



GROUNDTECH
CONSULTING

Job title: Pioneer House New-Build Project

Report type: Geo-Environmental Appraisal

Prepared for: AA Projects

Date: 02 December 2022

Document Control Form	
PROJECT	PIONEER HOUSE NEW-BUILD PROJECT
REPORT NAME	GEO-ENVIRONMENTAL APPRAISAL
REPORT REFERENCE	GRO-22228-3941
STATUS	FINAL
ISSUE DATE	02 DECEMBER 2022
REVISION	
CLIENT	AA PROJECTS
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SUMMARY

Site Details

Site Location

The site is located circa 3.3 miles North of Manchester Airport and is approximately centred on National Grid Reference 381581, 390664.

Site Area

The site is irregular in shape, approximately 0.47hectares in area and topographically level. The development area comprises a tarmac surfaced school bus road and drop off area, two tarmac surfaced yards, a basketball court, a large grass surfaced field, rectangular building, and several small areas of soft landscaping. The only building present in the development area is located adjacent to the northern boundary, it is single storey and of brick construction.

Ground Model

Made Ground Soils

Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl. The surfacing comprised tarmac and clayey topsoil with minor constituents of brick and concrete. The remainder consisted of ashy gravelly sand and firm occasionally soft to firm gravelly clay. The minor constituents included coal, brick, chert, brick, concrete, glass and occasional clinker.

Natural Soils

The natural strata generally comprised medium dense to very dense light brown clayey gravelly Sand with minor constituents of chert and quartzite.

Soft slightly gravelly Clay was present locally to WS04 from 1.2m to 1.8m bgl and stiff dark brown Clay was in WS04 from 3.0m to 3.45m bgl.

Bedrock

Bedrock was not encountered.

Groundwater

A single groundwater strike was noted in WS04 at 3.0m bgl at the base of the granular deposits.

Ground Engineering Assessment

Foundations

The most suitable foundations are considered to be strip/trench fill and pads constructed within the natural gravelly Sand deposits at a minimum depth of 0.6m bgl. All foundations should be deepened through the Made Ground and localised areas of soft clay. Therefore, it is likely that foundations will be cast at depths of between 0.7m and 1.8m bgl.

Highways

Untreated Made Ground should be assumed to have a CBR value of less than 2.5%.

SuDS

The use of SuDS drainage is not considered feasible at the site due to the poor infiltration rates calculated through soil percolation testing.

Constraints

The main development constraint is considered to be the localised area of soft clay encountered in WS04 from 1.2m to 1.8m bgl.

GQRA and Revised (PL) Assessment

Human Health

Based on the site having school end use, elevated concentrations of lead and PAHs have been recorded locally in the granular and cohesive Made Ground in WS04 and WS05. No other Contaminants of

Concern have been recorded. These elevated concentrations have been recorded beneath the area of the proposed MUGA pitch.

Asbestos has been recorded in one of the five samples of Made Ground that were screened, at shallow depth in WS01 at 0.2m bgl. This part of the site is beneath the footprint of the proposed teaching facility in the southern part of the proposed development area.

The proposed development will be predominantly covered in hardsurfacing which will break the pathway to site end users. However, a potential pollution linkage will occur in any areas of soft landscaping. Therefore, the risk to human health risk is Moderate to Low.

Controlled Waters

Gross mobile contamination has not been encountered and the risk to controlled waters is Low.

Permanent Ground Gas

Interim gas monitoring results indicate that the ground gas risk is low and CS1 conditions prevail. A full gas risk assessment will be issued on completion of the gas monitoring programme.

Final Appraisal

The following further work is required to commence to the construction phase:

- *Completion of gas monitoring programme.*
- *Issue gas assessment.*
- *Detailed foundation design.*
- *Confirmation of the recommendations made within this report with the Regulators.*

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Plans		
<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
GRO-22228-P01	-	<i>Project Location Plan</i>
GRO-22228-P04	-	<i>Exploratory Hole Location Plan</i>
GRO-22228-P05	-	<i>Generalised Ground Model</i>
GRO-22228-P06	-	<i>Contamination Plan</i>
GRO-22228-P07	-	<i>Illustrative Revised CSM</i>

1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by AA Projects to undertake a Geo-Environmental Appraisal for a site at Pioneer House School in Wythenshawe.

A Preliminary Risk Assessment has previously been undertaken by Groundtech Consulting referenced *GRO-22228-3630_1.2* dated 20 June 2022.

A main investigation was undertaken in accordance with BS 5930:2015, BS 10175:2013, BS 8576 and BS 22475 to revise the CSM and quantify the level of risk identified in the PRA. The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

The report has been undertaken to fulfil the requirements of a preliminary risk assessment in accordance with LCRM risk assessment guidance.

1.2 Proposed Development

The proposed development is commercial end use comprising a new single-storey teaching block, new MUGA pitch and new timber/steel canopy and outdoor gym.



Proposed Development

1.3 Limitations

Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

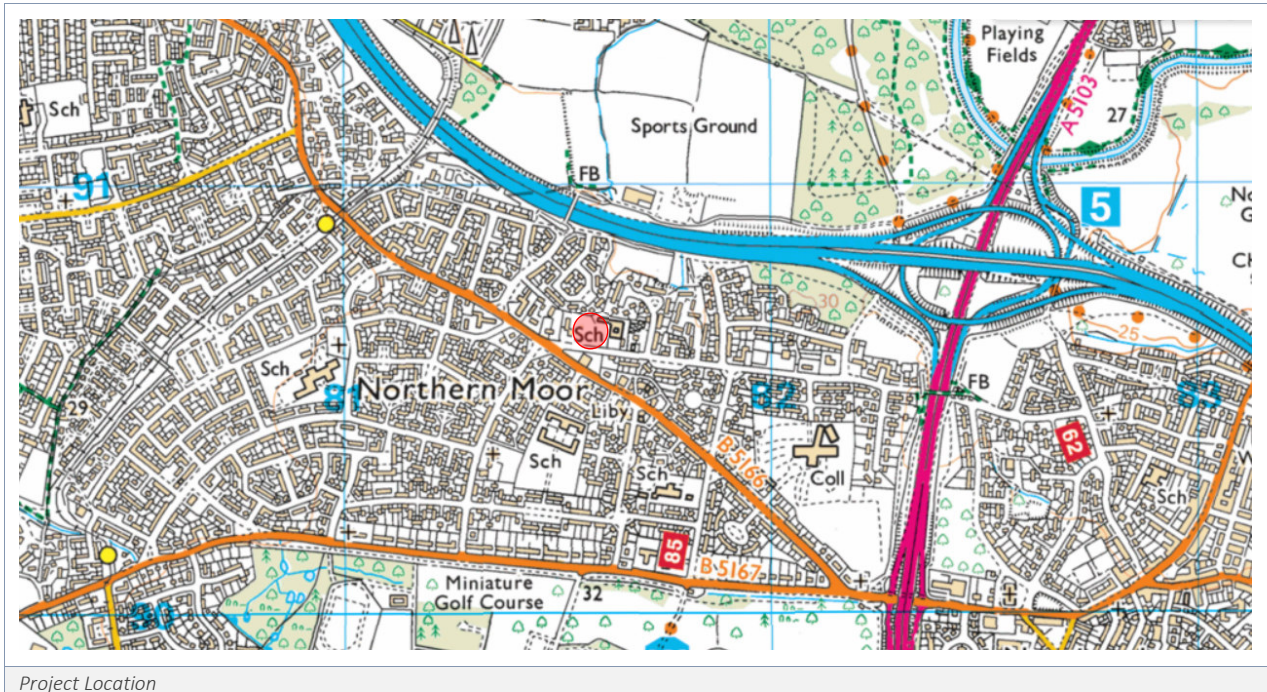


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2.0 SITE SETTING

2.1 Location

The site is located circa 3.3 miles North of Manchester Airport as shown on the Project Location Plan GRO-22228-P01. The site is approximately centred on National Grid Reference 381581, 390664.



Access to the site is gained off Yewtree Lane to the south.

2.2 Site Description

The site is irregular in shape, approximately 0.47 hectares in area, and generally topographically level.

Onsite Features

The site comprises the western area of Pioneer House High School. The main school building and areas of car parking are situated to the east off site. The development area consists of a tarmac surfaced school bus road and drop off area, two tarmac surfaced yards, a basketball court, a large grass surfaced field, a rectangular building and several small areas of soft landscaping.

The only building present in the development area is located adjacent to the northern boundary and is of single storey and brick construction.

Site Boundaries and Surrounding Area

The site is bounded by a circa 2.5m high green mesh fencing to the south, east and north. The site is open to the remainder of the school to the east. Mature deciduous trees are present along the southern boundary and the north western boundary.



The site is surrounded by the following features/land uses:

- North - Residential properties.
- East - The remainder of the school followed by residential properties.
- West - Residential properties.
- South - Residential properties followed by Rack House Primary School.

Site photographs are presented in *Appendix 2*.

3.0 SUMMARY OF PRELIMINARY RISK ASSESSMENT

A Preliminary Risk Assessment was undertaken by Groundtech Consulting at Pioneer House, referenced GRO-22228-3630_1.2, dated 20 June 2022.

Site History

Earliest historical maps date back to 1874 when three buildings were present onsite listed as 'Oak House' and a road is indicated to the east. The majority of the buildings were demolished in the 1950s and no further significant changes in land occurred.

Geology

The superficial deposits are indicated to be underlain by Devensian Fluvial-Glacial material which characteristically comprises sand and gravel.

The solid geology is Tarporley Siltstone Formation which consists of interbedded siltstone, mudstone and sandstone.

The nearest BGS borehole record is circa 10m north east of the site and the following sequence was recorded:

- *Topsoil and fill to 1.0m bgl.*
- *Brown mottled grey Clay to 1.4m bgl.*
- *Medium dense brown fine to medium Sand to 2.8m bgl.*

Hydrogeology

The superficial deposits in this area are classified by the Environment Agency as a Secondary A Aquifer and the bedrock is classified as a Secondary B Aquifer. The superficial Aquifer is classified as having a high leaching potential (soils which have little ability to attenuate diffuse source pollutants and therefore have the potential to allow pollutants to move rapidly).

The site is not within 500m of a Source Protection Zone.

The nearest active groundwater abstraction point is 1530m north east of the site used for direct spray irrigation at a borehole at Chorlton-Cum-Hardy Golf Club.

Hydrology

The nearest watercourse is unnamed and located 196m east of the site.

There are no active surface water abstraction points within 2000m.

Environment Agency information indicates that the site is outside a flood risk zone and is not at risk of flooding from Rivers and Coasts.

Environmental Information

The following environmental information was identified:

- *Gas Governor located 15m south.*
- *Nearest electricity substation is 66m south east.*
- *Allotment gardens identified c.150m west.*
- *Unspecified ground workings 135m east.*



Land Quality

Based on the lack of any significant sources of onsite contamination and all offsite sources being either minor or at a considerable distance, the risk to site end users from direct contact with the soils is considered to be *Low*.

Additionally, the risk to adjacent site users was also considered to be *Low*.

No volatile sources of contamination have been recorded and the risks from vapours are considered to be *Low*.

Made Ground is likely to be present underlying the site and as such, the risk to potable water supply pipes is considered to be *Low to Moderate*.

No significant sources of ground gas have been identified and the risk is considered to be *Low*.

As no mobile sources of contamination have been identified, the risk to both groundwater and surface waters is considered to be *Low*.

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site.
Maintain a watching brief for visual and olfactory evidence of contamination.
Obtain samples using methodology in current guidance for contamination analysis.
Identify realistic pollution linkages to groundwater.
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions.
Determine soil infiltration rates.
Determine if targeted supplementary investigation in areas of concern is required and for remedial design.
Install monitoring standpipes for gas monitoring.
Assess the identified pollution linkages in the CSM.

4.2 Scope of Works

The following scope of works was completed on Saturday 8th October 2022:

- 6 No. windowless sample boreholes (WS01 to WS06) were drilled to depths of between 1.65m and 3.45m bgl using a Dando Terrier windowless sample drilling rig.
- Soil percolation testing was carried out at two locations (SuDS1 and SuDS2) at depths of 1.3m and 1.6m bgl.

The exploratory hole locations are presented on Groundtech Plan GRO-22228-P04, and the logs are presented in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site, and target any areas of concern as summarised in the table below:

Location	Target Rationale
WS01 to WS03	Proposed teaching facility
WS04, WS05, SuDS1 and SuDS2	Proposed games court
WS06	Proposed canopy/gym

The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- BS 5930 'Code of Practice for Site Investigations' 2015.
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.
- BS EN ISO 14689:2002 'Geotechnical investigation and testing – Identification and classification of rock'.

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
<i>Environmental Sample</i>	<i>19</i>
<i>Disturbed Sample</i>	<i>10</i>

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed to obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for chemical analysis were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature.

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Analysis

To inform the Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations made during the Ground Investigation.

Contaminants of Concern	Matrix	Number
<i>Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc, sulphate and pH.</i>	<i>Soil</i>	<i>5</i>
<i>Polycyclic Aromatic Hydrocarbons (PAHs)</i>	<i>Soil</i>	<i>5</i>
<i>Asbestos Screening</i>	<i>Soil</i>	<i>5</i>
<i>Asbestos Quantification</i>	<i>Soil</i>	<i>1</i>

The Geo-Environmental Laboratory Testing Results are presented in *Appendix 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:

British Standard	Test Method	Number
<i>Part 2</i>	<i>Water Content</i>	<i>2</i>
<i>Part 2</i>	<i>Plasticity Index Analysis</i>	<i>2</i>
<i>Part 3</i>	<i>pH Value</i>	<i>3</i>
<i>Part 3</i>	<i>Water Soluble Sulphate Content</i>	<i>3</i>

The Geotechnical Laboratory Testing Results are presented in *Appendix 5*.

