

New Park House Phase 2 Ground Investigation



New Park House

Phase 2 Ground Investigation

Curtins Ref: NMGNPH-CUR-VV-XX-RP-C-0002

Revision: P01

Issue Date: 01 December 2020

Client Name: Greater Manchester MH Foundation Trust

Client Address: Finance Department, Harrop House, Bury New Road, Manchester, M25 3BL

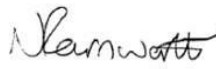
Site Address: North Manchester General Hospital, Ellis Drive, Crumpsall, M8 5RL



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Executive Summary

Appointment	In July 2020 Curtins were instructed by Greater Manchester MH Foundation Trust to undertake a Phase 2 Ground Investigation on land at the south east of the North Manchester General Hospital campus, Ellis Drive, Crumpsall, M8 5RL (approximately centred on NGR SD 84920 02150) that covers an area of approximately 3.32 Ha. Development plans for this site comprise the construction of a new single storey, part two storey, 150 bed health care unit following demolition and a cut and fill operation.
Current Site Status	The site is currently occupied by various hospital buildings, car parks, access roads and soft landscaped areas. The site can be accessed from Ellis Drive or Central Drive.
Summary of Preliminary Site Assessment	Historical mapping shows the site remained an area of undeveloped land from 1848 to 1894. By 1894 the northern two thirds of the site were occupied by the Manchester Workhouse, a chimney and mortuary were present from 1908. From 1908 a small building occupied the south of the site and an embankment along the southern boundary. In 1923 the workhouse became the Crescent Road Institution and Springfield Hospital by 1949. From 1978 Springfield Hospital joins with another, becoming the North Manchester General Hospital, the southern third of the site became occupied by car parks and roads. Made Ground deposits are not indicated to be present onsite according to BGS, however given the previous uses deposits are anticipated to be present. Superficial soils are identified as Glacial Till deposits across the majority of the site and Glaciofluvial Sheet Deposits across the north west. Bedrock deposits are identified as Chester Formation and Manchester Marls Formation (bedrock) separated by a fault. Environment Agency data indicates that the site, corresponding with the underlying Chester Formation and Manchester Marls Formation bedrock geology, overlies a Principal Aquifer and Secondary B Aquifer, respectively. The Glacial Till and Glaciofluvial Sheet deposits area associated with a Secondary Undifferentiated Aquifer and Secondary A Aquifer, respectively. The site is not located within a Source Protection Zone (SPZ). The nearest surface water feature is the River Irk approximately 270m east of site.
Fieldworks Undertaken	Fieldworks were carried out between 11th and 24th August 2020, comprising four cable percussive boreholes, one Geobore S borehole, nine window sample boreholes and fifteen hand dug foundation pits, primarily for the identification of foundations for existing buildings on the site. Ground gas and groundwater monitoring standpipes were installed within all cable percussive and Geobore S boreholes and three of the window sample boreholes (WS02, WS05 and WS07). Selected groundwater and soil samples were subjected to laboratory analysis. Six ground gas monitoring visits have been undertaken.
Encountered Ground Conditions	Made Ground was encountered in all exploratory holes from ground level to a depth between 0.40m and 1.60m bgl. In the upper Made Ground where Topsoil was not encountered, a layer of tarmacadam or paving slab was encountered. The Topsoil was typically a sand or a slightly gravelly very sandy clay, both with frequent rootlets. Deeper Made Ground was generally relatively variable both granular and cohesive with cobbles, gravel encountered was of mixed lithologies. In WS09 a void, associated with a possible hospital service tunnel was encountered. Underlying the Made Ground the glaciofluvial deposits were encountered as cohesive and granular material. Where encountered the cohesive material was typically recorded as a firm sandy slightly gravelly Clay with interlamination of sand and a soft slightly sandy to sandy gravelly Silt. Typically, the granular deposits comprised a medium dense to very dense slightly gravelly slightly clayey or silty sand with occasional interlaminated clay. In BH01, BH02, BH03 and BH05, the glaciofluvial deposits were underlain by cohesive glacial till. The cohesive material was recorded as stiff to very stiff brown grey slightly sandy slightly gravelly clay. The base of the deposit was not encountered. During returned monitoring visits, groundwater levels were between 1.80m and 11.25m bgl.
Environmental Laboratory Testing	With respect to the proposed 'Commercial' end-use of the site, no exceedances were noted in within the samples collected. No asbestos was identified in any of the samples tested. Concentrations of SVOCs and VOCs were recorded below thresholds where available and concentrations of PCBs were recorded below available thresholds. A Low risk rating is therefore identified to end users of the site, construction workers and adjacent residents (accounting for suitable PPE and environmental controls during construction). No exceedances were identified within the groundwater samples when screened against EU DWS thresholds. A Low risk rating is therefore identified to aquifers underlying the site. A Very Low risk rating is identified to the nearest surface water feature (River Irk), considering the considerable distance to the receptor.

