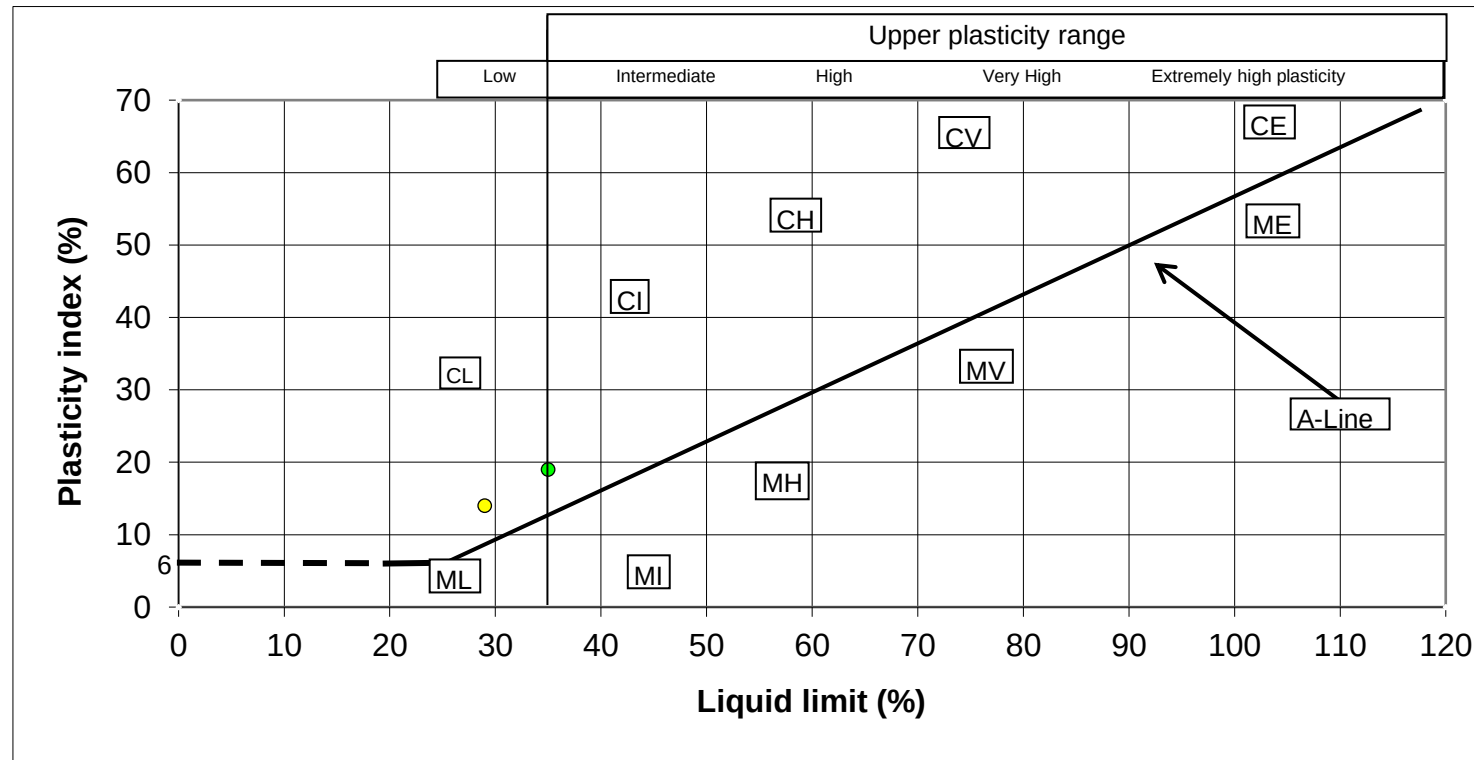
CLIENT: MARSTON & GRUNDY LLP SITE: 309 DICKENSON ROAD, LONGSIGHT (CCG-C-23-13693)



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
WS03	1.30	35.0	19.0
WS03	2.60	29.0	14.0



APPROVED BY	DK
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CLIENT: MARSTON & GRUNDY LLP	SITE: 309 DICKENSON ROAD, LONGSIGHT (CCG-C-23-13693)
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APPENDIX F: SOIL CONTAMINATION



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
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info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-46773

Issue: 1

Date of Issue: 06/03/2023

Contact: Tony Gerrard

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside L33 7BA

Quotation No: Q22-03450

Order No: Not Supplied

Customer Reference: CCG-C-23-13693

Date Received: 16/02/2023

Date Approved: 06/03/2023

Details: 309 Dickenson Road, Longsight

Approved by:

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

This report may only be reproduced in full



Sample Summary

Report No.: 23-46773, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
312395	WS01 0.40	13/02/2023	16/02/2023	Silty loam	
312396	WS02 0.50	13/02/2023	16/02/2023	Silty loam	
312397	WS03 0.50	13/02/2023	16/02/2023	Sandy loam	

Results Summary

Report No.: 23-46773, issue number 1

ELAB Reference				312395	312396	312397
Customer Reference						
Sample ID						
Sample Type				SOIL	SOIL	SOIL
Sample Location				WS01	WS02	WS03
Sample Depth (m)				0.40	0.50	0.50
Sampling Date				13/02/2023	13/02/2023	13/02/2023
Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	19.4	23.5	7.0
Material removed	N	%	0.1	21.8	35.3	59.4
Description of Inert material removed	N		0	Stones/Brick	Stones/Brick/Clinker	Stones/Clinker
Metals						
Antimony	N	mg/kg	2.5	2.7	4.4	5.3
Arsenic	M	mg/kg	1	21.4	31.5	20.1
Cadmium	M	mg/kg	0.5	< 0.5	0.6	0.8
Chromium	M	mg/kg	5	24.2	25.8	33.2
Copper	M	mg/kg	5	118	86.7	66.8
Lead	M	mg/kg	5	171	367	227
Mercury	M	mg/kg	0.5	< 0.5	16.2	1.3
Molybdenum	N	mg/kg	0.5	2.7	4.4	2.9
Nickel	M	mg/kg	5	28.2	30.3	32.9
Selenium	M	mg/kg	1	< 1.0	1.1	< 1.0
Zinc	M	mg/kg	5	142	184	196
Anions						
Water Soluble Sulphate	M	g/l	0.02	0.03	< 0.02	0.09
Inorganics						
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2
Acid Soluble Sulphate (SO ₄)	U	%	0.02	0.04	0.05	0.11
Water Soluble Boron	N	mg/kg	0.5	0.8	0.7	< 0.5
Miscellaneous						
pH	M	pH units	0.1	7.6	7.5	9.7
Soil Organic Matter	U	%	0.1	3.0	4.6	2.7
Polyaromatic hydrocarbons						
Naphthalene	SM	mg/kg	0.02	< 0.02	0.15	0.15
Acenaphthylene	SM	mg/kg	0.02	< 0.02	0.06	0.08
Acenaphthene	SM	mg/kg	0.02	< 0.02	0.25	0.34
Fluorene	S	mg/kg	0.02	< 0.02	0.21	0.22
Phenanthrene	SM	mg/kg	0.02	0.06	2.30	2.41
Anthracene	S	mg/kg	0.02	< 0.02	0.57	0.63
Fluoranthene	SM	mg/kg	0.02	0.08	3.93	4.41
Pyrene	SM	mg/kg	0.02	0.09	3.91	4.08
Benzo(a)anthracene	S	mg/kg	0.02	0.04	1.73	1.94
Chrysene	SM	mg/kg	0.02	0.06	1.95	2.24
Benzo(b)fluoranthene	SM	mg/kg	0.02	0.06	2.13	2.76
Benzo(k)fluoranthene	SM	mg/kg	0.03	< 0.03	0.67	1.03
Benzo(a)pyrene	S	mg/kg	0.02	0.05	1.61	2.23
Indeno(1,2,3-cd)pyrene	SM	mg/kg	0.02	0.03	1.12	1.67
Dibenzo(a,h)anthracene	SM	mg/kg	0.02	< 0.02	0.22	0.32
Benzo[g,h,i]perylene	SM	mg/kg	0.02	0.03	1.03	1.68
Total PAH(16)	NS	mg/kg	0.34	0.51	21.8	26.2
BTEX						
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 23-46773, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No.	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
312395	0.40	WS01	Brown Soil, Stones, Clinker, Brick, Organics	No asbestos detected	n/t	n/t	n/t	n/t
312396	0.50	WS02	Brown Soil, Stones, Clinker, Brick	No asbestos detected	n/t	n/t	n/t	n/t
312397	0.50	WS03	Brown Soil, Stones, Clinker, Concrete	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 23-46773, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	20/02/2023	107	Colorimetry
Sulphide	N	As submitted sample	22/02/2023	109	Colorimetry
Hexavalent chromium	N	As submitted sample	20/02/2023	110	Colorimetry
pH	M	Air dried sample	23/02/2023	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	23/02/2023	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	20/02/2023	300	ICPMS
Water soluble anions	M	Air dried sample	20/02/2023	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	21/02/2023	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	21/02/2023	181	GC-MS
BTEX in solids	M	As submitted sample	21/02/2023	181A	GC-MS
Water soluble boron	N	Air dried sample	20/02/2023	202	Colorimetry
Asbestos identification	U	Air dried sample	21/02/2023	281	Microscopy
Soil organic matter	U	Air dried sample	21/02/2023	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-46773, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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