4.5 Gas and Groundwater Monitoring

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of polyvinyl chloride (PVC) pipe - a bentonite seal was placed 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
WS01	1.2	0.5 – 1.2	Made Ground & Natural Sand	Ground Gas
WS02	1.2	0.5 – 1.2	Made Ground & Natural Sand	Ground Gas
WS04	3.0	1.0 – 3.0	Made Ground, Natural Clay & Sand	Ground Gas

Permanent gas and flow rate monitoring was carried out using a GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H_2S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (%LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Interim permanent gas and groundwater monitoring results are presented in *Appendix 6*.

5.0 GROUND MODEL

5.1 Made Ground

Made Ground was encountered beneath the site in all exploratory holes to depths of between 0.7m and 1.4m bgl.

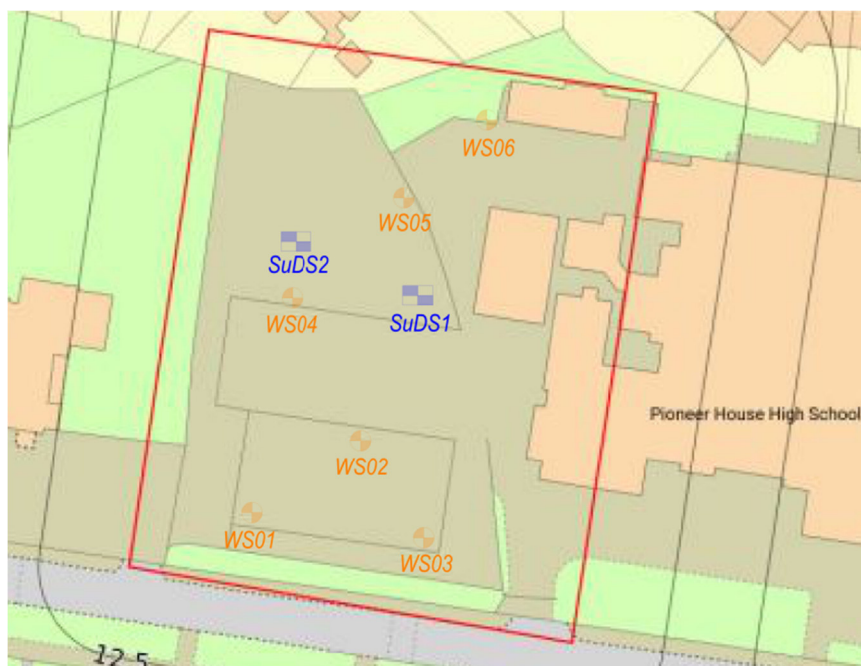
The surfacing at the site comprised two stratifications:

- *Dark brown slightly clayey sandy topsoil with minor constituents of brick, concrete and glass was encountered in WS04 to WS06, SuDS1 and SuDS2 to depths of between 0.2m and 0.25m bgl.*
- *Tarmac was present in WS01 to WS03 to a maximum depth of 0.1m bgl.*

Three main Made Ground populations were observed during the investigation and are described below:

- *Dark grey slightly gravelly occasionally ashy sand with minor constituents of tarmac and concrete was encountered in WS01 to WS03 from a depth of 0.1m to depths of between 0.3m and 0.8m bgl.*
- *Firm occasionally soft to firm gravelly clay with minor constituents of coal, brick and chert was present in WS02, WS04 and WS05 from depths of between 0.6m and 1.3m bgl to depths of between 0.7m and 1.4m bgl.*
- *Orange brown / black slightly ashy gravelly sand with minor constituents of brick, concrete, coal, chert, glass and occasional clinker was present in WS04 to WS06 and SuDS1 to SuDS2 from depths of between 0.2m and 0.25m bgl to depths of between 0.6m and 1.4m bgl.*

Locally in the southern area of site (WS01 and WS02), red brown sandy gravel of brick was encountered from depths of between 0.3m and 0.8m bgl to depths of up to 1.3m bgl.



Exploratory Hole Locations

5.2 Natural Ground

The natural strata encountered generally confirmed the published geological records.

Two main natural stratification were identified during the investigation and are described below:

- *Medium dense to very dense light brown clayey gravelly Sand with minor constituents of chert and quartzite was present in all exploratory holes from depths of between 0.7m and 1.4m bgl to depths of up to 1.65m and 3.0m bgl.*
- *Soft slightly gravelly Clay was in WS04 at from 1.2m and 1.8m bgl and stiff dark brown Clay was in the same borehole from 3.0m and 3.45m bgl.*

5.3 Bedrock

Bedrock was not encountered in this investigation.

5.4 Groundwater

Groundwater was encountered in WS04 at 3.0m bgl at the base of the natural sand deposits.

5.5 Watching Brief

A watching brief was maintained during the ground investigation for visual and olfactory evidence of contamination.

No evidence of olfactory contamination was noted during the Ground Investigation.

Visual evidence of contamination was recorded in the Made Ground matrix in the form of ash and rare clinker.

5.6 Excavation Stability

No evidence of spalling or collapse was encountered during excavation of the trial pits in the natural ground however instability of the granular Made Ground deposits was noted.

5.7 Excavation/Borehole Progress

Slow progress while excavating the trial pits was not experienced.

Shallow termination of the boreholes within the natural granular strata was encountered due to SPT refusals.

6.0 GROUND ENGINEERING

6.1 Geotechnical Testing Results

Comparison of water content and the value of 0.4 times the Liquid Limit in accordance with BRE Digest 412 'Desiccation in Clay Soils' suggests significant desiccation has taken place when 0.4 times the Liquid Limit is greater than the actual water measured water content. This is a rudimentary method but also a good guide.

Results of the PI analysis and the volume change potential of the clays is summarised in the table below:

Reference	Depth (m bgl)	Modified PI	Volume Change Potential	Desiccated Y/N
WS04	1.5	21.1	Medium	N
WS04	3.0 – 3.45	24.3	Medium	N

6.2 Assessment Background

The ground engineering investigation has been undertaken to formulate an accurate ground model in order to undertake preliminary foundation design. The ground model has been constructed with a moderate to high level of confidence and has evolved from the information obtained in the PRA.

At present, the site forms part of Pioneer House High School facility with the majority of site being hardsurfaced. A leisure court/playground is present in the southern area of site and the north western section is soft landscaped and fenced off from the remaining area of site.

The proposed development comprises the demolition of existing MUGA pitch and the construction of a new single-storey teaching block, a MUGA pitch and erection of new timber/steel framed canopy and outdoor gym area.

Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl and was typically granular in nature. The natural ground generally comprised medium dense to very dense gravelly sand with minor constituents of chert and quartzite. Localised bands of soft and stiff Clay were encountered within WS04 between 1.2m to 3.45m bgl.

Groundwater was encountered locally within WS04 at 3.0m bgl.

The main development constraint is the soft clay encountered locally within WS04 between 1.2m to 1.8m bgl.

Additionally, historic buildings are indicated to have been present at the centre and northern areas of site. It is possible that basements are situated beneath the footprint of these buildings and deeper Made Ground may be present locally. However, no evidence of basements was encountered through the Ground Investigation and the teaching facility is proposed to be constructed in the southern area of site where no buildings have previously been situated.

6.3 Geotechnical Parameters

The geotechnical test results have been evaluated to derive geotechnical parameters for the soils underlying the site. A 'depth to SPT N value' graph is presented on Plan GRO-22228-P05 in Appendix 7 to provide a generalised ground model for the site.

Characterisation of the geotechnical parameters above has been undertaken to select a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state.

The characteristic values of the granular and cohesive strata have been selected based on correlation with SPT values. The characteristic values for Ultimate Limit State (ULS) selected are presented in the table below:

Stratum	Parameter	Selected Characteristic Value
<i>Medium Dense Sand</i>	<i>Drained Angle of Friction (ϕ')</i>	<i>32°</i>
<i>Soft Clay</i>	<i>Undrained Shear Strength (c_u)</i>	<i>20kPa</i>
<i>Stiff Clay</i>	<i>Undrained Shear Strength (c_u)</i>	<i>100kPa</i>

6.4 Preliminary Foundation Design

The most suitable foundations for the proposed development are considered to be traditional strip/trench fill and/or pad foundations constructed within the natural Sand deposits at a minimum depth of 0.6m bgl. All foundations should be deepened through the Made Ground and any localised areas of soft clay and therefore, foundations are likely to be cast at depths of between 0.7m and 1.8m bgl.

Preliminary foundation design has been undertaken by calculation, a safe allowable bearing capacity of 125kN/m² is provided for ultimate limit state design for a 0.6m strip or 1.2m wide pad constructed within the natural medium dense sand at a depth of 0.7m bgl.

The settlement of the sand will be immediate and will predominantly occur during the construction phase. Settlement criteria of 25mm will not be exceeded and Serviceability Limit State conditions will be satisfied.

Construction Recommendations

The recommendations in this appraisal are preliminary and the detailed design should be developed in advance and during the construction phase. If the ground conditions or groundwater regime encountered during the construction phase differ significantly to the conditions encountered during the Ground Investigation, work should cease and Groundtech Consulting contacted for further advice.

During the construction phase, supervision by a suitably qualified geotechnical engineer should be on a continuous basis to check the design assumptions are correct and construction conforms to design in accordance with EC7. Supervision should include inspections, Control Ground Investigations and monitoring by a suitably qualified geotechnical engineer.

6.5 Building Near Trees

Mature trees are indicated along the site boundaries however foundations are to be constructed within the natural granular Sand deposits and will not encounter cohesive stratum. As a result, heave precautions are not required.

All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

6.6 Floor Slabs

Greater than 600mm of Made Ground has been recorded beneath the site, including the position of the proposed teaching facility. Therefore, suspended floor slabs will be required.

6.7 Construction

The trial pits indicate that instability of excavations is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. Instability of the Made Ground is a possibility and should be considered in the groundworks method statements.

Tracked high specification plant is recommended to maintain the build programme. Breaking equipment will be required during the construction phase of works.

Groundwater is not anticipated to be encountered in foundation excavations.

6.8 Concrete Classification

Made Ground

Water soluble sulphate testing was undertaken on four samples of the Made Ground. The range of soluble sulphate (SO₄) recorded is 6.3mg/l to 86.2mg/l and associated pH values ranged between 6.58 and 8.75 indicating slightly acidic to slightly alkaline conditions.

For a dataset containing less than five results, the highest recorded water soluble sulphate value and the lowest recorded pH value is used as the characteristic value. For the Made Ground, the selected characteristic water soluble sulphate value is 86.2mg/l and the pH value is 6.58.

Natural Strata

Water soluble sulphate testing was also undertaken on three samples of the natural ground. The range of soluble sulphate (SO₄) recorded is 10.0mg/l to 15.3mg/l and associated pH values ranged between 8.2 and 8.7 indicating slightly alkaline conditions.

A similar dataset is available therefore the selected characteristic water soluble sulphate value is 15.3mg/l and characteristic pH value is 8.2.

Granular soils are present beneath the site therefore groundwater is considered to be mobile.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 and sulphate class DS-1 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.

6.9 Highway Design

CBR values of greater than 5% are likely to be achieved in undisturbed natural granular soils for pavement design purposes, unless proven otherwise by in-situ testing at sub-base level by a specialist geotechnical engineer. As a minimum, the subgrade should be proof rolled prior to construction. Some reengineering of the subgrade is required prior to highway construction to achieve the required design CBR value.

Untreated Made Ground should be assumed to have a CBR value of less than 2.5%, unless proven otherwise. Highways Agency document HD25 'Interim Advice Note 73/06 Revision 1' (2009) states that where a subgrade has a CBR value lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic and must be improved.

The soils are considered to be frost susceptible due to the fines content and highway construction should be a minimum thickness of 450mm to mitigate the risk.

6.10 Sustainable Urban Drainage System (SuDS)

Soil percolation testing was undertaken as part of the scope of works to test the suitability of SuDS drainage.

Two soil percolation tests (SuDS1 and SuDS2) were undertaken at depths of 1.3m and 1.6m bgl in the central/northern section of site. The soil infiltration rates are presented in the table below:

Location	Test No.	Soil Infiltration Rate (m/sec)
<i>SuDS1</i>	<i>1</i>	9.81×10^{-6}
<i>SuDS1</i>	<i>2</i>	3.72×10^{-7}
<i>SuDS1</i>	<i>3</i>	4.42×10^{-7}
<i>SuDS2</i>	<i>1</i>	9.30×10^{-6}
<i>SuDS2</i>	<i>2</i>	4.66×10^{-6}
<i>SuDS2</i>	<i>3</i>	1.00×10^{-7}

In SuDS1, Made Ground was encountered to 1.0m bgl and was underlain by natural very clayey gravelly Sand to 1.3m bgl where the hole was terminated. Three soil percolation tests were carried out at 1.3m bgl and the soil infiltration rates of between 4.42×10^{-7} and 9.81×10^{-6} m/s were calculated indicating poor drainage conditions.

Made Ground was present to 1.4m bgl in SuDS2 overlying very clayey gravelly Sand to 1.6m bgl. Three soil percolation tests were undertaken at 1.6m bgl and the soil infiltration rates ranged between 1.00×10^{-7} and 9.30×10^{-6} m/s again indicating poor drainage conditions.

SuDS drainage is not considered to be a viable option for the site based on the soil infiltration rates that have been calculated and is likely due to the clay content of the natural granular soils.

7.0 LAND QUALITY

7.1 Geo-Environmental Testing Results - Soils

Five samples of Made Ground have been tested for a range of relevant Contaminants of Concern. In accordance with LCRM, a Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used and their ranking of importance are listed below:

- *Soil Guideline Values (SGVs) which demonstrate minimal risk.*
- *LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.*
- *C4SLs which demonstrate low risk.*

In deriving the GACs for use on Brownfield sites, we have assumed a 1.0% Soil Organic Matter unless the results indicate otherwise.

