



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

CIVIC ENGINEERS

Brownsfield Mill, Manchester

Geo-Environmental Assessment Report

DV/C3419/7106

September 2017

EXECUTIVE SUMMARY – BROWNSFIELD MILL	
Location	The site is centred on NGR 384896, 398415 as shown on the Site Location Plan C3419/01, and covers an area of 0.20 hectares. Access is gained from Great Ancoats Street to the east.
Ground Conditions	The majority of locations was surfaced with concrete, the surface of TP9/WS4, TP11 and TP12/WS5 had paving slabs at the surface. Underlying the hardstanding and at the surface of TP10/WS3 and TP13 was gravelly ashy sandy made ground comprising brick, coal and clinker with minor constituents including clay pipe, metal, plastic and rags, cobbles and rare boulders of brick and sandstone were also noted. The full depth of made ground was often not proven, however where it was proven the depth was in the range of 0.5m bgl to 4.2m bgl. Underneath the existing building footprint the natural clay strata was generally encountered from 0.5m to 1.2m bgl, however it was encountered at much deeper depths outside the building footprint and also within TP5/WS1, i.e. between 3.2m to 4.2m bgl.
Foundations and Floor Slabs	Externally the ground conditions have encountered a granular made ground to circa 1.2m bgl over soft to firm backfilled clay strata to circa 3.2m to 3.5m bgl. Therefore shallow foundations are unlikely to be feasible for the proposed fire escape or footbridge diversion due to the depth of excavation required. Internally deep made ground has been encountered locally and shallow foundations may prove unfeasible for the proposed columns. Furthermore restricted headroom within the building will make excavations to 3m+ likely unfeasible for the plant required. Due to the lack of natural strata encountered within some of the trial pits (TP1, TP2, TP3, TP5/WS1) and inconsistent depth to a suitable bearing stratum it may be more effective to pile the proposed internal foundations. Particularly through the cohesive made ground as encountered within TP5/WS1, or through the soft clays as encountered within TP3. Piles or mini piles are likely to be the most suitable founding option, in this case consideration should be given to further deep investigation using a cut down cable percussive rig to identify stratum at depth which could provide sufficient shaft and/or end bearing resistance. Made Ground beneath the existing building is variable but generally in excess of 600mm is generally present and floor slabs will need to be suspended or pre-cast concrete.
Soil Contamination	Widespread heavy metal contamination has been detected across the site, and PAHs have been detected localised to the west of the site. Localised asbestos has been detected within three locations, up to a maximum concentration of 0.048% by mass. Where hardstanding is not proposed it is recommended that a cover system comprising 450mm clean validated topsoil/subsoil over a warning geo-membrane is installed.
Ground Gases	Using the above calculated GSV's as an indicator for the characteristic situation of the gas regime places the site within CS-1. However typical concentrations of methane greater than 1 % elevates the site to CS-2. In accordance with BS8485:2015 a Type B building under CS-2 conditions requires 3.5 points to be considered to have satisfactory protection measures.
Further Work	• Completion of gas monitoring programme. • Issue gas assessment. • Further Intrusive Site investigation comprising cable percussive boreholes using a cut down rig. • Refurbishment / Demolition Asbestos survey. • Confirmation of Remedial Strategy with Local Authority • Foundation design

PROJECT QUALITY CONTROL DATA SHEET

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DRAWINGS

Drawing Number	Rev	Title
C3419/01	-	Site Location Plan
C3419/02	-	Exploratory Hole Location Plan
C3419/03a	-	Foundation Profiles 1-3
C3419/03b	-	Foundation Profiles 4, 6 & 7
C3419/03c	-	Foundation Profile 8
C3419/03d	-	Foundation Profiles 9, 10 & 13
C3419/04	-	Ground Level GPR Survey
C3419/05	-	Basement Level GPR Survey

APPENDICES

APPENDIX A	Exploratory Hole Logs
APPENDIX B	Chemical Testing Results
APPENDIX C	Geotechnical Testing Results
APPENDIX D	Frequency and Duration of Gas Monitoring
APPENDIX E	Interim Ground Gas Monitoring Results
APPENDIX F	Contaminated Land Screening Values
APPENDIX G	Contaminated Land Risk Assessment
APPENDIX H	Waste Assessment Report
APPENDIX I	Waste Disposal Guidance
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APPENDIX L	Contaminated Land Legislative Background
APPENDIX M	Limitations

**GEO-ENVIRONMENTAL ASSESSMENT REPORT
FOR
BROWNSFIELD MILL, MANCHESTER**

1.0 INTRODUCTION

1.1 Objectives

- 1.1.1 This report describes a Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Civic Engineers carried out at Brownsfield Mill, Manchester.
- 1.1.2 The objectives of the assessment were to determine the sites environmental setting and likely site conditions, highlighting potential areas of concern that may govern the sites redevelopment.
- 1.1.3 A main intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The main investigation was undertaken using trial pitting and window sampling.
- 1.1.4 The report has been completed to fulfil the requirements of a preliminary risk assessment in accordance with CLR11 "Model Procedures for the Management of Land Contamination".

1.2 Proposed Development

- 1.2.1 The proposed development is residential end use comprising a refitting of the existing building in the existing footprint with a communal gardens to the west of the building.

1.3 Limitations

- 1.3.1 This Assessment has been carried out based on information obtained from a number of areas, BSL have assumed that this information is correct.
- 1.3.2 There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.
- 1.3.3 This report has been prepared for the sole use of the client. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report they rely on it at their own risk and BSL do not owe them any Duty of Care.



2.0 THE SITE

2.1 Location & Access

- 2.1.1 The site covers an area of approximately 0.20 hectares and is situated within Manchester City Centre.
- 2.1.2 The site is centred on National Grid Reference 384896, 398415 as shown on the Site Location Plan C3419/01.
- 2.1.3 Access to the site is gained off Great Ancoats Street to the east of the site.

2.2 Site Description

- 2.2.1 The site is nearly completely covered by Brownsfield Mill itself which is an L-shaped 7 storey masonry structure with a basement level. To the north of the building within the L is a concrete and macadam surfaced courtyard bounded on all sides by brick walls.
- 2.2.2 To the north of the buildings is an undeveloped area surfaced with gravelly made ground. To the south west is a foot path surfaced with paving slabs. In this area is a concrete plinth supporting a footbridge crossing the neighbouring Rodale Canal which runs along the eastern boundary of the site.
- 2.2.3 Bounding the site to the north is Great Ancoats Street and to the west and south is a carpark. Further afield the area is characterised by commercial units and multi store buildings.

3.0 SUMMARY OF PREVIOUS REPORT

3.1 Desk Study

- 3.1.1 A Phase I Site Investigation Report (105-30) was undertaken by Civic Engineers in December 2016. The relevant findings are summarised below.
- 3.1.2 The mill currently on-site was built in 1825 and was extended soon after. The function of the mill pertained to cotton milling and clothing production until 1910 when the mill was used for aircraft manufacture. The building gradually became redundant from 1913. Most recently the building was used as a cash-and-carry.
- 3.1.3 The superficial deposits are noted as Glacial Till, which is classified by the EA as an unproductive aquifer.
- 3.1.4 The underlying bedrock is part of the Chester Pebble Bed Formation. This is classified by the Environment Agency as a Principal Aquifer.
- 3.1.4 The main risk associated with the site includes made ground and fill material, especially associated with backfilled canals.



4.0 METHOD OF INVESTIGATION

4.1 Objectives

4.1.1 The aim of the fieldwork was to:

- Investigate ground conditions on the site.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Investigate the existing foundations in locations as set out by Civic Engineers.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Install standpipes to allow future monitoring of ground gas and groundwater levels.
- Identify the presence the underlying basement to the northeast of the site.
- Give an assessment of the geo - environmental risks associated with redevelopment of the site.

4.2 Site Works

4.2.1 Five Window sample boreholes (WS1 to WS5) were drilled to 5.45m bgl using a tracked window sampling rig and liners (windowless) on 28th July 2017.

4.2.2 Thirteen hand excavated trial pits were excavated between 27th July and 31st July 2017 to a maximum depth of 1.25m bgl. The details of these are illustrated within Foundation Profile drawings C3419/03a-d.

4.2.3 Three areas were scanned using a ground penetrating radar in order to identify structures and services beneath the surface on the 8th August 2017. These areas and the identified substructures are presented within the GPR Survey Ground Floor and Basement drawings C3419/04 and C3419/05.

4.2.4 The approximate locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No. C3419/02. The exploratory hole logs are presented in Appendix A.

4.2.5 The exploratory holes were positioned by Civic Engineers. The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with BS 5930 'Code of Practice for Site Investigations' 1999 and BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.

4.3 Sampling

4.3.1 During the drilling of the exploratory holes, representative samples were taken at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing.

4.3.2 A summary of the samples taken is presented in the table below:



Type	Number
Environmental	20
Disturbed	14
U100	2

4.3.3 The type of sample is dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance.

4.3.4 Disturbed samples of soil for chemical testing were placed in plastic tubs and amber jars as required by the UKAS accredited laboratory, and transported under secure refrigerated conditions.

4.3.5 The distribution of samples taken across the site is recorded on the exploratory logs.

4.4 Laboratory Testing

4.4.1 As part of the assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

4.4.2 The following were analysed at an UKAS approved laboratory:

Determinands	Matrix	Number
Arsenic, Cadmium, Chromium (total and hex), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons, phenols, cyanide, organic matter, sulphate and pH	Soil	12
TPH CWG	Soil	2
Asbestos screening	Soil	14
Asbestos Quantification	Soil	3

4.4.3 The Chemical Laboratory Testing Results are presented in Appendix B.

4.4.4 Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

BS Test Number	Description	No of Samples
Part 2:	Natural Moisture Content	4
Part 2:	Plasticity Index Analysis	4
Part 3:	pH Value	6
Part 3:	Water Soluble Sulphate Content	6
Part 7:	Determination of Undrained Shear Strength in Triaxial Compression	2
Part 5:	One-dimensional consolidation	2

4.4.5 The Geotechnical Laboratory Testing Results are presented in Appendix C.

4.5 Monitoring

- 4.5.1 Gas and water monitoring standpipes were installed in three boreholes and subsequently one monitoring visit has been undertaken. All gas monitoring was undertaken using GA5000 infrared gas meter with integral electronic flow analyser.
- 4.5.2 Measurements of the percentage volume in air (%v/v) of oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane and the atmospheric pressure. Flow measurements on each standpipe (l/hr) were also taken. (Note: 100% LEL equates to 5% by volume).
- 4.5.3 The standpipes consisted of high-density polyethylene (HDPE) pipe. A bentonite seal was made around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Reason
TP5/WS1	4.0	1.0-4.0	Made Ground	Ground Gas
TP6/WS2	3.0	1.0-3.0	Clay	Ground Gas
TP12/WS5	3.5	1.0-3.5	Made Ground	Ground Gas

- 4.5.4 The results monitored peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.
- 4.5.5 Interim gas monitoring results are presented in Appendix E of this report.



5.0 GROUND CONDITIONS

5.1 Made Ground

- 5.1.1 The majority of locations was surfaced with concrete, this ranged from 0.05m to 0.25m in thickness. At the surface of TP9/WS4, TP11 and TP12/WS5 paving slabs were encountered to 0.06m bgl.
- 5.1.2 Underlying the hardstanding and at the surface of TP10/WS3 and TP13 was gravelly ashy sandy made ground. The gravel comprised brick, coal and clinker with minor constituents including clay pipe, metal, plastic and rags. Cobbles and rare boulders of brick and sandstone were also noted. The full depth of this was often not proven however, where it was proven the depth was in the range of 0.5m bgl to 4.2m bgl.
- 5.1.3 Clay with rare gravel of brick and coal was encountered within TP5/WS1 to 4.2m bgl, TP6/WS2 to 0.86m bgl, TP10/WS3 to 3.3m bgl and TP12/WS5 to 1.2m bgl.
- 5.1.4 Within TP9/WS4 and TP12/WS5 very soft grey to black silty organic clay was encountered. This was found to 3.2m bgl and 3.5m bgl respectively.
- 5.1.5 In the courtyard area of the mill building, i.e. to the northeast of the site, voids in the form of suspected cellars have been identified following the GPR survey carried out on site, the surface area affected by these is shown as a conjectured area on drawing C3419/04 and C3419/05.
- 5.1.6 Furthermore a void was identified within TP1 beneath a concrete subfloor from 1.10m to 1.80m bgl.

5.2 Natural Ground

- 5.2.1 Where encountered, the natural strata underlying the made ground generally comprised firm to stiff clays.
- 5.2.2 Underneath the existing building footprint the natural clay strata was generally encountered from 0.5m to 1.2m bgl, however it was encountered at much deeper depths outside the building footprint and also within TP5/WS1, i.e. between 3.2m to 4.2m bgl.
- 5.2.3 The clay strata was soft locally within TP3, however this was within the top 300mm of the strata.

5.3 Bedrock

- 5.3.1 Bedrock was not encountered in this investigation.

5.4 Groundwater

- 5.4.1 The exploratory holes were generally damp below 2m to 3m. Below 3m the holes were generally saturated. However, no standing water or strong groundwater ingressions were encountered.



5.5 Observations

- 5.5.1 During the works undertaken by BSL observations for both visual and olfactory evidence of contamination were made.
- 5.5.2 Ashy ground was noted near the surface within TP2, TP6, TP7, TP9, TP10, TP11, and TP12, i.e. sporadically across the entire site.
- 5.5.3 A slight hydrocarbon odour was noted within the near surface made ground of TP12/WS5.

Side Stability and Ease of Excavation

- 5.5.4 Pits were generally stable with the exception of where coarse made ground was encountered, i.e. TP8 which was terminated due to continual collapse.

6.0 TEST RESULTS

6.1 Chemical Test Results - Soils

6.1.1 The samples were tested for an assessment of the chemical contamination and results were examined with reference to a selection of guidance documents as detailed in Appendix F.

6.1.2 The apparent exceedence of the relevant Tier 1 generic screening value for a **residential end use without plant uptake** is taken as indicating further detailed assessment or remedial action is required.

6.1.3 A summary of the samples which were elevated relative to the proposed end use is presented below:

- **Metals**

Metal	Location ID	Concentration (mg/kg)	GAC (mg/kg)
Arsenic	TP3 @ 0.4m	44.3	40
	WS5 @ 1.3m	215.5	40
Mercury	TP7 @ 0.6m	46.3	1.2
	TP8 @ 0.5m	4.7	1.2
	TP9 @ 0.6m	94.5	1.2
	TP10 @ 0.5m	39.1	1.2
	TP11 @ 0.5m	35.8	1.2
	WS5 @ 1.3m	3.9	1.2
Nickel	TP10 @ 0.5m	696	180
	TP11 @ 0.5m	352	180
Lead	WS5 @ 0.4m	833	310
	TP3 @ 0.4m	3480	310
	TP1 @ 0.5m	833	310
	WS5 @ 1.3m	870	310

- **Petroleum Hydrocarbons**

A hydrocarbon odour was only noted within TP12/WS5 during our ground investigation. Elsewhere on site no visual or olfactory evidence of hydrocarbon contamination was noted. Samples from this location were tested for the presence of petroleum hydrocarbons, the carbon bands that were elevated above their respective GAC for a residential end-use without plant uptake are presented below.

Carbon Band	Location ID	Concentration (mg/kg)	GAC (mg/kg)
Aromatic C21 – C35	WS5 @ 0.4m	2669	1900
Aromatic C35 – C44	WS5 @ 0.4m	3380	1900
Aromatic C21 – C35	WS5 @ 1.3m	2072	1900
Aromatic C35 – C44	WS5 @ 1.3m	3469	1900

DL = detection limit

The above table shows that Deisel Range Organics (GRO) were elevated above GAC in WS5 at 0.40m and 1.3m bgl.

It is noted that the BTEX compounds and MTBE were below the laboratory detection limit on the same sample (TP12/WS5).

- **Polycyclic Aromatic Hydrocarbons**

PAH Species	Location ID	Concentration (mg/kg)	GAC (mg/kg)
Benzo[a]anthracene	WS5 @ 0.4m	14.15	11.0
	TP11 @ 0.5m	37.98	15.0
Chrysene	WS5 @ 1.3m	41.32	32.0
Benzo[b]fluoranthene	WS5 @ 0.4m	10.43	3.9
	TP3 @ 0.4m	22.80	3.9
	TP9 @ 0.6m	7.51	3.9
	WS5 @ 1.3m	5.35	4.0
	TP11 @ 0.5m	48.75	4.0
Benzo[a]pyrene	WS5 @ 0.4m	8.44	3.2
	TP3 @ 0.4m	13.23	3.2
	TP9 @ 0.6m	5.71	3.2
	WS5 @ 1.3m	4.23	3.2
	TP11 @ 0.5m	32.14	3.2
Dibenz(a,h)Anthracene	WS5 @ 0.4m	1.05	0.30
	TP3 @ 0.4m	3.31	0.30
	TP9 @ 0.6m	0.94	0.30
	WS5 @ 1.3m	1	0.32
	TP11 @ 0.5m	5.36	0.32

Elevated levels of PAHs have been identified within four locations (WS5, TP11, TP3, TP9) at five different depths.

- **Asbestos**

The presence of asbestos was screened for throughout 16 samples of made ground strata. Asbestos was positively identified within three of the samples. The details of the identified asbestos presence is tabulated below:

Location ID	Asbestos Type(s)	Asbestos Fibres / ACM	Asbestos Gravimetric & PCOM Total (Mass %)
WS5 @ 0.4m	Chrysotile	Fibre Bundles	<0.001%
TP3 @ 0.4m	Chrysotile	Fibre Bundles	<0.001%
TP9 @ 0.6m	Chrysotile & Amosite	Fibre Bundles, Cement Debris, Insulation Debris	0.048%

6.2 Chemical Test Results - Groundwater

6.2.1 Groundwater testing has not been included as part of this assessment.



6.3 Geotechnical Testing

6.3.1 Four samples of natural cohesive material were tested for their plasticity. Plasticity index results ranged between 24% and 33%.

6.3.2 Undrained Shear Strength testing was undertaken on two samples of the natural clay. The results are tabulated below:

Location ID	Undrained Shear Strength (kPa)	Bearing Capacity (kN/m ²)
TP9/WS4 @ 3.50 – 4.00m	93	186
TP6/WS2 @ 2.00 – 2.50m	178	356

6.3.3 table One Dimensional Consolidation tests were also undertaken on the same samples. A table of coefficient of volume compressibility at overburden pressure for each sample is tabulated below:

Location ID	Pressure (kPa)	M _v (m ² /MN)
TP9/WS4 @ 3.50 – 4.00m	70	0.251
TP6/WS2 @ 2.00 – 2.50m	40	0.270

6.4 Aggressive Ground Conditions

6.4.1 Water soluble sulphate testing was undertaken on six of the natural strata. The results revealed soluble sulphate (SO₄) contents of between 0.0159 to 0.0588 g/l. Associated pH values were obtained which ranged between 8.31 and 9.45 indicating alkaline conditions.

6.4.2 Similarly sulphate testing was also undertaken on eleven of the made ground strata. This has revealed soluble sulphate (SO₄) contents of between 0.0448 to 1.8428 g/l. Associated pH values were obtained which ranged between 7.51 to 9.43 indicating slightly alkaline conditions.

6.5 Waste Disposal Testing Results

6.5.1 We have reviewed the testing results and inputted them into the HazWasteOnline model which allows users to code and classify waste as defined in the EWC (European Waste Catalogue 2002) based on EC Regulation 1272/2008 on the Classification, labelling and packaging of substances and mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste (1st edition 2015)-Technical Guidance”).

6.5.2 This is a useful tool as waste producers have the legal responsibility to classify any waste they produce, despite most classifications in the UK being done by the waste receivers.

6.5.3 Twelve samples were tested to assess whether they contained any contaminants in the hazardous range when screened against assessment criteria within WM3. This



shows hazard codes present on five of the samples. The full Waste Classification Report is presented in Appendix H.

6.6 Waste Acceptance Criteria (WAC) Results

6.6.1 Testing for waste disposal was not allowed for in this assessment.

6.7 Gas Monitoring Results

6.7.1 Three gas monitoring visits have been carried out to date, between the 8th August and 5th September 2017

6.7.2 Methane gas has been identified within WS1 and WS5 on all three occasions monitored to date. The peak concentration encountered was 7.5% within WS5.

6.7.3 The peak carbon dioxide concentrations ranged from 0.1%v/v to 2.5%v/v. Steady state values also ranged from 0.1%v/v to 2.0%v/v, and were generally similar to the peak concentrations. CO₂ concentrations recorded are all generally low, however the highest concentrations have been recorded from WS1.

6.7.4 Peak oxygen concentrations ranged from 17.8%v/v to 20.9%v/v. Steady state concentrations also ranged from 17.7%v/v to 21.1%v/v and were generally similar to peak.

6.7.5 A maximum positive flow of 2.4 l/hr has been recorded from WS2. All other flows detected have been between 0.0l/hr and 0.6l/hr.

7.7.6 The atmospheric pressure ranged between 1006mb and 1009mb over the monitoring period.

6.7.7 Groundwater levels on the site ranged from 0.32m and 2.70m bgl. Groundwater has been encountered within every borehole on every occasion to date.

6.7.8 Interim records of the ground gas monitoring results are enclosed.



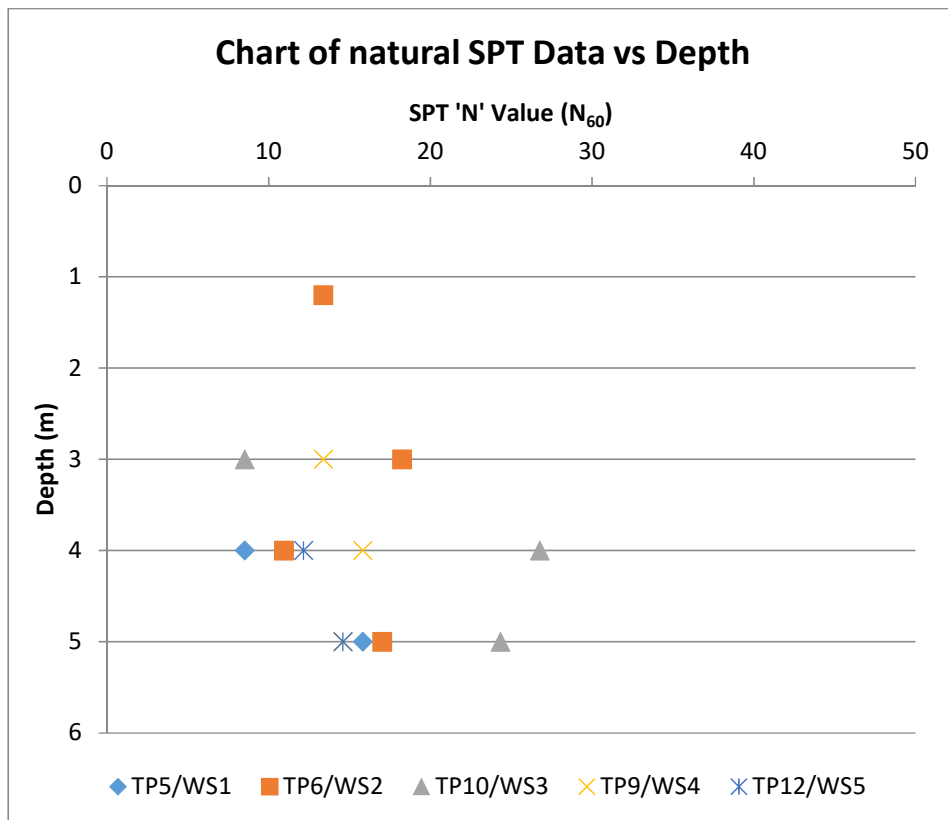
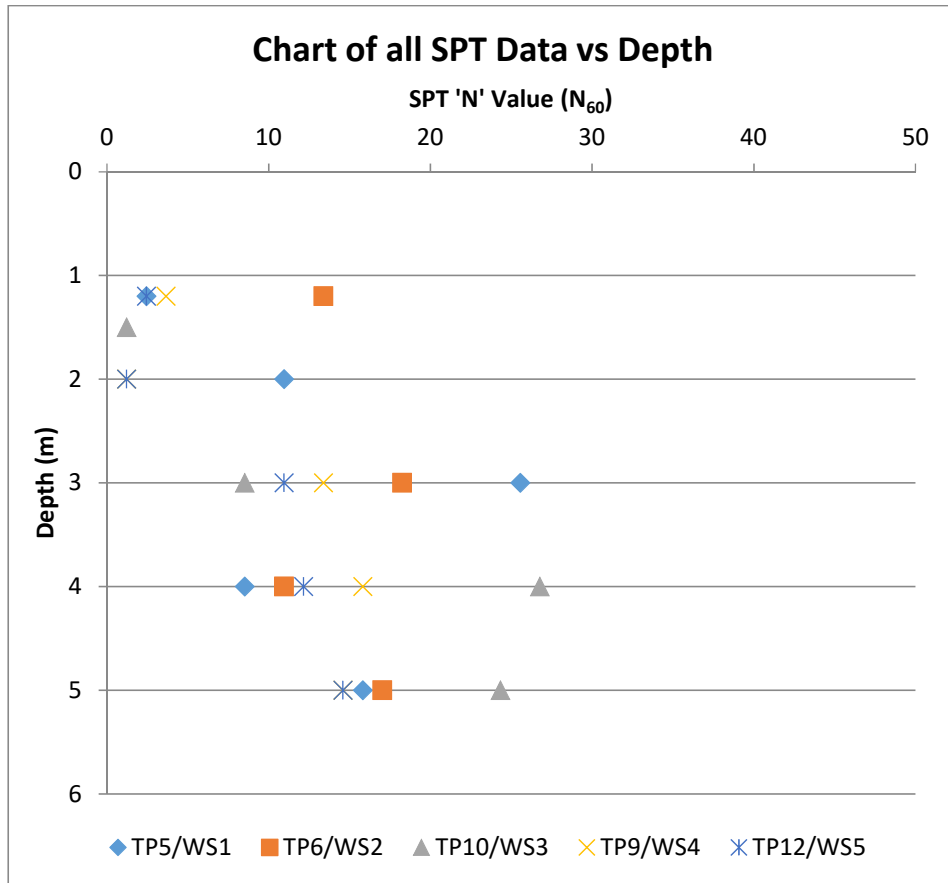
7.0 GEOTECHNICAL ASSESSMENT

7.1 General

- 7.1.1 Brownsfield Mill is an eighteenth century seven story building. It is planned to refurbish this as residential apartments whilst keeping the same external structure.
- 7.1.2 The near surface made ground was granular comprising gravelly ashy sand. The gravel comprised brick, coal and clinker with minor constituents including clay pipe, metal, plastic and rags. Cobbles and rare boulders of brick and sandstone were also noted. The basal depth of this was often not proven however, where it was proven the depth was in the range of 0.5m bgl to 2.2m bgl.
- 7.1.3 Where encountered, the natural strata underlying the made ground generally comprised firm to stiff clays.
- 7.1.4 Underneath the existing building footprint the natural clay strata was generally encountered from 0.5m to 1.2m bgl. However it was encountered at much deeper depths outside the building footprint and also within TP5/WS1, i.e between 3.2m to 4.2m bgl.
- 7.1.5 Cellars were suspected beneath the courtyard area of Brownsfield Mill in the northeast corner of the site. A GPR survey carried out during our site investigation provides further evidence of their presence and location, which are presented within GPR Survey drawings C3419/04 and C3419/05.
- 7.1.6 A shipping hole from the Rochdale Canal was suspected by Civic Engineers to be present within the northwest corner of the building. The excavation of TP1 suggests the canal bed which enters the building is at circa 1.8m bgl. This appears to have been capped with concrete at 1.10m bgl. The depths of these layers are illustrated within the foundation drawing C3419/03a.