Certificate of Analysis

Client: The Environmental Laboratory Ltd

Project: 23021929

Quote: BEC230228851 V1.2

Project Ref: Elab

Site: 23-46773

Contact: Brian Perry

Address: Unit A2, Windmill Road
Ponswood Ind. Est
St Leonards on Sea
East Sussex
TN38 9BY

E-Mail: bperry@elab-uk.co.uk

Phone: 01424 718618

No. Samples Received: 3

Date Received: 18/02/2023

Analysis Date: 01/03/2023

Date Issued: 01/03/2023

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory



Reported by Customer Service Co-Ordinator
Jacqui Hannah
01283 204384



Client: The Environmental Laboratory Ltd
Project Name: Elab-23-46773
Project No: 23021929
Date Issued: 01/03/2023

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
23021929-001	312395	15/02/2023 00:00:00	SOLID	Soil Sample
23021929-002	312396	15/02/2023 00:00:00	SOLID	Soil Sample
23021929-003	312397	15/02/2023 00:00:00	SOLID	Soil Sample



Client: The Environmental Laboratory Ltd
 Project Name: Elab-23-46773
 Project No: 23021929
 Date Issued: 01/03/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003
					Customer ID	312395	312396	312397
					Sample Type	SOLID	SOLID	SOLID
					Sampling Date	15/02/2023	15/02/2023	15/02/2023
>C6-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.240	<0.248	<0.200
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM		<0.012	<0.012	<0.010
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.240	<0.248	<0.200
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg^	UM		<0.048	<0.05	<0.040
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.240	<0.248	<0.200
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM		<0.012	<0.012	<0.010
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.240	<0.248	<0.200
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<12	<12	<10
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<12	<12	<10
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM		<24	<25	<20
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<12	<12	<10
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<12	<12	<10
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<4.81	<4.96	<4.00
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<4.81	<4.96	4.34
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<4.81	<4.96	12.4
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg^	U		<12.0	20.8	212
>C35-C44 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	6	mg/kg^	N		<7.21	<7.44	64.6
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U		<24.0	38.1	283
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<4.81	7.72	<4.00



Client: The Environmental Laboratory Ltd
 Project Name: Elab-23-46773
 Project No: 23021929
 Date Issued: 01/03/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003
					Customer ID	312395	312396	312397
					Sample Type	SOLID	SOLID	SOLID
					Sampling Date	15/02/2023	15/02/2023	15/02/2023
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		4.85	15.6	<4.00
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<4.81	49.8	39.9
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg^	U		<12.0	180	572
>C35-C44 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	6	mg/kg^	N		<7.21	28.5	176
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg^	U		26.0	278	760
Total Moisture at 35°C	CLANDPREP	0.1	%	N		16.8	19.4	<0.1
Description of Solid Material	CLANDPREP		-	N		CLAY	CLAY	SILT



Client: The Environmental Laboratory Ltd
 Project Name: Elab-23-46773
 Project No: 23021929
 Date Issued: 01/03/2023

Deviating Sample Report

<u>Sample Reference</u>	<u>Text ID</u>	<u>Method Code</u>	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
312395	23021929-001	BTEXHSA			✓			
312396	23021929-002	BTEXHSA			✓			
312397	23021929-003	BTEXHSA			✓			

Analysis Method

<u>Method Code</u>	<u>Method Description</u>	<u>Analysis Method</u>
BTEXHSA	BTEX by GCFID	As Received
CLANDPREP	Basic Solid Description	As Received
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
GROHSA/BTEXHSA	GRO CWG UK (C5-C10) Ali/Aro Split	As Received
TPHFIDUS (Aliphatic)	TPH (CWG UK) Aliphatic Split with Carbon Banding	As Received
TPHFIDUS (Aromatic)	TPH (CWG UK) Aromatic Split with Carbon Banding	As Received

Result Report Notes

Letters alongside results signify that the result has associated report notes.
 The report notes are as follows:

<u>Letter</u>	<u>Note</u>
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.
F	Based on the sample history, appearance and smell a dilution was applied prior to testing . Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
G	The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.



Client: The Environmental Laboratory Ltd
Project Name: Elab-23-46773
Project No: 23021929
Date Issued: 01/03/2023

HWOL Acronym Key

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35 °C.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35 °C.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis

APPENDIX G: SOIL CONTAMINATION SUMMARY TABLES

SOIL ASSESSMENT CRITERIA FOR RESIDENTIAL LAND USE (WITH HOME GROWN PRODUCE)

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)
<u>Metals</u>			
Arsenic	37	37	37
Boron	290	290	290
Cadmium	11	11	11
Chromium III	910	910	910
Chromium VI	6	6	6
Copper	240	240	240
*Lead	200	200	200
Mercury	1.2	1.2	1.2
Nickel	180	180	180
Selenium	250	250	250
Vanadium	410	410	410
Zinc	3700	3700	3700
<u>Non-Metals</u>			
Phenol	280	550	1100
<u>Polyaromatic Hydrocarbons (PAH)</u>			
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
<u>Petroleum Hydrocarbons</u>			
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 EC 5-7 (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

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.