The proposed end-use for the site comprises a new teaching facility, MUGA pitch, outdoor gym and canopy. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the Residential without plant uptake land-use scenario as defined in SR3 (EA, 2009b).

The strata or sources of contamination targeted by the laboratory testing scheduled are summarised in the table below:

Strata	Number of Samples Tested	Locations
<i>Granular Made Ground (Population 1)</i>	3	WS01, WS03, WS05
<i>Cohesive Made Ground (Population 2)</i>	1	WS04
<i>Topsoil Made Ground (Population 3)</i>	1	WS06

A summary of the Geo-Environmental Testing results is presented below and the GQRA Screening Values are presented in *Appendix 8*:

Contaminant	Metals		Exceedances	Locations
	Range (mg/kg)	Screening Value (mg/kg)		
<i>Arsenic</i>	1.0 – 26.5	40	-	-
<i>Cadmium</i>	0.2 – 0.6	85	-	-
<i>Chromium</i>	15.9 – 38.8	910	-	-
<i>Hexavalent Chromium</i>	<0.3	21	-	-
<i>Copper</i>	12 – 88	7100	-	-
<i>Lead</i>	15 – 572	310	1	WS04 at 0.7m
<i>Mercury</i>	<0.1 – 0.4	1.2	-	-
<i>Nickel</i>	10.1 – 31.0	180	-	-
<i>Selenium</i>	<1.0	430	-	-

Zinc	31 – 341	40000	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range (mg/kg)	Screening Value (mg/kg)	Exceedances	Locations
Naphthalene	<0.1 – 3.94	2.3	1	WS05 at 0.5m
Acenaphthylene	<0.06 – 1.81	2900	-	-
Acenaphthene	<0.1 – 14.2	3000	-	-
Fluorene	<0.08 – 8.80	2800	-	-
Phenanthrene	0.26 – 108.2	1300	-	-
Anthracene	<0.08 – 34.48	31000	-	-
Fluoranthene	0.64 – 193.64	1500	-	-
Pyrene	0.58 – 170.95	3700	-	-
Benzo(a)anthracene	0.45 – 118.98	11	1	WS05 at 0.5m
Chrysene	0.41 – 85.58	30	1	WS05 at 0.5m
Benzo(b)fluoranthene	0.53 – 105.85	3.9	1	WS05 at 0.5m
Benzo(k)fluoranthene	0.21 – 41.16	110	-	-
Benzo(a)pyrene	0.41 – 89.49	3.2	1	WS05 at 0.5m
Indeno(123cd)pyrene	0.30 – 64.81	45	1	WS05 at 0.5m
Dibenzo(ah)anthracene	<0.08 – 8.57	0.31	1	WS05 at 0.5m
Benzo(ghi)perylene	0.25 – 45.93	360	-	-
Others				
Organic Matter			2.5% – 14.4%	
pH			6.58 – 8.75	
Moisture Content			4.8 – 25.4%	
Asbestos Screen				
Position	Depth (m bgl)	Result	Quantification (mass%)	
WS01	0.20	Chrysotile: Fibre bundles	0.001	
WS03	0.20	None detected	-	
WS04	0.70	None detected	-	
WS05	0.50	None detected	-	
WS06	0.10	None detected	-	

7.2 Generic Quantitative Risk Assessment - Soils

Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl and was generally granular with minor constituents of brick, concrete, ash, clinker, coal, chert and glass present.

Heavy Metals

A single elevated concentration of lead was recorded in WS04 at 0.7m bgl at a concentration of 572mg/kg when compared to the screening value of 310mg/kg and was present in the soft to firm brown slightly gravelly clay. The elevated lead is potentially linked to ash present within the Made Ground matrix.

No other elevated metals were recorded.

Polycyclic Aromatic Hydrocarbons

Based on the site being developed commercially, elevated concentrations of naphthalene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(123cd)pyrene and

Dibenzo(ah)anthracene have been recorded in one of the five samples screened. The elevations were recorded in WS05 at 0.5m bgl within the ashy granular Made Ground strata encountered in the central/northern area of site. The elevated levels of PAHs are considered to be a result of the ash content of the Made Ground.

No other elevated PAHs have been detected in the remaining samples that have been tested.

Asbestos

Asbestos has been detected in one of the five samples screened in the form of Chrysotile fibre bundles in WS01 (0.2m bgl) and is likely to be associated with the historic demolition of the buildings immediately north. Quantification of the asbestos recorded the Chrysotile at 0.001mass % and is therefore present in very low quantities.

No asbestos was detected in the other four samples of Made Ground that were screened.

Contamination Plan

A contamination plan is presented as *GRO-22228-P06*. The elevated concentrations of lead and PAHs are present beneath the proposed area of the MUGA pitch, and the asbestos is beneath the proposed new teaching facility.

7.3 Permanent Ground Gases

A single ground gas monitoring visit has been carried out to date on 1st December 2022.

No concentrations of methane (CH₄) have been recorded within the boreholes. Detectable levels of carbon dioxide (CO₂) were recorded within the standpipes up to a maximum level of 3.9% v/v along with depleted oxygen (O₂) concentrations of a minimum of 13.9% v/v.

No positive gas flow rates were recorded.

The atmospheric pressure was 1025mb and the visit was carried out during a period of rising barometric pressure.

Groundwater was not encountered in any of the exploratory holes.

Based upon the initial results recorded, the site is in CS1 and gas protection measures will not be required within the proposed development. This will be confirmed on completion of the monitoring.

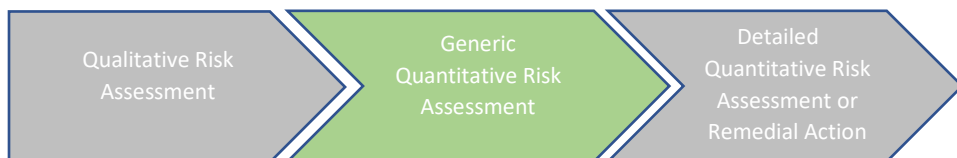
Radon

The site is not located in an area where radon precautions are required within new structures.

7.4 Revised Pollution Linkage Assessment

The pollution linkage assessment has been revised based on the Ground Investigation and testing to identify any realistic pollution linkages in order to quantify the risks to human health and controlled waters. The risk classification has been estimated in accordance with the CIRIA C552 assessment criteria presented in *Appendix 9* and an Illustrative CSM is presented on *GRO-22228-P07*.

Human Health Pollution Linkage Assessment



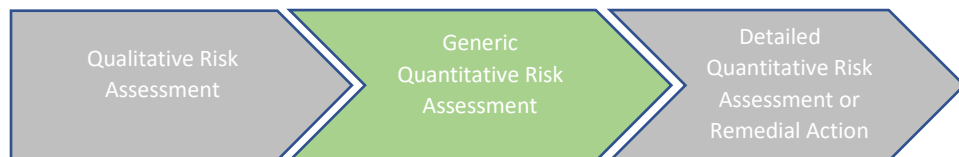
- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely	Medium	Moderate to Low	Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site. Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl and was generally granular with minor constituents of brick, concrete, ash, clinker, coal, chert and glass present. Geo-environmental testing has not recorded a single elevated concentration of lead in clay Made Ground of WS04 and elevated PAHs are in the ashy Made Ground of WS05. The elevated lead and PAHs have been recorded beneath the area of the proposed MUGA pitch. In addition, asbestos was detected in a single sample of Made Ground from WS01 at 0.2m bgl as Chrysotile fibre bundles. Quantification of the sample has indicated the asbestos is present in very low quantities (0.001mass%). The JIWG assessment tool indicates that the combined hazard, exposure and receptor ranking is Low. WS01 is

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						beneath the position of the proposed new teaching facility which will break the pathway to potentially contaminated soils. The proposed development is a new teaching facility, outdoor gym, canopy and MUGA pitch. Therefore, the site is to be predominantly covered in hardsurfacing which will break the linkage from contaminated soils to end site users. However, a potential pollution linkage will exist in any areas of soft landscaping.
PL2	Contaminated Soils	Inhalation of vapour.	Unlikely	Medium to Severe	Low	No sources of hydrocarbons have been identified through the PRA. No visual or olfactory evidence of volatile contamination/vapours have been identified through the Ground Investigation. In addition, no elevated concentrations of naphthalene have been recorded in the area of the proposed building through laboratory testing. No viable pollution linkage is considered to exist.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	Sensitive receptors in the form of residential housing are indicated at the western site boundary. However, gross mobile contamination has not been recorded and the risk to adjacent site users is considered to be low. No viable pollution linkage exists.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL4	Contaminated Soils	Attacking potable water supply pipe.	Unlikely to Low Likelihood	Medium	Moderate to Low	Geo-Environmental testing has recorded elevated levels of PAHs in one of the five samples of Made Ground that have been screened (WS05 at a depth of 0.5m bgl). The elevation was recorded within the granular ashy Made Ground encountered in the northern/central area of site which was encountered to a depth of 1.4m bgl and therefore within the proposed installation depth. At this stage, a viable pollution linkage is considered to exist and a local water company risk assessment is required to confirm the levels of protection required.
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Unlikely	Medium to Severe	Low	Made Ground has been encountered to a maximum depth of 1.4m bgl. No potential sources of ground gas have been identified through the desk-based study. Interim ground gas monitoring results place the site within CS1 and ground gas precautions are not required. The gas monitoring programme is ongoing and recommendations will be confirmed upon completion of the programme. The site is not within an area requiring radon precautions within foundations.

Controlled Waters Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process – **Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Unlikely	Medium	Very Low	Shallow Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl. No mobile contamination has been encountered through the Ground Investigation works and the geo-environmental testing. Geological maps indicate that the site is underlain by Glaciofluvial Sand and Gravel. The bedrock underlying the site is the Tarporley Siltstone Formation which comprises Mudstone, Siltstone and Sandstone. Groundwater is not considered a sensitive resource as the site is not within 500m of a SPZ and no potable groundwater abstraction licences are present within 2000m of the site. The proposed development will be completely covered with hardsurfacing and a new drainage system installed. This will considerably reduce infiltration and leaching of potential contaminants. Therefore, no realistic pollution linkage is considered to exist as a source of contamination has not been identified.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Medium	Very Low	Pollution Linkage 7 refers to the impaction of the unnamed watercourse 196m east of the site from contaminated soils and groundwater. No sources of mobile contamination have been identified through the PRA and gross mobile contamination has not been recorded through the Ground Investigation. Given the distance to the nearest receptor and the lack of mobile contamination, a viable pollution linkage does not exist.

7.5 Outline Remedial Strategy

Soils

It is likely that the PAH and lead contamination in the shallow granular and cohesive Made Ground will be beneath the proposed area of the MUGA pitch. The construction process of the MUGA pitch will require 450mm of compacted clean granular material to be placed which, along with the pitch's surface, will break the pollution linkage to any of the potentially contaminated material remaining. In this area no additional remedial measures are required.

The localised area of asbestos that has been recorded in WS01 is below the area of the proposed teaching facility which will break the pathway to proposed site end users.

If soft landscaping areas are proposed, a cover system comprising 450mm of suitably clean soils with a demarcation layer should be placed. Validation of the cover system will need to be carried out to ensure a sufficient thickness has been placed and to ensure that it is suitably clean.

Topsoil

Geo-Environmental testing undertaken on a single sample of topsoil in the northern area of site (WS06) indicates that the topsoil is likely to be suitable for reuse. Additional testing will be required prior to its reuse once the material has been stripped and stockpiled.

Controlled Waters

Mobile contamination has not been identified therefore remediation with respect to controlled waters is not required.

Ground Gas

Initial ground gas monitoring places the site in CS1 and gas protection measures will not be required. Recommendations will be confirmed upon completion of the monitoring programme.

The site does not lie within an area where radon precautions are required for foundations.

Watching Brief and Regulatory Liaison

A watching brief is recommended during future ground works for any previously unseen contamination. If identified, work should cease in that area and advice sought from Groundtech Consulting Limited.

Approval from the regulators should be obtained prior to the development commencing to avoid any delays at the construction stage.

7.6 Asbestos in Soils

Asbestos has been encountered within one of the five samples screened and is present within the ashy granular deposits of WS01 at 0.2m bgl. The asbestos has been recorded at very low quantities (0.001mass%). Where possible, it is advised that any Made Ground soils containing asbestos are left in the ground undisturbed.

Where soils will be disturbed as part of the ground works, in accordance with the Joint Industry Working Group (JIWG) decision support tool for CAR2012 work categories, the combined hazard and exposure ranking is very low. The work is classified as non-licensed and CAR does not apply. The JIWG table is presented in *Appendix 10*. This should be used as an aid to classify risk and recommend the level of protection required, the final decision on how asbestos within the soils should be managed should be made by the contractor.

7.7 Health and Safety - Construction and Ground Workers

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:

Pollution Linkage Ref	Potential Source	Pollution Linkage	Likelihood	Severity	Level of Risk
PL8	Made Ground	Ingestion, direct contact, inhalation of dusts.	Low Likelihood	Medium	<i>Moderate to Low</i>
PL9	Asbestos	Ingestion, direct contact, inhalation of dusts.	Low Likelihood	Medium	<i>Moderate to Low</i>

Elevated concentrations of PAHs have been recorded within the granular ashy Made Ground in the centre of site and lead was encountered locally in the cohesive Made Ground. In addition, very low quantities of asbestos (0.001mass%) have been detected at shallow depths (0.2m bgl) in WS01 in the southern part of site, beneath the footprint of the proposed teaching facility. The risk of the contaminated soils should be communicated to ground workers through a site induction and information should be made available through site noticeboards. As a minimum, ground workers should wear gloves when handling Made Ground soils and hand washing facilities should be made available.