7.2 Soil Parameters

- 7.2.1 The test results have been evaluated to derive geotechnical soil parameters for the site.
- 7.2.2 Undrained shear strength from geotechnical laboratory testing was shown to vary between 93kPa – 178kPa.
- 7.2.3 Geotechnical lab testing has also provided coefficient volume of compressibility for the firm to stiff clays beneath site between 0.251 to 0.270 m²/MN.
- 7.2.4 Two graphs are provided below; one to show all SPT N value data obtained, and the other showing the SPT N value data which was obtained from natural strata only. The graph is provided below to provide a profile of the ground conditions underlying the site.



- 7.2.5 Characterization of the geotechnical parameters above has been undertaken to obtain a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state.
- 7.2.6 Using the empirically derived correlation ($C_u = f1.N$) proposed by Stroud, 1974, a shear strength can be determined from the SPT N-value.
- 7.2.7 The above charts demonstrates that generally natural strata is not present at shallow depths and therefore shows a lack of information on natural ground to assign parameters for shallow foundations.
- 7.2.8 The chart indicates that in areas of proposed new foundations there is significant made ground present.
- 7.2.9 However it is possible that the ground conditions are not representative due to their proximity to existing foundations.

7.3 Foundations

- 7.3.1 It is believed that new foundations are to be installed within the building to support a new steel frame. Furthermore some external foundation is required to support a new fire escape.

- 7.3.2 The foundations for each of these elements has been considered separately below.

External Foundations (Fire Escape and Footbridge)

- 7.3.3 Externally the ground conditions have encountered a granular made ground to circa 1.2m bgl over soft to firm backfilled clay strata to circa 3.2m to 3.5m bgl. Therefore shallow foundations are unlikely to be feasible for the proposed fire escape or footbridge diversion due to the depth of excavation required. Piled foundations are likely to be the most suitable foundation solution. However at this stage not enough geotechnical information is available to provide an accurate bearing capacity.

Internal Foundations (New Steel Frame)

- 7.3.4 Deep made ground has been encountered locally and shallow foundation may prove unfeasible for the proposed columns.
- 7.3.5 Furthermore restricted headroom within the building will make excavations to 3m+ likely unfeasible for the plant required.
- 7.3.6 Due to the lack of natural strata encountered within some of the trial pits (TP1, TP2, TP3, TP5/WS1) and inconsistent depth to a suitable bearing stratum it may be more effective to pile the proposed internal foundations. Particularly through the cohesive made ground as encountered within TP5/WS1, or through the soft clays as encountered within TP3.
- 7.3.7 Piles or mini piles are likely to be the most suitable founding option, in this case consideration should be given to further deep investigation using a cut down cable percussive rig to identify stratum at depth which could provide sufficient shaft and/or end bearing resistance.



Hypothetical Shallow Bearing Capacity Calculations

- 7.3.8 The two calculations below should not be relied upon at this stage as we feel there is insufficient soil parameters available. We would recommend further investigation internally away from the existing column foundations to prove the presence of shallow bearing stratum, if shallow foundation are the preferred option.
- 7.3.9 Using the information obtained from the SPT's as shown above (section 7.2) using an average N-Value of 10 and plasticity index of 28.5 a shear strength of the underlying soils of 45kN/m² can be derived. From this data it is calculated that an ultimate bearing capacity of 320kPa could be achieved using a 1.3m wide strip founded at 2.0m depth (no factor of safety applied) in the natural clay. This is considered a conservative value given the geotechnical test results from the triaxial tests.
- 7.3.10 Testing of undisturbed samples showed shear strengths of between 93kPa and 178kPa from the clay strata between 2.00m and 3.50m bgl. Using a shear strength of 93 kPa as a conservative value from the geotechnical testing an ultimate bearing capacity of 645kPa can be achieved from a 1.3m wide strip founded at 2.0m bgl. Applying a factor of safety of 2.5 gives a safe bearing capacity of the underlying soils of circa 260kPa.

Hypothetical Shallow Foundation Settlement Calculations

- 7.3.11 We have also undertaken a preliminary settlement assessment, however the information used for this is not considered fully representative, i.e. due to the deep made ground present locally within TP5/WS1.
- 7.3.12 It is understood that the Ultimate Limit State Factored Load for the columns is circa 290kN. From the drawing supplied to us (105-30 – GA-100) we understand that the new frame comprising 20 columns will be supported upon a 1.30m wide strip 30m long. This equates to a working load of approximately 150kN/m².
- 7.3.13 Parameters for coefficient of compressibility M_v have been taken from the geotechnical testing at overburden pressure which equate to circa 0.26MN/m².
- 7.3.14 As a secondary check settlement has been calculated from empirically derived equations from Stroud, 1975, utilising an N-Value of 10 and an average PI of 28.5. This gives a coefficient of compressibility of 0.22MN/m².
- 7.3.15 Calculations for settlement on a 1.3m wide strip indicated that settlement of the underlying clay strata would be approximately 35mm - 45mm, which is likely to be unacceptable.
- 7.3.16 In summary shallow foundations are likely to be deep tranches or pads and it will be difficult to construct. Furthermore with the indicated loadings settlement is likely to be unacceptable.

General Guidance

- 7.3.17 In shallow foundations, bearing stratum should be inspected for 'soft spots' within the natural clay strata, resulting for instance from localised groundwater perched



within the overlying fill materials. Any such soft spots should be dealt with in accordance with good site practice.

- 7.3.18 If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during construction, work should cease and BSL contacted for further advice.
- 7.3.19 During the construction phase supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design.
- 7.3.20 Supervision should include inspections, Control Ground Investigations and monitoring.

7.4 Building Near Trees

- 7.4.1 No trees are currently on or near to site. However it has been noted that there are new trees proposed to the west of the site within the communal garden area. These should not be planted within influencing distance of the foundations of the existing building.

7.5 Floor Slabs

- 7.5.1 Made Ground beneath the existing building is variable but generally in excess of 600mm is generally present and floor slabs will need to be suspended or pre-cast concrete.

7.6 Construction

- 7.6.1 Instability of excavations through natural soils is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. Instability of the Made Ground should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.
- 7.6.2 Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme. Breaking equipment may also be required locally to penetrate old foundations associated with former construction.
- 7.6.3 Assessing the top 20% of water soluble sulphate contents of made ground soil samples shows the average value is 1500mg/l. The lowest pH value of made ground soils recorded was 7.51.
- 7.6.4 Although no groundwater was encountered during the site works and relatively impermeable natural soils are present, groundwater has since ingressed as noted during the gas and groundwater monitoring programme. We therefore consider the groundwater regime as mobile.
- 7.6.5 The results of laboratory pH and sulphate content indicate that ACEC Class AC-2 and sulphate class DS-2 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design



Concrete Class) to be used on site will be determined by the site specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

7.7 Soakaways

- 7.7.1 The use of soakaways within the natural ground is not feasible at the site due to the presence of relatively impermeable strata underlying the site. Furthermore the use of soakaways is not recommended due to the presence of contaminated made ground near the surface.
- 7.7.2 If drainage of the highway to soakaways is to be considered it is suggested that this is discussed with the Local Authority at the earliest opportunity, to confirm the adequacy of proposed testing and to allow their inspection of any testing.

8.0 ENVIRONMENTAL ASSESSMENT

8.1 General

- 8.1.1 Petroleum hydrocarbons were encountered within TP12/WS5 at typical depths at which a water pipeline would be installed. Consideration should be given to the location of the existing water pipeline and/or if a new connection is to be established. Hydrocarbons can degrade and deteriorate standard polyethylene water pipes, so this area should be avoided where possible. If not possible then the existing soils should be treated or the pipeline upgraded to a degradation resistant line.
- 8.1.2 A pipeline risk assessment (PRA) may be required by the local water company particularly if a new feed is to be installed.

8.2 Contamination

Soils

- 8.2.1 On the basis of the testing undertaken to date it would appear that there is widespread metal and PAH contamination in the near surface made ground. Furthermore localised TPH contamination has been identified within one location.
- 8.2.2 The identified elevated PAH concentrations have all been identified to the west of the site, mostly within made ground of ashy sand. WS5 at 1.3m bgl however is located at the top of a soft organic clay beneath an ashy sand.
- 8.2.3 Heavy metal contamination has been identified as widespread in nature across the site, with mercury being the most widespread and elevated contaminant relative to the GAC. Similarly to the PAH's it is located within the granular near surface, generally ashy made ground.
- 8.2.4 Asbestos has been detected within three samples from the sixteen that were screened. TP3 at 0.4m and WS5 0.4m bgl were shown to contain chrysotile fibre bundles at trace concentrations (<0.001%mass). TP9 at 0.6mbgl contained fibre bundles, asbestos cement debris and asbestos insulation debris at a total concentration of (0.048%mass). All of these samples were within the near surface ashy sand made ground. This is the same area that the heavy metals were encountered within to the west of the site.

Groundwater

- 8.2.5 The Superficial deposits were noted as Glacial Till by the Civic Engineers Desk Study (105/30 – Phase 1 - Site Investigation Report), which was confirmed during the ground investigation. This is classified by the Environment Agency as an unproductive aquifer, therefore no groundwater testing has been undertaken to date.
- 8.2.6 Furthermore no groundwater, surface water or potable water abstraction licences are located within 250m of the site boundary. With the exception of the Rochdale Canal which abuts the site, there are no controlled surface waters within 500m of the site boundary.

- 8.2.7 However the Rochdale Canal is lined and therefore considered a closed system with regard to the pathway for soil or groundwater contaminants migrating from site.

Permanent Ground Gases

- 8.2.8 In accordance with CIRIA C665 – Assessing Risks Posed by Hazardous Ground Gases to Buildings. The proposed building use is to be assessed using the methodology proposed by Wilson & Card, 1996.
- 8.2.9 With regard to BS8485:2015 the building is considered to be a Type B development.
- 8.2.10 Monitoring to date has shown that a worst case GSV (Gas Screening Value) for methane is 0.045l/hr.
- 8.2.11 Also the worst case scenario GSV for carbon dioxide is calculated to be 0.015l/hr.
- 8.2.12 Using the above calculated GSV's as an indicator for the characteristic situation of the gas regime places the site within CS-1. However typical concentrations of methane greater than 1 % elevates the site to CS-2.
- 8.2.13 In accordance with BS8485:2015 a Type B building under CS-2 conditions requires 3.5 points to be considered to have satisfactory protection measures.
- 8.2.14 The protections system should comprise at least two of the following three protection elements, substructural barrier, ventilation and/or a gas resistant membrane. These will require detailed design and specification in accordance with BS 8485:2015. Note that if a membrane is installed it must be verified in accordance with CIRIA C735 (Mallet et al 2014) or it will score zero points and will not be deemed to afford any protection.
- 8.2.15 A full assessment of the ground gas regime will be made on completion of the ground gas monitoring program.

8.3 Qualitative Risk Assessment

- 8.3.1 The risk assessment methodology used in this instance is based on **Source – Pathway – Receptor** (SPR) philosophy. The **source** is the presence of contamination, or substance/event likely to cause harm. The **receptor** is the target that may be detrimentally affected by the source. The **pathway** is the means of the contamination to move from the source to the receptor. Where any of these three factors are removed there is deemed to be no risk.
- 8.3.2 The CSMs have been revised based on the findings of the site investigation and laboratory testing results.

Human Health

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Heavy Metals and PAH's (Made Ground)	Ingestion, direct contact, inhalation of dusts.	End-users	Low Likelihood	Mild	Moderate/Low
Hydrocarbons (Made Ground)	Ingestion, direct contact, inhalation of vapours.	End-users	Low Likelihood	Mild	Moderate/Low
Asbestos	Inhalation of fibres	End-users	Low Likelihood	Medium	Low
Ground Gas (Made Ground)	Build up of gases in confined spaces	End-Users	Likely	Severe	High
OFF-SITE					
Details of off-site sources of contamination which present a risk to human health not provided to BSL.					N/A

Human Health Justification

- 8.3.3 The levels of heavy metals and PAHs are in some cases significantly elevated with respect to residential end-use without plant uptake. It is considered that the pollution linkage pathway for direct contact, ingestion and inhalation of dusts will be best broken by the presence of hardstanding, which is proposed across the site. Therefore the risk would be considered to be **moderate/low** to human health.
- 8.3.4 The hydrocarbons identified within TP12/WS5 to the northwest of the site are of generally longer chain molecules, so are not readily volatile. Again the proposed presence of hardstanding of concrete would break the pathway to site end-users for ingestion and direct contact. We therefore consider the risk to human health to be **moderate /low**.
- 8.3.5 Asbestos was detected above trace levels within one sample. The risk of fibre inhalation to site-end users is considered **Low** due to the proposed presence of hardstanding which would break the pathway.
- 8.3.6 A CS-2 ground gas regime has been detected during the gas monitoring program, related to elevated methane concentrations. Currently it is considered likely that a build up of noxious / explosive gases could arise within the building. We therefore consider the risk to site end-users as **high**.

Controlled Waters

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Heavy Metals and PAH's (Made Ground)	Migration through groundwater or granular soils	Controlled waters (Bedrock Principal Aquifer)	Unlikely	Medium	Low
Hydrocarbons (Made Ground)	Migration through groundwater or granular soils	Controlled waters (Bedrock Principal Aquifer)	Unlikely	Medium	Low



Controlled Waters Justification

- 8.3.7 The heavy metal, PAH and DRO (Diesel Range Organic) contamination identified within the made ground has the potential to pose a risk to the underlying bedrock aquifer. However the presence of thick glacial till deposits beneath the site prevent the downward migration of contamination toward the aquifer. Furthermore the presence of hardstanding at surface will reduce the chance of leaching of soil contaminants from the made ground.

8.4 Remedial Measures

- 8.4.1 Soft landscaping is proposed to the west of the building in a communal garden area for the residents. However, it is not envisaged this area will be utilised for the growth of produce for consumption.
- 8.4.2 Concentrations of heavy metals and PAHs in the made ground are in some cases significantly elevated with respect to a residential end-use without plant uptake scenario, in addition asbestos fibres are present. These contaminants pose a risk to site end users and it is considered that the pollution linkage pathway for direct contact, ingestion and inhalation of dusts will be best broken by the installation of a clean cover system in soft landscaping areas. The risk elsewhere on site will be mitigated by the presence of hardstanding.
- 8.4.3 Based on the proposed end use, it is recommended that the clean cover system should comprise 450mm clean validated topsoil / subsoil over a warning geo-membrane. This will allow plants to be grown and prevent undesirable soils being brought to the surface. Requirements will be subject to confirmation by the local regulatory authority.
- 8.4.4 Based on the data acquired to date, ground gas protection measures will be required to comply with Characteristic Situation 2 (CS2) during construction. Given the project requires the refurbishment of an existing structure, it is recommended that discussions with the local regulatory authority are entered into as soon as possible to confirm exact requirements.
- 8.4.5 During the ground works a watching brief should also be in place to observe for any previous unidentified contamination. Should any suspect materials or contamination be encountered, then a suitably qualified geo-environmental engineer should be contacted for advice.
- 8.4.6 The above remedial recommendations will be subject to confirmation by the local regulatory authority.

8.5 Asbestos

- 8.5.1 The investigation of asbestos issues within structures was beyond the scope of this report. However guidance from UK Government indicates that asbestos should be assumed to be present in buildings unless proven otherwise.
- 8.5.2 Any asbestos within structures will require removal prior to re-development. This will need to be done by a suitably qualified experienced and licensed contractor,

who ensures that adequate PPE is provided to operatives, and that all the relevant legislation is adhered to.

8.5.3 If not already done, a refurbishment/demolition survey should be carried on the building prior to any refurbishment taking place.

8.5.4 In addition the presence of asbestos within the ground will require, a safe system of work to be set up on site to deal with the asbestos risk from the made ground. This may include but be not limited to:

- Site personnel have the risk communicated at induction stage.
- Ensuring personnel have suitable training.
- Task monitoring to inform PPE requirements.
- Ensuring soils do not dry out to become dusty and that misting is available during groundworks.
- Separate stockpiling.
- Clean haulage routes

8.5.5 All such works will need to be agreed with the regulatory bodies (HSE, LA)

8.5.6 Additional guidance is provided within the Guidance Note in Appendix J.

8.6 Health and Safety Issues

8.6.1 During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Petroleum Hydrocarbons (Made Ground)	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Mild	Moderate /Low
Asbestos (Made Ground)	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Medium	Moderate
Heavy Metals and PAHs (Made Ground)	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Mild	Moderate /Low

Discussion

8.6.2 The presence of asbestos, including insulation debris (TP9 @ 0.6m) upto a maximum percentage of 0.048% by mass has been encountered within the near surface soils to the west of the site, which are proposed to be disturbed to create the communal garden areas. However it was not visibly discernible to the site engineer on site during our investigation.

8.6.3 The presence of elevated concentrations of PAHs and heavy metals poses a risk to construction workers, if exposed to dusts or direct contact with the soils. Exposed

soils should not be allowed to dry out and appropriate PPE should be provided to protect the workers.

8.6.4 General guidance on these matters is given in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

8.7 Waste

8.7.1 Details of how material should be classified for waste disposal are presented in Appendix I.

8.7.2 Waste Acceptance Criteria (WAC) testing was outside the scope of this investigation and the guidance given below is general.

Waste Classification - Total Concentrations

8.7.3 Based on the HazWasteOnline assessment the soils from the west of the site have generally been identified as Hazardous (WS5, TP3, TP9 and TP11). These made ground soils are not discernibly different to other near surface ashy made ground soils across the rest of the site. However these have generally been classified as Non-Hazardous.

8.7.4 It is anticipated that soils may need to be removed from the west of the site to accommodate the new communal garden area. The tested granular ashy made ground is classified as hazardous.

Waste Acceptance Criteria

8.7.5 The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- *They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and*



- *There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.*

General

- 8.7.6 If any gross hydrocarbon contaminated material is encountered during the construction phase (i.e. in the vicinity of WS5/TP12), it is possible that this may be classified as hazardous and testing should be undertaken at that time.
- 8.7.7 Where it is necessary to dispose material off site it is recommended that materials are segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route.

8.8 Compliance

- 8.8.1 It is recommended that the approval of the Local Authority is obtained for the proposed remedial scheme prior to any irrevocable action being taken.
- 8.8.2 Once the above bodies have approved the remedial proposals it would be useful to produce a short remediation specification. This will also give guidance to enable a suitably qualified contractor to carry out the works.

9.0 CONCLUSIONS

9.1 Summary

Environmental

- 9.1.1 Widespread heavy metal contamination has been detected across the site, and PAHs have been detected localised to the west of the site. Furthermore localised TPH contamination has been detected in one location to the northwest of the site. These contaminants are only considered to pose a low risk to the identified controlled waters.
- 9.1.2 The heavy metals and PAHs present a moderate / low risk to human health of site end-users.
- 9.1.3 Remedial measures are only anticipated to be required in the area of the communal gardens as the remainder of the building is being internally refurbished. We recommend that a cover layer of 450mm of imported soil should be used over a warning geo-membrane. However the exact requirements will need to be confirmed with the local authority.
- 9.1.4 The gas monitoring that has been undertaken suggests that ground gas poses a high risk to site end use due to the production of methane. This will likely require precautions in line with CS-2 which have been outlined above in section 8.2.13.
- 9.1.5 We recommend that a watching brief be in place during groundworks in the event any unforeseen contamination is identified. Should any suspect materials or contamination be encountered, then a suitably qualified geo-environmental engineer should be contacted for advice.
- 9.1.6 From screening of the samples through Hazwaste Online using WM3, it is anticipated that if soils are to be removed from the west of the site the majority will be classified as hazardous.

Geotechnical

- 9.1.7 Externally the ground conditions have encountered a granular made ground to circa 1.2m bgl over soft to firm backfilled clay strata to circa 3.2m to 3.5m bgl. Therefore shallow foundations are unlikely to be feasible for the proposed fire escape or footbridge diversion due to the depth of excavation required. However at this stage not enough geotechnical information is available to provide an accurate bearing capacity.
- 9.1.8 Internally deep made ground has been encountered locally and shallow foundations may prove unfeasible for the proposed columns.
- 9.1.9 Furthermore restricted headroom within the building will make excavations to 3m+ likely unfeasible for the plant required.
- 9.1.10 Due to the lack of natural strata encountered within some of the trial pits (TP1, TP2, TP3, TP5/WS1) and inconsistent depth to a suitable bearing stratum it may be more effective to pile the proposed internal foundations. Particularly through the



cohesive made ground as encountered within TP5/WS1, or through the soft clays as encountered within TP3.

- 9.1.11 Piles or mini piles are likely to be the most suitable founding option, in this case consideration should be given to further deep investigation using a cut down cable percussive rig to identify stratum at depth which could provide sufficient shaft and/or end bearing resistance.
- 9.1.12 Hypothetical preliminary bearing capacity calculations have been done for shallow foundations based on a founding depth of 2m within the clays that were encountered. The indicative bearing capacity is provided in section 7.3 of this report, however it would need to be proven that ground conditions away from the existing column foundations show shallow natural soils. Similarly preliminary settlement calculations have also been done which show settlement is likely to be unacceptable.
- 9.1.13 ACEC Class AC-2 and sulphate class DS-2 conditions prevail and concrete for foundations should be prepared in respect to this.
- 9.1.14 Made Ground beneath the existing building is variable but generally in excess of 600mm is generally present and floor slabs will need to be suspended or pre-cast concrete.
- 9.1.15 A GPR survey carried out identified the surface location of cellars beneath the courtyard to the northeast of the site. This is shown on GPR Survey drawings C3419/04 and C3419/05.
- 9.1.16 The excavation of TP1 identified a void which is likely the historic shipping hole which entered through the arched entrance through the northwestern corner of the building.