METALS DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 23-13693

Site name: Dickenson Road, Longsight

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								
WS01	0.40	SOIL	< 0.5	24.2	< 0.8	118	171	< 0.5	28.2	142
WS02	0.50	SOIL	0.6	25.8	< 0.8	86.7	367	16.2	30.3	184
WS03	0.50	SOIL	0.8	33.2	< 0.8	66.8	227	1.3	32.9	196
Human Health Risk Assessment (GAC)			11	910	6	2400	200	1.2	180	3700



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

Job number: 23-13693

Site name: Dickenson Road, Longsight

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

			Semi/non-metals		Inorganics			Other		
Contaminants			Arsenic	Boron	Selenium	Cyanide (free)	Sulphate (water soluble)	Sulphate (water soluble)	pH (units)	Soil Organic Matter %
Units			mg/kg	mg/kg	mg/kg	mg/kg	g/l	mg/l	units	units
Limit of Detection			1.0	0.5	1.0	1.0	0.02	20.0	0.1	0.1
Human Health Risk Assessment (GAC)			37	290	250	22	NA	NA	NA	NA
Sample Location	Sample Depth (m)	Sample type								
WS01	0.40	SOIL	21.4	0.8	< 1.0	< 1.0	0.03	n/t	7.6	3
WS02	0.50	SOIL	31.5	0.7	1.1	< 1.0	< 0.02	n/t	7.5	4.6
WS03	0.50	SOIL	20.1	< 0.5	< 1.0	< 1.0	0.09	n/t	9.7	2.7
Human Health Risk Assessment (GAC)			37	290	11	22	NA	NA	NA	NA



SPECIATED PAH'S DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: 23-13693

Site name: Dickenson Road, Longsight

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			Acenaphthene	Acenaphthylene	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																	
WS01	0.40	SOIL	< 0.02	< 0.02	< 0.02	0.04	0.05	0.06	0.03	< 0.03	0.06	< 0.02	0.08	< 0.02	0.03	< 0.02	0.06	0.09	0.51
WS02	0.50	SOIL	0.25	0.06	0.57	1.73	1.61	2.13	1.03	0.67	1.95	0.22	3.93	0.21	1.12	0.15	2.3	3.91	21.8
WS03	0.50	SOIL	0.34	0.08	0.63	1.94	2.23	2.76	1.68	1.03	2.24	0.32	4.41	0.22	1.67	0.15	2.41	4.08	26.2
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



SPECIATED TPH'S DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: **23-13693**Site name: **Dickenson Road, Longsight**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			Speciated TPH's															
			Aromatics							Aliphatics							TOTAL TPH'S	
			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
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																
WS01	0.40	SOIL	<0.01	<0.01	<0.04	<4.81	4.85	<4.81	<12.0	<7.21	<0.24	<0.01	<0.24	<4.81	<4.81	n/t	<7.21	26
WS02	0.50	SOIL	<0.01	<0.01	<0.05	7.72	15.6	49.8	180	28.5	<0.24	<0.01	<0.24	<4.96	<4.96	n/t	<7.44	302.4
WS03	0.50	SOIL	<0.01	<0.01	<0.04	<4.00	<4.00	39.9	572	176	<0.20	<0.01	<0.20	<4.00	<4.34	224.4	64.6	1077
Human Health Risk Assessment (GAC)			140	290	11	180	330	540	1500	1500	78	230	65	330	2400	92000	92000	NA



BTEX DATA SUMMARY AND RISK ASSESSMENT SHEET

Job number: **23-13693**

Site name: **Dickenson Road, Longsight**

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				
WS01	0.40	SOIL	< 10.0	< 10.0	< 10.0	< 10.0
WS02	0.50	SOIL	< 10.0	< 10.0	< 10.0	< 10.0
WS03	0.50	SOIL	< 10.0	< 10.0	< 10.0	< 10.0
Human Health Risk Assessment (GAC)			170	11	110000	130000



CC GEOTECHNICAL LIMITED

Consulting Geotechnical and Geoenvironmental Engineers

ASBESTOS ASSESSMENT SHEET

Job number: 23-13693

Site name: Dickenson Road, Longsight

Prepared by: TG

Authorised by: CB

Sample Location	Sample Depth (m)	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)	Assessment
WS01	0.40	No asbestos detected	n/t	n/t	n/t	n/t	No asbestos detected
WS02	0.50	No asbestos detected	n/t	n/t	n/t	n/t	No asbestos detected
WS03	0.50	No asbestos detected	n/t	n/t	n/t	n/t	No asbestos detected

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 H: PRELIMINARY WASTE CLASSIFICATION REPORT



Waste Classification Report

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

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



1DM9Y-FL7CP-ZDRAO

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

Job name

Dickenson Road, Longsight

Description/Comments

Project

Dickenson Rd', Longsight

Site

Classified by

Name: **Tony Gerrard**
Date: **07 Mar 2023 10:50 GMT**
Telephone: **0151 545 2750**

Company: **CC Geotechnical Ltd**

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

HazWasteOnline™ Certification:

Course
Hazardous Waste Classification

Date

Purpose of classification

2 - Material Characterisation

Address of the waste

Manchester

Post Code N/A

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Residential redevelopment

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

Waste created during site preparation works

Description of the waste

Granular clayey made ground



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01	0.40	Non Hazardous		3
2	WS02	0.50	Non Hazardous		8
3	WS03	0.50	Hazardous	HP 3(i), HP 7, HP 11	13

Related documents

#	Name	Description
1	CCG SOIL A 2020	waste stream template used to create this Job

Report

Created by: Tony Gerrard

Created date: 07 Mar 2023 10:50 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	18
Appendix B: Rationale for selection of metal species	21
Appendix C: Version	22



Classification of sample: WS01

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

Sample details

Sample name: **WS01** LoW Code: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: **0.40 m** Chapter: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Entry:

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				21.4	mg/kg	1.32	28.255	mg/kg	0.00283 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				24.2	mg/kg	1.462	35.37	mg/kg	0.00354 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				118	mg/kg	1.126	132.855	mg/kg	0.0133 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	171	mg/kg	1.56	266.728	mg/kg	0.0171 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				<0.5	mg/kg	1.353	<0.677	mg/kg	<0.0000677 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				28.2	mg/kg	2.976	83.931	mg/kg	0.00839 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				142	mg/kg	2.774	393.929	mg/kg	0.0394 %		
	024-007-00-3	236-878-9	13530-65-9									
10	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5											
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.8	mg/kg	1.923	<1.538	mg/kg	<0.000154 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
12	boron { diboron trioxide; boric oxide }				0.8	mg/kg	3.22	2.576	mg/kg	0.000258 %		
	005-008-00-8	215-125-8	1303-86-2									
13	pH				7.6	pH		7.6	pH	7.6 pH		
			PH									
14	phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
15	naphthalene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
	601-052-00-2	202-049-5	91-20-3									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	acenaphthylene	205-917-1	208-96-8		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
17	acenaphthene	201-469-6	83-32-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
18	fluorene	201-695-5	86-73-7		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
19	phenanthrene	201-581-5	85-01-8		0.06 mg/kg		0.06 mg/kg	0.000006 %		
20	anthracene	204-371-1	120-12-7		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
21	fluoranthene	205-912-4	206-44-0		0.08 mg/kg		0.08 mg/kg	0.000008 %		
22	pyrene	204-927-3	129-00-0		0.09 mg/kg		0.09 mg/kg	0.000009 %		
23	benzo[a]anthracene	601-033-00-9	200-280-6		0.04 mg/kg		0.04 mg/kg	0.000004 %		
24	chrysene	601-048-00-0	205-923-4		0.06 mg/kg		0.06 mg/kg	0.000006 %		
25	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.06 mg/kg		0.06 mg/kg	0.000006 %		
26	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %		
28	indeno[123-cd]pyrene	205-893-2	193-39-5		0.03 mg/kg		0.03 mg/kg	0.000003 %		
29	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
30	benzo[ghi]perylene	205-883-8	191-24-2		0.03 mg/kg		0.03 mg/kg	0.000003 %		
31	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
32	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
33	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
35	TPH (C6 to C40) petroleum group		TPH		26 mg/kg		26 mg/kg	0.0026 %		
36	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37	polychlorobiphenyls; PCB	602-039-00-4	215-648-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
38	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
39	antimony { antimony trioxide }	051-005-00-X	215-175-0		2.7 mg/kg	1.197	3.232 mg/kg	0.000323 %		
40	beryllium { beryllium oxide }	004-003-00-8	215-133-1		<0.1 mg/kg	2.775	<0.278 mg/kg	<0.0000278 %		<LOD