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.*

7.8 Waste Classification by Assessment

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”).

This is a useful tool as waste producers have the legal responsibility to classify any waste they produce.

Five samples were tested to assess whether they contained any contaminants in the hazardous range when screened against assessment criteria within WM3. The results are in the Waste Classification Report presented in *Appendix 11*.

Based on the HazWasteOnline assessment tool, the Made Ground soils have been classified as *Non-Hazardous* for waste disposal purposes.

Total testing was not undertaken on the natural soils and are assumed to be *Non-Hazardous*.

Asbestos was encountered within one of the five samples and was recorded at a concentration below the Hazardous threshold of 0.1%.

7.9 Waste Acceptance Criteria (WAC) Results

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

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste) led to the establishment of a methodology for classifying wastes. Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. There are three different WAC, these are for:

- *Inert waste*
- *Non-Hazardous waste*
- *Hazardous waste*

Wastes should first be classified based on their total concentrations as detailed in the previous section. WAC testing is then required if the end disposal route is a landfill.

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.*

If any organic contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous, and testing should be undertaken at that time.

Materials should be 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. It is recommended that where possible, the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

The reuse of soils on the site this should be done in accordance with the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE CoP). Any re-use scheme should be designed to minimise disposal costs.

After a cut and fill balance plan/volume calculation has been carried out, a U1 and T5 exemption could be registered. This will allow the use of the following soils without a waste permit or under Dow CoP MMP:



- 1,000 tonnes (c.600m³) of non-hazardous soil
- 5,000 tonnes (c.3,000m³) of natural sand and gravels.
- 50,000 tonnes (c.25,000m³) of bituminous material to be used in roadways.
- 5,000 tonnes (c.3,000m³) of crushed concrete / stone.

8.0 FINAL APPRAISAL

8.1 Land Quality

Made Ground has been encountered beneath the site to a maximum depth of 1.4m bgl and was generally granular with localised bands of clay present. Minor constituents of brick, concrete, clinker and ash were commonly observed within the Made Ground matrix.

Based on the site having school end use, elevated concentrations of lead and PAHs have been recorded locally in the granular and cohesive Made Ground in WS04 and WS05. No other Contaminants of Concern have been recorded. These elevated concentrations have been recorded beneath the area of the proposed MUGA pitch.

Asbestos has been recorded in one of the five samples of Made Ground that were screened, at shallow depth in WS01 at 0.2m bgl. This part of the site is beneath the footprint of the proposed teaching facility in the southern part of the proposed development area.

The proposed development will be predominantly covered in hardsurfacing which will break the pathway to site end users. However, a potential pollution linkage will occur in any areas of soft landscaping. Therefore, the risk to human health risk is *Moderate to Low*.

Gross mobile contamination has not been recorded and the risk to controlled waters is *Very Low*.

Interim ground gas monitoring results place the site within CS1 and ground gas precautions are not required. The ground gas monitoring programme is ongoing, and the ground gas recommendations will be confirmed in an addendum gas assessment. The site is not in an area where radon protection measures are required. At this stage, the risk from permanent ground gases is *Low*.

The Made Ground has been categorised as *Non-Hazardous* for waste disposal purposes. A single topsoil sample was tested and indicates that it may be suitable for reuse as part of the proposed development however, further testing will be required to confirm this.

8.2 Ground Engineering

The most suitable foundations for the proposed development are considered to be shallow strip/trench and/or pad foundations constructed in the medium dense to dense gravelly Sand at a minimum depth of 0.6m bgl. Foundations should be deepened through the Made Ground and any localised areas of soft clay.

A suspended floor slab is recommended for the proposed development.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

CBR values of greater than 5% are likely to be achieved in undisturbed natural granular soils for pavement design purposes. Untreated Made Ground should be assumed to have a CBR value of less than 2.5%,

Poor soil infiltration rates have been recorded and the use of SuDS drainage is not considered feasible at the site.

8.3 Required Supplementary Investigation

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

Completion of gas monitoring programme.

Issue gas assessment.

Detailed foundation design.

Confirmation of the recommendations made within this report with the Regulators.

9.0 RELEVANT INDUSTRY REFERENCES

- British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.
- British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2015
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of soil*" BS EN ISO 14688:2002.
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- CIRIA 552 "*Contaminated Land Risk Assessment – A guide to good practice*" 2001.
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- BS 8485:2015 '*Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings*'
- The Hazardous Waste (England) Regulations 2005.
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- Water Framework Directive.
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CL:AIRE "*The Definition of Waste: Development Industry Code of Practice*" Version 2 March 2011.

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Total Petroleum Hydrocarbon Criteria Working Group Volume 5 Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach June 1999.

APPENDIX 1 - Plans



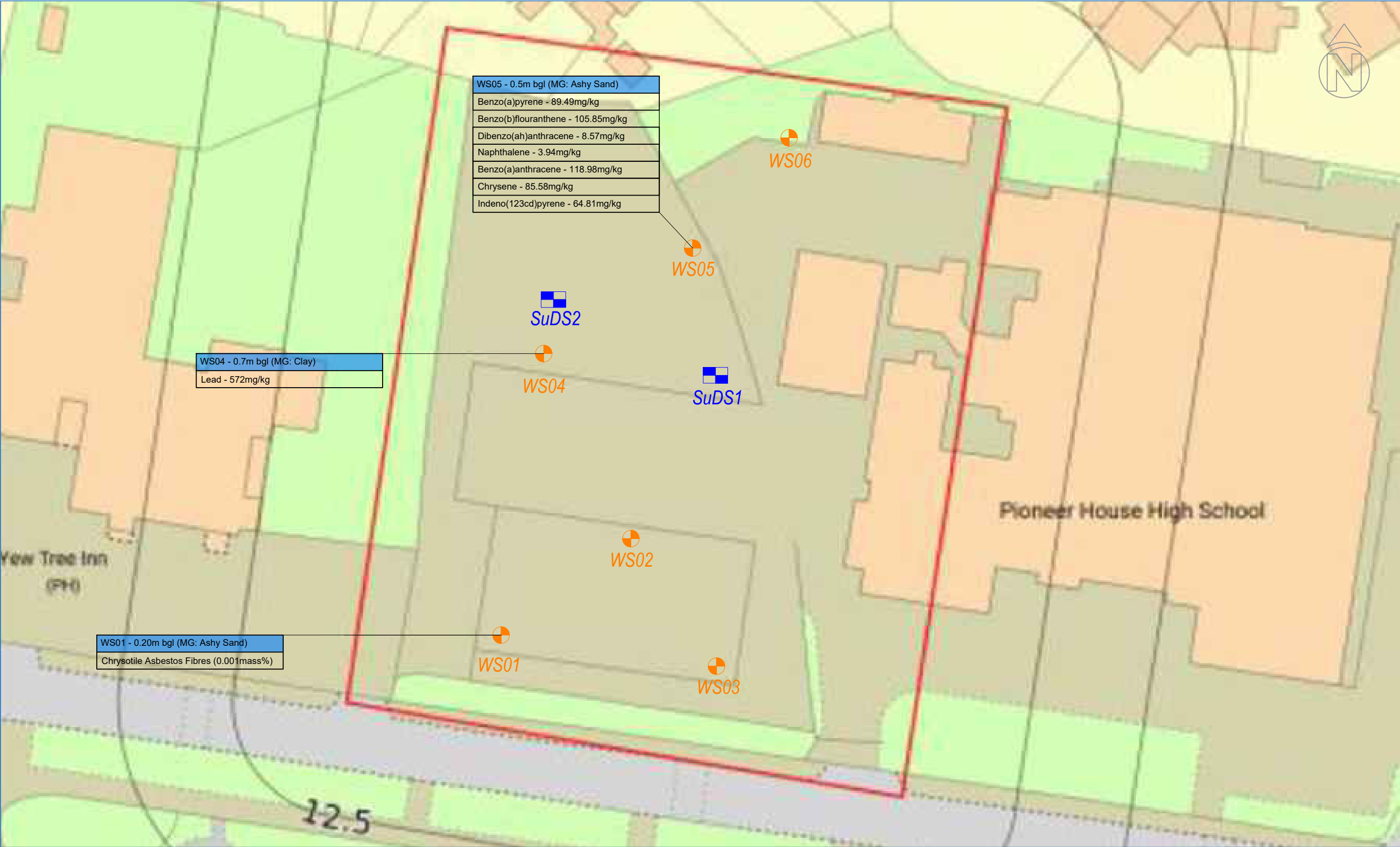
DATE	JUNE 2022
SCALE	NTS
PLAN NUMBER	GRO-22228-P01

Status	
	Preliminary
	Draft
●	Issued
	For Comment
	Approved





GROUNDTECH CONSULTING	CLIENT	AA PROJECTS	DATE	NOVEMBER 2022			Status		Notes APPROXIMATE POSITION OF WINDOWLESS SAMPLE BOREHOLE APPROXIMATE POSITION OF SOIL PERCOLATION TEST
	PROJECT TITLE	PIONEER HOUSE NEW-BUILD PROJECT	SCALE	NTS			Preliminary		
	PLAN TITLE	EXPLORATORY HOLE LOCATION PLAN	PLAN NUMBER	GRO-22228-P04			Draft		
							Issued		
							For Comment		
			Rev.	Details		Date	Approved		

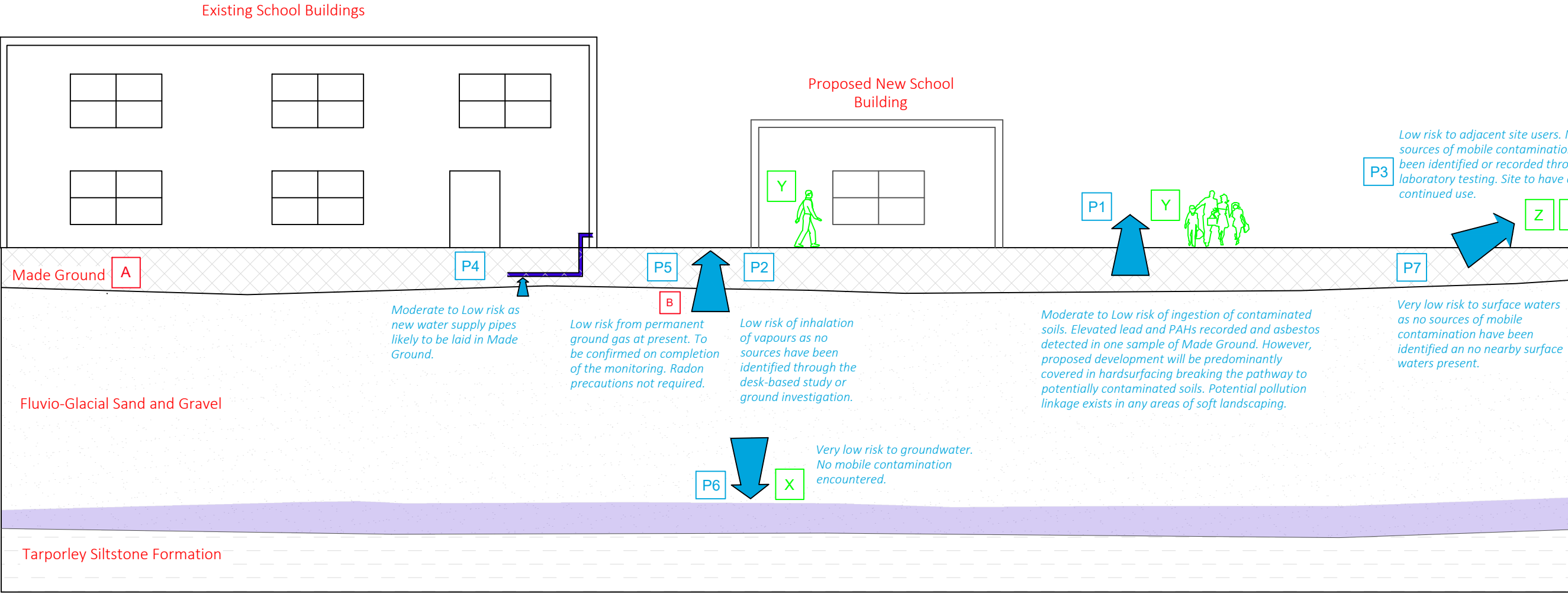


GROUNDTECH CONSULTING	CLIENT	DATE				Status	Notes APPROXIMATE POSITION OF WINDOWLESS SAMPLE BOREHOLE APPROXIMATE POSITION OF SOIL PERCOLATION TEST
	AA PROJECTS	NOVEMBER 2022				Preliminary	
	PROJECT TITLE	SCALE				Draft	
	PIONEER HOUSE NEW-BUILD PROJECT	NTS				Issued	
	PLAN TITLE	PLAN NUMBER				For Comment	
	CONTAMINATION PLAN	GRO-22228-P06	Rev.	Details	Date	Approved	

SOURCES
A. Contaminated soils / Made ground. B. Ground gas.

POLLUTION LINKAGES
P1. Ingestion of soil and dust. P2. Inhalation of vapour. P3. Inhalation of soil dust by adjacent site users. P4. Attacking of potable water supply pipe. P5. Migration and accumulation of ground gas in internal places. P6. Impaction of groundwater from soil contamination. P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS
W. Unnamed watercourse c.196m east. X. Groundwater within the Secondary A Aquifer. Y. Site end users. Z. Adjacent site users.



GROUNDTECH CONSULTING G	CLIENT	DATE				Status		Notes
	AA PROJECTS	NOVEMBER 2022				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	PIONEER HOUSE NEW-BUILD PROJECT	NTS				Issued	●	
	PLAN TITLE	PLAN NUMBER				For Comment		
	ILLUSTRATIVE REVISED CONCEPTUAL SITE MODEL	GRO-22228-P07	Rev.	Details	Date	Approved		





APPENDIX 2 - Site Photographs



Photograph 1 - Basketball court in the southern area of the site.