9.2 Further Work

- 9.2.1 The following further work is considered necessary to progress the site to construction phase:

- Completion of gas monitoring programme.
- Issue gas assessment.
- Further Intrusive Site investigation comprising cable percussive boreholes using a cut down rig.
- Refurbishment / Demolition Asbestos survey.
- Confirmation of Remedial Strategy with Local Authority
- Foundation design

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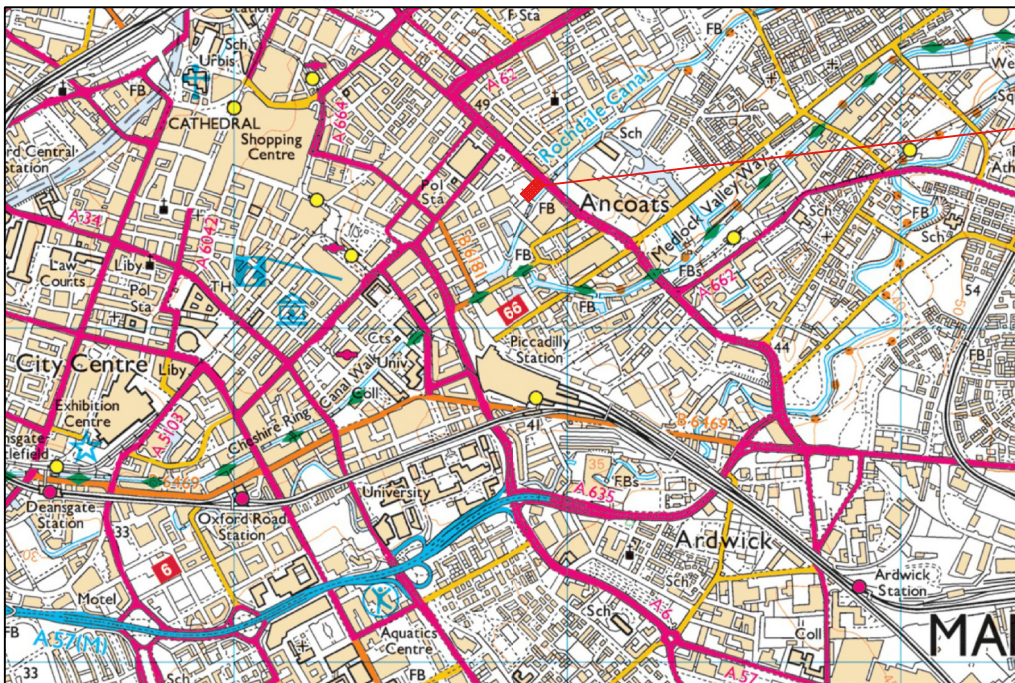
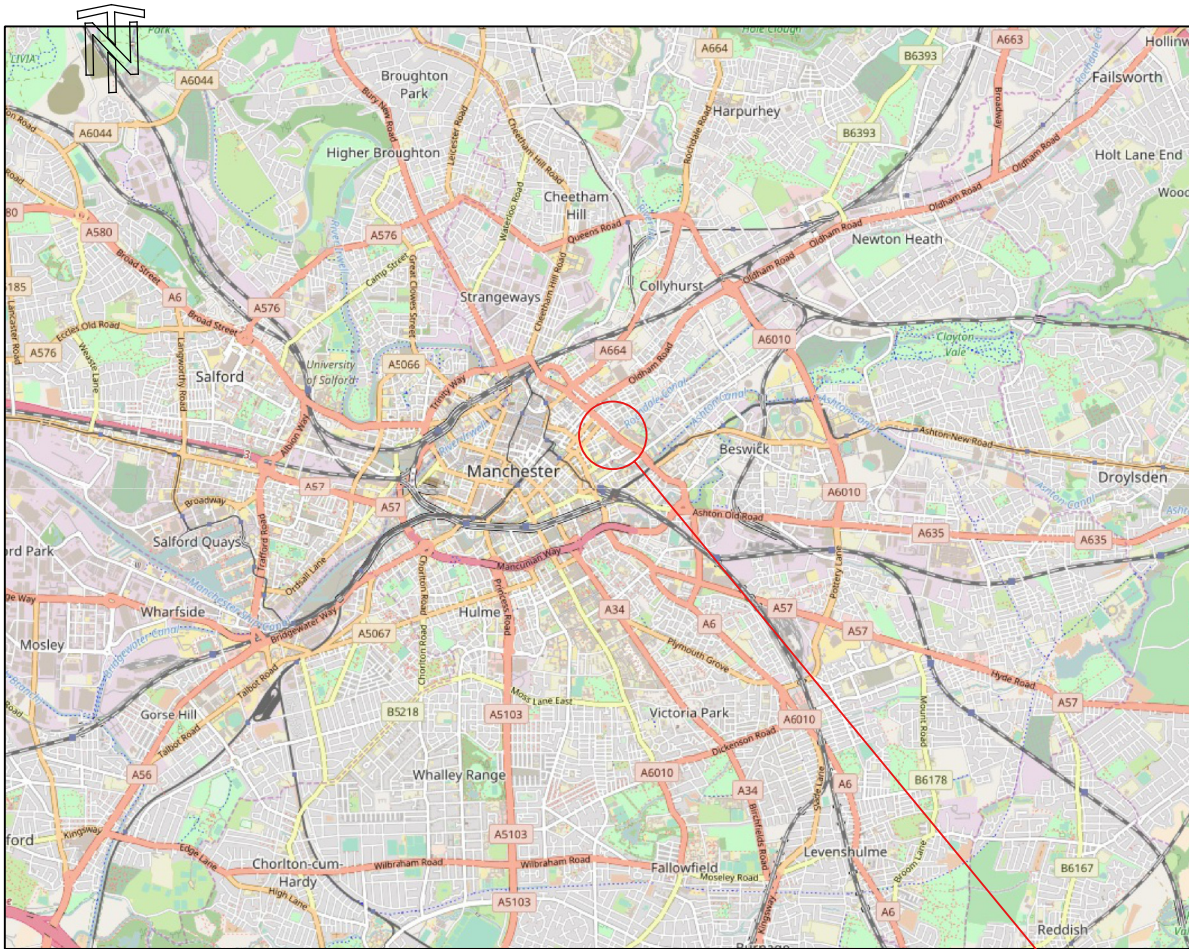
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49. Total Petroleum Hydrocarbon Criteria Working Group Volume 3 Selection of Representative TPH Fractions Based on Fate and Transport Considerations July 1997.
50. Total Petroleum Hydrocarbon Criteria Working Group Volume 4 Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH).
51. Total Petroleum Hydrocarbon Criteria Working Group Volume 5 Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach June 1999.



DRAWINGS



SITE

CLIENT CIVIC ENGINEERS	DRAWING DETAIL SITE LOCATION PLAN	 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE	
PROJECT TITLE BROWNSFIELD MILL, MANCHESTER	DATE AUG 2017	SCALE NTS	DRAWN DV
	DRAWING NUMBER C3419/01	REVISION —	
			CHECKED —



TP12/WS5

B
EX-019

TP1

IC IC

Paving slabs

Concrete floor

TP2

C
105-30

TP11

Public footpath

D
EX-021

TP3

TP4

IC

IC

IC

D
EX-023

Concrete brige
plinth

TP9/WS4

A
EX-018

TP5/WS1

TP13

Concrete floor

TP6/WS2

Gravelly made
ground

TP10/WS3

A
EX-018

TP7

TP8

B
EX-019

C
105-30

Rochdale Canal

KEY

TP10/WS3

Approximate
location of trial pit
with window
sample follow on.

TP13

Approximate trial
pit location

DESCRIPTION	REV	DATE
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CLIENT	CIVIC ENGINEERS
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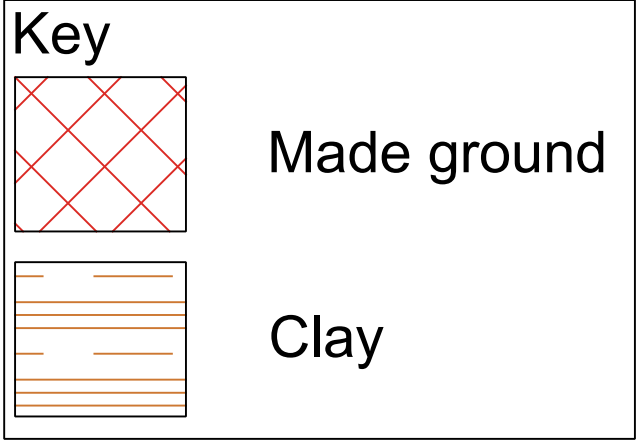
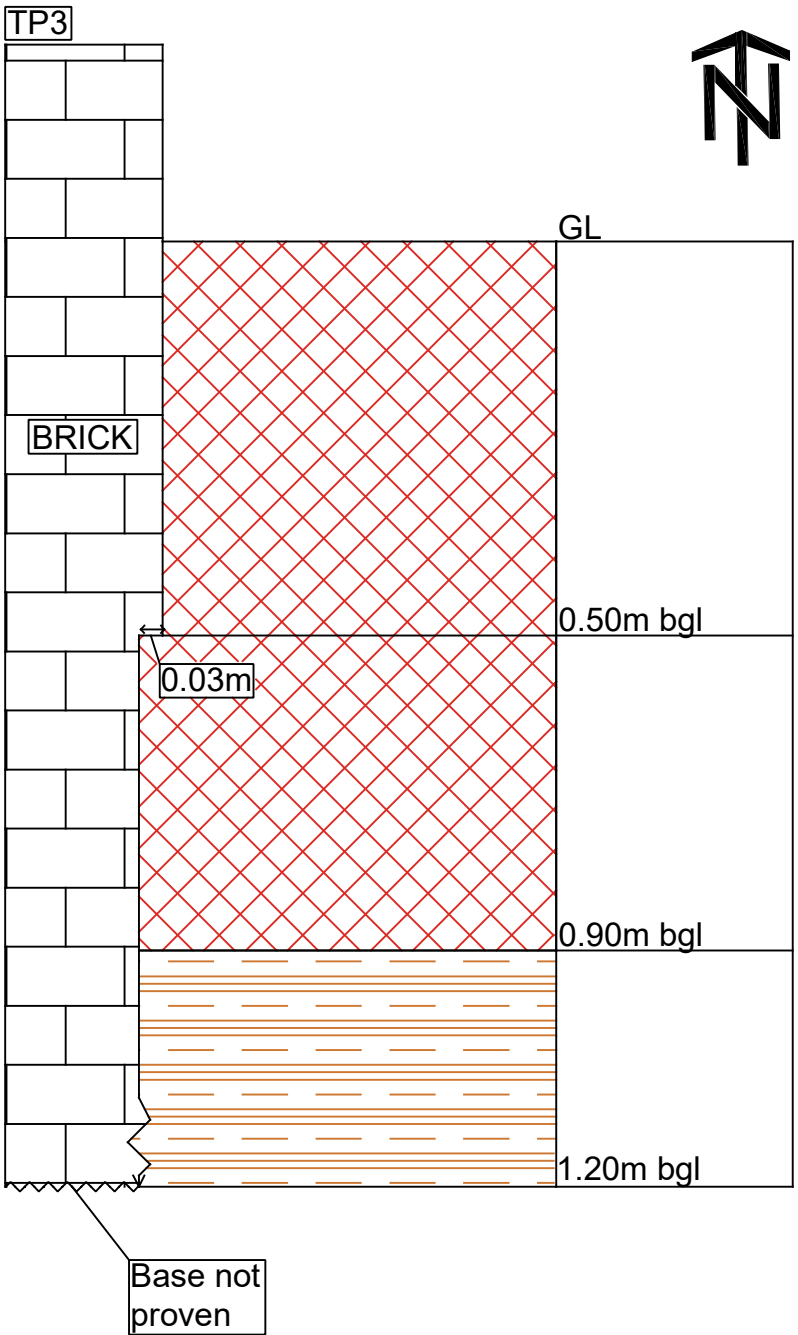
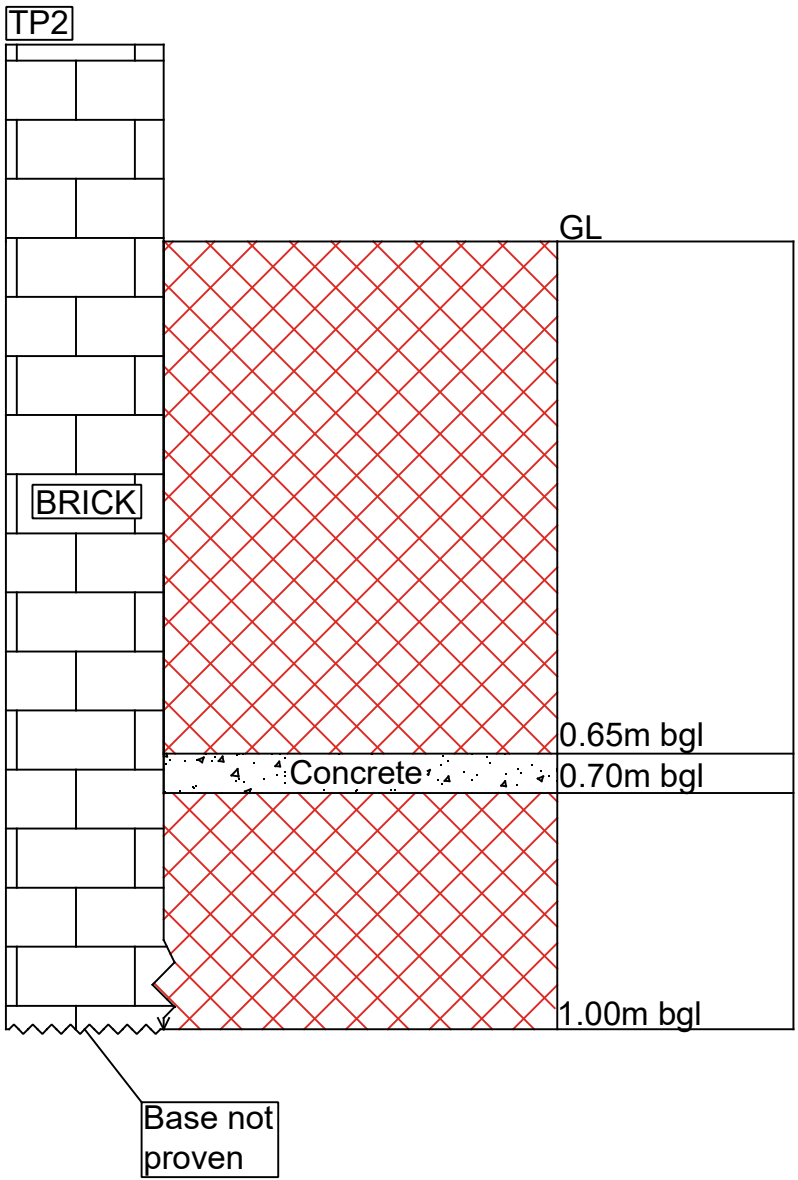
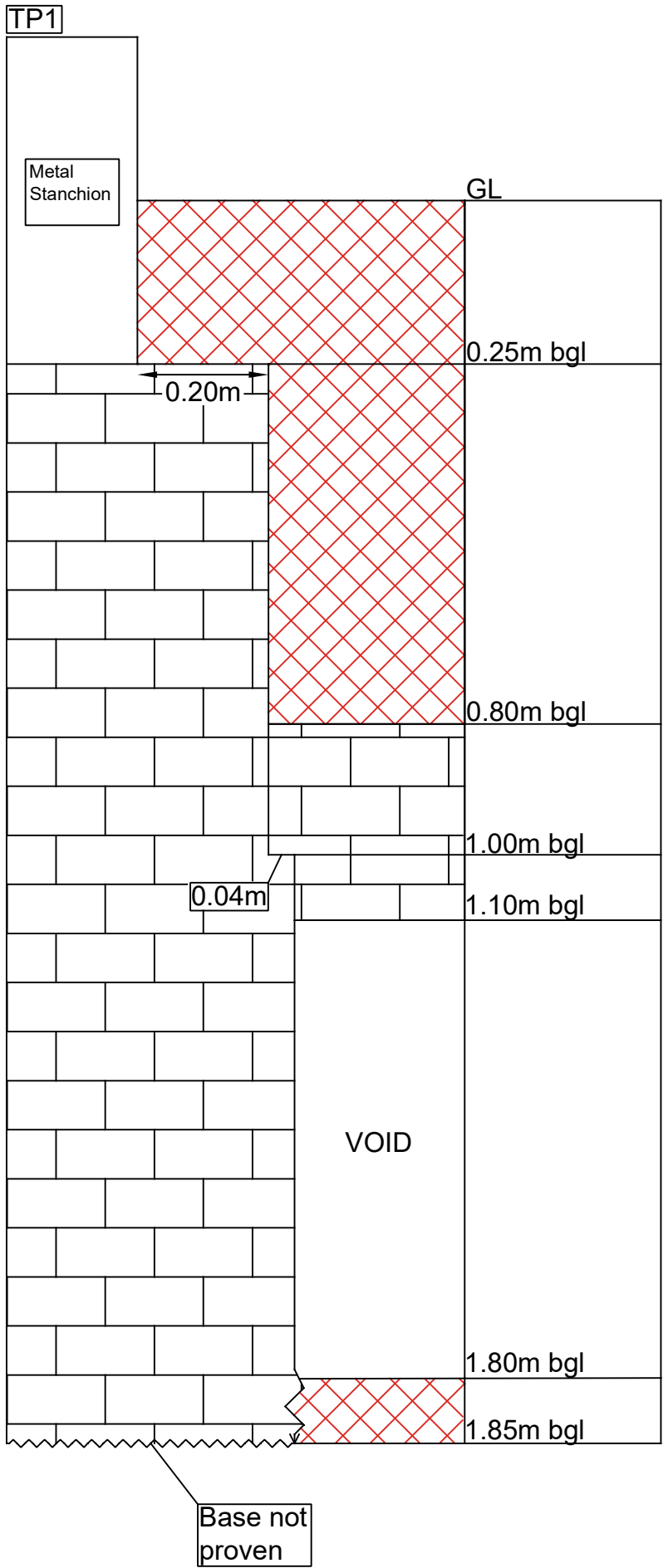
PROJECT TITLE	BROWNSFIELD MILL, MANCHESTER
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DRAWING DETAIL	EXPLORATORY HOLE LOCATION PLAN
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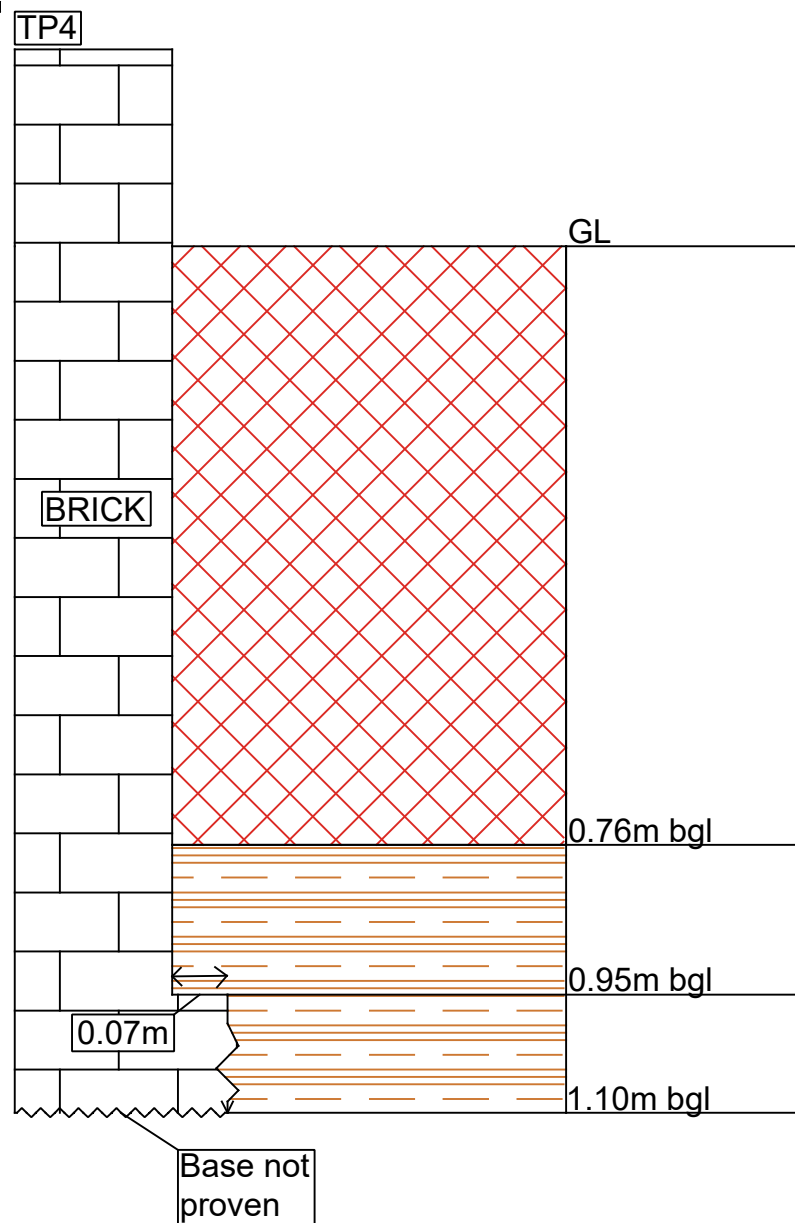
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DATE	AUGUST 2017	SCALE	NTS
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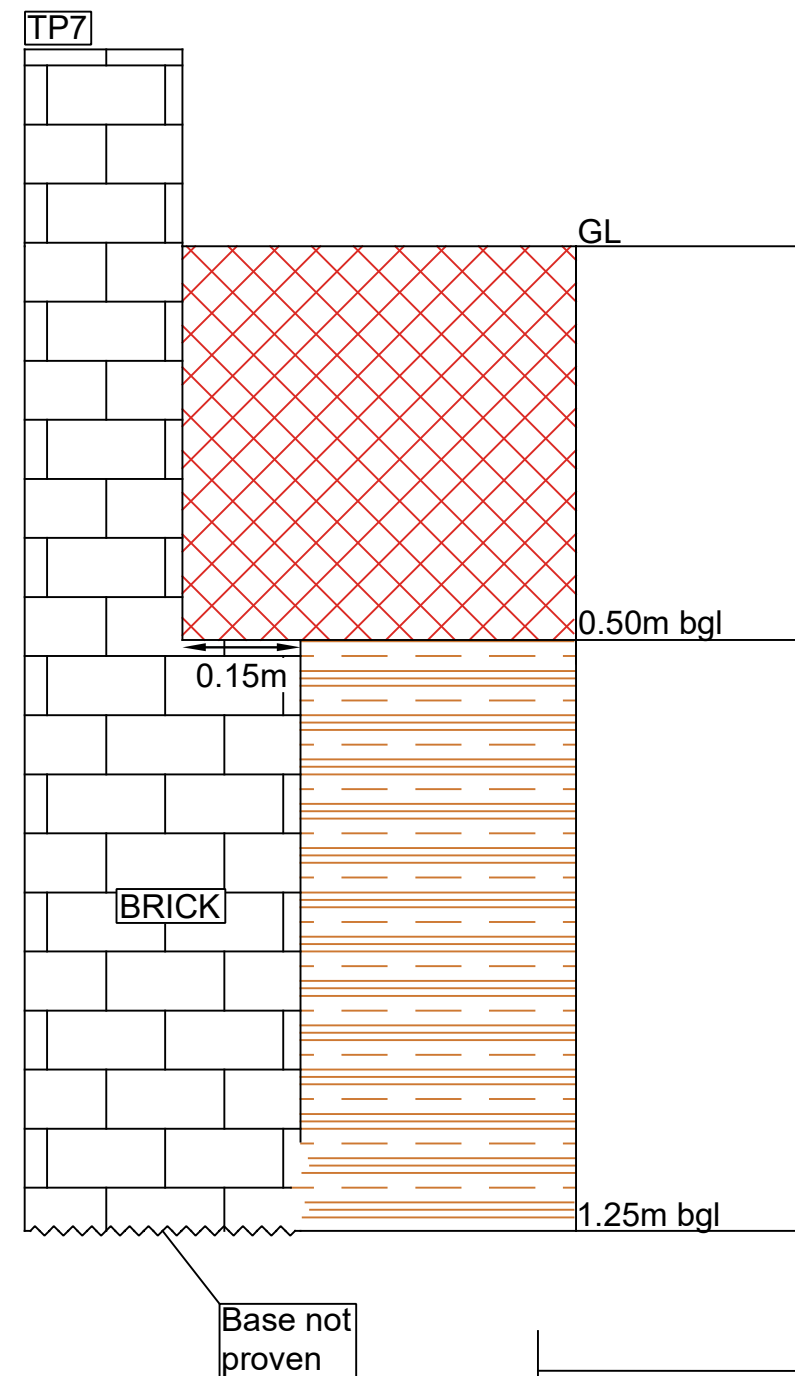
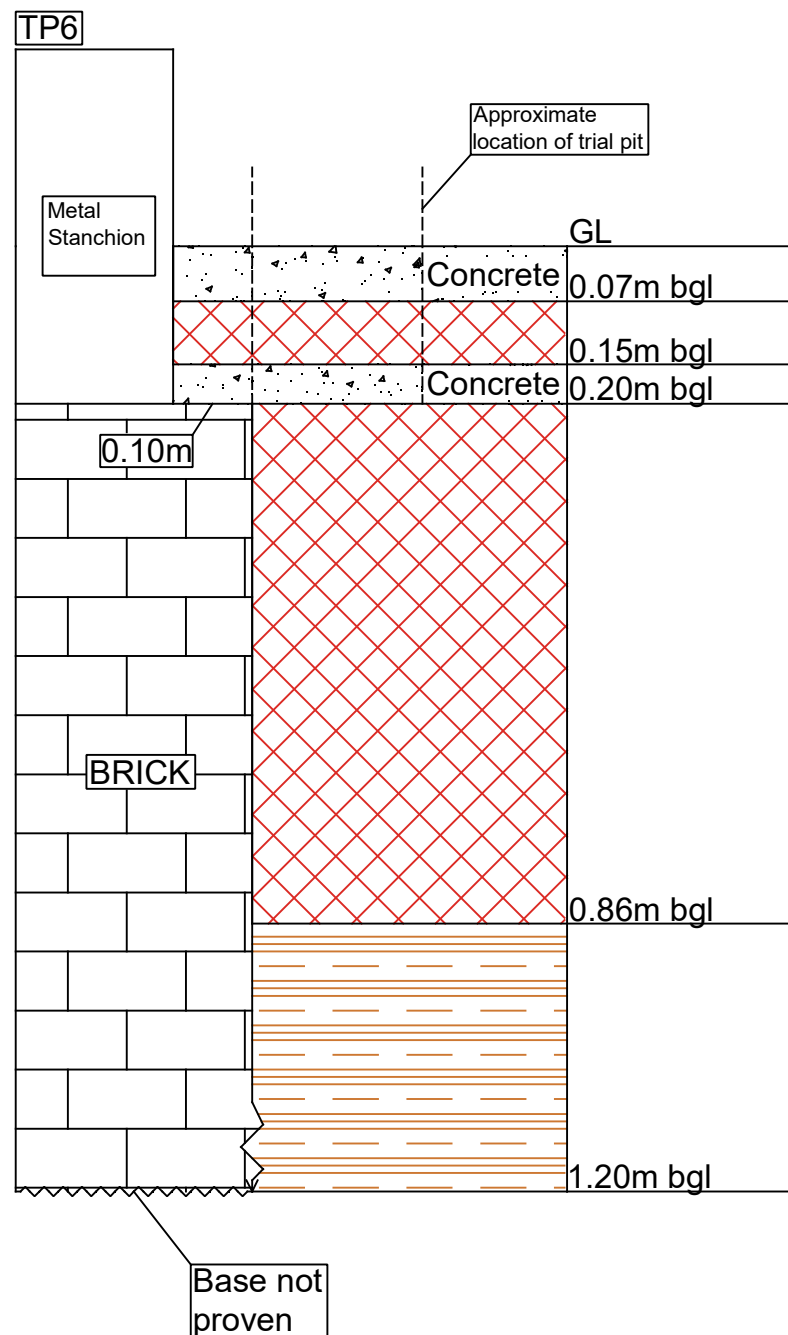
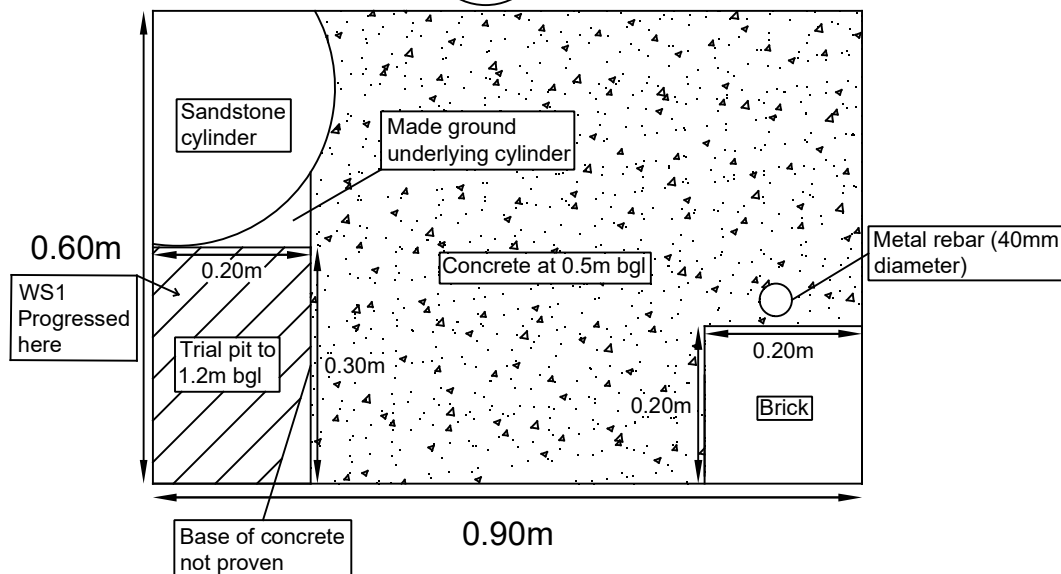
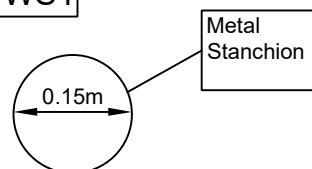
DRAWING NUMBER	C3419/02	REVISION	-
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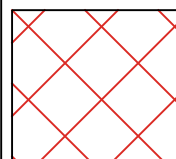
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CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL, MANCHESTER	
DRAWING DETAIL	FOUNDATION PROFILES TP1-TP3	
DRAWN	DV	CHECKED DMG
DATE	AUGUST 2017	SCALE 1:10@A3
DRAWING NUMBER	C3419/03a	REVISION -