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
41	manganese { manganese sulphate }				<0.1 mg/kg	2.749	<0.275 mg/kg	<0.0000275 %		<LOD
	025-003-00-4	232-089-9	7785-87-7							
42	molybdenum { molybdenum(VI) oxide }				2.7 mg/kg	1.5	4.051 mg/kg	0.000405 %		
	042-001-00-9	215-204-7	1313-27-5							
43	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							
44	tetrachloroethylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-028-00-4	204-825-9	127-18-4							
45	carbon tetrachloride; tetrachloromethane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-008-00-5	200-262-8	56-23-5							
46	trichloroethylene; trichloroethene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-027-00-9	201-167-4	79-01-6							
47	vinyl chloride; chloroethylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-023-00-7	200-831-0	75-01-4							
48	DDT (ISO); clofenotane (INN); dicophane; 1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane; dichlorodiphenyltrichloroethane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-045-00-7	200-024-3	50-29-3							
49	chlordan (ISO); 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindan				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-047-00-8	200-349-0	57-74-9							
50	hexachlorocyclohexanes, including lindane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-043-00-6	210-168-9, 200-401-2, 206-270-8, 206-271-3	58-89-9, 319-84-6, 319-85-7, 608-73-1							
51	dieldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-049-00-9	200-484-5	60-57-1							
52	endrin (ISO); 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4:5,8-dimethanonaphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-051-00-X	200-775-7	72-20-8							
53	heptachlor (ISO); 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-046-00-2	200-962-3	76-44-8							
54	hexachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-065-00-6	204-273-9	118-74-1							
55	chlordecone (ISO); perchloropentacyclo[5,3,0,02,6,03,9,04,8]decan-5-one; decachloropentacyclo[5,2,1,02,6,03,9,05,8]decan-4-one				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	606-019-00-6	205-601-3	143-50-0							
56	aldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-048-00-3	206-215-8	309-00-2							
57	pentachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-074-00-5	210-172-0	608-93-5							
58	dodecachloropentacyclo[5.2.1.02,6.03,9.05,8]decane; mirex				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-077-00-1	219-196-6	2385-85-5							
59	camphechlor (ISO); toxaphene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-044-00-1	232-283-3	8001-35-2							
60	hexabromobiphenyl				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		252-994-2	36355-01-8							
61	2,3,7,8-TeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
		217-122-7	1746-01-6							
62	1,2,3,7,8-PeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			40321-76-4							
63	1,2,3,4,7,8-HxCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			39227-28-6							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
64	1,2,3,6,7,8-HxCDD		57653-85-7		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
65	1,2,3,7,8,9-HxCDD		19408-74-3		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
66	1,2,3,4,6,7,8-HpCDD		35822-46-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
67	OCDD		3268-87-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
68	2,3,7,8-TeCDF		51207-31-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
69	1,2,3,7,8-PeCDF		57117-41-6		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
70	2,3,4,7,8-PeCDF		57117-31-4		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
71	1,2,3,4,7,8-HxCDF		70648-26-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
72	1,2,3,6,7,8-HxCDF		57117-44-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
73	1,2,3,7,8,9-HxCDF		72918-21-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
74	2,3,4,6,7,8-HxCDF		60851-34-5		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
75	1,2,3,4,6,7,8-HpCDF		67562-39-4		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
76	1,2,3,4,7,8,9-HpCDF		55673-89-7		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
77	OCDF		39001-02-0		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
78	petrol (gasoline) petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
79	diesel petroleum group		68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
80	heavy/residual fuel oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
81	crude oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
82	kerosine petroleum group including kerosine (petroleum); kerosine (petroleum) hydrosulphurised; kerosine (petroleum) sweetened	232-366-4; 265-184-9; 294-799-5	8008-20-6; 64742-81-0; 91770-15-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.0891 %		

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

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 Concentrations too low to be considered flammable risk



Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0026%)



Classification of sample: WS02



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

Sample details

Sample name:	LoW Code:
WS02	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50 m	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				31.5	mg/kg	1.32	41.59	mg/kg	0.00416 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.6	mg/kg	1.142	0.685	mg/kg	0.0000685 %		
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				25.8	mg/kg	1.462	37.708	mg/kg	0.00377 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				86.7	mg/kg	1.126	97.615	mg/kg	0.00976 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	367	mg/kg	1.56	572.452	mg/kg	0.0367 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				16.2	mg/kg	1.353	21.926	mg/kg	0.00219 %		
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				30.3	mg/kg	2.976	90.181	mg/kg	0.00902 %		
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.1	mg/kg	1.405	1.546	mg/kg	0.000155 %		
	034-002-00-8											
9	zinc { zinc chromate }				184	mg/kg	2.774	510.443	mg/kg	0.051 %		
	024-007-00-3	236-878-9	13530-65-9									
10	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5											
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.8	mg/kg	1.923	<1.538	mg/kg	<0.000154 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
12	boron { diboron trioxide; boric oxide }				0.7	mg/kg	3.22	2.254	mg/kg	0.000225 %		
	005-008-00-8	215-125-8	1303-86-2									
13	pH				7.5	pH		7.5	pH	7.5 pH		
			PH									
14	phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
15	naphthalene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
	601-052-00-2	202-049-5	91-20-3									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	acenaphthylene	205-917-1	208-96-8		0.06 mg/kg		0.06 mg/kg	0.000006 %		
17	acenaphthene	201-469-6	83-32-9		0.25 mg/kg		0.25 mg/kg	0.000025 %		
18	fluorene	201-695-5	86-73-7		0.21 mg/kg		0.21 mg/kg	0.000021 %		
19	phenanthrene	201-581-5	85-01-8		2.3 mg/kg		2.3 mg/kg	0.00023 %		
20	anthracene	204-371-1	120-12-7		0.57 mg/kg		0.57 mg/kg	0.000057 %		
21	fluoranthene	205-912-4	206-44-0		3.93 mg/kg		3.93 mg/kg	0.000393 %		
22	pyrene	204-927-3	129-00-0		3.91 mg/kg		3.91 mg/kg	0.000391 %		
23	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.73 mg/kg		1.73 mg/kg	0.000173 %		
24	chrysene	601-048-00-0	205-923-4	218-01-9	1.95 mg/kg		1.95 mg/kg	0.000195 %		
25	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	2.13 mg/kg		2.13 mg/kg	0.000213 %		
26	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.67 mg/kg		0.67 mg/kg	0.000067 %		
27	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.61 mg/kg		1.61 mg/kg	0.000161 %		
28	indeno[123-cd]pyrene	205-893-2	193-39-5		1.12 mg/kg		1.12 mg/kg	0.000112 %		
29	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.22 mg/kg		0.22 mg/kg	0.000022 %		
30	benzo[ghi]perylene	205-883-8	191-24-2		1.03 mg/kg		1.03 mg/kg	0.000103 %		
31	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
32	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
33	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
34	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]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
35	TPH (C6 to C40) petroleum group		TPH		302.4 mg/kg		302.4 mg/kg	0.0302 %		
36	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
38	asbestos	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
39	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4	4.4 mg/kg	1.197	5.267 mg/kg	0.000527 %		
40	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	<0.1 mg/kg	2.775	<0.278 mg/kg	<0.0000278 %		<LOD