Photograph 2 - South east area of the site adjacent to the basketball court.



Photograph 3 – Vegetated southern boundary of the site.



Photograph 4 - South east boundary of the site.



Photograph 5 – SuDS1.



Photograph 6 – SuDS2.



APPENDIX 3 – Exploratory Hole Logs



GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: PIONEER HOUSE NEW-BUILD PROJECT

Project No.
GRO-22228

Co-ords: -

Hole Type
WS

Location: WYTHENSHAW

Level:

Scale
1:25

Client: AA PROJECTS

Dates: 08/10/2022 -

Logged By
LH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmac.	
		0.20	ES		0.35			MADE GROUND: Dark grey slightly gravelly slightly ashy sand. Gravel is angular to subangular fine to coarse of mixed lithologies including tarmac and concrete.	
		0.50	ES		0.80			MADE GROUND: Red brown sandy angular to subangular fine to coarse gravel of brick with low cobble content of brick.	
		1.00	D		1.00			Light brown slightly clayey slightly gravelly fine to medium SAND. Gravel is subangular to rounded fine to coarse of chert and quartzite. Rootlets present.	1
		1.20	ES	N=50 (5,6/50 for 235mm)	1.65			Becoming very dense and gravelly from 1.2m bgl.	2
								End of borehole at 1.65 m	3
									4
									5

Remarks

1. Hand dug inspection pit to 1.2m bgl. 2. No groundwater encountered. 3. Hole terminated due to SPT refusal. 4. Monitoring standpipe installed to 1.2m bgl (0.5m plain, 0.7m slotted).







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CONSULTING

Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: PIONEER HOUSE NEW-BUILD PROJECT

Project No.
GRO-22228

Co-ords: -

Hole Type
WS

Location: WYTHENSHAW

Level:

Scale
1:25

Client: AA PROJECTS

Dates: 08/10/2022 -

Logged By
LH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND: Tarmac.	
		0.20	ES		0.30			MADE GROUND: Dark grey slightly gravelly sand. Gravel is angular to subangular fine to coarse of mixed lithologies including tarmac and concrete.	
		0.50	ES					MADE GROUND: Red brown sandy angular to subangular fine to coarse gravel of brick with low cobble content of brick.	
		1.00	D		0.90			Light brown slightly clayey slightly gravelly fine to medium SAND. Gravel is subangular to rounded fine to coarse of chert and quartzite. Rootlets present.	1
		1.00	ES						
		1.20	D					Becoming very dense and gravelly from 1.2m bgl.	
		1.20		N=50 (4,6/50 for 235mm)	1.65			End of borehole at 1.65 m	2
									3
									4
									5

Remarks

1. Hand dug inspection pit to 1.2m bgl. 2. No groundwater encountered. 3. Hole terminated due to SPT refusal. 4. Monitoring standpipe installed to 1.2m bgl (0.5m plain, 0.7m slotted).





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Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: PIONEER HOUSE NEW-BUILD PROJECT

Project No.
GRO-22228

Co-ords: -

Hole Type
WS

Location: WYTHENSHAW

Level:

Scale
1:25

Client: AA PROJECTS

Dates: 08/10/2022 -

Logged By
LH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.25			MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	1
		0.50	ES				MADE GROUND: Black slightly gravelly ashy sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, sandstone, glass, clinker, coal and chert.		
		0.70	ES				MADE GROUND: Soft to firm brown slightly gravelly clay. Gravel is angular to subangular fine to medium of coal.		
		1.20	ES	N=0 (0,0/0,0,0,0)	1.20			Soft brown slightly gravelly CLAY. Gravel is angular to subangular fine to medium of coal.	2
		1.30							
		1.50	D		1.80			Medium dense light brown slightly clayey slightly gravelly fine to medium SAND. Gravel is angular to subrounded medium to coarse of chert and quartzite.	
		2.00		N=13 (2,3/3,3,3,4)					
		2.50	D					Stiff dark brown CLAY.	3
		3.00		N=48 (3,5/10,9,11,18)	3.00				
		3.00 - 3.45	D		3.45			End of borehole at 3.45 m	4
								5	

Remarks

1. Hand dug inspection pit to 1.2m bgl. 2. Groundwater encountered at 3.0m bgl. 3. Hole terminated due to collapse. 4. Monitoring standpipe installation to 3.0m bgl (1.0m plain, 2.0m slotted).





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Borehole Log

Borehole No.

WS05

Sheet 1 of 1

Project Name: PIONEER HOUSE NEW-BUILD
PROJECT

Project No.
GRO-22228

Co-ords: -

Hole Type
WS

Location: WYTHENSHAW

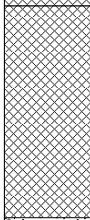
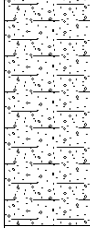
Level:

Scale
1:25

Client: AA PROJECTS

Dates: 08/10/2022 -

Logged By
LH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	N=50 (8,11/50 for 165mm)	0.20			MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	1
		0.50	ES					MADE GROUND: Black slightly gravelly ashy sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, sandstone, glass, clinker, coal and chert.	
		1.00 1.00 - 1.45 1.20	ES D		1.65			Very dense light brown slightly clayey slightly gravelly fine to medium SAND. Gravel is angular to subrounded medium to coarse of chert and quartzite.	
		End of borehole at 1.65 m							
									2
									3
									4
									5

Remarks

1. Hand dug inspection pit to 1.2m bgl. 2. No groundwater encountered. 3. Hole terminated due to SPT refusal. 4. Backfilled with arisings.





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Borehole Log

Borehole No.

WS06

Sheet 1 of 1

Project Name: PIONEER HOUSE NEW-BUILD PROJECT

Project No.
GRO-22228

Co-ords: -

Hole Type
WS

Location: WYTHENSHAW

Level:

Scale
1:25

Client: AA PROJECTS

Dates: 08/10/2022 -

Logged By
LH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.22			MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	
					0.60			MADE GROUND: Dark brown slightly gravelly sand. Gravel is angular to subrounded fine to coarse of mixed lithologies including brick, glass and quartzite.	
					0.70			MADE GROUND: Firm dark brown slightly gravelly sandy clay Gravel is angular to subrounded fine to coarse of mixed lithologies including brick and quartzite.	
								Very dense light brown slightly clayey fine to medium SAND.	
		1.20		N=50 (7,10/50 for 235mm)				Becoming slightly gravelly at 0.9m bgl.	1
					1.65			End of borehole at 1.65 m	2
									3
									4
									5

Remarks

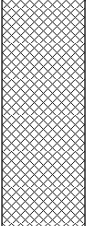
1. Hand dug inspection pit to 1.2m bgl. 2. No groundwater encountered. 3. Hole terminated due to SPT refusal. 4. Backfilled with arisings.



Trial Pit Log

Trialpit No
SuDS1
Sheet 1 of 1

Project Name:	PIONEER HOUSE NEW-BUILD PROJECT	Project No.	GRO-22228	Co-ords:	-	Level:		Date	08/10/2022
Location:	WYTHENSHAW			Dimensions (m):	2			Scale	1:25
Client:	AA PROJECTS			Depth	1.30	0.6		Logged	CJH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.20			MADE GROUND: Grass over dark brown slightly clayey gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	
	0.50	ES					MADE GROUND: Orange brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	
	1.20	D		1.00			Light grey very clayey gravelly fine to medium SAND. Gravel is angular to subrounded fine to medium of mixed lithologies including chert and quartzite.	1
				1.30			End of pit at 1.30 m	
								2
								3
								4
								5

Remarks: 1. Pit sides unstable. 2. No groundwater encountered. 3. Soil percolation test carried out at 1.3m bgl. 4. Backfilled with arisings.

Stability: Unstable



Trial Pit Log

Trialpit No
SuDS2
Sheet 1 of 1

Project Name:	PIONEER HOUSE NEW-BUILD PROJECT	Project No.	GRO-22228	Co-ords:	-	Level:		Date	08/10/2022
Location:	WYTHENSHAW			Dimensions (m):	2			Scale	1:25
Client:	AA PROJECTS			Depth	1.60			Logged	CJH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.25			MADE GROUND: Grass over dark brown slightly clayey gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	
	0.60	ES					MADE GROUND: Orange brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, glass and concrete.	1
	1.50	D		1.40			Light grey very clayey gravelly fine to medium SAND. Gravel is angular to subrounded fine to medium of mixed lithologies including chert and quartzite.	
				1.60			End of pit at 1.60 m	2
								3
								4
								5

Remarks: 1. Pit sides unstable. 2. No groundwater encountered. 3. Soil percolation test carried out at 1.3m bgl. 4. Backfilled with arisings.

Stability: Unstable



APPENDIX 4 – Geo-Environmental Testing Results

Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE



Attention : Luke Harrison
Date : 1st November, 2022
Your reference : GRO-22228
Our reference : Test Report 22/16564 Batch 1
Location : Pioneer House
Date samples received : 11th October, 2022
Status : Final Report
Issue : 1

Twenty four samples were received for analysis on 11th October, 2022 of which eight were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

Authorised By:



Liza Klebe

Project Co-ordinator

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-22228
Location: Pioneer House
Contact: Luke Harrison
EMT Job No: 22/16564

Report : Solid

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

EMT Sample No.	13-15	19-21	29-31	35-37	44-45	46	50-53	55-57			Please see attached notes for all abbreviations and acronyms		
Sample ID	WS01	WS01	WS03	WS03	WS04	WS04	WS05	WS06					
Depth	0.20	1.00	0.20	1.00	0.70	1.50	0.50	0.10					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	J T	T	V J T	V J T					
Sample Date	08/10/2022	08/10/2022	08/10/2022	08/10/2022	08/10/2022	08/10/2022	08/10/2022	08/10/2022					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022			LOD/LOR	Units	Method No.
Arsenic #	5.5	-	1.0	-	26.5	-	20.4	11.5			<0.5	mg/kg	TM30/PM15
Cadmium #	0.3	-	0.5	-	0.4	-	0.6	0.2			<0.1	mg/kg	TM30/PM15
Chromium #	15.9	-	16.9	-	29.7	-	38.8	38.6			<0.5	mg/kg	TM30/PM15
Copper #	14	-	12	-	60	-	88	29			<1	mg/kg	TM30/PM15
Lead #	151	-	15	-	572	-	229	79			<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1	-	0.4	-	0.2	0.2			<0.1	mg/kg	TM30/PM15
Nickel #	10.1	-	20.0	-	21.3	-	31.0	19.7			<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	<1	-	<1	-	<1	<1			<1	mg/kg	TM30/PM15
Zinc #	34	-	31	-	341	-	212	81			<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.20 _{AB}	-	<0.20 _{AB}	-	0.10	-	3.94 _{AB}	<0.08 _{AA}			<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.21 _{AB}	-	0.39 _{AB}	-	0.16	-	1.81 _{AB}	<0.06 _{AA}			<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.25 _{AB}	-	<0.25 _{AB}	-	0.10	-	14.20 _{AB}	<0.10 _{AA}			<0.05	mg/kg	TM4/PM8
Fluorene #	<0.20 _{AB}	-	<0.20 _{AB}	-	0.08	-	8.80 _{AB}	<0.08 _{AA}			<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.70 _{AB}	-	0.41 _{AB}	-	1.73	-	108.20 _{AB}	0.26 _{AA}			<0.03	mg/kg	TM4/PM8
Anthracene #	0.29 _{AB}	-	0.34 _{AB}	-	0.40	-	32.48 _{AB}	<0.08 _{AA}			<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.91 _{AB}	-	0.69 _{AB}	-	3.98	-	193.64 _{AB}	0.64 _{AA}			<0.03	mg/kg	TM4/PM8
Pyrene #	0.92 _{AB}	-	0.72 _{AB}	-	3.40	-	170.95 _{AB}	0.58 _{AA}			<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.61 _{AB}	-	0.71 _{AB}	-	1.81	-	118.98 _{AB}	0.45 _{AA}			<0.06	mg/kg	TM4/PM8
Chrysene #	0.62 _{AB}	-	0.77 _{AB}	-	1.99	-	85.58 _{AB}	0.41 _{AA}			<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	1.68 _{AB}	-	2.23 _{AB}	-	3.17	-	147.01 _{AB}	0.74 _{AA}			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.14 _{AB}	-	1.85 _{AB}	-	1.82	-	89.49 _{AB}	0.41 _{AA}			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	1.09 _{AB}	-	1.99 _{AB}	-	1.39	-	64.81 _{AB}	0.30 _{AA}			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.20 _{AB}	-	0.29 _{AB}	-	0.18	-	8.57 _{AB}	<0.08 _{AA}			<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.05 _{AB}	-	2.14 _{AB}	-	1.22	-	45.93 _{AB}	0.25 _{AA}			<0.04	mg/kg	TM4/PM8
PAH 16 Total	9.2 _{AB}	-	12.5 _{AB}	-	21.5	-	1094.4 _{AB}	4.0 _{AA}			<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.21 _{AB}	-	1.61 _{AB}	-	2.28	-	105.85 _{AB}	0.53 _{AA}			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.47 _{AB}	-	0.62 _{AB}	-	0.89	-	41.16 _{AB}	0.21 _{AA}			<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100 _{AB}	-	90 _{AB}	-	96	-	100 _{AB}	98 _{AA}			<0	%	TM4/PM8
Natural Moisture Content	7.3	-	4.8	-	25.4	-	19.9	19.2			<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) #	0.0096	0.0100	0.0063	0.0153	0.0860	0.0150	0.0516	0.0892			<0.0015	g/l	TM38/PM20
Organic Matter	13.5	-	4.2	-	9.4	-	14.4	2.5			<0.2	%	TM21/PM24
pH #	8.75	8.20	8.70	8.04	6.58	8.30	8.38	8.18			<0.01	pH units	TM73/PM11