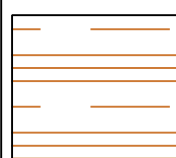
Plan view of TP5/WS1



Key

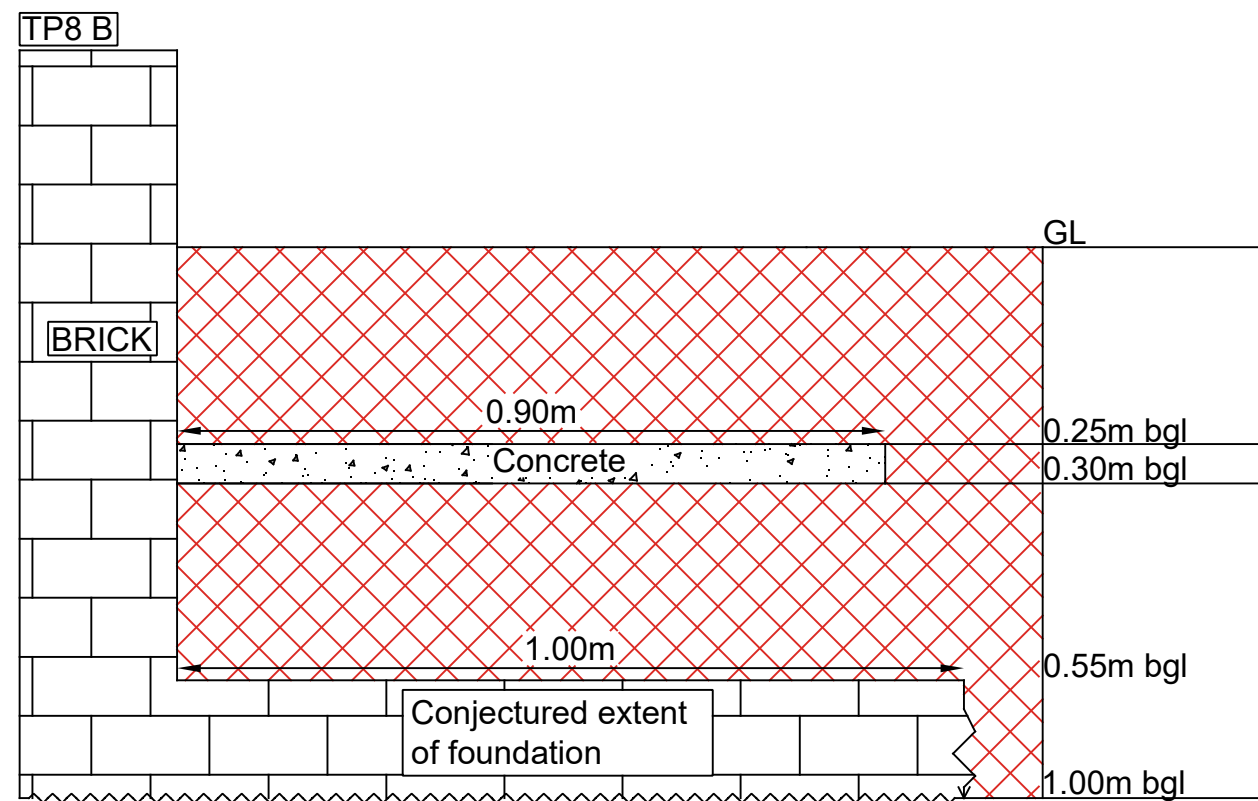
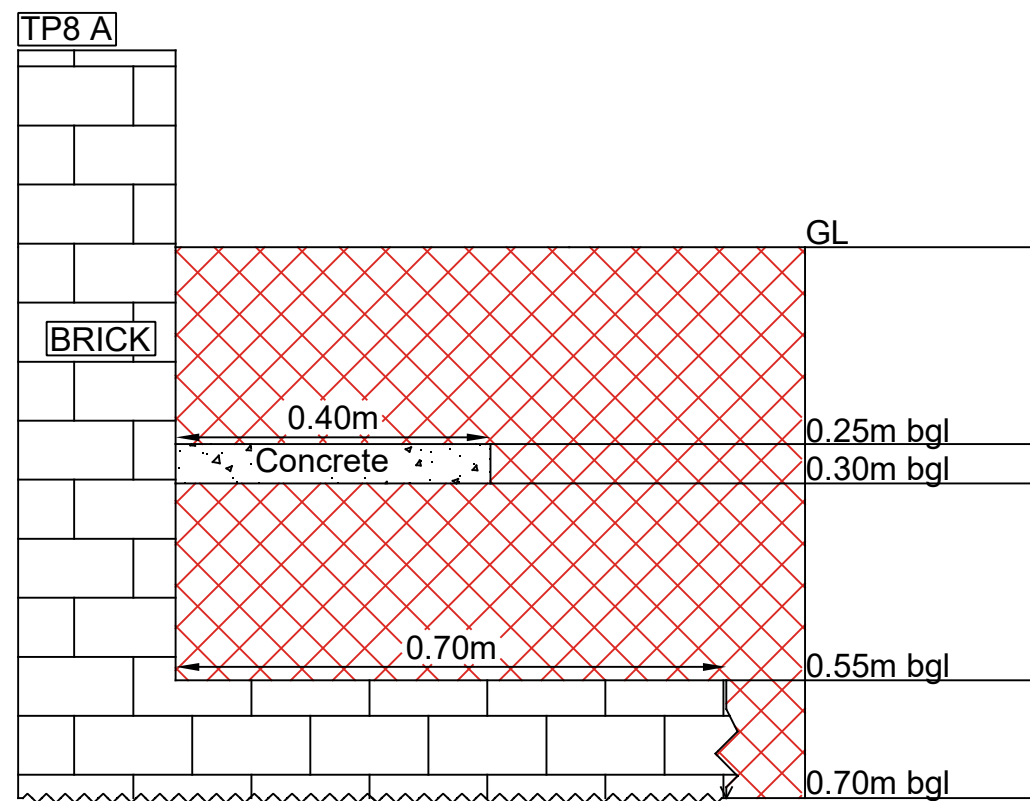


Made ground

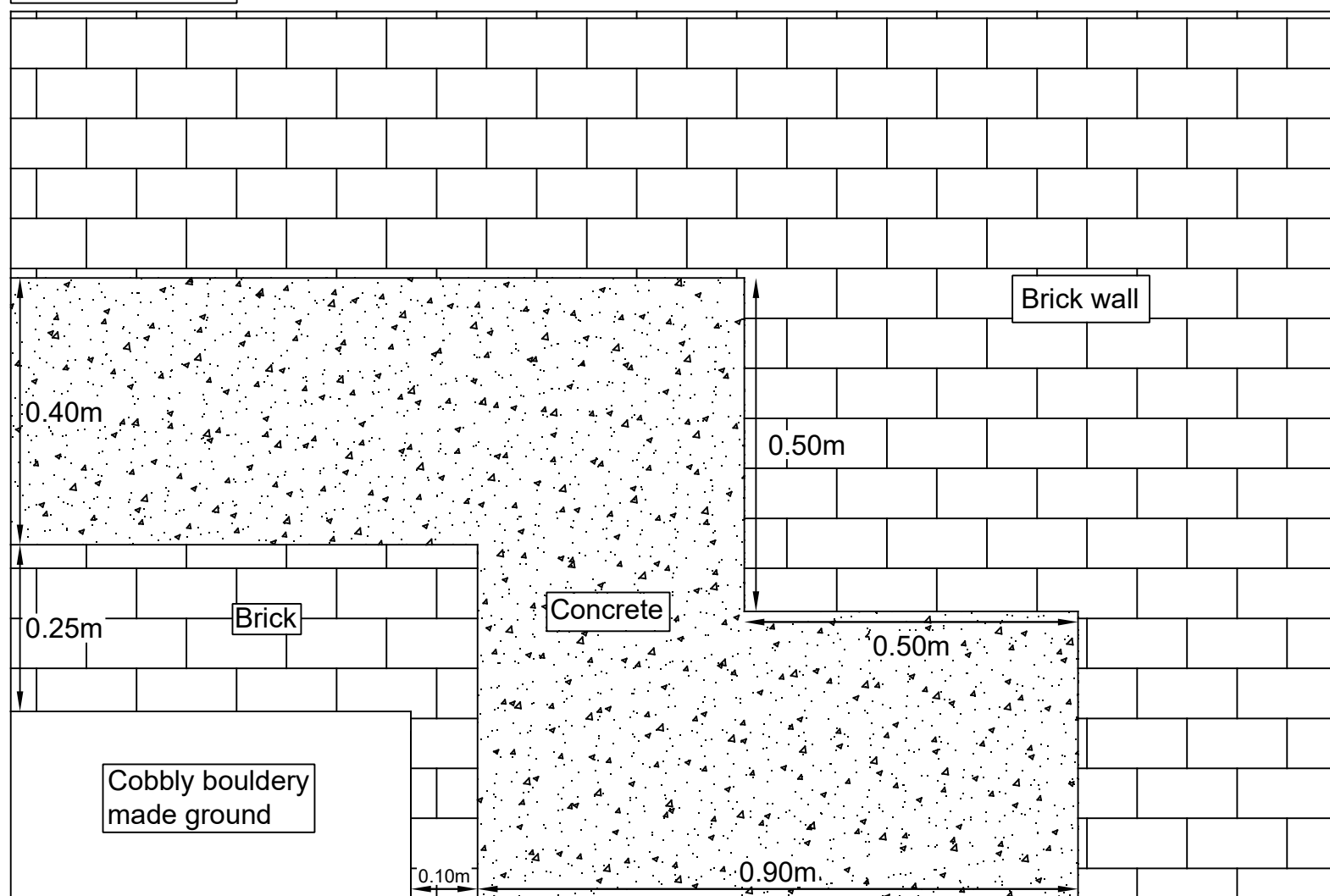


Clay

DESCRIPTION	REV	DATE
 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE		
CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL, MANCHESTER	
DRAWING DETAIL	FOUNDATION PROFILES TP4, TP6 & TP7	
DRAWN	DV	CHECKED DMG
DATE	AUGUST 2017	SCALE 1:10@A3
DRAWING NUMBER	C3419/03b	REVISION -



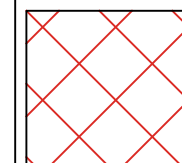
Plan view of TP8



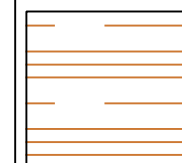
Profile A

Profile B

Key

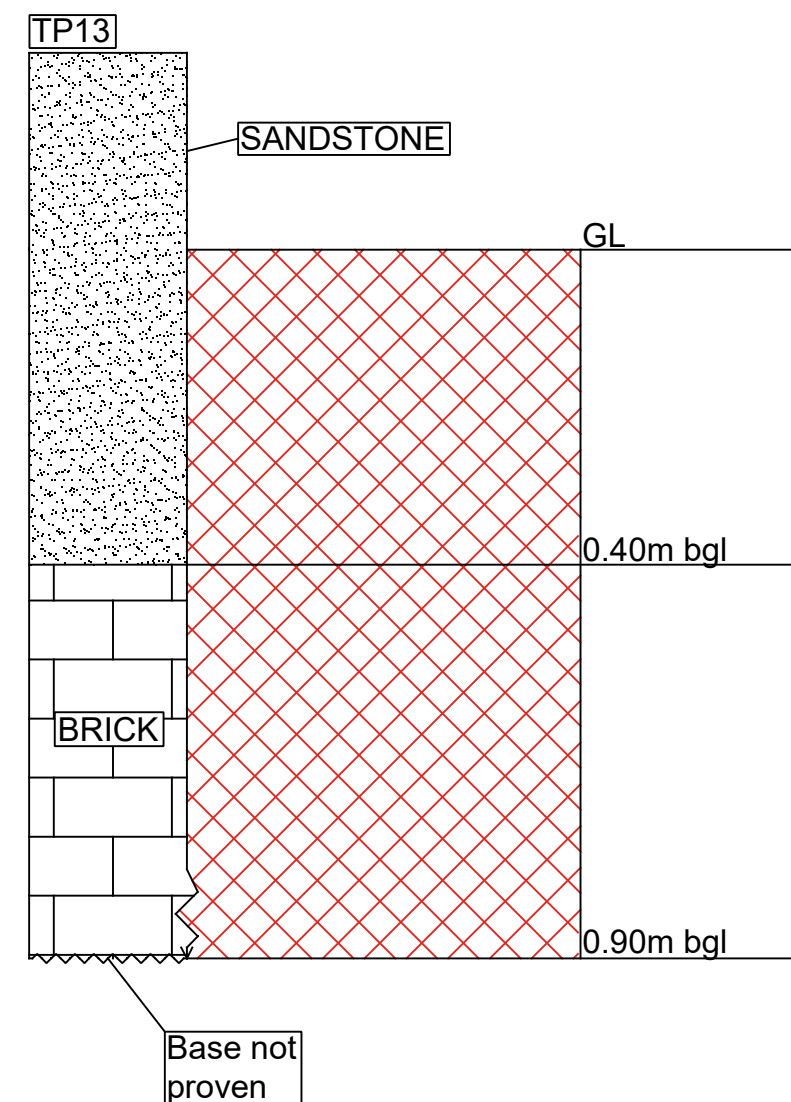
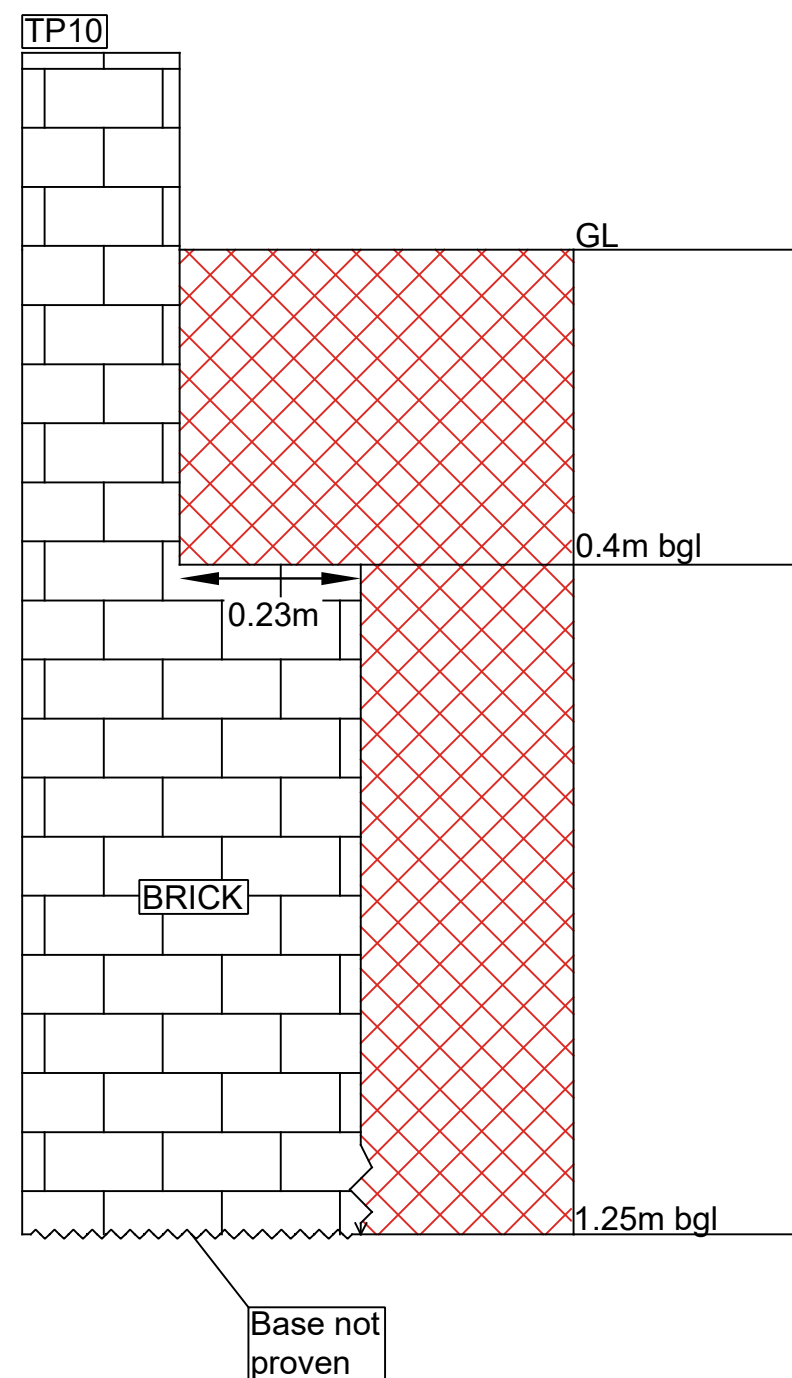
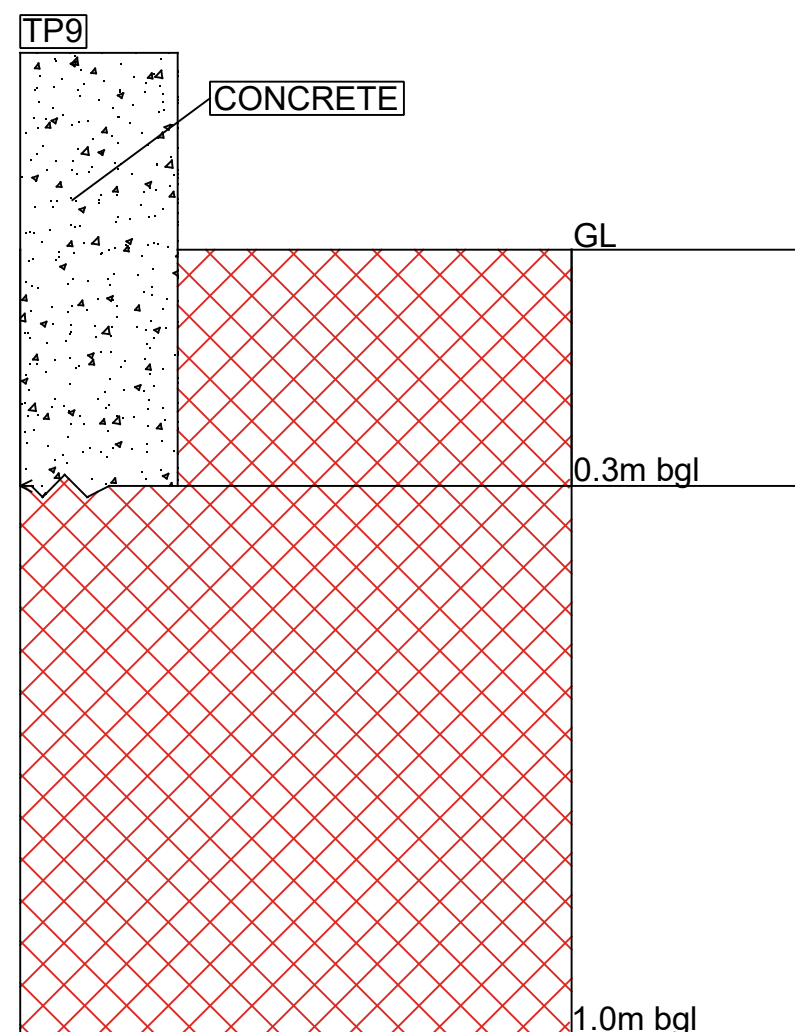


Made ground

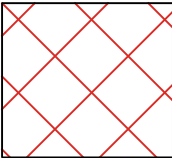


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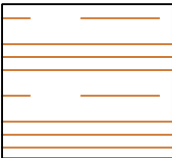
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 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE		
CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL, MANCHESTER	
DRAWING DETAIL	FOUNDATION PROFILES TP8	
DRAWN	DV	CHECKED DMG
DATE	AUGUST 2017	SCALE 1:10@A3
DRAWING NUMBER	C3419/03c	REVISION -



Key

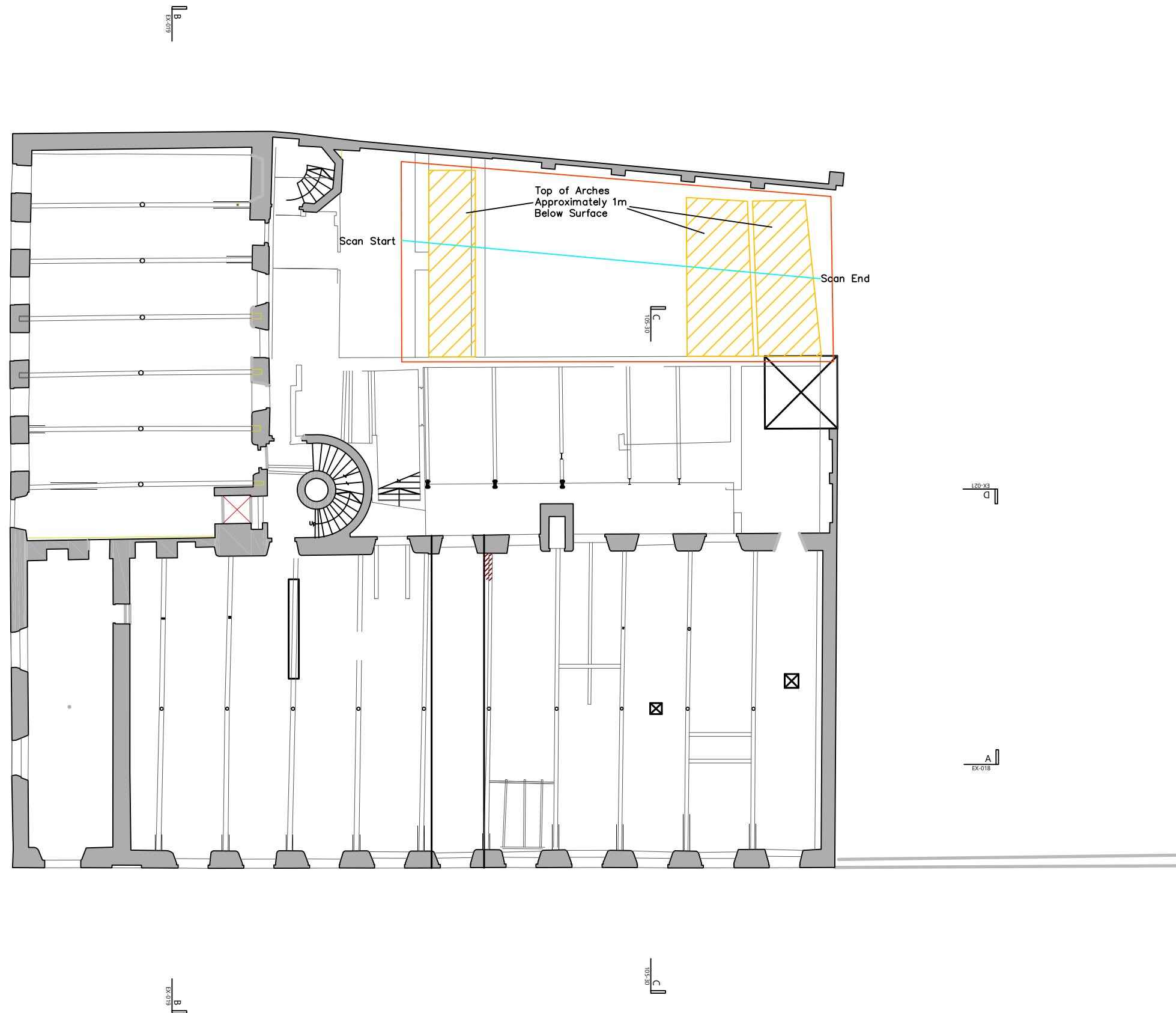


Made ground



Clay

DESCRIPTION	REV	DATE
 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE		
CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL, MANCHESTER	
DRAWING DETAIL	FOUNDATION PROFILES TP9, TP10 & TP13	
DRAWN DV	CHECKED DMG	
DATE AUGUST 2017	SCALE 1:10@A3	
DRAWING NUMBER C3419/03d	REVISION —	