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
41	manganese { manganese sulphate }				<0.1 mg/kg	2.749	<0.275 mg/kg	<0.0000275 %		<LOD
	025-003-00-4	232-089-9	7785-87-7							
42	molybdenum { molybdenum(VI) oxide }				4.4 mg/kg	1.5	6.601 mg/kg	0.00066 %		
	042-001-00-9	215-204-7	1313-27-5							
43	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							
44	tetrachloroethylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-028-00-4	204-825-9	127-18-4							
45	carbon tetrachloride; tetrachloromethane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-008-00-5	200-262-8	56-23-5							
46	trichloroethylene; trichloroethene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	602-027-00-9	201-167-4	79-01-6							
47	vinyl chloride; chloroethylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-023-00-7	200-831-0	75-01-4							
48	DDT (ISO); clofenotane (INN); dicophane; 1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane; dichlorodiphenyltrichloroethane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-045-00-7	200-024-3	50-29-3							
49	chlordan (ISO); 1,2,4,5,6,7,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindan				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-047-00-8	200-349-0	57-74-9							
50	hexachlorocyclohexanes, including lindane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-043-00-6	210-168-9, 200-401-2, 206-270-8, 206-271-3	58-89-9, 319-84-6, 319-85-7, 608-73-1							
51	dieldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-049-00-9	200-484-5	60-57-1							
52	endrin (ISO); 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4:5,8-dimethanonaphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-051-00-X	200-775-7	72-20-8							
53	heptachlor (ISO); 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-046-00-2	200-962-3	76-44-8							
54	hexachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-065-00-6	204-273-9	118-74-1							
55	chlordecone (ISO); perchloropentacyclo[5.3.0.02,6.03,9.04,8]decan-5-one; decachloropentacyclo[5.2.1.02,6.03,9.05,8]decan-4-one				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	606-019-00-6	205-601-3	143-50-0							
56	aldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-048-00-3	206-215-8	309-00-2							
57	pentachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-074-00-5	210-172-0	608-93-5							
58	dodecachloropentacyclo[5.2.1.02,6.03,9.05,8]decane; mirex				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-077-00-1	219-196-6	2385-85-5							
59	camphechlor (ISO); toxaphene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-044-00-1	232-283-3	8001-35-2							
60	hexabromobiphenyl				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		252-994-2	36355-01-8							
61	2,3,7,8-TeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
		217-122-7	1746-01-6							
62	1,2,3,7,8-PeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			40321-76-4							
63	1,2,3,4,7,8-HxCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			39227-28-6							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
64	1,2,3,6,7,8-HxCDD		57653-85-7		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
65	1,2,3,7,8,9-HxCDD		19408-74-3		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
66	1,2,3,4,6,7,8-HpCDD		35822-46-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
67	OCDD		3268-87-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
68	2,3,7,8-TeCDF		51207-31-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
69	1,2,3,7,8-PeCDF		57117-41-6		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
70	2,3,4,7,8-PeCDF		57117-31-4		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
71	1,2,3,4,7,8-HxCDF		70648-26-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
72	1,2,3,6,7,8-HxCDF		57117-44-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
73	1,2,3,7,8,9-HxCDF		72918-21-9		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
74	2,3,4,6,7,8-HxCDF		60851-34-5		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
75	1,2,3,4,6,7,8-HpCDF		67562-39-4		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
76	1,2,3,4,7,8,9-HpCDF		55673-89-7		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
77	OCDF		39001-02-0		<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
78	petrol (gasoline) petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
79	diesel petroleum group		68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
80	heavy/residual fuel oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
81	crude oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
82	kerosine petroleum group including kerosine (petroleum); kerosine (petroleum) hydrosulphurised; kerosine (petroleum) sweetened	232-366-4; 265-184-9; 294-799-5	8008-20-6; 64742-81-0; 91770-15-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
Total:								0.151 %		

Key

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

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 Concentrations too low to be considered flammable risk



Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0302%)



Classification of sample: WS03

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

Sample details

Sample name:	LoW Code:
WS03	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	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.: 0.108%)

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.: 0.108%)

Hazard properties (substances considered hazardous until shown otherwise)

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

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.108%)