Client Name: Groundtech Consulting Limited
Reference: GRO-22228
Location: Pioneer House
Contact: Luke Harrison

Note:

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

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

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/16564	1	WS01	0.20	15	Anthony Carman	19/10/2022	General Description (Bulk Analysis)	Debris
					Anthony Carman	19/10/2022	Asbestos Fibres	Fibre Bundles
					Anthony Carman	19/10/2022	Asbestos ACM	NAD
					Anthony Carman	19/10/2022	Asbestos Type	Chrysotile
					Matthew Turner	27/10/2022	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Matthew Turner	27/10/2022	Total Detailed Gravimetric Quantification (% Asb)	0.001 (mass %)
					Matthew Turner	27/10/2022	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.001 (mass %)
					Remigiusz Blichowski	01/11/2022	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					Remigiusz Blichowski	01/11/2022	Asbestos Gravimetric & PCOM Total	0.001 (mass %)
22/16564	1	WS03	0.20	31	Anthony Carman	19/10/2022	General Description (Bulk Analysis)	Debris
					Anthony Carman	19/10/2022	Asbestos Fibres	NAD
					Anthony Carman	19/10/2022	Asbestos ACM	NAD
					Anthony Carman	19/10/2022	Asbestos Type	NAD
22/16564	1	WS04	0.70	45	Anthony Carman	19/10/2022	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	19/10/2022	Asbestos Fibres	NAD
					Anthony Carman	19/10/2022	Asbestos ACM	NAD
					Anthony Carman	19/10/2022	Asbestos Type	NAD
22/16564	1	WS05	0.50	52	Anthony Carman	19/10/2022	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	19/10/2022	Asbestos Fibres	NAD
					Anthony Carman	19/10/2022	Asbestos ACM	NAD
					Anthony Carman	19/10/2022	Asbestos Type	NAD
22/16564	1	WS06	0.10	57	Anthony Carman	19/10/2022	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	19/10/2022	Asbestos Fibres	NAD
					Anthony Carman	19/10/2022	Asbestos ACM	NAD
					Anthony Carman	19/10/2022	Asbestos Type	NAD

Client Name: Groundtech Consulting Limited

Reference: GRO-22228

Location: Pioneer House

Contact: Luke Harrison

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/16564

SOILS and ASH

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

STACK EMISSIONS

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution
AB	x5 Dilution

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 22/16564

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ + 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ + 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	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
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM based on HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes



APPENDIX 5 – Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL22/6671

Report Date: 03 November 2022

Client's Reference: GRO-22118

Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Luke Harrison

Contract Title: Pioneer House

Date Received: 17/10/2022

Date Commenced: 17/10/2022

Date Completed: 3/11/2022

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:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Pioneer House

Contract No:

PSL22/6671

Client Ref:

GRO-22118

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

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



4043

PSL

Professional Soils Laboratory

Pioneer House

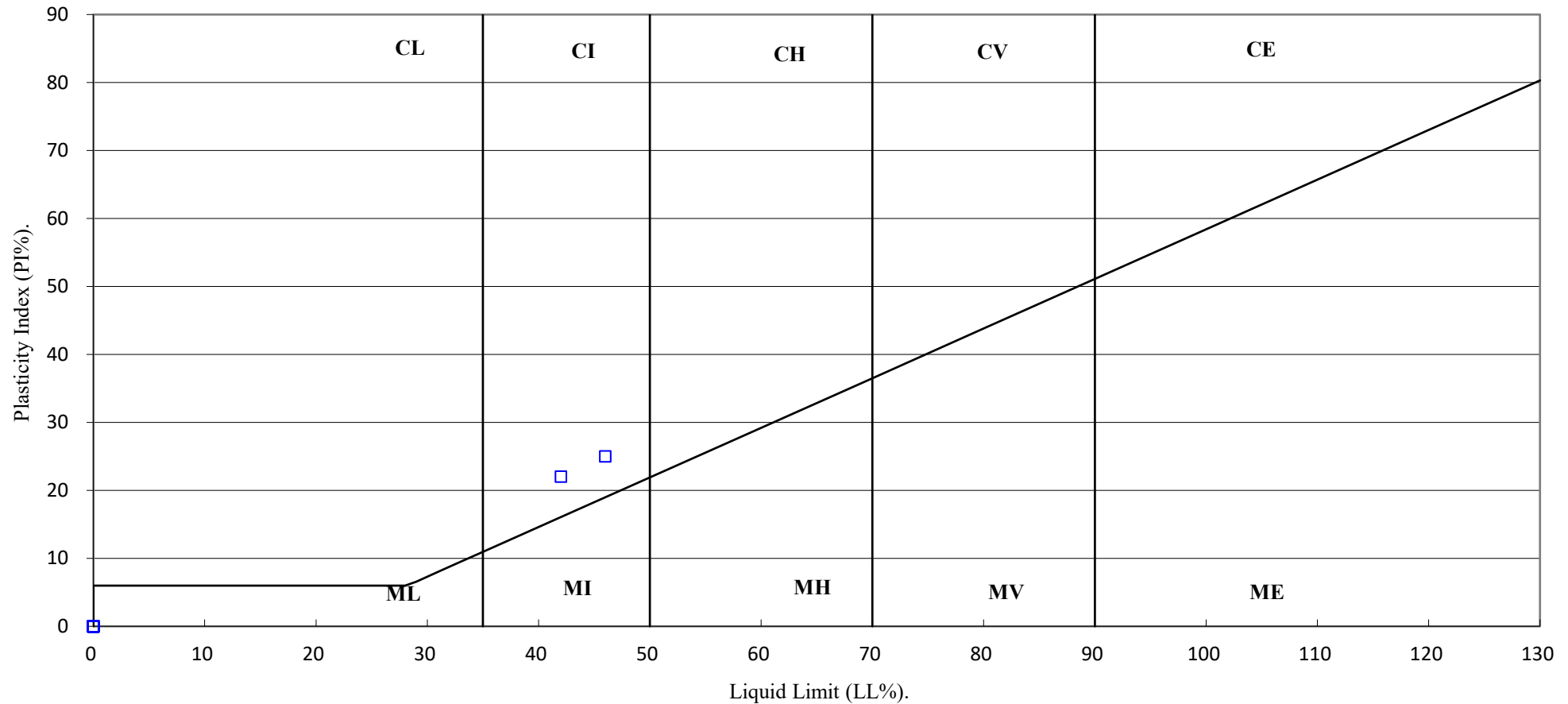
Contract No:

PSL22/6671

Client Ref:

GRO-22118

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Pioneer House

Contract No:

PSL22/6671

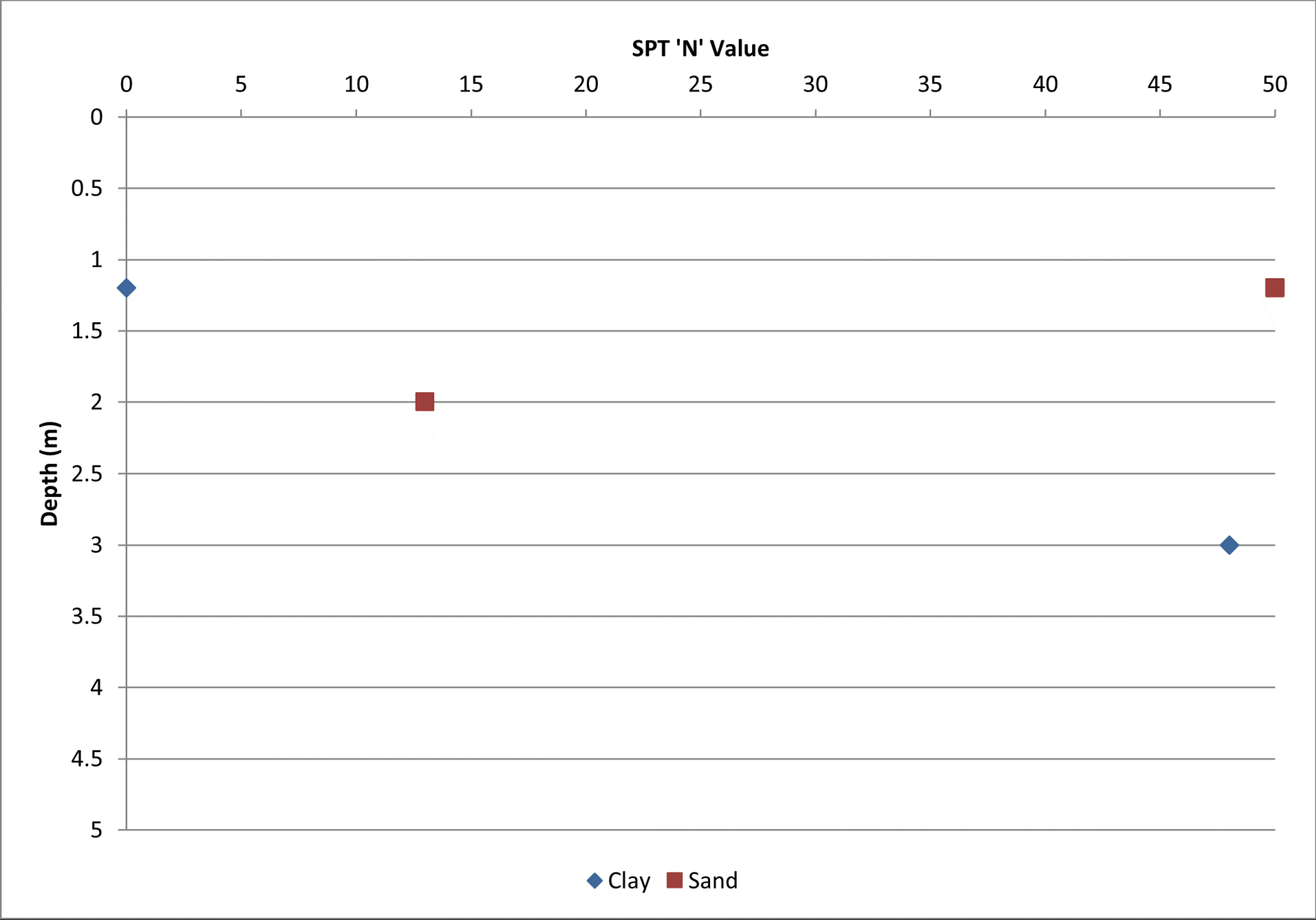
Client Ref:

GRO-22118



APPENDIX 6 – Permanent Ground Gas Monitoring Results

APPENDIX 7 – Generalised Ground Model



CLIENT
AA PROJECTS
PROJECT TITLE
PIONEER HOUSE NEW-BUILD PROJECT
PLAN TITLE
GENERALISED GROUND MODEL

DATE
NOVEMBER 2022
SCALE
NTS
PLAN NUMBER
GRO-22228-P05

Rev.	Details	Date

Status
Preliminary
Draft
Issued
For Comment
Approved

Notes





APPENDIX 8 – Generic Screening Values (Commercial)