UNDERGROUND SERVICE KEY

ARCH AREA

SURVEY EXTENT

(AR) - ASSUMED ROUTE

D - DEPTH (M)

EOT - END OF TRACE

(FW) - FOUL WATER

SCAN IMAGE

GAS

(SW) - SURFACE WATER

TFR - TAKEN FROM RECORDS

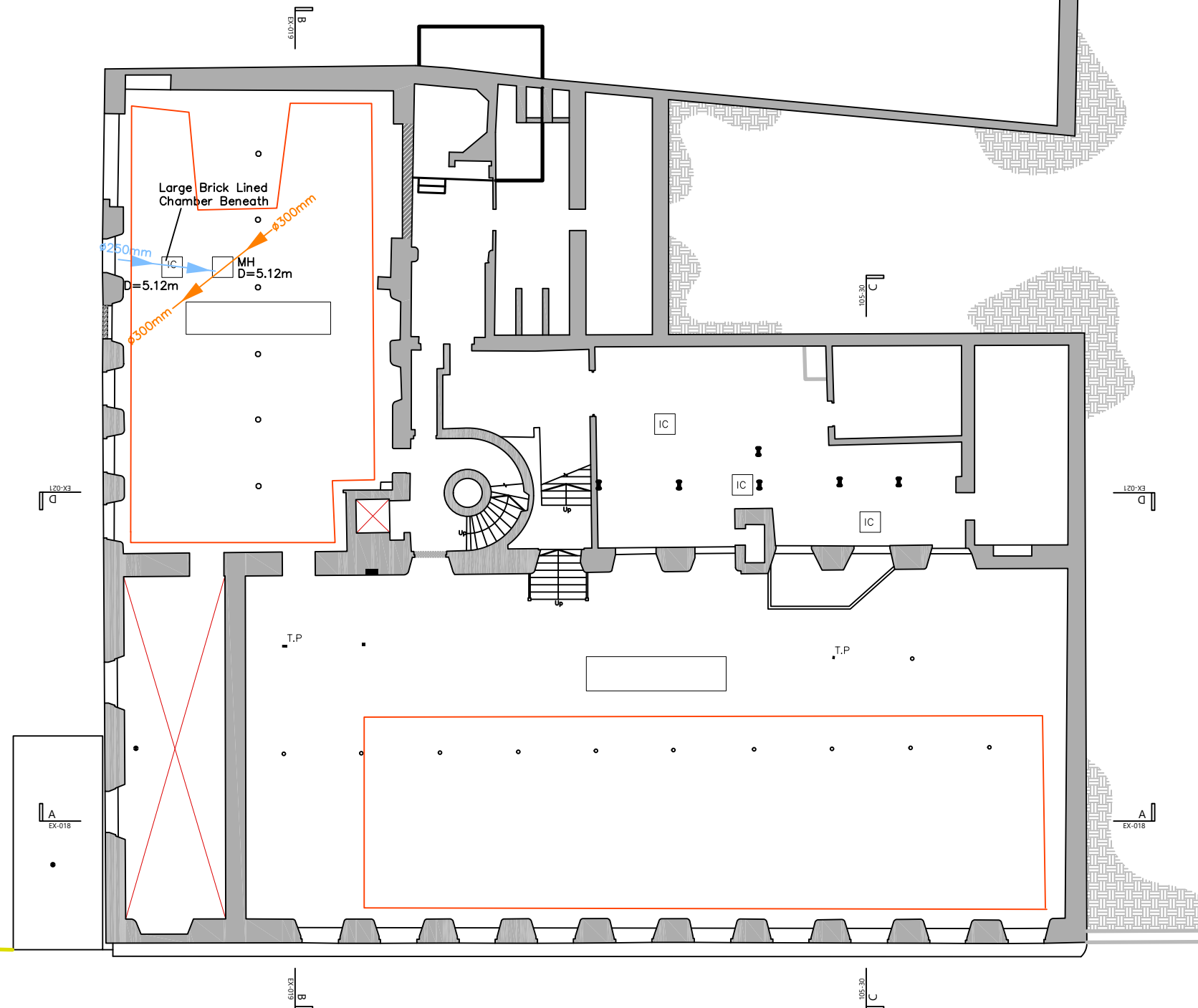
UTL - UNABLE TO LIFT

UTS - UNABLE TO SURVEY

NOTE
Information concerning the location of services is given for your assistance and is intended for guidance only.
N D Oliver & Co Ltd does not accept liability for the accuracy or completeness of the information provided

- NOTES
- ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS THIS DRAWING IS COPYRIGHT OF BSL.
 - DRAWING NOT FOR CONSTRUCTION PURPOSES.

DESCRIPTION	REV	DATE
 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE		
CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL	
DRAWING DETAIL	GPR SURVEY – GROUND FLOOR	
DRAWN	DMG	CHECKED AJS
DATE	Sept 2017	SCALE 1:200 @ A3
DRAWING NUMBER	C3419/04	REVISION —



UNDERGROUND SERVICE KEY

FW	FOUL WATER	SW	SURFACE WATER
SE	SURVEY EXTENT		

(AR) - ASSUMED ROUTE
(D) - DEPTH (M)
(EOT) - END OF TRACE
(FW) - FOUL WATER

(SW) - SURFACE WATER
(TFR) - TAKEN FROM RECORDS
(UTL) - UNABLE TO LIFT
(UTS) - UNABLE TO SURVEY

NOTE
Information concerning the location of services is given for your assistance and is intended for guidance only.
N D Oliver & Co Ltd does not accept liability for the accuracy or completeness of the information provided

- NOTES**
- ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
 - DRAWING NOT FOR CONSTRUCTION PURPOSES.

DESCRIPTION	REV	DATE
 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE		
CLIENT	CIVIC ENGINEERS	
PROJECT TITLE	BROWNSFIELD MILL	
DRAWING DETAIL	GPR SURVEY – BASEMENT LEVEL	
DRAWN	DMG	CHECKED AJS
DATE	Sept 2017	SCALE 1:200 @ A3
DRAWING NUMBER	C3419/05	REVISION —



APPENDIX A Exploratory Hole Logs



William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP1

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
31/07/2017

Location: BINNS PLACE, MANCHESTER

Dimensions
(m):

Depth
1.80

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	ES		0.25			MADE GROUND: Concrete.	1
							MADE GROUND: Dark brown gravelly ashy fine to coarse sand with occasional cobbles of angular brick.	
				0.80			MADE GROUND: Brick wall.	
				1.10			<i>pit extended to avoid brick wall obstruction.</i>	
							VOID	
				1.80			End of pit at 1.80 m	2
								3
								4
								5

Remarks: 1. No groundwater encountered.
2. Pit sides stable.
3. Pit terminated due to reach by hand digging tools.

Stability:



Trial Pit Log

Trialpit No

TP2

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
27/07/2017

Location: BINNS PLACE, MANCHESTER

Dimensions (m):	Depth 1.00
--------------------	---------------

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.80	ES		0.25			MADE GROUND: Concrete.
				0.65			MADE GROUND: Dark grey gravelly ashy fine to coarse sand. Gravel is angular fine to coarse of brick, coal and clinker.
				0.70			MADE GROUND: Concrete.
				1.00			MADE GROUND: Dark grey gravelly ashy fine to coarse sand with occasional angular sandstone cobbles. Gravel is angular fine to coarse of brick, coal and clinker.
							End of pit at 1.00 m
							1
							2
							3
							4
							5

Remarks:	1. No groundwater encountered. 2. Pit sides stable.
----------	--

Stability:





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP3

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
27/07/2017

Location: BINNS PLACE, MANCHESTER

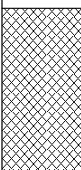
Dimensions
(m):

Depth
1.20

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.24 0.35			MADE GROUND: Concrete.	
							VOID	
	1.00 1.00	D ES		0.90 1.20			MADE GROUND: Dark brown to black slightly gravelly ashy fine to coarse sand. Gravel is angular fine to coarse of brick, slate and concrete.	
							Soft brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of quartzite.	1
							End of pit at 1.20 m	
								2
								3
								4
								5

Remarks: 1. No groundwater encountered.
2. Pit sides stable.

Stability:





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP4

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
27/07/2017

Location: BINNS PLACE, MANCHESTER

Dimensions
(m):

Depth
1.10

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.13			MADE GROUND: Concrete.	
	0.50	ES					MADE GROUND: Greyish brown slightly gravelly ashy clayey sand. Gravel is angular fine to coarse of brick and clay pipe.	
				0.76			Stiff reddish brown mottled grey CLAY.	
	1.00	D		1.10			End of pit at 1.10 m	
								1
								2
								3
								4
								5

Remarks: 1. Groundwater seep at 1.1m bgl.
2. Pit sides stable.

Stability:





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP5/WS1

Sheet 1 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND: Concrete.	
					0.20			MADE GROUND: Multicoloured sandy angular fine to coarse gravel of brick and concrete with a high cobble content of angular brick.	
								MADE GROUND: Brown gravelly fine to coarse sand with occasional angular brick cobbles. Gravel is angular fine to coarse of brick, concrete, metal, wood. Rare cloth.	
		1.00	ES						1
		1.20		N=2 (1,0/1,0,0,1)					
		2.00		N=9 (1,2/3,2,2,2)					2
					2.20				
		2.50	ES					MADE GROUND: Firm brown slightly sandy clay with rare angular fine to medium gravel of brick and coal.	
		3.00		N=21 (4,5/5,5,5,6)					3
		4.00		N=7 (1,1/1,2,2,2)				No recovery from 4.0m to 4.2m bgl.	4
		4.30	D		4.20			Stiff brown slightly sandy CLAY.	
		5.00		N=13 (2,2/3,3,3,4)					5

Continued on next sheet

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. Installation to 4.0m bgl, 1.0m plain, 3.0m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP5/WS1

Sheet 2 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45			End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. Installation to 4.0m bgl, 1.0m plain, 3.0m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP6/WS2

Sheet 1 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.07 0.15 0.23						MADE GROUND: Concrete.	
								MADE GROUND: Black slightly gravelly ashy sand. Gravel is angular fine to coarse of clinker.	
								MADE GROUND: Concrete.	
		0.50	ES					MADE GROUND: Firm brown slightly sandy clay with occasional angular fine to coarse gravel of brick and coal.	
					0.86				
		1.00	D					Stiff reddish brown mottled brown CLAY.	1
		1.20		N=11 (2,2/2,2,3,4)					
		2.00 - 2.50	U						2
		3.00 3.00	D	N=15 (2,3/3,4,4,4)					3
		4.00 4.00	D	N=9 (1,1/2,2,2,3)				damp from 4.0m to 5.0m bgl.	4
		5.00		N=14 (2,2/3,3,4,4)					5

Continued on next sheet

Remarks

- Foundation inspection pit excavated to 1.2m bgl.
- Installation to 3.0m bgl, 1.0m plain, 2.0m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP6/WS2

Sheet 2 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45			End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. Installation to 3.0m bgl, 1.0m plain, 2.0m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP7

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
27/07/2017

Location: BINNS PLACE, MANCHESTER

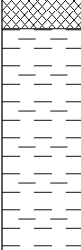
Dimensions
(m):

Depth
1.25

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.09			MADE GROUND: Concrete.	
	0.20	ES					MADE GROUND: Grey brown to black slightly gravelly ashy fine to coarse sand. Gravel is angular fine to coarse of brick and rare coal and clinker.	
				0.37			MADE GROUND: Orange brown fine to coarse sand.	
	0.60	ES		0.50			Firm reddish brown mottled grey CLAY.	
	0.90	D						
				1.25			End of pit at 1.25 m	

Remarks: 1. Groundwater seepage at 0.9m bgl.
2. Pit sides stable.

Stability:



Trial Pit Log

Trialpit No

TP8

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
27/07/2017

Location: BINNS PLACE, MANCHESTER

Dimensions
(m):

Scale
1:25

Client: CIVIC ENGINEERS

Depth
0.70

Logged
DV

[illegible]

Remarks:	1. Pit terminated due to unstable ground and large <0.7m boulders. 2. No groundwater encountered.
----------	--

Stability:





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP9/WS4

Sheet 1 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 -

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.07			0.07			MADE GROUND: Paving slab.	1
		0.15			0.15			MADE GROUND: Greyish brown slightly gravelly fine to coarse sand. Gravel is angular fine to medium of limestone.	
		0.25			0.25			MADE GROUND: Grey sandy angular fine to coarse GRAVEL of limestone.	
		0.60	ES					MADE GROUND: Plastic membrane over dark brown gravelly ashy fine to coarse sand. Gravel is angular fine to coarse of brick, slag, slate, coal and clinker.	
		1.20		N=3 (1,1/0,1,1,1)	1.20				
		1.60	ES					Very soft dark grey silty organic clay with humic organic odour.	
		2.00		N=1 (1,0/0,0,0,1)					2
		3.00		N=11 (2,2/2,3,3,3)					3
		3.50			3.20			Stiff reddish brown CLAY	
		3.50 - 4.00	D U						
		4.00		N=13 (2,3/3,3,3,4)					4
		4.50	D						
		5.00		N=12 (2,2/3,3,3,3)					5

Continued on next sheet

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. Groundwater seep encountered at 0.8m bgl.
3. No installation, backfilled with arisings.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.

TP9/WS4

Sheet 2 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 -

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45			End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. Groundwater seep encountered at 0.8m bgl.
3. No installation, backfilled with arisings.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.
TP10/WS3
Sheet 1 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		1.20			MADE GROUND: Dark brown to black slightly gravelly ashy fine to coarse sand. Gravel is angular fine to coarse of brick, slate, coal and clinker.	1
		1.22	D						
		1.50	ES	N=1 (1,0/0,0,1,0)	3.30			MADE GROUND: Firm brown slightly sandy clay with rare angular fine to medium gravel of coal and brick.	2
		1.50							
		3.00		N=7 (1,0/1,1,2,3)				becoming dark greyish brown, slightly sandy, gravelly with occasional clinker from 2.5m bgl.	3
		3.40	ES		4.00			Stiff reddish brown CLAY.	4
		3.50	D						
		4.00		N=22 (3,4/5,5,6,6)	4.50				5
		4.50	D		5.00				
		5.00		N=20 (2,3/4,5,5,6)					

Continued on next sheet

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. No installation, backfilled with arisings.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.
TP10/WS3

Sheet 2 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45			End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1. Foundation inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. No installation, backfilled with arisings.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP11

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
31/07/2017

Location: BINNS PLACE, MANCHESTER

Dimensions
(m):

Depth
1.10

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.07			MADE GROUND: Paving slab.
				0.15			MADE GROUND: Orange brown fine to coarse sand.
				0.30			MADE GROUND: Grey gravelly fine to coarse sand.. Gravel is angular
							Dark brownish grey gravelly ashy fine to coarse sand with rare cobbles of angular brick. Gravel is angular fine to coarse of brick, glass, coal and clinker.
				1.10			End of pit at 1.10 m

1

2

3

4

5

Remarks: 1. Groundwater seep at 0.9m bgl.
2. Pit sides stable.

Stability:





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.
TP12/WS5
Sheet 1 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.06			0.06			MADE GROUND: Paving slab.	
		0.25			0.25			MADE GROUND: Grey very gravelly fine to coarse sand. Gravel is angular fine to coarse of limestone.	
		0.40	ES					MADE GROUND: Plastic membrane over dark brown to black gravelly ashy sand with rare angular brick cobbles and a slight hydrocarbon odour. Gravel is angular fine to coarse of brick and clinker.	
		0.80			0.80			MADE GROUND: Firm brown mottled dark grey slightly sandy clay with rare angular fine to coarse gravel of brick.	1
		1.20	ES	N=2 (1,0/1,0,0,1)	1.20			MADE GROUND: Very soft dark grey to black silty organic clay with a slight hydrocarbon odour.	
		1.30							
		2.00		N=1 (1,0/0,0,0,1)					2
		3.00		N=9 (1,1/2,2,2,3)					3
		3.50			3.50			Stiff reddish brown CLAY.	
		3.80	D						
		4.00		N=10 (1,1/1,3,3,3)					4
		4.50	D						
		5.00		N=12 (2,2/3,3,3,3)					5

Continued on next sheet

Remarks

1. Inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. Installation to 3.5m bgl, 1.0m plain, 2.5m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Borehole Log

Borehole No.
TP12/WS5

Sheet 2 of 2

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -

Hole Type
WS

Location: BINNS PLACE, MANCHESTER

Level:

Scale
1:25

Client: CIVIC ENGINEERS

Dates: 27/07/2017 - 28/07/2017

Logged By
DV

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45			End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1. Inspection pit excavated to 1.2m bgl.
2. No groundwater encountered.
3. Installation to 3.5m bgl, 1.0m plain, 2.5m slotted.





William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Trial Pit Log

Trialpit No

TP13

Sheet 1 of 1

Project Name: BROWNSFIELD MILL

Project No.
C3419

Co-ords: -
Level:

Date
31/07/2017

Location: BINNS PLACE, MANCHESTER

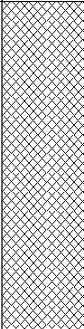
Dimensions
(m):

Depth
1.10

Scale
1:25

Logged
DV

Client: CIVIC ENGINEERS

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.70	ES		1.10			MADE GROUND: Dark brown gravelly ashy fine to coarse with rare cobbles of angular brick. Gravel is angular fine to coarse of brick.	1
							End of pit at 1.10 m	2
								3
								4
								5

Remarks: 1. No groundwater encountered.
2. Pit sides stable.

Stability:





APPENDIX B

Chemical Testing Results



Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Brownfield Solutions Limited
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention :	Dan Vowles
Date :	12th September, 2017
Your reference :	C3419
Our reference :	Test Report 17/13102 Batch 1
Location :	Brownsfield Mill
Date samples received :	2nd August, 2017
Status :	Final report
Issue :	3

Twenty five samples were received for analysis on 2nd August, 2017 of which twenty were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Please see attached notes for all abbreviations and acronyms

Client Name: Brownfield Solutions Limited
Reference: C3419
Location: Brownsfield Mill
Contact: Dan Vowles
JE Job No.: 17/13102

Report : Solid

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

J E Sample No.	1	5-7	8-10	11	21	22-24	25-27	28	29	30-32	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS1	WS1	WS2	WS2	WS4	WS5	WS5	WS5	WS3	TP1			
Depth	4.30	2.50	0.50	1.20	3.50	0.40	1.30	3.80	3.50	0.50			
COC No / misc													
Containers	T	V J T	V J T	T	T	V J T	V J T	T	T	V J T			
Sample Date	28/07/2017	28/07/2017	28/07/2017	28/07/2017	28/07/2017	28/07/2017	28/07/2017	28/07/2017	28/07/2017	31/07/2017			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	-	-	-	-	-	<0.1 ^{SV}	<0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	-	-	-	-	<0.1 ^{SV}	<0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>C8-C10	-	-	-	-	-	0.8 ^{SV}	0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	-	-	-	-	35.2	5.5	-	-	-	<0.2	mg/kg	TM5/PM16
>C12-C16 #	-	-	-	-	-	234	33	-	-	-	<4	mg/kg	TM5/PM16
>C16-C21 #	-	-	-	-	-	458	201	-	-	-	<7	mg/kg	TM5/PM16
>C21-C35 #	-	-	-	-	-	4192	1423	-	-	-	<7	mg/kg	TM5/PM16
Total aliphatics C5-35	-	-	-	-	-	4920	1663	-	-	-	<19	mg/kg	TM5/PM16/PM18
Aromatics													
>C5-EC7 #	-	-	-	-	-	<0.1 ^{SV}	<0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	-	-	-	-	<0.1 ^{SV}	<0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	-	-	-	-	<0.1 ^{SV}	<0.1 ^{SV}	-	-	-	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	-	-	-	-	11.8	7.3	-	-	-	<0.2	mg/kg	TM5/PM16
>EC12-EC16 #	-	-	-	-	-	146	117	-	-	-	<4	mg/kg	TM5/PM16
>EC16-EC21 #	-	-	-	-	-	553	1273	-	-	-	<7	mg/kg	TM5/PM16
>EC21-EC35 #	-	-	-	-	-	2669	2072	-	-	-	<7	mg/kg	TM5/PM16
Total aromatics C5-35 #	-	-	-	-	-	3380	3469	-	-	-	<19	mg/kg	TM5/PM16/PM18
Total aliphatics and aromatics(C5-35)	-	-	-	-	-	8300	5132	-	-	-	<38	mg/kg	TM5/PM16/PM18
MTBE #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
Benzene #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
Toluene #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
o-Xylene #	-	-	-	-	-	<5 ^{SV}	<5 ^{SV}	-	-	-	<5	ug/kg	TM31/PM12
Total Phenols HPLC	-	<0.15	<0.15	-	-	<0.15	<0.15	-	-	<0.15	<0.15	mg/kg	TM26/PM21
Natural Moisture Content	-	26.9	23.6	-	-	-	67.3	-	-	14.3	<0.1	%	PM4/PM0
Natural Moisture Content	-	-	-	-	-	26.6	-	-	-	-	<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3	<0.3	-	-	<0.3	<0.3	-	-	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0192	0.0857	0.0836	0.0430	0.0159	-	0.0448	0.0220	0.0588	1.1619	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	0.1724	-	-	-	-	<0.0015	g/l	TM38/PM60
Total Cyanide #	-	<0.5	<0.5	-	-	1.8	26.1	-	-	5.5	<0.5	mg/kg	TM89/PM45
Organic Matter	-	6.8	2.3	-	-	NDP	23.0	-	-	6.6	<0.2	%	TM21/PM24
pH #	9.45	7.99	8.43	8.39	7.90	7.69	7.51	8.31	8.46	7.99	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Brownfield Solutions Limited
Reference: C3419
Location: Brownsfield Mill
Contact: Dan Vowles
JE Job No.: 17/13102

Report : Solid

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

J E Sample No.	36-38	42-44	48-50	51-53	54-56	57-59	63-65				Please see attached notes for all abbreviations and acronyms		
Sample ID	TP3	TP4	TP7	TP8	TP9	TP10	TP11						
Depth	0.40	0.50	0.60	0.50	0.60	0.50	0.50						
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	27/07/2017	27/07/2017	27/07/2017	28/07/2017	28/07/2017	27/07/2017	27/07/2017						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017	02/08/2017				LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>C8-C10	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	-	-	-	-	-	-				<0.2	mg/kg	TM5/PM16
>C12-C16 #	-	-	-	-	-	-	-				<4	mg/kg	TM5/PM16
>C16-C21 #	-	-	-	-	-	-	-				<7	mg/kg	TM5/PM16
>C21-C35 #	-	-	-	-	-	-	-				<7	mg/kg	TM5/PM16
Total aliphatics C5-35	-	-	-	-	-	-	-				<19	mg/kg	TM5/PM16
Aromatics													
>C5-EC7 #	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	-	-	-	-	-	-				<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	-	-	-	-	-	-				<0.2	mg/kg	TM5/PM16
>EC12-EC16 #	-	-	-	-	-	-	-				<4	mg/kg	TM5/PM16
>EC16-EC21 #	-	-	-	-	-	-	-				<7	mg/kg	TM5/PM16
>EC21-EC35 #	-	-	-	-	-	-	-				<7	mg/kg	TM5/PM16
Total aromatics C5-35 #	-	-	-	-	-	-	-				<19	mg/kg	TM5/PM16
Total aliphatics and aromatics(C5-35)	-	-	-	-	-	-	-				<38	mg/kg	TM5/PM16
MTBE #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
Benzene #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
Toluene #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
o-Xylene #	-	-	-	-	-	-	-				<5	ug/kg	TM31/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15				<0.15	mg/kg	TM26/PM21
Natural Moisture Content	NDP	25.0	29.6	2.4	NDP	23.0	11.9				<0.1	%	PM4/PM0
Natural Moisture Content	24.1	-	-	-	23.4	-	-				<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	1.9	<0.3	<0.3				<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	0.0864	0.0281	0.4158	-	0.0626	0.0506				<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	1.8428	-	-	-	0.1865	-	-				<0.0015	g/l	TM38/PM60
Total Cyanide #	<0.5	<0.5	<0.5	2.0	27.0	<0.5	<0.5				<0.5	mg/kg	TM89/PM45
Organic Matter	NDP	6.3	2.2	1.6	NDP	15.6	9.1				<0.2	%	TM21/PM24
pH #	9.43	8.51	9.02	8.20	8.04	8.29	8.34				<0.01	pH units	TM73/PM11

Client Name: Brownfield Solutions Limited
Reference: C3419
Location: Brownsfield Mill
Contact: Dan Vowles

Note:

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

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/13102	1	WS1	1.00	3	07/09/2017	General Description (Bulk Analysis)	soil/stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
17/13102	1	WS1	2.50	6	07/09/2017	General Description (Bulk Analysis)	Soil/Stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
17/13102	1	WS2	0.50	9	07/09/2017	General Description (Bulk Analysis)	Soil/Stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
17/13102	1	WS4	1.60	19	07/08/2017	General Description (Bulk Analysis)	Soil/Stone
					07/08/2017	Asbestos Fibres	NAD
					07/08/2017	Asbestos Fibres (2)	NAD
					07/08/2017	Asbestos ACM	NAD
					07/08/2017	Asbestos ACM (2)	NAD
					07/08/2017	Asbestos Type	NAD
					07/08/2017	Asbestos Type (2)	NAD
					07/08/2017	Asbestos Level Screen	NAD
17/13102	1	WS5	0.40	23	07/08/2017	General Description (Bulk Analysis)	Soil/Stone
					07/08/2017	Asbestos Fibres	Fibre Bundles
					07/08/2017	Asbestos ACM	NAD