Determinands

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

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	 arsenic { arsenic trioxide }				20.1	mg/kg	1.32	26.539	mg/kg	0.00265 %		
	033-003-00-0	215-481-4	1327-53-3									
2	 cadmium { cadmium oxide }				0.8	mg/kg	1.142	0.914	mg/kg	0.0000914 %		
	048-002-00-0	215-146-2	1306-19-0									
3	 chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				33.2	mg/kg	1.462	48.524	mg/kg	0.00485 %		
		215-160-9	1308-38-9									
4	 copper { dicopper oxide; copper (I) oxide }				66.8	mg/kg	1.126	75.209	mg/kg	0.00752 %		
	029-002-00-X	215-270-7	1317-39-1									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
5	lead { lead chromate }			1	227 mg/kg	1.56	354.078 mg/kg	0.0227 %			
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				1.3 mg/kg	1.353	1.76 mg/kg	0.000176 %			
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				32.9 mg/kg	2.976	97.919 mg/kg	0.00979 %			
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
9	zinc { zinc chromate }				196 mg/kg	2.774	543.733 mg/kg	0.0544 %			
	024-007-00-3	236-878-9	13530-65-9								
10	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.8 mg/kg	1.923	<1.538 mg/kg	<0.000154 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	boron { diboron trioxide; boric oxide }				<0.5 mg/kg	3.22	<1.61 mg/kg	<0.000161 %			<LOD
	005-008-00-8	215-125-8	1303-86-2								
13	pH				9.7 pH		9.7 pH	9.7 pH			
			PH								
14	phenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
15	naphthalene				0.15 mg/kg		0.15 mg/kg	0.000015 %			
	601-052-00-2	202-049-5	91-20-3								
16	acenaphthylene				0.08 mg/kg		0.08 mg/kg	0.000008 %			
		205-917-1	208-96-8								
17	acenaphthene				0.34 mg/kg		0.34 mg/kg	0.000034 %			
		201-469-6	83-32-9								
18	fluorene				0.22 mg/kg		0.22 mg/kg	0.000022 %			
		201-695-5	86-73-7								
19	phenanthrene				2.41 mg/kg		2.41 mg/kg	0.000241 %			
		201-581-5	85-01-8								
20	anthracene				0.63 mg/kg		0.63 mg/kg	0.000063 %			
		204-371-1	120-12-7								
21	fluoranthene				4.41 mg/kg		4.41 mg/kg	0.000441 %			
		205-912-4	206-44-0								
22	pyrene				4.08 mg/kg		4.08 mg/kg	0.000408 %			
		204-927-3	129-00-0								
23	benzo[a]anthracene				1.94 mg/kg		1.94 mg/kg	0.000194 %			
	601-033-00-9	200-280-6	56-55-3								
24	chrysene				2.24 mg/kg		2.24 mg/kg	0.000224 %			
	601-048-00-0	205-923-4	218-01-9								
25	benzo[b]fluoranthene				2.76 mg/kg		2.76 mg/kg	0.000276 %			
	601-034-00-4	205-911-9	205-99-2								
26	benzo[k]fluoranthene				1.03 mg/kg		1.03 mg/kg	0.000103 %			
	601-036-00-5	205-916-6	207-08-9								
27	benzo[a]pyrene; benzo[def]chrysene				2.23 mg/kg		2.23 mg/kg	0.000223 %			
	601-032-00-3	200-028-5	50-32-8								
28	indeno[123-cd]pyrene				1.67 mg/kg		1.67 mg/kg	0.000167 %			
		205-893-2	193-39-5								
29	dibenz[a,h]anthracene				0.32 mg/kg		0.32 mg/kg	0.000032 %			
	601-041-00-2	200-181-8	53-70-3								
30	benzo[ghi]perylene				1.68 mg/kg		1.68 mg/kg	0.000168 %			
		205-883-8	191-24-2								
31	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
32	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
33	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
34	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
35	TPH (C6 to C40) petroleum group				1077 mg/kg		1077 mg/kg	0.108 %			
			TPH								
36	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
37	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
38	asbestos				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5								
39	antimony { antimony trioxide }				5.3 mg/kg	1.197	6.345 mg/kg	0.000634 %			
	051-005-00-X	215-175-0	1309-64-4								
40	beryllium { beryllium oxide }				<0.1 mg/kg	2.775	<0.278 mg/kg	<0.0000278 %			<LOD
	004-003-00-8	215-133-1	1304-56-9								
41	manganese { manganese sulphate }				<0.1 mg/kg	2.749	<0.275 mg/kg	<0.0000275 %			<LOD
	025-003-00-4	232-089-9	7785-87-7								
42	molybdenum { molybdenum(VI) oxide }				2.9 mg/kg	1.5	4.351 mg/kg	0.000435 %			
	042-001-00-9	215-204-7	1313-27-5								
43	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								
44	tetrachloroethylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-028-00-4	204-825-9	127-18-4								
45	carbon tetrachloride; tetrachloromethane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-008-00-5	200-262-8	56-23-5								
46	trichloroethylene; trichloroethene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	602-027-00-9	201-167-4	79-01-6								
47	vinyl chloride; chloroethylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-023-00-7	200-831-0	75-01-4								
48	DDT (ISO); clofenotane (INN); dicophane; 1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane; dichlorodiphenyltrichloroethane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-045-00-7	200-024-3	50-29-3								
49	chlordane (ISO); 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindan				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-047-00-8	200-349-0	57-74-9								
50	hexachlorocyclohexanes, including lindane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-043-00-6	210-168-9, 200-401-2, 206-270-8, 206-271-3	58-89-9, 319-84-6, 319-85-7, 608-73-1								
51	dieldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-049-00-9	200-484-5	60-57-1								
52	endrin (ISO); 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4:5,8-dimethanonaphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	602-051-00-X	200-775-7	72-20-8								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
53	heptachlor (ISO); 1,4,5,6,7,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-046-00-2	200-962-3	76-44-8							
54	hexachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-065-00-6	204-273-9	118-74-1							
55	chlordecone (ISO); perchloropentacyclo[5,3,0,02,6,03,9,04,8]decan-5-one; decachloropentacyclo[5,2,1,02,6,03,9,05,8]decan-4-one				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	606-019-00-6	205-601-3	143-50-0							
56	aldrin (ISO)				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-048-00-3	206-215-8	309-00-2							
57	pentachlorobenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-074-00-5	210-172-0	608-93-5							
58	dodecachloropentacyclo[5,2,1,02,6,03,9,05,8]decane; mirex				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-077-00-1	219-196-6	2385-85-5							
59	camphechlor (ISO); toxaphene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-044-00-1	232-283-3	8001-35-2							
60	hexabromobiphenyl				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		252-994-2	36355-01-8							
61	2,3,7,8-TeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
		217-122-7	1746-01-6							
62	1,2,3,7,8-PeCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			40321-76-4							
63	1,2,3,4,7,8-HxCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			39227-28-6							
64	1,2,3,6,7,8-HxCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			57653-85-7							
65	1,2,3,7,8,9-HxCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			19408-74-3							
66	1,2,3,4,6,7,8-HpCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			35822-46-9							
67	OCDD				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			3268-87-9							
68	2,3,7,8-TeCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			51207-31-9							
69	1,2,3,7,8-PeCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			57117-41-6							
70	2,3,4,7,8-PeCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			57117-31-4							
71	1,2,3,4,7,8-HxCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			70648-26-9							
72	1,2,3,6,7,8-HxCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			57117-44-9							
73	1,2,3,7,8,9-HxCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			72918-21-9							
74	2,3,4,6,7,8-HxCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			60851-34-5							
75	1,2,3,4,6,7,8-HpCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			67562-39-4							
76	1,2,3,4,7,8,9-HpCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			55673-89-7							
77	OCDF				<0.1 ng/kg		<1.0e-07 mg/kg	<1.0e-11 %		<LOD
			39001-02-0							
78	petrol (gasoline) petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
79	diesel petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			68334-30-5, 68476-34-6,							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
			94114-59-7, 1159170-26-9							
80	heavy/residual fuel oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
81	crude oils petroleum group				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
82	kerosine petroleum group including kerosine (petroleum); kerosine (petroleum) hydrosulphurised; kerosine (petroleum) sweetened				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		232-366-4; 265-184-9; 294-799-5	8008-20-6; 64742-81-0; 91770-15-9							
Total:								0.214 %		

Key

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



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

■ **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

▪ **hexabromobiphenyl** (EC Number: 252-994-2, CAS Number: 36355-01-8)

Description/Comments:
Data source: POP specific threshold from ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004).
Data source date: 01 Jul 2013
Hazard Statements: POP >= 0.005 %

▪ **2,3,7,8-TeCDD** (EC Number: 217-122-7, CAS Number: 1746-01-6)

Description/Comments: 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

▪ **1,2,3,7,8-PeCDD** (CAS Number: 40321-76-4)

Description/Comments: 1,2,3,7,8-pentachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

▪ **1,2,3,4,7,8-HxCDD** (CAS Number: 39227-28-6)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)



■ **1,2,3,6,7,8-HxCDD** (CAS Number: 57653-85-7)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **1,2,3,7,8,9-HxCDD** (CAS Number: 19408-74-3)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **1,2,3,4,6,7,8-HpCDD** (CAS Number: 35822-46-9)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

■ **OCDD** (CAS Number: 3268-87-9)

Description/Comments: octachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

■ **2,3,7,8-TeCDF** (CAS Number: 51207-31-9)

Description/Comments: 2,3,7,8-tetrachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **1,2,3,7,8-PeCDF** (CAS Number: 57117-41-6)

Description/Comments: 1,2,3,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.03)

■ **2,3,4,7,8-PeCDF** (CAS Number: 57117-31-4)

Description/Comments: 2,3,4,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.3)

■ **1,2,3,4,7,8-HxCDF** (CAS Number: 70648-26-9)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **1,2,3,6,7,8-HxCDF** (CAS Number: 57117-44-9)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **1,2,3,7,8,9-HxCDF** (CAS Number: 72918-21-9)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

■ **2,3,4,6,7,8-HxCDF** (CAS Number: 60851-34-5)

Description/Comments: 2,3,4,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)



▪ **1,2,3,4,6,7,8-HpCDF** (CAS Number: 67562-39-4)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

▪ **1,2,3,4,7,8,9-HpCDF** (CAS Number: 55673-89-7)

Description/Comments: 1,2,3,4,7,8,9-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

▪ **OCDF** (CAS Number: 39001-02-0)

Description/Comments: octachlorodibenzo[b,d]furan
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

▪ **petrol (gasoline) petroleum group**

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. 1; H224, Skin Irrit. 2; H315, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, STOT SE 3; H336, Asp. Tox. 1; H304, Aquatic Chronic 2; H411