Generic Assessment Criteria (GAC)									
Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source	
SOM	%	1	2.5	6	1	2.5	6		
Arsenic	mg/kg	32	32	32	640	640	640	SGVs	
Beryllium	mg/kg	1.7	1.7	1.7	12	12	12	LQM S4ULs	
Boron (water soluble)	mg/kg	290	290	290	240000	240000	240000	LQM S4ULs	
Cadmium	mg/kg	10	10	10	230	230	230	SGVs	
Chromium (Total)	mg/kg	910	910	910	8600	8600	8600	LQM S4ULs	
Chromium (VI)	mg/kg	21	21	21	49	49	49	DEFRA C4SLs	
Copper	mg/kg	2400	2400	2400	68000	68000	68000	LQM S4ULs	
Lead	mg/kg	200	200	200	2300	2300	2300	DEFRA C4SLs	
Organic Mercury	mg/kg	1.2	1.2	1.2	26	26	26	LQM S4ULs	
Nickel	mg/kg	130	130	130	980	980	980	LQM S4ULs	
Selenium	mg/kg	350	350	350	13000	13000	13000	SGVs	
Vanadium	mg/kg	410	410	410	9000	9000	9000	LQM S4ULs	
Zinc	mg/kg	3700	3700	3700	730000	730000	730000	LQM S4ULs	
Aliphatic EC 5 - 6	mg/kg	42	78	160	3200 (304) ^{sol}	5900 (558) ^{sol}	12000 (1150) ^{sol}	LQM S4ULs	
Aliphatic EC 6 - 8	mg/kg	100	230	530	7800 (144) ^{sol}	17000 (322) ^{sol}	40000 (736) ^{sol}	LQM S4ULs	
Aliphatic EC 8 - 10	mg/kg	27	65	150	2000 (78) ^{sol}	4800 (190) ^{sol}	11000 (451) ^{sol}	LQM S4ULs	
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vap}	330 (118) ^{vap}	760 (283) ^{vap}	9700 (48) ^{sol}	23000 (118) ^{vap}	47000 (283) ^{vap}	LQM S4ULs	
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	59000 (24) ^{sol}	82000 (59) ^{sol}	90000 (142) ^{sol}	LQM S4ULs	
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) ^{sol}	92000 (21) ^{sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs	
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) ^{sol}	92000 (21) ^{sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs	
Aromatic EC 5 - 7	mg/kg	70	140	300	26000 (1220) ^{sol}	46000 (2260) ^{sol}	86000 (4710) ^{sol}	LQM S4ULs	
Aromatic EC 7 - 8	mg/kg	130	290	660	56000 (869) ^{vap}	110000 (1920) ^{vap}	180000 (4360) ^{vap}	LQM S4ULs	
Aromatic EC 8 - 10	mg/kg	34	83	190	3500 (613) ^{vap}	8100 (1500) ^{vap}	17000 (3580) ^{vap}	LQM S4ULs	
Aromatic EC 10 - 12	mg/kg	74	180	380	16000 (364) ^{sol}	28000 (899) ^{sol}	34000 (2150) ^{sol}	LQM S4ULs	
Aromatic EC 12 - 16	mg/kg	140	330	660	36000 (169) ^{sol}	37000	38000	LQM S4ULs	
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs	
Benzene	mg/kg	0.33	0.33	0.33	95	95	95	SGVs	
Toluene	mg/kg	610	610	610	4400	4400	4400	SGVs	
Ethyl Benzene	mg/kg	350	350	350	2800	2800	2800	SGVs	
Xylene - o	mg/kg	250	250	250	2600	2600	2600	SGVs	
Xylene - m	mg/kg	240	240	240	3500	3500	3500	SGVs	
Xylene - p	mg/kg	230	230	230	3200	3200	3200	SGVs	
MTBE (methyl tert-butyl ether)	mg/kg	49	84	160	7900	13000	24000	CL:AIRE 2010	
Acenaphthene	mg/kg	210	510	1100	84000 (57) ^{sol}	97000 (141) ^{sol}	100000	LQM SAULs	
Acenaphthylene	mg/kg	170	420	920	83000 (86.1) ^{sol}	97000 (212) ^{sol}	100000	LQM S4ULs	
Anthracene	mg/kg	2400	5400	11000	520000	540000	540000	LQM S4ULs	
Benz(a)anthracene	mg/kg	7.2	11	13	170	170	180	LQM S4ULs	
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	35	35	77*	DEFRA C4SL*/LQM	
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	44	44	45	LQM S4ULs	
Benzo(ghi)perylene	mg/kg	320	340	350	3900	4000	4000	LQM S4ULs	
Benzo(k)fluoranthene	mg/kg	77	93	100	1200	1200	1200	LQM S4ULs	
Chrysene	mg/kg	15	22	27	350	350	350	LQM S4ULs	
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	3.5	3.6	3.6	LQM S4ULs	
Fluoranthene	mg/kg	280	560	890	23000	23000	23000	LQM S4ULs	
Fluorene	mg/kg	170	400	860	63000 (30.9) ^{sol}	68000	71000	LQM S4ULs	
Indeno(123-cd)pyrene	mg/kg	27	36	41	500	510	510	LQM S4ULs	
Naphthalene	mg/kg	2.3 ^f	5.6 ^f	13 ^f	190 ^f (76.4) ^{sol}	460 ^f (183) ^{sol}	1100 ^f (432) ^{sol}	LQM S4ULs	
Phenanthrene	mg/kg	95	220	440	22000	22000	23000	LQM S4ULs	
Pyrene	mg/kg	620	1200	2000	54000	54000	54000	LQM S4ULs	

Generic Assessment Criteria (GAC)								GRUNDTech CONSULTING
Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Phenol	mg/kg	420	420	420	3200	3200	3200	SGVs
Chlorophenols	mg/kg	0.87 ^g	2	4.5	3500	4000	4300	LQM S4ULs
Pentachlorophenol	mg/kg	0.22	0.52	1.2	400	400	400	LQM S4ULs
Carbon disulphide	mg/kg	0.14	0.29	0.62	11	22	47	LQM S4ULs
Hexachlorobutadiene	mg/kg	0.29	0.7	1.6	31	66	120	LQM S4ULs
1,1,1,2 Tetrachloroethane	mg/kg	1.6	3.4	7.5	270	550	1100	LQM S4ULs
1,1,1 Trichloroethane	mg/kg	8.8	18	39	660	1300	3000	LQM S4ULs
Trichloroethene	mg/kg	0.016	0.034	0.075	1.2	2.6	5.7	LQM S4ULs
Tetrachloromethane (Carbon Tetrachloride)	mg/kg	0.026	0.056	0.13	2.9	6.3	14	LQM S4ULs
1,2-Dichloroethane	mg/kg	0.0071	0.011	0.019	0.67	0.97	1.7	LQM S4ULs
Chloroethene (Vinyl chloride)	mg/kg	0.00064	0.00087	0.0014	0.059	0.077	0.12	LQM S4ULs
Trichloromethane (Chloroform)	mg/kg	0.91	1.7	3.4	99	170	350	LQM S4ULs
Tetrachloroethene	mg/kg	0.18	0.39	0.9	19	42	95	LQM S4ULs
Hexachlorobenzene	mg/kg	1.8 (0.2) ^{vop}	3.3 (0.5) ^{vop}	4.9	110 (0.2) ^{vop}	120	120	LQM S4ULs
Pentachlorobenzene	mg/kg	5.8	12	22	640 (43) ^{sol}	770 (107) ^{sol}	830	LQM S4ULs
1,2,4,5-Tetrachlorobenzene	mg/kg	0.33	0.77	1.6	42 (19.7) ^{sol}	72 (49.1) ^{sol}	96	LQM S4ULs
1,2,3,5-Tetrachlorobenzene	mg/kg	0.66	1.69	3.7	49 (39.4) ^{vop}	120 (98.1) ^{vop}	240 (235) ^{vop}	LQM S4ULs
1,2,3,4-Tetrachlorobenzene	mg/kg	15	36	78	1700 (122) ^{vop}	3080 (304) ^{vop}	4400 (728) ^{vop}	LQM S4ULs
1,3,5-Trichlorobenzene	mg/kg	0.33	0.81	1.9	23	55	130	LQM S4ULs
1,2,4-Trichlorobenzene	mg/kg	2.6	6.4	15	220	530	1300	LQM S4ULs
1,2,3-Trichlorobenzene	mg/kg	1.5	3.6	8.6	102	250	590	LQM S4ULs
1,4-dichlorobenzene	mg/kg	61 ^f	150 ^f	350 ^f	4400 ^f (224) ^{vop}	10000 ^f (540)	25000 ^f (1280)	LQM S4ULs
1,3-dichlorobenzene	mg/kg	0.4	1	2.3	30	73	170	LQM S4ULs
1,2-Dichlorobenzene	mg/kg	23	55	130	2000 (571) ^{sol}	4800 (1370) ^{sol}	11000 (3240) ^{sol}	LQM S4ULs
Chlorobenzene	mg/kg	0.46	1	2.4	56	130	290	LQM S4ULs
Gamma-Hexachlorocyclohexane	mg/kg	0.06	0.14	0.33	67	69	70	LQM S4ULs
Beta-Hexachlorocyclohexane	mg/kg	0.085	0.2	0.46	65	65	65	LQM S4ULs
Alpha -Hexachlorocyclohexane	mg/kg	0.23	0.55	1.2	170	180	180	LQM S4ULs
Beta -Endosulfan	mg/kg	7	17	39	6300 (0.00007)	7800 (0.0002)	8700	LQM S4ULs
Alpha-Endosulfan	mg/kg	7.4	18	41	5600 (0.003) ^{vop}	7400 (0.007) ^{vop}	8400 (0.016) ^{vop}	LQM S4ULs
Dichlorvos	mg/kg	0.032	0.066	0.14	140	140	140	LQM S4ULs
Atrazine	mg/kg	3.3	7.6	17.4	9300	9400	9400	LQM S4ULs
Dieldrin	mg/kg	0.97	2	3.5	170	170	170	LQM S4ULs
Aldrin	mg/kg	5.7	6.6	7.1	170	170	170	LQM S4ULs
HMX	mg/kg	5.7	13	26	110000	110000	110000	LQM S4ULs
2,4,6-Trinitrotoulene	mg/kg	1.6	3.7	8.1	1000	1000	1000	LQM S4ULs
RDX	mg/kg	120	250	540	210000	210000	210000	LQM S4ULs

^{sol} S4UL exceeds the solubility saturation limit (which is presented in brackets)

^{vop} S4ULs presented exceeds the vapour saturation limit, which is presented in brackets

^f For naphthalene, the S4UL is based on a comparison



APPENDIX 9 – CIRIA Risk Assessment Methodology

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

LCRM 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.

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 10 – JIWG Decision Receptor Tool

Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Chrysotile alone	0
Sub-total		10
Hazard ranking		Low

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.



Stage 2		Score
Emission Factors		
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Very Low quantities - 0.001 to 0.01 %wt/wt	1
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Low	2
Activity type and effect on deterioration of ACMs	Minimal disturbance, no deterioration expected	1
Best description of primary host material matrix	Coarse to Fine Sand	2
Sub-total		6
Exposure ranking		Low

Stage 3			
Pathway and Receptor Sensitivity		Score	
Receptor category	Commercial/industrial	No score required	
Age of Receptor	Young adult (>16 and <24)	2	
Duration of exposure/site occupancy	> 1hr <10 hr daily exposure (e.g. part-time to full time occupational exposure or extended daily recreational exposure)	3	
Receptor ranking		5	Medium
Combined hazard, exposure and receptor ranking			Low
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	Material buried at shallow depth, potential to be disturbed by excavation	C	
Pathway ranking		4C	Low
Overall ranking			Very Low



Joint Industry Working Group
Asbestos in Soil and Construction & Demolition Materials

Project Reference	GRO-22228
Site Name	Pioneer House
Client	AA Projects
Run by	LH
Date	22-Nov-22
Reviewed by	LH
Characterisation of scenario being evaluated	
Interpretation of scenario ranking by DST	

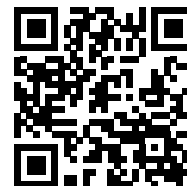


APPENDIX 11 – Waste Classification Report

Waste Classification Report

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

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



6ZMXM-8121Y-W2GSM

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

Job name

EMT-22-16564-Batch-1-202211011554

Description/Comments

Project

GRO-22228

Site

Pioneer House

Classified by

Name:

Richard Wyatt

Date:

22 Nov 2022 15:01 GMT

Telephone:

07742660133

Company:

Groundtech Consulting Limited

First Floor, Lloyd House

Orford Court, Greenfold Way

Leigh

WN7 3XJ

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

HazWasteOnline™ Certification:

-

Course

Hazardous Waste Classification

Date

50% complete

Purpose of classification

1 - Back Office

Address of the waste

Post Code

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

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

Description of the waste

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01-08/10/2022-0.20m		Non Hazardous		3
2	WS01-08/10/2022-1.00m		Non Hazardous		5
3	WS03-08/10/2022-0.20m		Non Hazardous		6
4	WS03-08/10/2022-1.00m		Non Hazardous		8
5	WS04-08/10/2022-0.70m		Non Hazardous		9
6	WS04-08/10/2022-1.50m		Non Hazardous		11
7	WS05-08/10/2022-0.50m		Non Hazardous		12
8	WS06-08/10/2022-0.10m		Non Hazardous		14

Related documents

#	Name	Description
1	EMT-22-16564-Batch-1-202211011554.HWOL	Element .hwol file used to populate the Job

Report

Created by: Richard Wyatt

Created date: 22 Nov 2022 15:01 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	16
Appendix B: Rationale for selection of metal species	17
Appendix C: Version	17

Classification of sample: WS01-08/10/2022-0.20m

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

Sample details

Sample name:	LoW Code:	
WS01-08/10/2022-0.20m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7.3% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 7.3% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				5.5	mg/kg	1.895	9.711	mg/kg	0.000971 %	✓	
	033-005-00-1											
2	cadmium { cadmium sulfate }				0.3	mg/kg	1.855	0.519	mg/kg	0.0000519 %	✓	
	048-009-00-9	233-331-6	10124-36-4									
3	copper { copper sulphate pentahydrate }				14	mg/kg	3.929	51.264	mg/kg	0.00513 %	✓	
	029-023-00-4	231-847-6	7758-99-8									
4	lead { lead chromate }			1	151	mg/kg	1.56	219.508	mg/kg	0.0141 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
5	mercury { mercury difulminate }				<0.1	mg/kg	1.419	<0.142	mg/kg	<0.0000142 %		<LOD
	080-005-00-2	211-057-8	628-86-4									
6	nickel { nickel diiodide }				10.1	mg/kg	5.324	50.117	mg/kg	0.00501 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
8	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				34	mg/kg	4.398	139.356	mg/kg	0.0139 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
9	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
10	naphthalene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.21	mg/kg		0.196	mg/kg	0.0000196 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				<0.25	mg/kg		<0.25	mg/kg	<0.000025 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.7	mg/kg		0.652	mg/kg	0.0000652 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.29	mg/kg		0.27	mg/kg	0.000027 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				0.91	mg/kg		0.848	mg/kg	0.0000848 %	✓	
		205-912-4	206-44-0									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	pyrene	204-927-3	129-00-0		0.92 mg/kg		0.857 mg/kg	0.0000857 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.61 mg/kg		0.568 mg/kg	0.0000568 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.62 mg/kg		0.578 mg/kg	0.0000578 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.14 mg/kg		1.062 mg/kg	0.000106 %	✓	
21	indeno[123-cd]pyrene				1.09 mg/kg		1.016 mg/kg	0.000102 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
23	benzo[ghi]perylene				1.05 mg/kg		0.979 mg/kg	0.0000979 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.21 mg/kg		1.128 mg/kg	0.000113 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.47 mg/kg		0.438 mg/kg	0.0000438 %	✓	
26	pH		PH		8.75 pH		8.75 pH	8.75 pH		
27	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 %		0.0009 %	0.000932 %	✓	
28	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		15.9 mg/kg	1.462	21.658 mg/kg	0.00217 %	✓	
Total:								0.0435 %		

Key

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

Classification of sample: WS01-08/10/2022-1.00m

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

Sample details

Sample name: **WS01-08/10/2022-1.00m** LoW Code: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Chapter: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Entry:

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH		PH		8.2 pH		8.2 pH	8.2 pH		
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS03-08/10/2022-0.20m