Client Name: Brownfield Solutions Limited
Reference: C3419
Location: Brownsfield Mill
Contact: Dan Vowles

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/13102	1	WS5	0.40	23	07/08/2017	Asbestos Type	Chrysotile
					07/08/2017	Asbestos Level Screen	<0.1%
					16/08/2017	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					16/08/2017	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					16/08/2017	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					16/08/2017	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					16/08/2017	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
17/13102	1	WS5	1.30	26	07/08/2017	General Description (Bulk Analysis)	Soil/Stone
					07/08/2017	Asbestos Fibres	NAD
					07/08/2017	Asbestos Fibres (2)	NAD
					07/08/2017	Asbestos ACM	NAD
					07/08/2017	Asbestos ACM (2)	NAD
					07/08/2017	Asbestos Type	NAD
					07/08/2017	Asbestos Type (2)	NAD
17/13102	1	TP1	0.50	31	07/08/2017	Asbestos Level Screen	NAD
					07/09/2017	General Description (Bulk Analysis)	Soil/Stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
17/13102	1	TP2	0.80	34	07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
					07/09/2017	General Description (Bulk Analysis)	soil/stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
17/13102	1	TP3	0.40	37	07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
					07/08/2017	General Description (Bulk Analysis)	soil/stones
					07/08/2017	Asbestos Fibres	Fibre Bundles
					07/08/2017	Asbestos ACM	NAD
17/13102	1	TP4	0.50	43	07/08/2017	Asbestos Type	Chrysotile
					07/08/2017	Asbestos Level Screen	<0.1%
					16/08/2017	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					16/08/2017	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					16/08/2017	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					16/08/2017	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					16/08/2017	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
17/13102	1	TP4	0.50	43	07/08/2017	General Description (Bulk Analysis)	Soil/Stone
					07/08/2017	Asbestos Fibres	NAD
					07/08/2017	Asbestos Fibres (2)	NAD
					07/08/2017	Asbestos ACM	NAD
					07/08/2017	Asbestos ACM (2)	NAD
					07/08/2017	Asbestos Type	NAD
					07/08/2017	Asbestos Type (2)	NAD

Client Name: Brownfield Solutions Limited
Reference: C3419
Location: Brownsfield Mill
Contact: Dan Vowles

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/13102	1	TP4	0.50	43	07/08/2017	Asbestos Level Screen	NAD
17/13102	1	TP7	0.60	49	07/08/2017	General Description (Bulk Analysis)	Soil/Stone
					07/08/2017	Asbestos Fibres	NAD
					07/08/2017	Asbestos Fibres (2)	NAD
					07/08/2017	Asbestos ACM	NAD
					07/08/2017	Asbestos ACM (2)	NAD
					07/08/2017	Asbestos Type	NAD
					07/08/2017	Asbestos Type (2)	NAD
					07/08/2017	Asbestos Level Screen	NAD
17/13102	1	TP8	0.50	52	07/09/2017	General Description (Bulk Analysis)	soil/stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD
17/13102	1	TP9	0.60	55	08/08/2017	General Description (Bulk Analysis)	soil/stones
					08/08/2017	Asbestos Fibres	Fibre Bundles
					08/08/2017	Asbestos Fibres (2)	Fibre Bundles
					08/08/2017	Asbestos ACM	Insulation Debris
					08/08/2017	Asbestos ACM (2)	Asbestos Cement Debris
					08/08/2017	Asbestos Type	Amosite
					08/08/2017	Asbestos Type (2)	Chrysotile
					08/08/2017	Asbestos Level Screen	Asbestos level cannot be determined from Screen. Quantification required.
					16/08/2017	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					16/08/2017	Total Detailed Gravimetric Quantification (% Asb)	0.044 (mass %)
					16/08/2017	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.044 (mass %)
					16/08/2017	Asbestos PCOM Quantification (Fibres)	0.004 (mass %)
					16/08/2017	Asbestos Gravimetric & PCOM Total	0.048 (mass %)
17/13102	1	TP10	0.50	58	07/08/2017	General Description (Bulk Analysis)	soil/stones
					07/08/2017	Asbestos Fibres	NAD
					07/08/2017	Asbestos Fibres (2)	NAD
					07/08/2017	Asbestos ACM	NAD
					07/08/2017	Asbestos ACM (2)	NAD
					07/08/2017	Asbestos Type	NAD
					07/08/2017	Asbestos Type (2)	NAD
					07/08/2017	Asbestos Level Screen	NAD
17/13102	1	TP11	0.50	64	07/09/2017	General Description (Bulk Analysis)	soil/stones
					07/09/2017	Asbestos Fibres	NAD
					07/09/2017	Asbestos Fibres (2)	NAD
					07/09/2017	Asbestos ACM	NAD
					07/09/2017	Asbestos ACM (2)	NAD
					07/09/2017	Asbestos Type	NAD
					07/09/2017	Asbestos Type (2)	NAD
					07/09/2017	Asbestos Level Screen	NAD

Matrix : Solid

9 of 15

Matrix : Solid

Location: Brownsfield Mill

Contact: Dan Vowles

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/13102

SOILS

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

JE Job No: 17/13102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of PTEX and calculation of Aliphatic fractions.	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of PTEX and calculation of Aliphatic fractions.	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes

JE Job No: 17/13102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes

JE Job No: 17/13102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes



APPENDIX C

Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL17/3772

Report Date: 01 September 2017

Client's Reference: C3419

Client Name: Brownfield Solutions
William Smith House
173-183 Willton Street
Northwich
Cheshire
CW9 5LP

For the attention of: Dan Vowles

Contract Title: Brownsfield Mill

Date Received: 3/8/2017

Date Commenced: 3/8/2017

Date Completed: 1/9/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)


S Eyre
(Senior Technician)

A Fry
(Senior Technician)

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e-mail: rgunson@prosoils.co.uk
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

Brownsfield Mill

Contract No:

PSL17/3772

Client Ref:

C3419

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



PSL
Professional Soils Laboratory

Brownsfield Mill

Contract No:

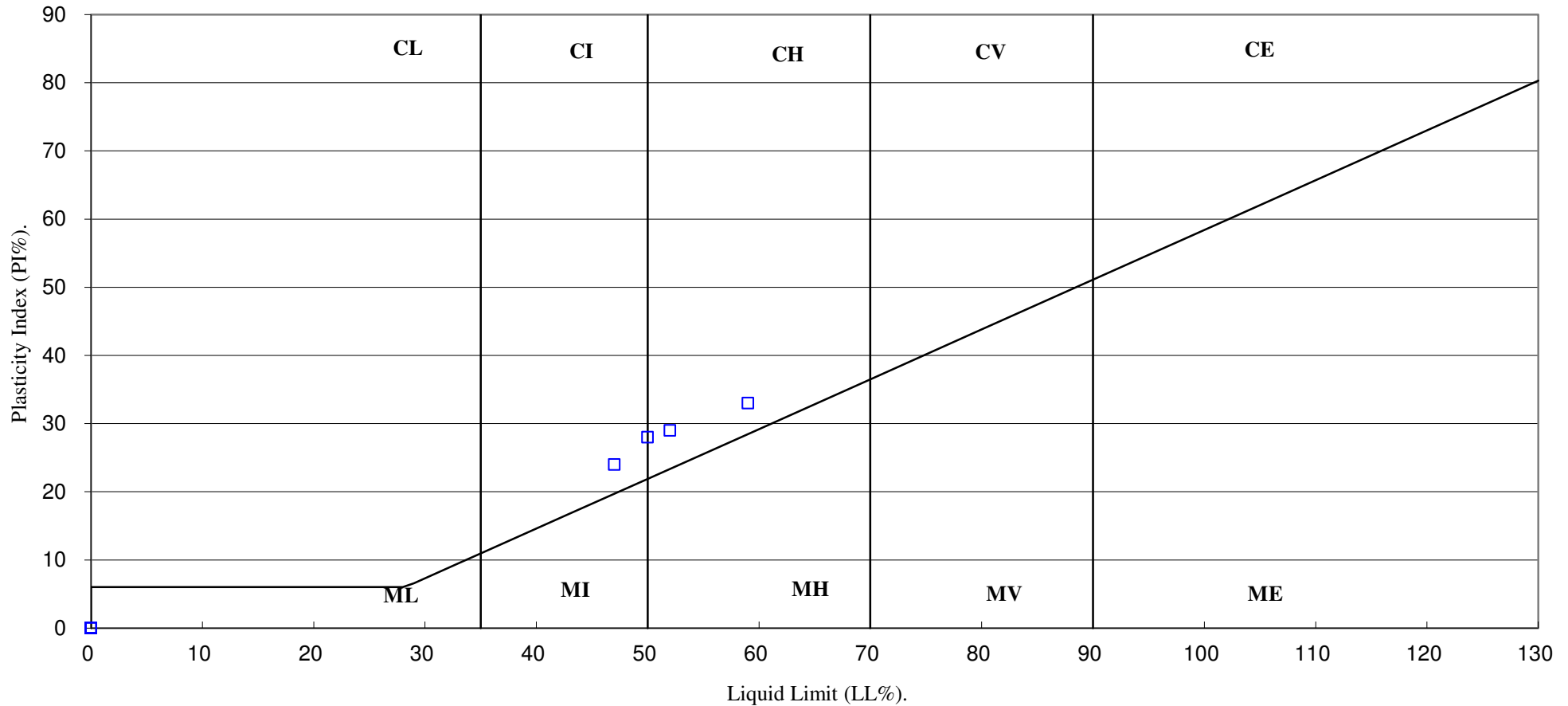
PSL17/3772

Client Ref:

C3419

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



PSL
Professional Soils Laboratory

Brownsfield Mill

Contract No:

PSL17/3772

Client Ref:

C3419

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: TP6-WS2

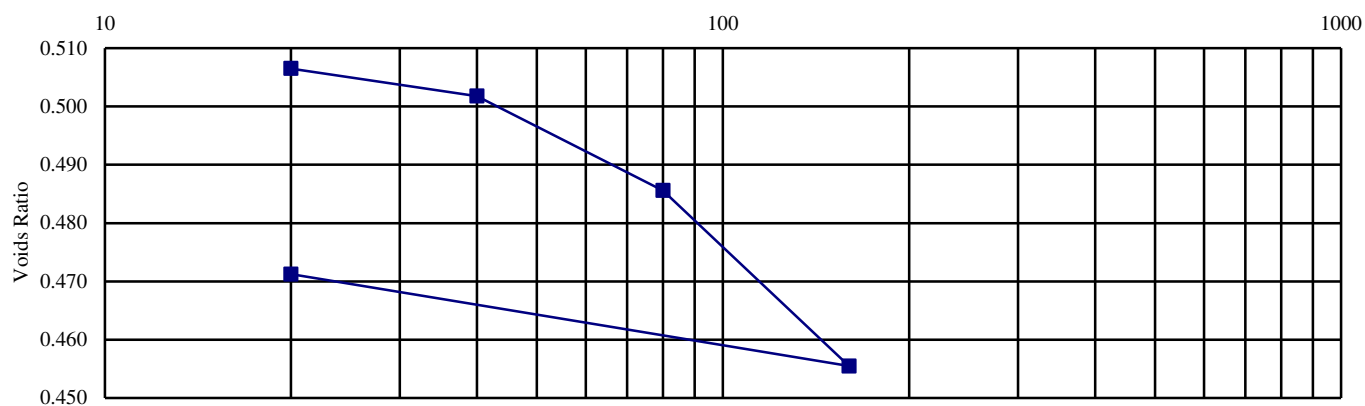
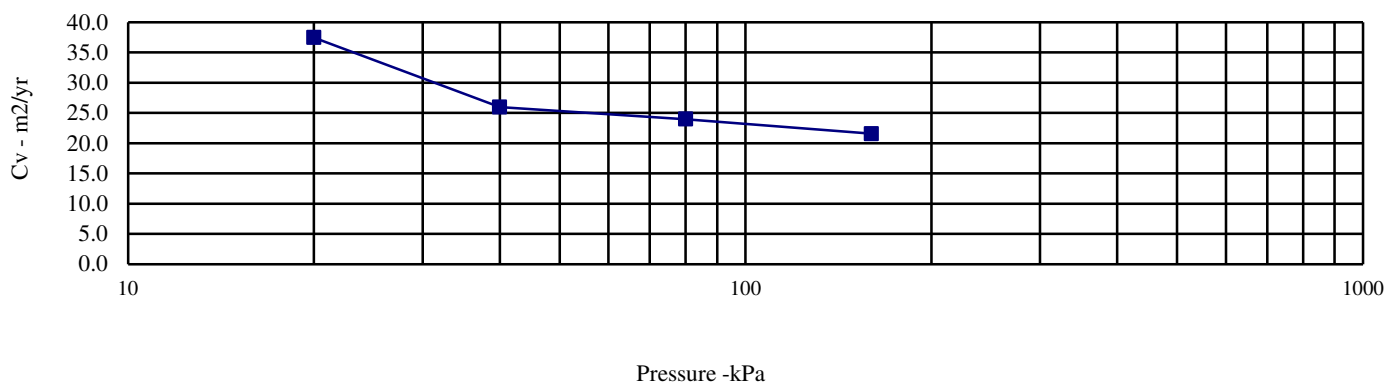
Top Depth (m): 2.00

Sample Number:

Base Depth (m) : 2.50

Sample Type: U

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	19	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.09	0	20	0.274	37.480	Method used to	
Dry Density (Mg/m3):	1.75	20	40	0.157	25.952	determine CV:	T90
Voids Ratio:	0.515	40	80	0.270	23.982	Nominal temperature	
Degree of saturation:	100.2	80	160	0.253	21.572	during test ' C:	20
Height (mm):	19.888	160	20	0.077	-	Remarks:	
Diameter (mm)	50.003					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Brownsfield Mill

Contract No:
PSL17/3773
Client Ref:
C3419

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: TP6/WS2

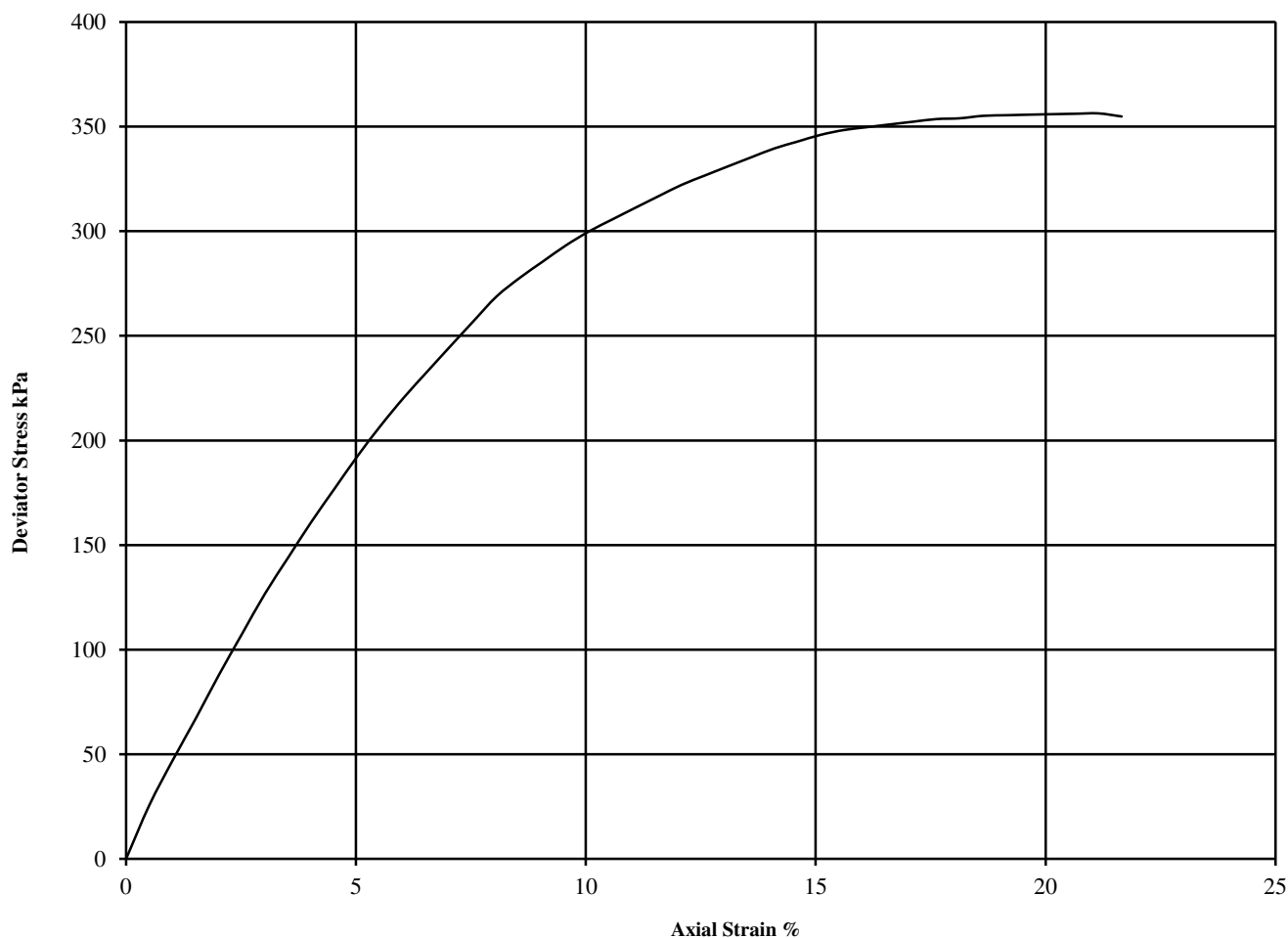
Top Depth (m): 2.00

Sample Number:

Base Depth (m): 2.50

Sample Type

U



Diameter (mm):		70.0	Height (mm):		139.0	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.45 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	19	2.13	1.79	40	356	178	21.2	Intermediate	



Brownsfield Mill

Contract No:

PSL17/3772

Client Ref:

C3419

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: TP9-WS4

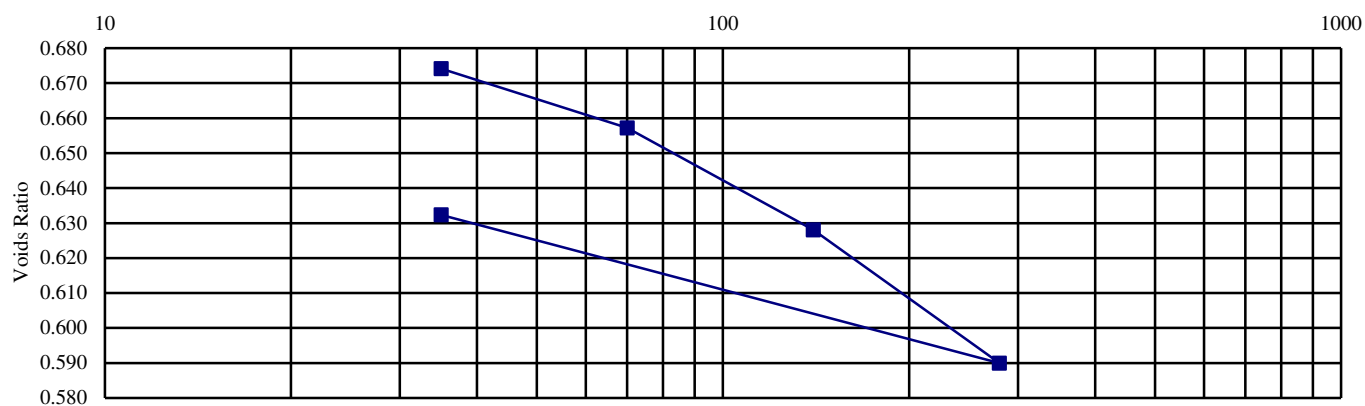
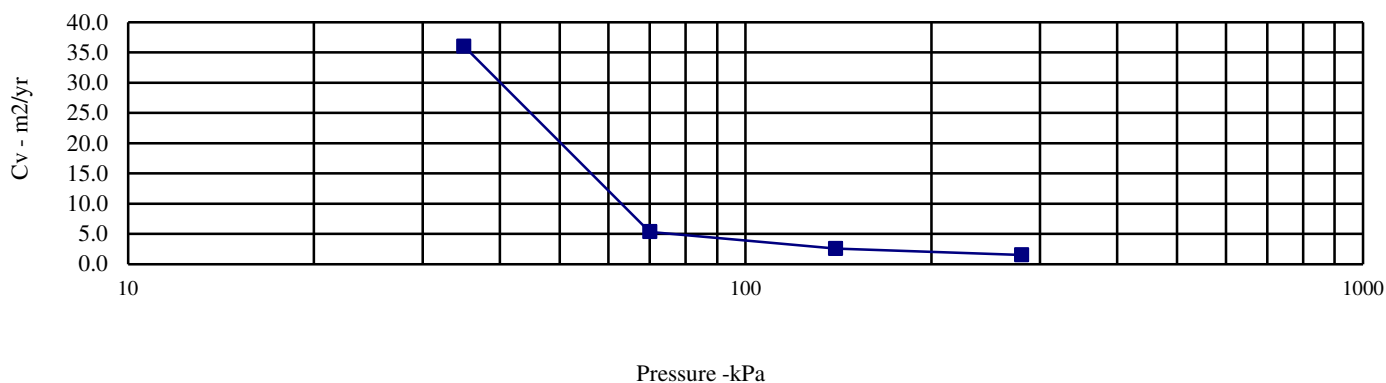
Top Depth (m): 3.50

Sample Number:

Base Depth (m) : 4.00

Sample Type: U

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	26	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.96	0	35	0.377	36.015	Method used to	
Dry Density (Mg/m3):	1.56	35	70	0.289	5.352	determine CV:	T90
Voids Ratio:	0.697	70	140	0.251	2.555	Nominal temperature	
Degree of saturation:	97.7	140	280	0.167	1.516	during test ' C:	20
Height (mm):	19.83	280	35	0.109	-	Remarks:	
Diameter (mm)	50.05					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Brownsfield Mill

Contract No:
PSL17/3773
Client Ref:
C3419

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: TP9/WS4

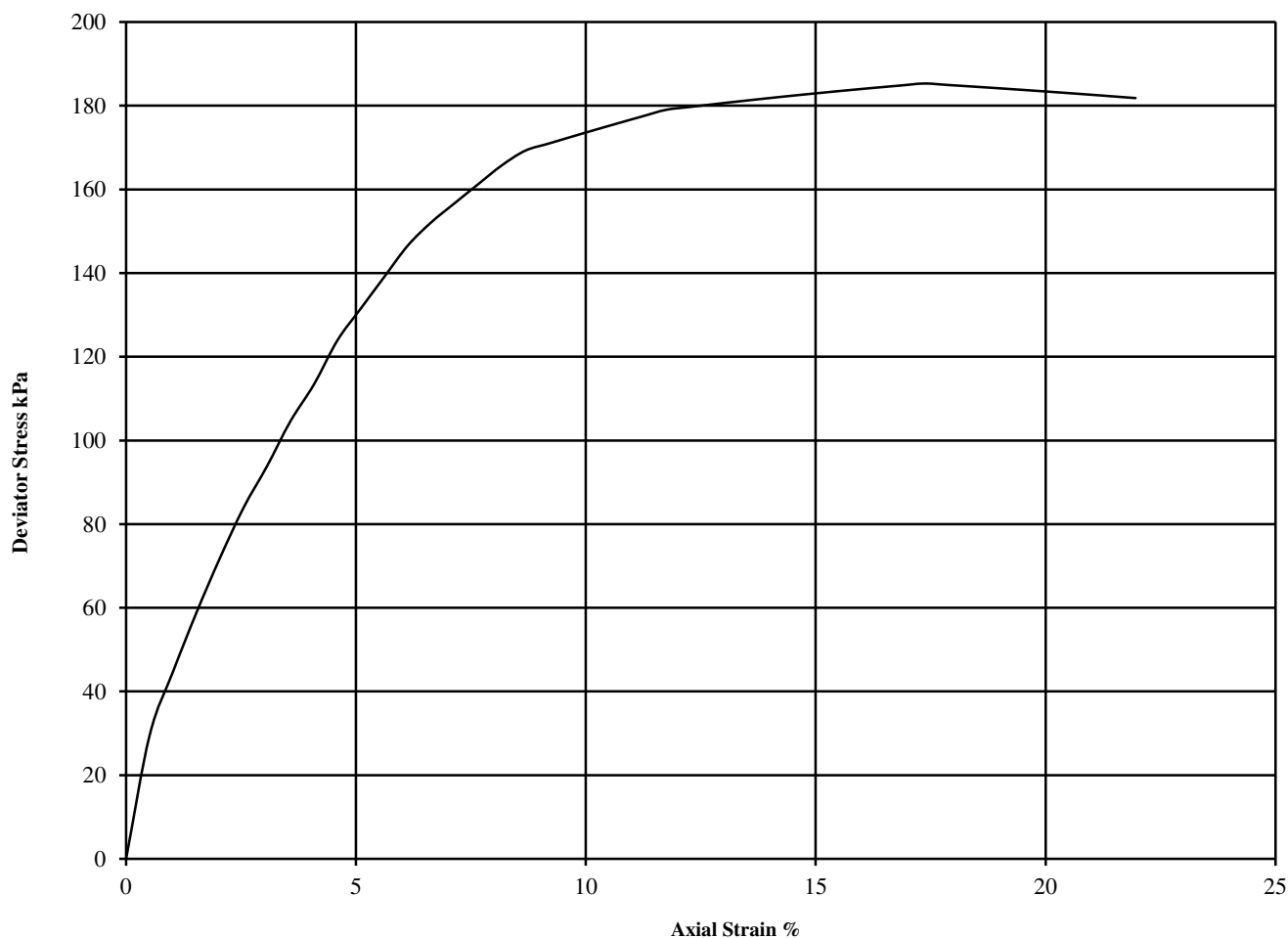
Top Depth (m): 3.50

Sample Number:

Base Depth (m): 4.00

Sample Type

U



Diameter (mm):		72.0	Height (mm):		141.0	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell	Corr. Max.	Shear	Failure Strain (%)	Mode of Failure	Undisturbed Sample
				Pressure	Deviator	Strength			Sample taken from top of tube
				(kPa)	Stress	Cu			Rate of strain = 2 %/min
				(kPa)		(kPa)			Latex Membrane used 0.2 mm thick,
				θ_3	$(\theta_1-\theta_3)_f$	$^{1/2}(\theta_1-\theta_3)_f$			Correction applied 0.46
1	24	1.95	1.58	70	185	93	17.4	Intermediate	See summary of soil descriptions



Brownsfield Mill

Contract No:

PSL17/3772

Client Ref:

C3419

APPENDIX D
Frequency and Duration of Gas Monitoring

Ground Gas Guidance

Redevelopment on brownfield sites is an ever increasing occurrence, including those sites where a potential ground gas issue is present.