Ground Gas Assessment	During the ground gas monitoring programme methane (CH₄) was recorded below the instrument's detection limit within all the monitoring wells. Maximum carbon dioxide (CO₂) concentrations were recorded at 4.2%. Gas flow was recorded at a maximum peak flow rate of 33.8 l/hr on the sixth visit in BH04 which dissipated quickly to steady state flow rates as did other high peak flow rates identified in deep boreholes. A maximum steady state flow rate of 1.5 l/hr recorded in BH05 on the second visit. Elevated peak flow rates recorded in deep wells have been attributed to flooded response zones and therefore are considered unrepresentative and have been discounted from hazardous gas screening value calculations. A maximum borehole Q_{hg} of 0.0038 l/hr for carbon dioxide was recorded and these values have been taken as the sites Gas Screening Value. The site is therefore classified as CS1 not requiring protection measures. A Low risk rating is therefore identified to the end user from hazardous gases from soils.
Geotechnical Assessment	Ground conditions across the site are highly variable laterally and vertically. In addition, a cut and fill exercise is proposed, which will potentially result in changes in the net load across the site. Therefore, during detailed design assessment of foundations, levels, shape and founding stratum is required. Preliminary assessments indicate that an allowable bearing capacity of 90 kPa for 1m wide strips or pads is acceptable, overlying the dense granular deposits outside the influence zone of groundwater. Areas of soft to loose deposits should be excavated prior to construction works and where cut and fill exercises result in foundations being placed within groundwater influence zones, the bearing capacity can be up to halve the presumed values. Ground bearing floor slabs should not span granular and made ground soils due to potential for differential settlement. For this reason, suspended floor slabs should be considered. It may be possible to re-engineer the existing made ground to adopt a ground bearing floor slab, subject to proposed formation levels and the findings of additional laboratory and in situ testing. Based on the laboratory test results it is considered that a Design Sulphate Class may be taken as DS-1 with an ACEC class of AC-1 within Made Ground and a Design Sulphate Class of DS-1 with an ACEC class of AC-1 within superficial deposits being appropriate.
Re-use of Site Soils	Based on the geochemical testing results presented as part of this investigation it is considered that there is no specific requirement to remove soils from site because of them presenting an unacceptable risk to human health or the environment. The re-use of site-won soils may therefore be undertaken if the following principles are met: i) the geotechnical suitability of the material needs to be confirmed; ii) the re-use of the material needs to be covered as part of the planning approval, e.g. site levels maintained within agreed limits; iii) the volume of the material being re-used needs to be confirmed and traceable; and iv) regulatory approval from the relevant authorities has been sought. The made ground and natural soils recorded do not indicate any clear signs that would result in it being deemed as unacceptable for re-use and re-engineering on site. However additional geotechnical testing is required to further assess the suitability of soils for re-use in general accordance with the Specification for highway works including laboratory analysis and in-situ trial tests to confirm the compaction properties of the material. In the meantime, it should be assumed that some degree of sorting will be required to allow re-use of soils on site. In addition, all topsoil and material containing organics must be removed and not used as capping, however it is likely it may be possible to re-use as topsoil/class 5 material elsewhere on the site. An earthworks specification should be produced which will detail requirements for testing. As large volumes of soils will be required for analysis it is recommended that these works are undertaken following demolition works when all areas of the site are accessible for bulk sampling.
Initial Waste Classification	An initial assessment for the waste classification of the Made Ground soils encountered on site has been carried out through a comparison of the soil testing results against the Tier 1 Thresholds and using the Waste Soils Characterisation Assessment Tool, Cat-WasteSoil. The initial classification of seventeen Made Ground soil samples collected and analysed during the investigation indicates that fourteen samples may be classed as non-hazardous waste with respect to Environment Agency waste classes, using the guidance given in WM3. Whilst all three of the natural soil samples collected and analysed during the investigation may be classed as non-hazardous waste. The initial classification classed three Made Ground samples as hazardous waste for off-site disposal, BH01 at 0.50m bgl, WS02 at 0.45m bgl and TP02 at 0.35m bgl. This is due to the recorded concentration of hydrocarbons/oils. Waste Acceptance Criteria (WAC) testing on these samples has revealed they may be disposed of as Stable Non-Reactive Hazardous Waste in a Non-Hazardous Landfill. Landfill operators are not obliged to accept waste, and if they were to do so, may have specific requirements beyond those outlines above prior to acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise. Additional analysis of soils being removed from site may be required to confirm waste materials are compliant with the descriptions above.

Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

- 1) Undertake further geotechnical classification testing for made ground and natural soils to inform re-use, to be undertaken when areas are accessible potentially as part of/following demolition works. Testing requirements should be detailed in an earthworks specification.
- 2) It is recommended that construction contractors ensure suitable environmental controls are in place during construction and provide staff with appropriate PPE and sanitary facilities, with reference to the environmental testing results presented herein and within Appendix C.
- 3) Should unexpected contamination be observed during construction advice should be obtained from a Geo-environmental Engineer.

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1.0 1.0 Introduction

1.1 Project Background

Curtins were instructed by GNMH Foundation Trust in July 2020 to undertake an initial Phase 2 Ground Investigation for New Park House at North Manchester General Hospital, Ellis Drive, Crumpsall M8 5RL. The site is centred on National Grid Reference (NGR) SD 84920 02150 and covers an area of approximately 3.32 Ha. The site location plan is presented on *Figure 2.1*.

The proposed development plans comprise the construction of a single storey, part two storey, 150 bed health care unit following demolition and a cut and fill operation. A current proposed development plan is included in *Appendix A*.

1.2 Scope of Services

The Phase 2 Ground Investigation Report will characterise the environmental and geotechnical conditions of the wider site development. The ground investigation has also been undertaken to assess the ground and groundwater conditions at the proposed location of new mental health care unit.

The Preliminary Phase 2 Ground Investigation Report is intended to determine:

- a) Preliminary assessment of the geotechnical suitability of the site soils for re-use within a cut and fill.
- b) Preliminary assessment into the likelihood of potential shallow site soils contamination, due to site's current and historic land use, adversely impacting the end-user.
- c) Preliminary assessment into the likelihood of potential of groundwater contamination, due to site's current and historic land use, adversely impacting the end-user.
- d) If there is risk to the end-user from soil gases including methane, carbon dioxide, carbon monoxide and hydrogen sulphide.
- e) Recommendations for the design of foundations and building floor slabs.

It is noted that further works will be required to classify site soils for re-use at a later date, likely following demolition works.

Detailed flood risk assessment, ecology, archaeological studies and waste classification for off-site disposal are outside of the scope of this report.

2.0 Preliminary Site Assessment Summary

A Phase 1 Desktop Study was undertaken for the site by Curtins Consulting in March 2020 (Ref.1). A summary of the detailed findings of this Desktop Study, comprising current site setting, history, geology and hydrogeology/hydrology is presented within this Section with reference to additional information sources.