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

Sample details

Sample name:	LoW Code:
WS03-08/10/2022-0.20m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
4.8% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 4.8% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				1	mg/kg	1.895	1.808	mg/kg	0.000181 %	✓	
	033-005-00-1											
2	cadmium { cadmium sulfate }				0.5	mg/kg	1.855	0.885	mg/kg	0.0000885 %	✓	
	048-009-00-9	233-331-6	10124-36-4									
3	copper { copper sulphate pentahydrate }				12	mg/kg	3.929	44.989	mg/kg	0.0045 %	✓	
	029-023-00-4	231-847-6	7758-99-8									
4	lead { lead chromate }			1	15	mg/kg	1.56	22.326	mg/kg	0.00143 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
5	mercury { mercury difulminate }				<0.1	mg/kg	1.419	<0.142	mg/kg	<0.0000142 %		<LOD
	080-005-00-2	211-057-8	628-86-4									
6	nickel { nickel diiodide }				20	mg/kg	5.324	101.609	mg/kg	0.0102 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
8	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				31	mg/kg	4.398	130.091	mg/kg	0.013 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
9	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
10	naphthalene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.39	mg/kg		0.372	mg/kg	0.0000372 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				<0.25	mg/kg		<0.25	mg/kg	<0.000025 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.41	mg/kg		0.391	mg/kg	0.0000391 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.34	mg/kg		0.324	mg/kg	0.0000324 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				0.69	mg/kg		0.658	mg/kg	0.0000658 %	✓	
		205-912-4	206-44-0									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	pyrene	204-927-3	129-00-0		0.72 mg/kg		0.687 mg/kg	0.0000687 %	✓	
18	benzo[a]anthracene	200-280-6	56-55-3		0.71 mg/kg		0.677 mg/kg	0.0000677 %	✓	
19	chrysene	205-923-4	218-01-9		0.77 mg/kg		0.735 mg/kg	0.0000735 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		1.85 mg/kg		1.765 mg/kg	0.000177 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		1.99 mg/kg		1.899 mg/kg	0.00019 %	✓	
22	dibenz[a,h]anthracene	200-181-8	53-70-3		0.29 mg/kg		0.277 mg/kg	0.0000277 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		2.14 mg/kg		2.042 mg/kg	0.000204 %	✓	
24	benzo[b]fluoranthene	205-911-9	205-99-2		1.61 mg/kg		1.536 mg/kg	0.000154 %	✓	
25	benzo[k]fluoranthene	205-916-6	207-08-9		0.62 mg/kg		0.592 mg/kg	0.0000592 %	✓	
26	pH		PH		8.7 pH		8.7 pH	8.7 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16.9 mg/kg	1.462	23.569 mg/kg	0.00236 %	✓	
Total:								0.0333 %		

Key

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

EVALUATION VERSION

Classification of sample: WS03-08/10/2022-1.00m



Non Hazardous Waste

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

Sample details

Sample name:	LoW Code:	
WS03-08/10/2022-1.00m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH		PH		8.04 pH		8.04	pH	8.04 pH		
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS04-08/10/2022-0.70m

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

Sample details

Sample name:	LoW Code:
WS04-08/10/2022-0.70m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
25.4%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 25.4% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				26.5	mg/kg	1.895	40.036	mg/kg	0.004 %	✓	
	033-005-00-1											
2	cadmium { cadmium sulfate }				0.4	mg/kg	1.855	0.592	mg/kg	0.0000592 %	✓	
	048-009-00-9	233-331-6	10124-36-4									
3	copper { copper sulphate pentahydrate }				60	mg/kg	3.929	187.993	mg/kg	0.0188 %	✓	
	029-023-00-4	231-847-6	7758-99-8									
4	lead { lead chromate }			1	572	mg/kg	1.56	711.495	mg/kg	0.0456 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
5	mercury { mercury difulminate }				0.4	mg/kg	1.419	0.453	mg/kg	0.0000453 %	✓	
	080-005-00-2	211-057-8	628-86-4									
6	nickel { nickel diiodide }				21.3	mg/kg	5.324	90.437	mg/kg	0.00904 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
8	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				341	mg/kg	4.398	1195.927	mg/kg	0.12 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
9	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
10	naphthalene				0.1	mg/kg		0.0797	mg/kg	0.00000797 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.16	mg/kg		0.128	mg/kg	0.0000128 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				0.1	mg/kg		0.0797	mg/kg	0.00000797 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.08	mg/kg		0.0638	mg/kg	0.00000638 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				1.73	mg/kg		1.38	mg/kg	0.000138 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.4	mg/kg		0.319	mg/kg	0.0000319 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				3.98	mg/kg		3.174	mg/kg	0.000317 %	✓	
		205-912-4	206-44-0									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	pyrene	204-927-3	129-00-0		3.4 mg/kg		2.711 mg/kg	0.000271 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.81 mg/kg		1.443 mg/kg	0.000144 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	1.99 mg/kg		1.587 mg/kg	0.000159 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.82 mg/kg		1.451 mg/kg	0.000145 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		1.39 mg/kg		1.108 mg/kg	0.000111 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.18 mg/kg		0.144 mg/kg	0.0000144 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		1.22 mg/kg		0.973 mg/kg	0.0000973 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	2.28 mg/kg		1.818 mg/kg	0.000182 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.89 mg/kg		0.71 mg/kg	0.000071 %	✓	
26	pH		PH		6.58 pH		6.58 pH	6.58 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		29.7 mg/kg	1.462	34.616 mg/kg	0.00346 %	✓	
Total:								0.203 %		

Key

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

Supplementary Hazardous Property Information

HP 1: Explosive "waste which is capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic waste, explosive organic peroxide waste and explosive self-reactive waste is included"

Force this Hazardous property to non hazardous because No explosive at this concentration.

Hazard Statements hit:

Unst. Expl.; H200 "Unstable explosives"

Because of determinand:

mercury difulminate: (compound conc.: 0.00004%)

Classification of sample: WS04-08/10/2022-1.50m

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

Sample details

Sample name: **WS04-08/10/2022-1.50m** LoW Code: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Chapter: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Entry:

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH		PH		8.3 pH		8.3 pH	8.3 pH		
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS05-08/10/2022-0.50m

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

Sample details

Sample name:	LoW Code:
WS05-08/10/2022-0.50m	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.9% (dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19.9% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				20.4	mg/kg	1.895	32.234	mg/kg	0.00322 %	✓	
	033-005-00-1											
2	cadmium { cadmium sulfate }				0.6	mg/kg	1.855	0.928	mg/kg	0.0000928 %	✓	
	048-009-00-9	233-331-6	10124-36-4									
3	copper { copper sulphate pentahydrate }				88	mg/kg	3.929	288.371	mg/kg	0.0288 %	✓	
	029-023-00-4	231-847-6	7758-99-8									
4	lead { lead chromate }			1	229	mg/kg	1.56	297.913	mg/kg	0.0191 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
5	mercury { mercury difulminate }				0.2	mg/kg	1.419	0.237	mg/kg	0.0000237 %	✓	
	080-005-00-2	211-057-8	628-86-4									
6	nickel { nickel diiodide }				31	mg/kg	5.324	137.659	mg/kg	0.0138 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
8	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				212	mg/kg	4.398	777.615	mg/kg	0.0778 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
9	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
10	naphthalene				3.94	mg/kg		3.286	mg/kg	0.000329 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				1.81	mg/kg		1.51	mg/kg	0.000151 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				14.2	mg/kg		11.843	mg/kg	0.00118 %	✓	
		201-469-6	83-32-9									
13	fluorene				8.8	mg/kg		7.339	mg/kg	0.000734 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				108.2	mg/kg		90.242	mg/kg	0.00902 %	✓	
		201-581-5	85-01-8									
15	anthracene				32.48	mg/kg		27.089	mg/kg	0.00271 %	✓	
		204-371-1	120-12-7									
16	fluoranthene				193.64	mg/kg		161.501	mg/kg	0.0162 %	✓	
		205-912-4	206-44-0									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	pyrene	204-927-3	129-00-0		170.95 mg/kg		142.577 mg/kg	0.0143 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	118.98 mg/kg		99.233 mg/kg	0.00992 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	85.58 mg/kg		71.376 mg/kg	0.00714 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	89.49 mg/kg		74.637 mg/kg	0.00746 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		64.81 mg/kg		54.053 mg/kg	0.00541 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	8.57 mg/kg		7.148 mg/kg	0.000715 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		45.93 mg/kg		38.307 mg/kg	0.00383 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	105.85 mg/kg		88.282 mg/kg	0.00883 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	41.16 mg/kg		34.329 mg/kg	0.00343 %	✓	
26	pH		PH		8.38 pH		8.38 pH	8.38 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		38.8 mg/kg	1.462	47.296 mg/kg	0.00473 %	✓	
Total:								0.239 %		

Key

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

Supplementary Hazardous Property Information

HP 1: Explosive "waste which is capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic waste, explosive organic peroxide waste and explosive self-reactive waste is included"

Force this Hazardous property to non hazardous because No explosive at this concentration.

Hazard Statements hit:

Unst. Expl.; H200 "Unstable explosives"

Because of determinand:

mercury difulminate: (compound conc.: 0.00002%)

Classification of sample: WS06-08/10/2022-0.10m

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

Sample details

Sample name:	LoW Code:
WS06-08/10/2022-0.10m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
19.2%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.2% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				11.5	mg/kg	1.895	18.278	mg/kg	0.00183 %	✓	
	033-005-00-1											
2	cadmium { cadmium sulfate }				0.2	mg/kg	1.855	0.311	mg/kg	0.0000311 %	✓	
	048-009-00-9	233-331-6	10124-36-4									
3	copper { copper sulphate pentahydrate }				29	mg/kg	3.929	95.589	mg/kg	0.00956 %	✓	
	029-023-00-4	231-847-6	7758-99-8									
4	lead { lead chromate }			1	79	mg/kg	1.56	103.377	mg/kg	0.00663 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
5	mercury { mercury difulminate }				0.2	mg/kg	1.419	0.238	mg/kg	0.0000238 %	✓	
	080-005-00-2	211-057-8	628-86-4									
6	nickel { nickel diiodide }				19.7	mg/kg	5.324	87.994	mg/kg	0.0088 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
8	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				81	mg/kg	4.398	298.852	mg/kg	0.0299 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
9	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
	024-017-00-8											
10	naphthalene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.26	mg/kg		0.218	mg/kg	0.0000218 %	✓	
		201-581-5	85-01-8									
15	anthracene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<LOD
		204-371-1	120-12-7									
16	fluoranthene				0.64	mg/kg		0.537	mg/kg	0.0000537 %	✓	
		205-912-4	206-44-0									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	pyrene	204-927-3	129-00-0		0.58 mg/kg		0.487 mg/kg	0.0000487 %	✓	
18	benzo[a]anthracene	200-280-6	56-55-3		0.45 mg/kg		0.378 mg/kg	0.0000378 %	✓	
19	chrysene	205-923-4	218-01-9		0.41 mg/kg		0.344 mg/kg	0.0000344 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.41 mg/kg		0.344 mg/kg	0.0000344 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.3 mg/kg		0.252 mg/kg	0.0000252 %	✓	
22	dibenz[a,h]anthracene	200-181-8	53-70-3		<0.08 mg/kg		<0.08 mg/kg	<0.000008 %		<LOD
23	benzo[ghi]perylene	205-883-8	191-24-2		0.25 mg/kg		0.21 mg/kg	0.000021 %	✓	
24	benzo[b]fluoranthene	205-911-9	205-99-2		0.53 mg/kg		0.445 mg/kg	0.0000445 %	✓	
25	benzo[k]fluoranthene	205-916-6	207-08-9		0.21 mg/kg		0.176 mg/kg	0.0000176 %	✓	
26	pH		PH		8.18 pH		8.18 pH	8.18 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		38.6 mg/kg	1.462	47.329 mg/kg	0.00473 %	✓	
Total:								0.0622 %		

Key

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

Supplementary Hazardous Property Information

HP 1: Explosive "waste which is capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic waste, explosive organic peroxide waste and explosive self-reactive waste is included"

Force this Hazardous property to non hazardous because No explosive at this concentration.

Hazard Statements hit:

Unst. Expl.; H200 "Unstable explosives"

Because of determinand:

mercury difulminate: (compound conc.: 0.00002%)

Appendix A: Classifier defined and non GB MCL determinands

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

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

Data source date: 21 Aug 2015

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

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

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

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

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

Data source date: 17 Jul 2015

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

Appendix B: Rationale for selection of metal species

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

Worst case scenario

cadmium {cadmium sulfate}

Worst case scenario

copper {copper sulphate pentahydrate}

Worst case scenario

lead {lead chromate}

Worst case scenario

mercury {mercury difulminate}

Worst case scenario

nickel {nickel diiodide}

Worst case scenario

selenium {nickel selenate}

Worst case scenario

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

Worst case scenario

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

Worst case scenario

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

Worst case scenario

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2022.325.5408.10064 (21 Nov 2022)

HazWasteOnline Database: 2022.325.5408.10064 (21 Nov 2022)

This classification utilises the following guidance and legislation:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021



APPENDIX 12 – Relevant 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:

- LCRM – 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 13 - Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change (see below) and should be investigated if there is any significant delay in acting on the findings of this Report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions in this Report should not be relied upon in the future without written confirmation from Groundtech Consulting Ltd that it is safe to do so.

The observations and conclusions outlined in this Report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting Ltd.

Groundtech Consulting Ltd is not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The Report is based upon Groundtech Consulting Ltd's observations of existing physical conditions at the Site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the Client on the history and usage of the Site. The findings and recommendations contained in this Report are based in part upon information provided by third parties, and Groundtech Consulting Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd and forms the contract with the client.



Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions may also vary due to the ground's heterogeneous properties and because investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this Report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.