▪ **diesel petroleum group** (CAS Number: 68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9)

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, Skin Irrit. 2; H315, Acute Tox. 4; H332, Carc. 2; H351, Asp. Tox. 1; H304, STOT RE 2; H373, Aquatic Chronic 2; H411

▪ **heavy/residual fuel oils petroleum group**

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: Muta. 1B; H340, Carc. 1B; H350, Acute Tox. 4; H332, Repr. 2; H361d, STOT RE 2; H373, Aquatic Chronic 2; H411

▪ **crude oils petroleum group**

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. 2; H225, Carc. 1B; H350, Eye Irrit. 2; H319, Asp. Tox. 1; H304, STOT RE 2; H373, STOT SE 3; H336, Aquatic Chronic 2; H411

▪ **kerosine petroleum group including kerosine (petroleum); kerosine (petroleum) hydrosulphurised; kerosine (petroleum) sweetened** (EC Number: 232-366-4; 265-184-9; 294-799-5, CAS Number: 8008-20-6; 64742-81-0; 91770-15-9)

Description/Comments: Review of ECHA Registered Substances database; Concawe report: hazard classification and labelling of petroleum substances in the European Economic Area - 2012; REACH compliant SDS from Total, Petrobras; Petrochem; Shell; ESS
Data source: <http://echa.europa.eu/information-on-chemicals/registered-substances>;
Hazard classification and labelling of petroleum substances in the European Economic Area - 2012 (CONCAWE); SDS: company websites
Data source date: 21 Jan 2014
Hazard Statements: Flam. Liq. 3; H226, Skin Irrit. 2; H315, Asp. Tox. 1; H304, Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

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

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

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



copper {dicopper oxide; copper (I) oxide}

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

lead {lead chromate}

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

mercury {mercury dichloride}

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

nickel {nickel chromate}

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

selenium {selenium compounds with the exception of cadmium 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. (edit as required)

zinc {zinc chromate}

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

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] (edit as required)

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 (edit as required)

boron {diboron trioxide; boric oxide}

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

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 (edit as required)

beryllium {beryllium oxide}

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

manganese {manganese sulphate}

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

molybdenum {molybdenum(VI) oxide}

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.65.5540.10249 (06 Mar 2023)
HazWasteOnline Database: 2023.65.5540.10249 (06 Mar 2023)



This classification utilises the following guidance and legislation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

APPENDIX I: 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 the 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 satisfactorily 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 contamination 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 unacceptable 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 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 already obtained.

If DQRA reveals that unacceptable 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 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 developed 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 quantitative techniques vary considerably, therefore GQRA and DQRA for human health, controlled waters and ground gas must be undertaken separately. The risk assessment methodologies where quantitative assessment is used for risks to human health, risks to controlled waters and risks posed by ground gas, if relevant, are described hereunder.

BACKGROUND INFORMATION, 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

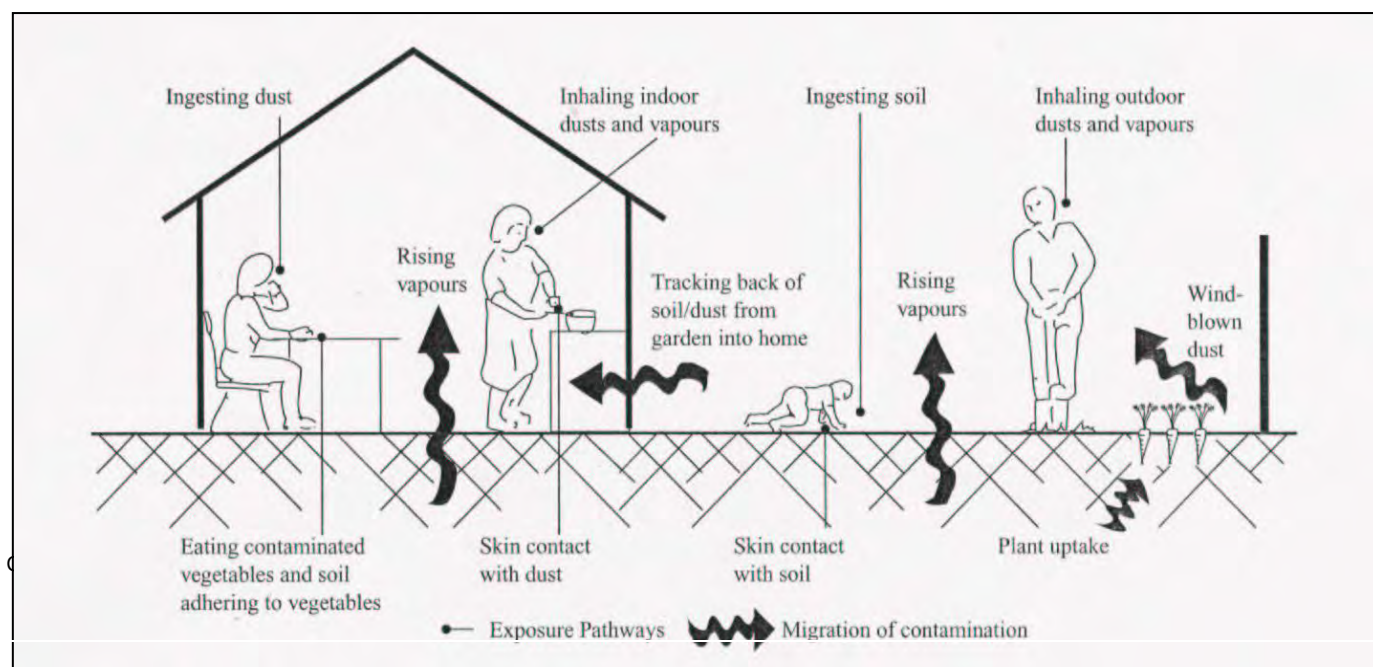
Other guidance/software used in spatial / statistical assessment is provided in:

- 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:



(

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 Methodology

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

- Tier 1 Preliminary Risk Assessment
- 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 Conceptual 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 revealed 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 Quantitative 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, Aromatic 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 analysis 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 Assessment 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 to identify separate populations if numerous populations are present. In order 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).