2.1 Current Setting

The site is split between various car parks within the vicinity of Ellis Drive, Crumpsall, M8 5RL. All areas can be accessed from this address or Central Drive as shown on *Figure 2.1*. The site is part of the wider North Manchester General Hospital and currently comprises hospital buildings, car parking areas, areas of soft landscaping and connecting roads associated with the North Manchester Greater Hospital.

The site is bounded to the north by Central Drive followed by further buildings associated with the North Manchester General Hospital, to the east by Crescent Drive and SD Waste Paper Recycling Centre, to the west by the hospital's Estates and Transport Department and further car parks. The south of the site is bound by Eyam Road, followed by residential properties. Topographically, the site is located on a slope dipping away from the southwest.

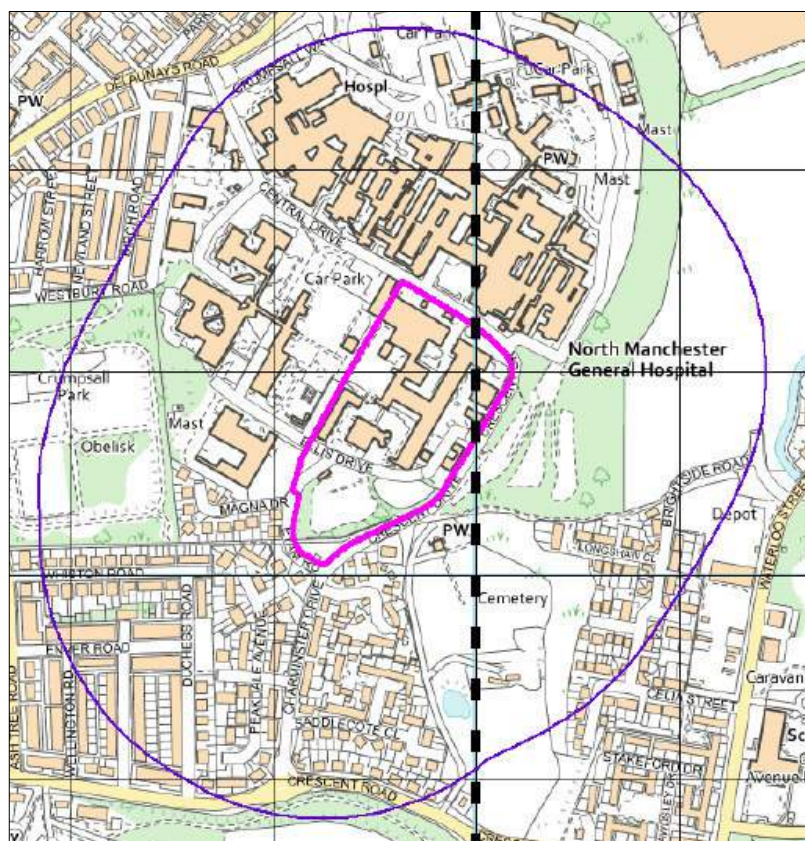


Figure 2.1 – Site Location Plan (site boundary shown in pink, 100m buffer shown in purple). Crown Copyright. License number 100020245

2.2 Previous Site Use

A review of the available historical maps (Ref. 1) for the site has been undertaken with specific reference to the potential sources of contamination.

Earliest historical map (1848) shows the site as an area of undeveloped agricultural land, with surrounding areas of similar use. Two ponds are located 155m and 180m south of the site, with the pond 155m from site infilled by 1894.

By 1894 the northern two thirds of the site become occupied by the Manchester Workhouse, while the southern third remains undeveloped. A hospital is located 148m north, the Prestwich Union Workhouse is 170m north and a *Brick Works* is 250m west of the site.

A chimney is present on maps from 1908, associated with the Manchester Workhouse. A mortuary is noted to the north on site and the southern third of the site is occupied by a small building and embankment along the southern boundary of site. The hospital 148m north has expanded southwards and the *Brick Works* is no longer present on maps from 1908. An *Engineering Works* is now located 235m east of the site, no longer present from 1931.