CIRIA C665 is the current guidance which gives up-to-date advice on all aspects of ground gas. It outlines good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to gas contaminated land. Two semi-quantitative methods are set out for the assessment of risk:

- 1 For low rise housing with a ventilated under floor void at minimum 150 mm (Boyle and Witherington);
- 2 For all other development types (Wilson and Card).

Both methods use the concept of Gas Screening Values (GSVs) to identify levels of risk. The mitigation and management of potentially unacceptable risk is described with reference to both passive and active systems of gas. Source removal is also discussed as an option.

CIRIA C665 and the advice it contains has been prepared to be generally consistent with CLR11 *Model Procedures for the management of land contamination* (Defra and Environment Agency, 2004a). The aim of CIRIA C665 is a consistent approach to decision making, particularly relating to the scope of protective design measures on a site specific basis.

Legislative Framework

CIRIA C665 provides technical guidance however also recognises the context into which the guidance has to be employed. Government policy is based upon a “suitable for use approach”, which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the “source” in a “pollutant linkage” which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be “contaminated land” under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land* (DETR, 2000a).

Frequency and Duration of Monitoring

The monitoring period for a specific site covers the “worst case” scenario. A “worst case” scenario will occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of the additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with soil gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Flats)	2 months	3 months	6 months	12 months	24 months
	High (Residential with Gardens)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Flats)	6	6	9	12	24
	High (Residential with Gardens)	6	9	12	24	24

Note

- NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).
- There is no industry consent over "high", "medium" or "low" generation potential of source.
- At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.



APPENDIX E
Interim Ground Gas Monitoring Results

08/08/2017



Key

ND	Not Detected
NA	Not Available
NGW	No Groundwater

	Percentage Concentrations				Parts per Million		mb				
Ambient	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	LEL	Hydrogen Sulphide (H ₂ S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	21.1	0.1	0.0	0.0	0.0	NA	1009	JB	GA5000	Overcast	Falling
Finish	20.9	0.1	0.0	0.0	0.0	NA	1009				

[illegible]

23/08/2017



Key

ND	Not Detected
NA	Not Available
NGW	No Groundwater

	Percentage Concentrations				Parts per Million		mb				
Ambient	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	LEL	Hydrogen Sulphide (H ₂ S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	20.7	0.1	0.0	0.0	0.0	NA	1008	JM	GA5000	Clear	Rising
Finish	20.8	0.1	0.0	0.0	0.0	NA	1008				

[illegible]

05/09/2017



<u>Key</u>	
ND	Not Detected
NA	Not Available
NGW	No Groundwater

	Percentage Concentrations				Parts per Million		mb				
Ambient	Oxygen (O₂)	Carbon Dioxide (CO₂)	Methane (CH₄)	LEL	Hydrogen Sulphide (H₂S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	21.3	0.1	0.1	0.0	0.0	NA	1006	JM	GA5000	Clear	Rising
Finish	21.3	0.1	0.1	0.0	0.0	NA	1007				

[illegible]



APPENDIX F

Contaminated Land Screening Values

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General

The current recommended method for assessing contamination is on the basis of:

Source-Pathway-Receptor

Where any one of these “pollution linkages” is absent there is deemed to be no risk.

Fundamentally receptors can be considered as humans and controlled waters (surface and ground waters).

The purpose of using Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake clean up based on the data to hand is cost effective.

Human Health

Current UK guidance is provided by DEFRA and the Environment Agency (EA). Publications forming part of the guidance include; CLEA Model, toxicological reports and soil guideline values (SGV), collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values for soil contamination based on standard land uses and soil assumptions.

CLEA guidance has gone through a number of revisions, all of the original SGV's that were published have been withdrawn and publication of new SGV's commenced in 2009.

For determinands where no SGVs are available, S4UL values have been published using the CLEA 1.06 Model. These are the third set of generic assessment criteria generated by CIEH, and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

No SGV or S4UL is available for lead as this is derived based on blood lead levels. C4SL values for six determinands including lead was published by DEFRA/CL:AIRE in December 2014 and they represent a low risk as opposed to minimal risk. The C4SL values are based on a sandy loam with 6% Soil Organic Matter. These screening values were published by DEFRA for Part 2A use, although with the dual purpose for use under planning. However these have not been officially accepted by Local Government for use under planning. S4ULs remain the first reference due to the broader range of end uses and soil organic content.

The preference from the EA is that site specific screening levels are used wherever possible. Due to numerous factors it is not always possible to utilise site specific values. In these instances the following data sources are used in the order of preference given below:

- Current UK SGV's
- CIEH S4UL values (derived by CIEH/LQM)
- DEFRA/CL:AIRE C4SL's
- CL:AIRE GAC values
- Guidance from other European countries
- Guidance from the outside Europe.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations). The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impact of contamination on controlled waters are Environmental Quality Standards (EQS). The EQS's cover a large number of compounds.

Where certain compounds are not covered by the EQS these are commonly compared to the UK Drinking Water Standards (DWS).

Further Assessment

When screening values are exceeded then further consideration is required. This could include the use of simple measures to break the pollution pathway and mitigate the risk, further more detailed investigation, including the deriving of site specific values to better define the risk and to design appropriate remedial measures.



APPENDIX G
Contaminated Land Risk Assessment

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ⇨ Hazard Assessment ⇨ Risk Estimation ⇨ Risk Evaluation

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under CLR11, three tiers of risk assessment exist - Preliminary, Generic Quantitative and Detailed Quantitative.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- **High likelihood:** There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- **Likely:** There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- **Low likelihood:** There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;
- **Unlikely:** There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- **Severe:** Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;
- **Medium:** Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;
- **Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.
- **Minor:** harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

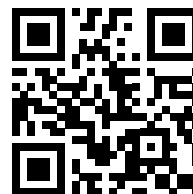
- **Very high:** There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to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



**APPENDIX H
Waste Assessment Report**



Waste Classification Report



A4DAK-S3WJ8-DALB9

Job name

C3419

Description/Comments

Project

Brownsfield Mill

Site

C3419

Waste Stream Template

BSL Suite

Classified by

Name:
Dan Gates
Date:
18/09/2017 15:27:54 UTC
Telephone:
01606 334844

Company:
Brownfield Solutions Ltd
William Smith House
173-183 Witton Street
Northwich
CW9 5LP

Report

Created by: Dan Gates
Created date: 18/09/2017 15:27 UTC

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1[1]	2.50	Non Hazardous		3
2	WS2[1]	0.50	Non Hazardous		5
3	WS5[2]	0.40	Hazardous	HP 7, HP 11	7
4	WS5[3]	1.30	Hazardous	HP 7, HP 11, HP 14	10
5	TP1[1]	0.50	Non Hazardous		13
6	TP3[1]	0.40	Hazardous	HP 7	15
7	TP4[1]	0.50	Non Hazardous		17
8	TP7[1]	0.60	Non Hazardous		19
9	TP8[1]	0.50	Non Hazardous		21
10	TP9[1]	0.60	Hazardous	HP 2, HP 7	23
11	TP10[1]	0.50	Non Hazardous		26
12	TP11[1]	0.50	Hazardous	HP 14	28

Appendices

Appendix A: Classifier defined and non CLP determinands
Appendix B: Rationale for selection of metal species

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Appendices	Page
Appendix C: Version	32



Classification of sample: WS1[1]

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

Sample details

Sample Name:	LoW Code:
WS1[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2.50 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				21.1 mg/kg	1.32	27.859 mg/kg	0.00279 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	<0.1 mg/kg	1.285	<0.129 mg/kg	<0.00001 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				62 mg/kg	1.462	90.616 mg/kg	0.00906 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				65 mg/kg	1.126	73.183 mg/kg	0.00732 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	65 mg/kg		65 mg/kg	0.0065 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				36.1 mg/kg	1.579	57.02 mg/kg	0.0057 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	034-002-00-8									
9	zinc { zinc oxide }				83 mg/kg	1.245	103.311 mg/kg	0.0103 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
10	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
11	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
14	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	anthracene	204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
19	chrysene	601-048-00-0	205-923-4	218-01-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
21	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	benzo[ghi]perylene	205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
26	phenol	604-001-00-2	203-632-7	108-95-2	<0.15 mg/kg		<0.15 mg/kg	<0.000015 %			<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
28	pH		PH		7.99 pH		7.99 pH	7.99 pH			
Total:									0.0421 %		

Key

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



Classification of sample: WS2[1]

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

Sample details

Sample Name:	LoW Code:
WS2[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				9.9 mg/kg	1.32	13.071 mg/kg	0.00131 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	<0.1 mg/kg	1.285	<0.129 mg/kg	<0.00001 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				48.2 mg/kg	1.462	70.447 mg/kg	0.00704 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				35 mg/kg	1.126	39.406 mg/kg	0.00394 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	20 mg/kg		20 mg/kg	0.002 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				38.2 mg/kg	1.579	60.337 mg/kg	0.00603 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	034-002-00-8									
9	zinc { zinc oxide }				78 mg/kg	1.245	97.088 mg/kg	0.00971 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
10	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
11	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
14	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	anthracene	204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
19	chrysene	601-048-00-0	205-923-4	218-01-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
21	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
23	benzo[ghi]perylene	205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
26	phenol	604-001-00-2	203-632-7	108-95-2	<0.15 mg/kg		<0.15 mg/kg	<0.000015 %			<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
28	pH		PH		8.43 pH		8.43 pH	8.43 pH			
Total:									0.0304 %		

Key

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

Classification of sample: WS5[2]

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

Sample details

Sample Name:	LoW Code:
WS5[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 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.: 0.83%)

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.: 0.83%)

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				26.5 mg/kg	1.32	34.989 mg/kg	0.0035 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	4.7 mg/kg	1.285	6.041 mg/kg	0.00047 %	✓	
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				44.4 mg/kg	1.462	64.893 mg/kg	0.00649 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				370 mg/kg	1.126	416.579 mg/kg	0.0417 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	833 mg/kg		833 mg/kg	0.0833 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.812 mg/kg	0.0000812 %	✓	
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				39.6 mg/kg	1.579	62.548 mg/kg	0.00625 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							



#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	034-002-00-8											
9	zinc { zinc oxide }				918	mg/kg	1.245	1142.647	mg/kg	0.114 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
10	naphthalene				0.42	mg/kg		0.42	mg/kg	0.000042 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.54	mg/kg		0.54	mg/kg	0.000054 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				1.95	mg/kg		1.95	mg/kg	0.000195 %	✓	
		201-469-6	83-32-9									
13	fluorene				1.57	mg/kg		1.57	mg/kg	0.000157 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				12.28	mg/kg		12.28	mg/kg	0.00123 %	✓	
		201-581-5	85-01-8									
15	anthracene				3.18	mg/kg		3.18	mg/kg	0.000318 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				18.57	mg/kg		18.57	mg/kg	0.00186 %	✓	
		205-912-4	206-44-0									
17	pyrene				15.75	mg/kg		15.75	mg/kg	0.00158 %	✓	
		204-927-3	129-00-0									
18	benzo[a]anthracene				8.05	mg/kg		8.05	mg/kg	0.000805 %	✓	
	601-033-00-9	200-280-6	56-55-3									
19	chrysene				8.12	mg/kg		8.12	mg/kg	0.000812 %	✓	
	601-048-00-0	205-923-4	218-01-9									
20	benzo[a]pyrene; benzo[def]chrysene				8.44	mg/kg		8.44	mg/kg	0.000844 %	✓	
	601-032-00-3	200-028-5	50-32-8									
21	indeno[123-cd]pyrene				5.87	mg/kg		5.87	mg/kg	0.000587 %	✓	
		205-893-2	193-39-5									
22	dibenz[a,h]anthracene				1.05	mg/kg		1.05	mg/kg	0.000105 %	✓	
	601-041-00-2	200-181-8	53-70-3									
23	benzo[ghi]perylene				4.98	mg/kg		4.98	mg/kg	0.000498 %	✓	
		205-883-8	191-24-2									
24	benzo[b]fluoranthene				10.43	mg/kg		10.43	mg/kg	0.00104 %	✓	
	601-034-00-4	205-911-9	205-99-2									
25	benzo[k]fluoranthene				4.05	mg/kg		4.05	mg/kg	0.000405 %	✓	
	601-036-00-5	205-916-6	207-08-9									
26	TPH (C6 to C40) petroleum group				8300	mg/kg		8300	mg/kg	0.83 %	✓	
			TPH									
27	benzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
28	toluene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
29	ethylbenzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
30	xylene				<5	mg/kg		<5	mg/kg	<0.0005 %		<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]									
31	polychlorobiphenyls; PCB				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
32	phenol				<0.15	mg/kg		<0.15	mg/kg	<0.000015 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
33	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
34	pH				7.69	pH		7.69	pH	7.69 pH		
			PH									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
35	asbestos				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<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							
Total:								1.099 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: **Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons.**



Classification of sample: WS5[3]

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

Sample details

Sample Name:	LoW Code:
WS5[3]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.30 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.: 0.513%)

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.: 0.513%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

dicopper oxide; copper (I) oxide: (compound conc.: 0.128%)

zinc oxide: (compound conc.: 0.196%)

R51/53 "Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.513%)

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	 arsenic { arsenic trioxide }				215.5 mg/kg	1.32	284.53 mg/kg	0.0285 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	 cadmium { cadmium sulfide }			1	3.3 mg/kg	1.285	4.241 mg/kg	0.00033 %	✓	
	048-010-00-4	215-147-8	1306-23-6							



#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
3	chromium in chromium(III) compounds { chromium(III) oxide }				60.9	mg/kg	1.462	89.009	mg/kg	0.0089 %	✓	
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				1138	mg/kg	1.126	1281.261	mg/kg	0.128 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	870	mg/kg		870	mg/kg	0.087 %	✓	
	082-001-00-6											
6	mercury { mercury dichloride }				3.9	mg/kg	1.353	5.279	mg/kg	0.000528 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel dihydroxide }				63.8	mg/kg	1.579	100.772	mg/kg	0.0101 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				4	mg/kg	2.554	10.214	mg/kg	0.00102 %	✓	
	034-002-00-8											
9	zinc { zinc oxide }				1575	mg/kg	1.245	1960.425	mg/kg	0.196 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
10	naphthalene				0.56	mg/kg		0.56	mg/kg	0.000056 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.43	mg/kg		0.43	mg/kg	0.000043 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				0.84	mg/kg		0.84	mg/kg	0.000084 %	✓	
		201-469-6	83-32-9									
13	fluorene				1.17	mg/kg		1.17	mg/kg	0.000117 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				5.21	mg/kg		5.21	mg/kg	0.000521 %	✓	
		201-581-5	85-01-8									
15	anthracene				1.89	mg/kg		1.89	mg/kg	0.000189 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				16.13	mg/kg		16.13	mg/kg	0.00161 %	✓	
		205-912-4	206-44-0									
17	pyrene				12.28	mg/kg		12.28	mg/kg	0.00123 %	✓	
		204-927-3	129-00-0									
18	benzo[a]anthracene				6.24	mg/kg		6.24	mg/kg	0.000624 %	✓	
	601-033-00-9	200-280-6	56-55-3									
19	chrysene				5.23	mg/kg		5.23	mg/kg	0.000523 %	✓	
	601-048-00-0	205-923-4	218-01-9									
20	benzo[a]pyrene; benzo[def]chrysene				4.23	mg/kg		4.23	mg/kg	0.000423 %	✓	
	601-032-00-3	200-028-5	50-32-8									
21	indeno[123-cd]pyrene				3.39	mg/kg		3.39	mg/kg	0.000339 %	✓	
		205-893-2	193-39-5									
22	dibenz[a,h]anthracene				1	mg/kg		1	mg/kg	0.0001 %	✓	
	601-041-00-2	200-181-8	53-70-3									
23	benzo[ghi]perylene				2.79	mg/kg		2.79	mg/kg	0.000279 %	✓	
		205-883-8	191-24-2									
24	benzo[b]fluoranthene				5.35	mg/kg		5.35	mg/kg	0.000535 %	✓	
	601-034-00-4	205-911-9	205-99-2									
25	benzo[k]fluoranthene				2.08	mg/kg		2.08	mg/kg	0.000208 %	✓	
	601-036-00-5	205-916-6	207-08-9									
26	TPH (C6 to C40) petroleum group				5132	mg/kg		5132	mg/kg	0.513 %	✓	
			TPH									
27	benzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
28	toluene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
29	ethylbenzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
30		xylene				<5 mg/kg		<5 mg/kg	<0.0005 %		<LOD	
	601-022-00-9	202-422-2 [1]	95-47-6 [1]									
		203-396-5 [2]	106-42-3 [2]									
		203-576-3 [3]	108-38-3 [3]									
		215-535-7 [4]	1330-20-7 [4]									
31		polychlorobiphenyls; PCB				<5 mg/kg		<5 mg/kg	<0.0005 %		<LOD	
	602-039-00-4	215-648-1	1336-36-3									
32		phenol				<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD	
	604-001-00-2	203-632-7	108-95-2									
33		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD	
	024-001-00-0	215-607-8	1333-82-0									
34		pH				7.51 pH		7.51 pH	7.51 pH			
			PH									
Total:										0.983 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i) on Flam. Liq. 1; H224, Flam. Liq. 2; H225, Flam. Liq. 3; H226: **Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons.**



Classification of sample: TP1[1]

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

Sample details

Sample Name:	LoW Code:
TP1[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
24.1%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 24.1% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				26.8	mg/kg	1.32	26.857	mg/kg	0.00269 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium sulfide }			1	0.6	mg/kg	1.285	0.585	mg/kg	0.0000455 %	✓	
	048-010-00-4	215-147-8	1306-23-6									
3	chromium in chromium(III) compounds { chromium(III) oxide }				73.2	mg/kg	1.462	81.202	mg/kg	0.00812 %	✓	
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				440	mg/kg	1.126	376.002	mg/kg	0.0376 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	833	mg/kg		632.247	mg/kg	0.0632 %	✓	
	082-001-00-6											
6	mercury { mercury dichloride }				0.3	mg/kg	1.353	0.308	mg/kg	0.0000308 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel dihydroxide }				28.4	mg/kg	1.579	34.047	mg/kg	0.0034 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	034-002-00-8											
9	zinc { zinc oxide }				562	mg/kg	1.245	530.943	mg/kg	0.0531 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
10	naphthalene				0.07	mg/kg		0.0531	mg/kg	0.00000531 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.16	mg/kg		0.121	mg/kg	0.0000121 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				0.15	mg/kg		0.114	mg/kg	0.0000114 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.07	mg/kg		0.0531	mg/kg	0.00000531 %	✓	
		201-695-5	86-73-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		1.18 mg/kg		0.896 mg/kg	0.0000896 %	✓	
15	anthracene	204-371-1	120-12-7		0.35 mg/kg		0.266 mg/kg	0.0000266 %	✓	
16	fluoranthene	205-912-4	206-44-0		3.63 mg/kg		2.755 mg/kg	0.000276 %	✓	
17	pyrene	204-927-3	129-00-0		3.03 mg/kg		2.3 mg/kg	0.00023 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.55 mg/kg		1.176 mg/kg	0.000118 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	1.83 mg/kg		1.389 mg/kg	0.000139 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.58 mg/kg		1.199 mg/kg	0.00012 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		1.12 mg/kg		0.85 mg/kg	0.000085 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.3 mg/kg		0.228 mg/kg	0.0000228 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		1.18 mg/kg		0.896 mg/kg	0.0000896 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	2.4 mg/kg		1.822 mg/kg	0.000182 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.94 mg/kg		0.713 mg/kg	0.0000713 %	✓	
26	phenol	604-001-00-2	203-632-7	108-95-2	<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
28	pH		PH		7.99 pH		7.99 pH	7.99 pH		
Total:								0.17 %		

Key

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



Classification of sample: TP3[1]

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

Sample details

Sample Name:	LoW Code:
TP3[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
29.6%	
(wet weight correction)	

Hazard properties

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

Hazard Statements hit:

Carc. 1A; 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:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.245%)

Determinands

Moisture content: 29.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				44.3	mg/kg	1.32	41.177	mg/kg	0.00412 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium sulfide }			1	0.4	mg/kg	1.285	0.362	mg/kg	0.0000282 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
3		chromium in chromium(III) compounds { chromium(III) oxide }				32.1	mg/kg	1.462	33.029	mg/kg	0.0033 %	✓	
			215-160-9	1308-38-9									
4		copper { dicopper oxide; copper (I) oxide }				379	mg/kg	1.126	300.405	mg/kg	0.03 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	3480	mg/kg		2449.92	mg/kg	0.245 %	✓	
		082-001-00-6											
6		mercury { mercury dichloride }				1.2	mg/kg	1.353	1.143	mg/kg	0.000114 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
7		nickel { nickel dihydroxide }				30.5	mg/kg	1.579	33.915	mg/kg	0.00339 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	1.798	mg/kg	0.00018 %	✓	
		034-002-00-8											
9		zinc { zinc oxide }				336	mg/kg	1.245	294.43	mg/kg	0.0294 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
10		naphthalene				0.41	mg/kg		0.289	mg/kg	0.0000289 %	✓	
		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
	CLP index number	EC Number	CAS Number							
11	acenaphthylene	205-917-1	208-96-8		1.12 mg/kg		0.788 mg/kg	0.0000788 %	✓	
12	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	fluorene	201-695-5	86-73-7		0.06 mg/kg		0.0422 mg/kg	0.00000422 %	✓	
14	phenanthrene	201-581-5	85-01-8		1.79 mg/kg		1.26 mg/kg	0.000126 %	✓	
15	anthracene	204-371-1	120-12-7		1.01 mg/kg		0.711 mg/kg	0.0000711 %	✓	
16	fluoranthene	205-912-4	206-44-0		14.4 mg/kg		10.138 mg/kg	0.00101 %	✓	
17	pyrene	204-927-3	129-00-0		13.12 mg/kg		9.236 mg/kg	0.000924 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		14.15 mg/kg		9.962 mg/kg	0.000996 %	✓	
19	chrysene	601-048-00-0	205-923-4		14.61 mg/kg		10.285 mg/kg	0.00103 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		13.23 mg/kg		9.314 mg/kg	0.000931 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		14.59 mg/kg		10.271 mg/kg	0.00103 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		3.31 mg/kg		2.33 mg/kg	0.000233 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		10.8 mg/kg		7.603 mg/kg	0.00076 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		22.8 mg/kg		16.051 mg/kg	0.00161 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		8.86 mg/kg		6.237 mg/kg	0.000624 %	✓	
26	phenol	604-001-00-2	203-632-7		<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
28	pH		PH		9.43 pH		9.43 pH	9.43 pH		
29	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		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
Total:								0.325 %		

Key

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



Classification of sample: TP4[1]

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

Sample details

Sample Name:	LoW Code:	
TP4[1]	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		
Moisture content:		
2.4%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 2.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				13.4 mg/kg	1.32	17.268 mg/kg	0.00173 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	0.2 mg/kg	1.285	0.251 mg/kg	0.0000195 %	✓	
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				51.9 mg/kg	1.462	74.034 mg/kg	0.0074 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				55 mg/kg	1.126	60.438 mg/kg	0.00604 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	40 mg/kg		39.04 mg/kg	0.0039 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				19.7 mg/kg	1.579	30.369 mg/kg	0.00304 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	034-002-00-8									
9	zinc { zinc oxide }				53 mg/kg	1.245	64.387 mg/kg	0.00644 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
10	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
11	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
14	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
15	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		204-371-1	120-12-7								
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
17	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
18	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
19	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
20	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
21	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-893-2	193-39-5								
22	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
23	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-883-8	191-24-2								
24	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
25	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
26	phenol				<0.15 mg/kg		<0.15 mg/kg	<0.000015 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
27	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
28	pH				8.51 pH		8.51 pH	8.51 pH			
			pH								
Total:									0.029 %		

Key

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



Classification of sample: TP7[1]

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

Sample details

Sample Name:	LoW Code:
TP7[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.60 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
23.4%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 23.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				9.8 mg/kg	1.32	9.911 mg/kg	0.000991 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	2.1 mg/kg	1.285	2.067 mg/kg	0.000161 %	✓	
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				53.6 mg/kg	1.462	60.008 mg/kg	0.006 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				41 mg/kg	1.126	35.36 mg/kg	0.00354 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	40 mg/kg		30.64 mg/kg	0.00306 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				46.3 mg/kg	1.579	56.018 mg/kg	0.0056 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	034-002-00-8									
9	zinc { zinc oxide }				212 mg/kg	1.245	202.132 mg/kg	0.0202 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
10	naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
11	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
12	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
13	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
14	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
15	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		204-371-1	120-12-7								
16	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
17	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
18	benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
19	chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
20	benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
21	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-893-2	193-39-5								
22	dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
23	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		205-883-8	191-24-2								
24	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
25	benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
26	phenol				<0.15 mg/kg		<0.15 mg/kg	<0.000015 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
27	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
28	pH				9.02 pH		9.02 pH	9.02 pH			
			PH								
Total:									0.04 %		

Key

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



Classification of sample: TP8[1]