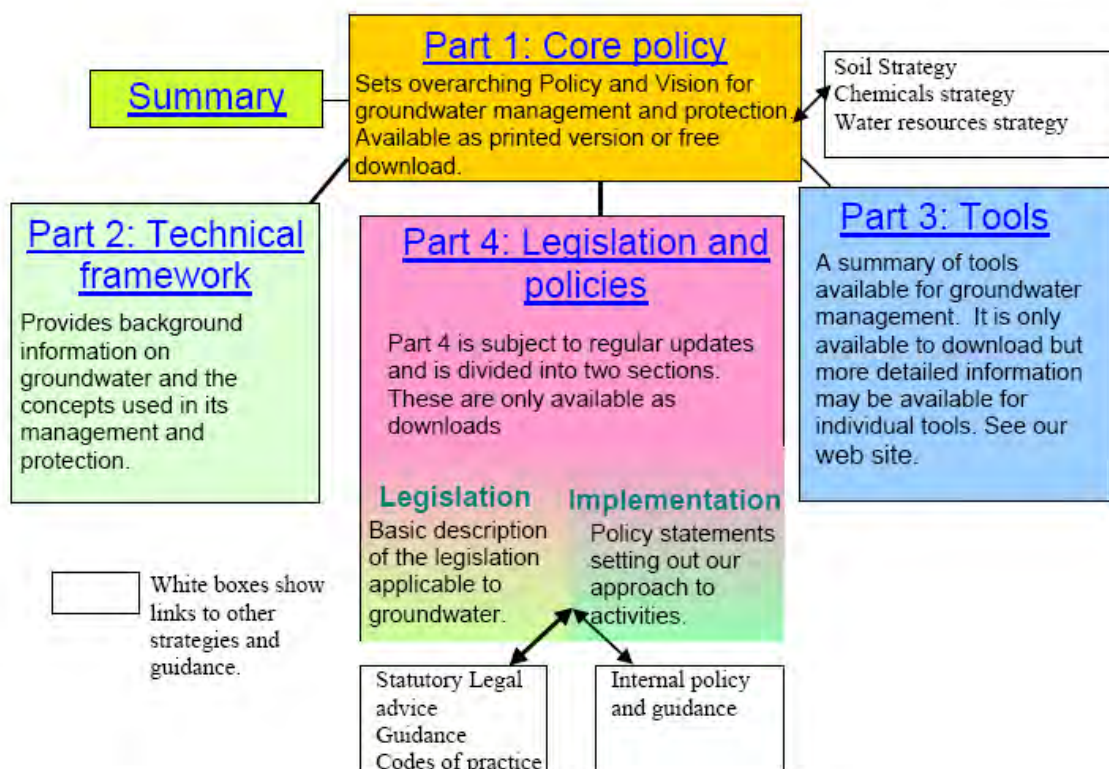
Environment Agency Guidance

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.

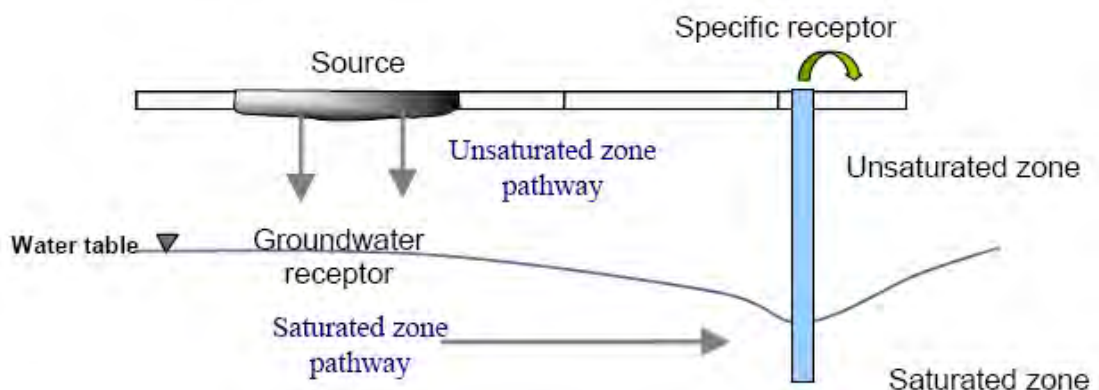
When assessing groundwater impact the Environment Agency advocate the application of their framework methodology "Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination" Environment Agency (2006). The methodology has four levels of assessment as described below:

- 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 Substances Directive (76/464/EEC and Daughter Directives)
- The Surface Waters (Abstraction for Drinking Water Classification) Regulations 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 if the materials are suitable for their 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

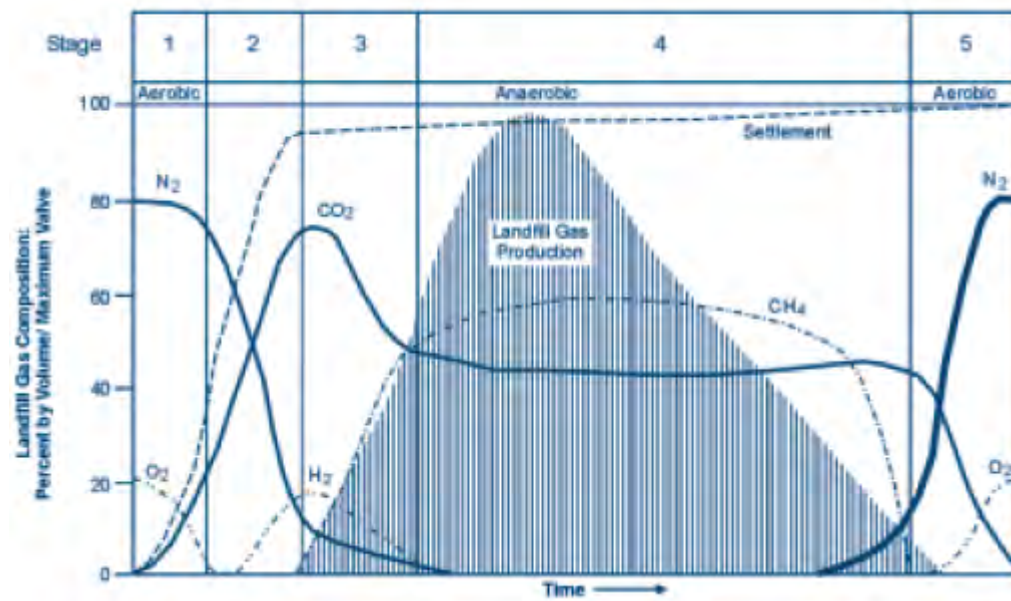
is no simple indicator of the presence of the gas until such a time as explosive limits are reached and an incident occurs. Methane is lighter than air and has a low toxicity. However, at high concentrations it can result in asphyxiation due to oxygen displacement.

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

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 assessments 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 Assessment
- 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.

Tier 1 Preliminary Risk Assessment

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 Quantitative 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:

$$GSV (l/hr) = \frac{[gas\ well\ gas\ concentration\ (\%v/v)] \times [gas\ well\ flow\ rate\ (l/hr)]}{100}$$

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 BS8485:2007, 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 housing¹. 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	<i>Ventilation performance in accordance with Annex A (BS8485)</i> <i>If passive ventilation is poor this is generally unacceptable and some form of active system will be required.</i> <i>There have to be robust management systems in place to ensure the continued maintenance of any ventilation system.</i> <i>Active ventilation can always be designed to meet good performance.</i> <i>Mechanically assisted systems come in two forms: extraction and positive pressurization.</i>
	Good performance	1	
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	
Ventilated car park (basement or undercroft)		4	
b) Barriers			
Floor slabs			<i>It is good practice to install ventilation in all foundation systems to effect pressure relief as a minimum.</i> <i>Breaches in floor slabs such as joints have to be effectively sealed against gas ingress in order to maintain these performances.</i>
Block and beam floor slab		0	
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	<i>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.</i>
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	<i>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.</i>
Permanent monitoring and alarm system ^A	Installed in the underfloor venting/dilution system	2	
	Installed in the building	1	
e) Pathway Intervention			
Pathway intervention		-	<i>This can consist of site protection measures for off-site or on-site sources (see Annex A, BS8485)</i>
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 J: NOTES ON LIMITATIONS

Standard Terms and Conditions of Engagement

Notes on Limitations For Geoenvironmental and Geotechnical Consultancy Services

General

CC GEOTECHNICAL LTD has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from CC GEOTECHNICAL LTD and a charge may be levied against such approval.

CC GEOTECHNICAL LTD accepts no responsibility or liability for:

the consequences of this document being used for any purpose or project other than for which it was commissioned and/or

the consequences of use of this document by any party with whom an agreement has not been executed.

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 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.

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 the timescale available, and the locations of the exploratory holes may have been restricted to areas unoccupied by the building(s) on the site, and further restricted by the existence of buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

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.

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 number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out to provide sufficient information within the agreed scope of the investigation, under the general headings of type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to provide 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 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; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.