From 1923 the Manchester Workhouse on site and Prestwich Workhouse become Crescent Road Institution and Delaunay's Road Institution, respectively. Delaunay's Road Institution becomes a hospital with nurse's homes from 1931 and later, in 1949, it is named Crumpsall Hospital.

The Manchester Workhouse to the north of site becomes the Springfield Hospital from 1949, extended eastwards, with associated hospital buildings, sports grounds and car parks present. From 1978 the Springfield and Crumpsall Hospital areas become the North Manchester General Hospital. The southern third of the site is occupied by a car park with an embankment and road constructed along the southern boundary.

2.3 Published Geology

A study of the British Geological Survey (BGS) maps, 1:50,000 (Solid and Drift Edition, Sheet No. 085, 2011) (Ref. 2) indicates the following geological sequence underlying the site:

- **Superficial Deposits:** Glacial Till (majority of the site) and Glaciofluvial Sheet Deposits (northwest of site).
- **Solid Geology:** Chester Formation (majority of the site) and Manchester Marls (outcrop in the centre of the site).

2.3.1 Made Ground Deposits

Made Ground is not indicated on the geological maps; however, it is anticipated that Made Ground of unknown composition will be present in parts of the site, associated with previous development phases and redevelopment in the surrounding area.

2.3.2 Superficial Deposits

Superficial deposits are recorded as Glacial Till deposits across the majority of the site and Glaciofluvial Sheet Deposits on the northwest of the site. The Glacial Till deposits are expected to consist of a heterogenous mixture of clay, sand, gravel and boulders that vary widely in size and shape. The Glaciofluvial Sheet deposits typically comprise layers of sand and gravel of varied colour.

2.3.3 Bedrock Deposits

The majority of the site is underlain by a Chester Formation, typically comprising conglomerate and sandstone beds with subordinate beds of mudstone. The Manchester Marls Formation outcrops in the centre of site, generally comprising a red marl of calcareous mudstone and siltstone.

2.4 Hydrogeology and Hydrology

Environment Agency and Phase 1 report (Ref. 1) indicates that the geological sequence underlying the site has the following hydrogeological characteristics:

Geology	Associated Hydrogeological Classification
Made Ground deposits are not indicated to be present	N/A
Glacial Till	Secondary Undifferentiated Aquifer ¹
Glaciofluvial Sheet Deposits	Secondary A Aquifer ²
Chester Formation	Principal Aquifer ³
Manchester Marls Formation	Secondary B Aquifer ⁴

Notes:

1. Assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
2. Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formally classed as minor aquifers.

3. *Layers of rock or drift deposits that have high intergranular and/or river base flow on a strategic scale. They provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.*
4. *Predominantly lower permeability layers which may store and yield amounts of groundwater due to localised features. These are generally the water bearing parts of the former non-aquifers.*

There is one recorded fault through the middle of the site, orientated northwest southeast. The fault separates the Chester Formation and the Manchester Marl Formation. A sequence of faults run parallel to this fault, the closest approximately 180m and 240m north and south of the site, respectively.

The site is not located within a Source Protection Zone (SPZ).

There are no groundwater abstraction points within 500m of the site. The closest is 618m north of the site, associated with general cooling processes for industrial, commercial and public services.

The nearest surface water feature is the River Irk, 270m east of the site which flows towards the south and has a river quality of GAQ Grade E with a flow rate of less than 2.5 cumecs.

2.5 Unexploded Ordnance (UXO) Risk Assessment

The likelihood of UXO being encountered on a development site is influenced by several factors including; the proximity to strategic targets, the nature of the development works being undertaken and evidence of local damage in the post-war periods amongst others. To determine the likelihood of UXO being present on a site, a step-wise risk assessment process is followed. This process is outlined within CIRIA C681 Unexploded Ordnance: A Guide for the Construction Industry (Ref. 3).