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

Sample details

Sample Name:	LoW Code:
TP8[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
23%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 23% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5.6 mg/kg	1.32	5.693 mg/kg	0.000569 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium sulfide }			1	0.3 mg/kg	1.285	0.297 mg/kg	0.0000231 %	✓	
	048-010-00-4	215-147-8	1306-23-6							
3	chromium in chromium(III) compounds { chromium(III) oxide }				13 mg/kg	1.462	14.63 mg/kg	0.00146 %	✓	
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				31 mg/kg	1.126	26.875 mg/kg	0.00269 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	175 mg/kg		134.75 mg/kg	0.0135 %	✓	
	082-001-00-6									
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel dihydroxide }				4.7 mg/kg	1.579	5.716 mg/kg	0.000572 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	034-002-00-8									
9	zinc { zinc oxide }				56 mg/kg	1.245	53.672 mg/kg	0.00537 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
10	naphthalene				0.09 mg/kg		0.0693 mg/kg	0.00000693 %	✓	
	601-052-00-2	202-049-5	91-20-3							
11	acenaphthylene				0.07 mg/kg		0.0539 mg/kg	0.00000539 %	✓	
		205-917-1	208-96-8							
12	acenaphthene				0.08 mg/kg		0.0616 mg/kg	0.00000616 %	✓	
		201-469-6	83-32-9							
13	fluorene				0.06 mg/kg		0.0462 mg/kg	0.00000462 %	✓	
		201-695-5	86-73-7							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		1.01 mg/kg		0.778 mg/kg	0.0000778 %	✓	
15	anthracene	204-371-1	120-12-7		0.26 mg/kg		0.2 mg/kg	0.00002 %	✓	
16	fluoranthene	205-912-4	206-44-0		1.55 mg/kg		1.194 mg/kg	0.000119 %	✓	
17	pyrene	204-927-3	129-00-0		1.37 mg/kg		1.055 mg/kg	0.000105 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.71 mg/kg		0.547 mg/kg	0.0000547 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.82 mg/kg		0.631 mg/kg	0.0000631 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.74 mg/kg		0.57 mg/kg	0.000057 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.46 mg/kg		0.354 mg/kg	0.0000354 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.11 mg/kg		0.0847 mg/kg	0.00000847 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		0.46 mg/kg		0.354 mg/kg	0.0000354 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.99 mg/kg		0.762 mg/kg	0.0000762 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.38 mg/kg		0.293 mg/kg	0.0000293 %	✓	
26	phenol	604-001-00-2	203-632-7	108-95-2	<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
28	pH		PH		8.2 pH		8.2 pH	8.2 pH		
Total:								0.0252 %		

Key

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



Classification of sample: TP9[1]

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

Sample details

Sample Name:	LoW Code:
TP9[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.60 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
11.9%	
(wet weight correction)	

Hazard properties

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

Hazard Statements hit:

Carc. 1A; 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:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.132%)

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00032%)

Determinands

Moisture content: 11.9% Wet Weight Moisture Correction applied (MC)

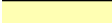
#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
1		arsenic { arsenic trioxide }				36	mg/kg	1.32	41.875	mg/kg	0.00419 %	✓		
		033-003-00-0	215-481-4	1327-53-3										
2		cadmium { cadmium sulfide }			1	4.2	mg/kg	1.285	4.756	mg/kg	0.00037 %	✓		
		048-010-00-4	215-147-8	1306-23-6										
3		chromium in chromium(III) compounds { chromium(III) oxide }				75.3	mg/kg	1.462	96.959	mg/kg	0.0097 %	✓		
			215-160-9	1308-38-9										
4		copper { dicopper oxide; copper (I) oxide }				433	mg/kg	1.126	429.496	mg/kg	0.0429 %	✓		
		029-002-00-X	215-270-7	1317-39-1										
5		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	1502	mg/kg		1323.262	mg/kg	0.132 %	✓		
		082-001-00-6												
6		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD	
		080-010-00-X	231-299-8	7487-94-7										



#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
7	nickel { nickel dihydroxide }				94.5	mg/kg	1.579	131.5	mg/kg	0.0132 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.25	mg/kg	0.000225 %	✓	
	034-002-00-8											
9	zinc { zinc oxide }				1008	mg/kg	1.245	1105.366	mg/kg	0.111 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
10	naphthalene				0.27	mg/kg		0.238	mg/kg	0.0000238 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.35	mg/kg		0.308	mg/kg	0.0000308 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				0.72	mg/kg		0.634	mg/kg	0.0000634 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.58	mg/kg		0.511	mg/kg	0.0000511 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				7.5	mg/kg		6.608	mg/kg	0.000661 %	✓	
		201-581-5	85-01-8									
15	anthracene				2.09	mg/kg		1.841	mg/kg	0.000184 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				11.93	mg/kg		10.51	mg/kg	0.00105 %	✓	
		205-912-4	206-44-0									
17	pyrene				9.91	mg/kg		8.731	mg/kg	0.000873 %	✓	
		204-927-3	129-00-0									
18	benzo[a]anthracene				5.12	mg/kg		4.511	mg/kg	0.000451 %	✓	
	601-033-00-9	200-280-6	56-55-3									
19	chrysene				5.1	mg/kg		4.493	mg/kg	0.000449 %	✓	
	601-048-00-0	205-923-4	218-01-9									
20	benzo[a]pyrene; benzo[def]chrysene				5.71	mg/kg		5.031	mg/kg	0.000503 %	✓	
	601-032-00-3	200-028-5	50-32-8									
21	indeno[123-cd]pyrene				5.59	mg/kg		4.925	mg/kg	0.000492 %	✓	
		205-893-2	193-39-5									
22	dibenz[a,h]anthracene				0.94	mg/kg		0.828	mg/kg	0.0000828 %	✓	
	601-041-00-2	200-181-8	53-70-3									
23	benzo[ghi]perylene				4.53	mg/kg		3.991	mg/kg	0.000399 %	✓	
		205-883-8	191-24-2									
24	benzo[b]fluoranthene				7.51	mg/kg		6.616	mg/kg	0.000662 %	✓	
	601-034-00-4	205-911-9	205-99-2									
25	benzo[k]fluoranthene				2.92	mg/kg		2.573	mg/kg	0.000257 %	✓	
	601-036-00-5	205-916-6	207-08-9									
26	phenol				<0.15	mg/kg		<0.15	mg/kg	<0.000015 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
27	chromium in chromium(VI) compounds { chromium(VI) oxide }				1.9	mg/kg	1.923	3.219	mg/kg	0.000322 %	✓	
	024-001-00-0	215-607-8	1333-82-0									
28	pH				8.04	pH		8.04	pH	8.04 pH		
			PH									
29	asbestos				0.048	mg/kg		0.0423	mg/kg	0.00000423 %	✓	
	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									
Total:										0.32 %		



Key

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



Classification of sample: TP10[1]

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

Sample details

Sample Name:	LoW Code:
TP10[1]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }			1	26.9	mg/kg	1.32	35.517	mg/kg	0.00355 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium sulfide }			1	0.8	mg/kg	1.285	1.028	mg/kg	0.00008 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
3		chromium in chromium(III) compounds { chromium(III) oxide }				61.3	mg/kg	1.462	89.593	mg/kg	0.00896 %	✓	
			215-160-9	1308-38-9									
4		copper { dicopper oxide; copper (I) oxide }				393	mg/kg	1.126	442.474	mg/kg	0.0442 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	696	mg/kg		696	mg/kg	0.0696 %	✓	
		082-001-00-6											
6		mercury { mercury dichloride }				0.7	mg/kg	1.353	0.947	mg/kg	0.0000947 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
7		nickel { nickel dihydroxide }				39.1	mg/kg	1.579	61.758	mg/kg	0.00618 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
9		zinc { zinc oxide }				389	mg/kg	1.245	484.194	mg/kg	0.0484 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
10		naphthalene				0.08	mg/kg		0.08	mg/kg	0.000008 %	✓	
		601-052-00-2	202-049-5	91-20-3									
11		acenaphthylene				0.06	mg/kg		0.06	mg/kg	0.000006 %	✓	
			205-917-1	208-96-8									
12		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
13		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
14		phenanthrene				0.53	mg/kg		0.53	mg/kg	0.000053 %	✓	
			201-581-5	85-01-8									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
15	anthracene	204-371-1	120-12-7		0.15 mg/kg		0.15 mg/kg	0.000015 %	✓	
16	fluoranthene	205-912-4	206-44-0		1.08 mg/kg		1.08 mg/kg	0.000108 %	✓	
17	pyrene	204-927-3	129-00-0		1.04 mg/kg		1.04 mg/kg	0.000104 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.5 mg/kg		0.5 mg/kg	0.00005 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.51 mg/kg		0.51 mg/kg	0.000051 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.61 mg/kg		0.61 mg/kg	0.000061 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.54 mg/kg		0.54 mg/kg	0.000054 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.15 mg/kg		0.15 mg/kg	0.000015 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		0.46 mg/kg		0.46 mg/kg	0.000046 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.78 mg/kg		0.78 mg/kg	0.000078 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.3 mg/kg		0.3 mg/kg	0.00003 %	✓	
26	phenol	604-001-00-2	203-632-7		<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
28	pH		PH		8.29 pH		8.29 pH	8.29 pH		
Total:								0.182 %		

Key

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



Classification of sample: TP11[1]

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

Sample details

Sample Name:	LoW Code:
TP11[1]	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 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Risk phrases hit:

R52/53 "Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

benzo[a]anthracene: (conc.: 0.0038%)

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				21.3	mg/kg	1.32	28.123	mg/kg	0.00281 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium sulfide }			1	0.7	mg/kg	1.285	0.9	mg/kg	0.00007 %	✓	
	048-010-00-4	215-147-8	1306-23-6									
3	chromium in chromium(III) compounds { chromium(III) oxide }				55.8	mg/kg	1.462	81.555	mg/kg	0.00816 %	✓	
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				194	mg/kg	1.126	218.422	mg/kg	0.0218 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	352	mg/kg		352	mg/kg	0.0352 %	✓	
	082-001-00-6											
6	mercury { mercury dichloride }				1.5	mg/kg	1.353	2.03	mg/kg	0.000203 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel dihydroxide }				35.8	mg/kg	1.579	56.546	mg/kg	0.00565 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	034-002-00-8											
9	zinc { zinc oxide }				216	mg/kg	1.245	268.858	mg/kg	0.0269 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
10	naphthalene				1.54	mg/kg		1.54	mg/kg	0.000154 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				1.3	mg/kg		1.3	mg/kg	0.00013 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				20.55	mg/kg		20.55	mg/kg	0.00206 %	✓	
		201-469-6	83-32-9									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
13	fluorene	201-695-5	86-73-7		10.94 mg/kg		10.94 mg/kg	0.00109 %	✓	
14	phenanthrene	201-581-5	85-01-8		56.69 mg/kg		56.69 mg/kg	0.00567 %	✓	
15	anthracene	204-371-1	120-12-7		22.73 mg/kg		22.73 mg/kg	0.00227 %	✓	
16	fluoranthene	205-912-4	206-44-0		109.74 mg/kg		109.74 mg/kg	0.011 %	✓	
17	pyrene	204-927-3	129-00-0		81.79 mg/kg		81.79 mg/kg	0.00818 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		37.98 mg/kg		37.98 mg/kg	0.0038 %	✓	
19	chrysene	601-048-00-0	205-923-4		41.32 mg/kg		41.32 mg/kg	0.00413 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		32.14 mg/kg		32.14 mg/kg	0.00321 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		21.35 mg/kg		21.35 mg/kg	0.00214 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		5.36 mg/kg		5.36 mg/kg	0.000536 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		19.57 mg/kg		19.57 mg/kg	0.00196 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		48.75 mg/kg		48.75 mg/kg	0.00488 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		18.96 mg/kg		18.96 mg/kg	0.0019 %	✓	
26	phenol	604-001-00-2	203-632-7		<0.15 mg/kg		<0.15 mg/kg	<0.000015 %		<LOD
27	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
28	pH		PH		8.34 pH		8.34 pH	8.34 pH		
Total:								0.154 %		

Key

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

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462

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: 17/07/2015

Risk Phrases: R20 , R22 , R36 , R37 , R38 , R42 , R43 , R50/53 , R60 , R61

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

■ **dicopper oxide; copper (I) oxide** (EC Number: 215-270-7, CAS Number: 1317-39-1)

CLP index number: 029-002-00-X

Data source: Regulation (EU) 2016/1179 of 19 July 2016 (ATP9)

Additional Risk Phrases: N R50/53 , N R50/53 >= 0.25 %

Additional Hazard Statement(s): None.

Reason for additional Hazards Statement(s)/Risk Phrase(s):

10/10/2016 - N R50/53 risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

10/10/2016 - N R50/53 >= 0.25 % risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

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

CLP index number: 082-001-00-6

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Additional Risk Phrases: None.

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

Reason for additional Hazards Statement(s)/Risk Phrase(s):

03/06/2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium

www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

■ **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: 17/07/2015

Risk Phrases: R22 , R26 , R27 , R36 , R37 , R38

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: 17/07/2015

Risk Phrases: R36 , R37 , R38 , N R50/53 , N R51/53

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: 06/08/2015

Risk Phrases: N R50/53

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: 06/08/2015

Risk Phrases: R22 , R36 , R37 , R38 , R40 , R43 , N R50/53

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: 17/07/2015

Risk Phrases: R36 , R37 , R38 , R43 , N R50/53

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: 21/08/2015
Risk Phrases: Xn R22 , N R50/53
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: 21/08/2015
Risk Phrases: Xi R36/37/38 , N R50/53
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: 06/08/2015
Risk Phrases: R40
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: 23/07/2015
Risk Phrases: N R50/53
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

▪ **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25/05/2015
Risk Phrases: None.
Hazard Statements: None.

▪ **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: 25/05/2015
Risk Phrases: R10 , R45 , R46 , R51/53 , R63 , R65
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

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

CLP index number: 601-023-00-4
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Risk Phrases: None.
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03/06/2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

CLP index number: 602-039-00-4
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Risk Phrases: None.
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29/09/2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

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

Absence of hexavalent chromium indicates it unlikely that lead chromate is present within the site soils.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

zinc {zinc oxide}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils. Given the presence of groundwater underlying the site at shallow depths an insoluble form has been selected (zinc oxide). Furthermore the presence of ash and clinker suggests oxides of zinc will be present.

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

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition, May 2015**

HazWasteOnline Classification Engine Version: 2017.248.3389.6849 (05 Sep 2017)

HazWasteOnline Database: 2017.261.3397.6865 (18 Sep 2017)

This classification utilises the following guidance and legislation:

WM3 - Waste Classification - May 2015

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



APPENDIX I Waste Disposal Guidance

WASTE CLASSIFICATION FOR SOILS

Introduction

Waste producers have a duty of care classify the waste they are producing:

- before it is collected, disposed of or recovered.
- to identify the controls that apply to the movement of the waste.
- to complete waste documents and records.
- to identify suitably authorised waste management options.
- to prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each of individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal

In July 2005 the United Kingdom implemented the European Directive 1999/31/EC (The Landfill Directive), this introduced the current regime for waste and waste disposal to landfill. The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets his permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points

- Not all waste can be landfilled
- Landfills are classified according to whether they can accept **hazardous, non-hazardous** or **inert** wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue (EWC 2002) and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not ie the hazard assessment. The most common EWC waste codes related to soil are:

17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (eg asbestos, diesel) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on “risk phrases” which can include risks such as carcinogenicity, flammability or toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations**.

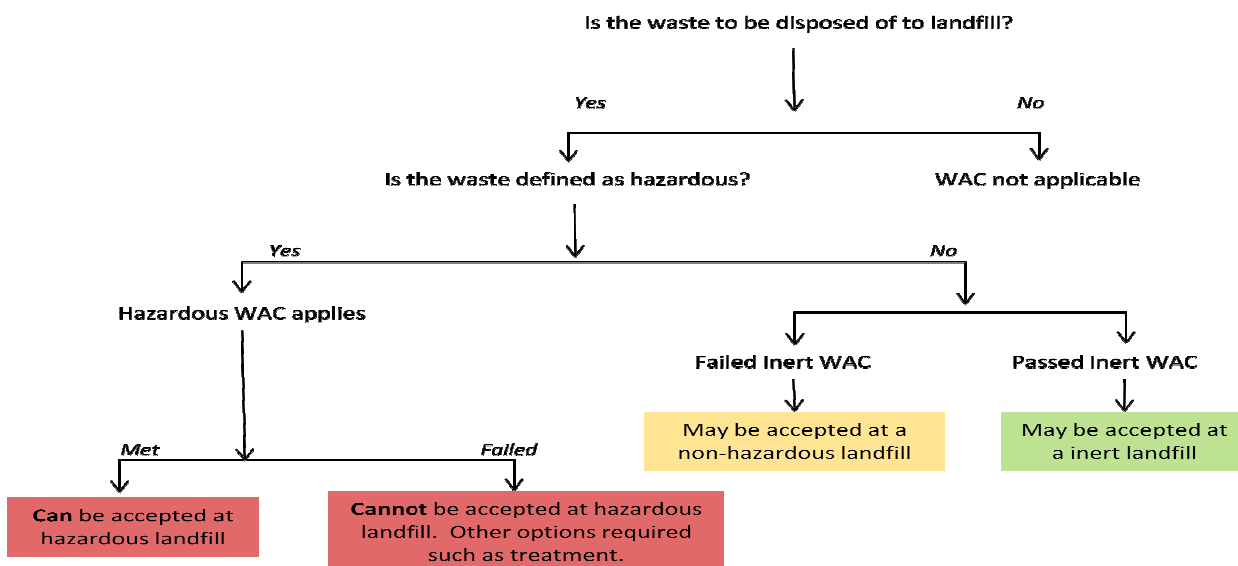
Waste Definitions

Inert	- Will not undergo any significant physical, chemical or biological transformations. - Will not dissolve. - Will not burn. - Will not physically or chemically react. - Will not biodegrade. - Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. - Has insignificant total leachability and pollutant content. - Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above) Is not hazardous (see below)
Hazardous	Soil has hazardous properties as defined in WM3 (.Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance)
Stable Non-reactive hazardous waste [#]	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents: in the waste alone (for example, by biodegradation); under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints); by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that has been stabilised and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. The WAC limits **cannot be used to make an assessment of whether a waste is hazardous**. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.



Hydrocarbons in Soils

WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However hydrocarbons in soils are a mixture rather than a pure product and absolute entries are not relevant.

Known Oils

The simplest scenario is where the identity of the contaminating oil is known, or can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation that the chromatograph is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils

Where hydrocarbons are contaminating soils it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

For contaminated land specific consideration must be given to the following before proceeding;

- The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as, waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
- The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of **marker compounds** is optional; however it is recommended that where possible the marker compounds should be used.

WM3 states:

If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:

- The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
- This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the Council Decision (2003/33/EC).
2. Environment Agency Environmental Permitting Regulations: *"Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land"* 2009.
3. Environment Agency *"Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria"* Nov 2010.
4. Environment Agency *"Guidance on the classification and assessment of waste (Technical Guidance WM3)"* 1st edition May 2015.
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).



APPENDIX J
Additional Asbestos Guidance

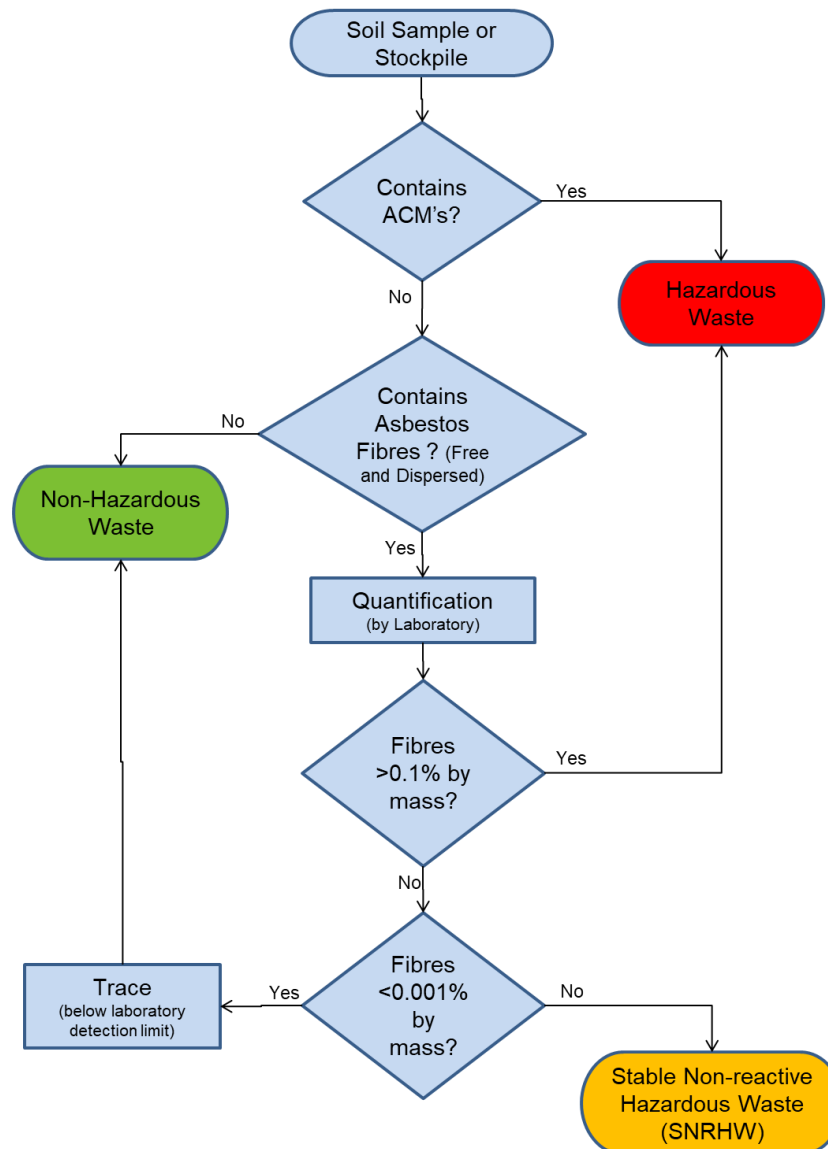
ADDITIONAL ASBESTOS GUIDANCE NOTE

Disposal

The 1st Edition of WM3 “Guidance on the classification and assessment of waste” published in May 2015, details the way in which Asbestos is assessed within soils.

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's)



Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site¹. These levels are often termed “trace” by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)¹. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	Insulation materials and asbestos-containing construction materials
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and “*other suitable materials*” may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction

Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether or not the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four hour period. The control limit is not a ‘safe’ level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 “the release of dispersed asbestos fibres from soil” 1988 concludes that:

- Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m³.
- An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (eg by wetting).

- The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use

The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation. There is currently a Joint Industry Working Group (JIWG) tasked with producing a Code of Practice for Asbestos in Soil, Made Ground and Construction & Demolition Material that will clarify in due course the position of the various government agencies.

Asbestos containing materials can remain in situ under a suitable cover system which may be hardsurfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Preliminary publications from JIWG (April 2015) provide guides for decision making in relation to construction. These are at a "Beta" test stage and further publications will be provided in due course.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk. There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required.

The re-use of soils containing asbestos at concentrations above hazardous waste levels is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

1 – This is based on asbestos concentration only and consideration of other hazardous substances needs to be made and this may affect the classification of the waste.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR Hazardous	Hazardous		Suitable for re-use on site	Precautions
Not detected	✓	✓			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractors method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes	None
Trace (<0.001%)		✓ ²			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: - Ensuring soils do not dry out to become dusty. - Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			✓		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling. - Clean haulage routes.	Possibly Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover or hardstanding cover required.
0.1+%				✓	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Site wide and or perimeter monitoring. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling. - Clean haulage routes. - Decontamination unit	Unlikely ³ Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the risk for generating dusts will be significantly increased with repeated handling and compaction.	Clean cover and a hard dig layer. A plan should be in place for future excavations as part of the Health and Safety File.

- 2 The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.
- 3 The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.



**APPENDIX K
CL:AIRE CoP Guidance**

RE-USE OF WASTE - GUIDANCE NOTE

Definition of Waste:

The Environment Agency considers waste to be “...any material that is discarded, or intended to be discarded...” This includes any soil from trenches, footing, site strip etc. It is no longer required in its original location, therefore it is considered to be waste.

Re-use of Waste

Previously large scale earthworks and remedial schemes relied on waste management exemptions to allow the re-use of waste. However in 2010 the Environment Agency in England and Wales removed many of the waste management licence exemptions and severely restricted the quantity of materials available for other exemptions.

For purposes of earthworks and remediation, the previous exemptions available have been replaced by CL:AIRE Code of Practice (CoP), also commonly referred to as a “Materials Management Plan”.

CL:AIRE: Code of Practice

Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. The developer/contractor is advised to complete all works under the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE CoP).

Potential scenarios where soils may be able to be re-used:

- Material capable of being used in another place on the same site without treatment;
- Material capable of being used in another place on the same site following ex-situ treatment on site;
- Material capable of being used in another development site without treatment (Direct Transfer);
- Material capable of being used in another development site following ex-situ treatment on another site eg Hub site;

The Code of Practice requires 4 No. Factors to be addressed:

1. Protection of human health and protection of the environment.
2. Suitability of use, without further treatment.
3. Certainty of use.
4. Quantity of material.

In order to satisfy these requirements the following are required:

- i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
- ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
- iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
- iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
- v) Volume calculations.
- vi) Planning permission for the development.
- vii) Contractual details to be clear, regarding who steps in is a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (eg bioremediation, stabilisation) will require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.



APPENDIX L
Contaminated Land Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused;
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;



APPENDIX M

Limitations

Standard Limitations

This desk study report was conducted and has been prepared for the sole internal use and reliance of the Client, Beara Properties Limited. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

The findings and opinions conveyed via the desk study are based on information obtained from a variety of sources as detailed within this report, which BSL believes are reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

Any recommendations made in this report should be confirmed with the Regulatory bodies and Planning Authority prior to implementation to ensure compliance.

No existing manhole covers were lifted or drainage runs inspected during the course of this ground investigation.

The site plans enclosed in this report should not be scaled off.