Risk mapping (Ref. 4) for UXO's has placed the site in a Moderate Risk area. Moderate-risk areas are those with a bombing density of up to 11-50 bombs per 1000 acres and may contain WWII targets.

The Phase 1 report (Ref. 1) indicated no evidence of ruins or significant bomb damage within 1km of the site and no significant targets noted within 1km of the site boundary.

Considering the above and that the site was occupied throughout the war period and developed after the war, Curtins identified a Low Risk of encountering UXO during Ground Investigation works.

Contractors undertaking excavations works should carry out their own UXO Risk Assessment in respect to their works.

2.6 Landfill and Pollution

There are no operational landfills and one historic landfill in one within 500m of the site, the historic landfill is 223m south identified as Abraham Moss Centre with no records of the type of waste disposed. There are no records of licenced waste management facilities within 500m of the site.

There are six potentially infilled land (water and non-water) recorded within 250m of the site. The closest recorded is 9m southwest associated with an unknown filled ground, most likely a small pond.

One local authority pollution and prevention control permit is located north of the site registered to the North Manchester General Hospital for clinical waste incineration, which has since been revoked. This coincides with the chimney on site, no longer present on maps from 1999.

There are no pollution incidents within 250m of the site, the closest is 378m east due to a crude sewage spill in 1997.

One registered radioactive substance is recorded north of the site, registered to the North Manchester Healthcare NHS Trust for disposal of radioactive waste in 1991, which has since been revoked.

2.7 Summary of Phase 1 Conceptual Site Model

Table 2.7 records initial Potential Pollutant Linkages (PPL) identified which are to be assessed further through the Phase 2 Investigation.

Table 2.7 – Potential Pollutant Linkages

Source	Pathway	Receptor	Risk Rating
On-site sources of potential contamination: Potential contamination associated with Made Ground of unknown composition from uncontrolled deposition of construction materials on-site during construction of the Manchester Workhouse buildings and later, the North Manchester General Hospital buildings on site. Potential contamination associated with Made Ground of unknown composition from uncontrolled deposition during demolition of buildings on site. Off-site sources of potential contamination: Potential contamination associated with the construction of the residential and commercial properties off site. Potential contamination associated with the various Works within 250m of the site. Uncontrolled deposition of Made Ground within 250m of the site associated with the back fill of ponds within 250m of the site.	Direct contact, ingestion, inhalation (dust and vapours)	Site End Users	Moderate/Low
		Construction and Maintenance Workers	
On and off-site soils with the potential to generate ground gases: Potential ground gas generation from Made Ground containing organic/putrescible content on site. Historically infilled land within 100m of the site of unknown material, in particular 9m southwest. Historic landfill site 223m south of site.	Vertical and horizontal migration through underlying superficial deposits into buildings and air spaces	Site End Users	Moderate/Low

Potential contaminants of concern associated with any Made Ground present include, amongst others; broad range aliphatic and aromatic hydrocarbons present within any fuel oils; inorganic compounds including heavy metals and asbestos present in discarded building materials; organic compounds including possible volatile organic compounds and PCBs present associated with nearby/on site Works and Workhouse.

The qualitative risk assessment determined the above risks associated with the proposed development of the site warrant further investigation.

It was recommended that a ground investigation is conducted to both confirm this assessment and provide data in support of the structural and civil engineering design. The scope of the investigation undertaken is detailed in *Section 3.0*.

The risks presented to controlled waters (groundwater and surface water) were identified as Low and Very Low respectively. However, groundwater samples were collected from specific borehole locations in order to confirm the risk to groundwater.

3.0 Ground Investigation Scope of Works

Site investigation works were undertaken by Curtins between the 11th and 24th August 2020.

The scope of the ground investigation was designed in general accordance with current UK guidance including:

- CLRM (Ref. 5);
- British Standard (BS) 10175:2011+A2:2017 (Ref. 6);
- BS5930:2020 (Ref. 7); and
- and BS EN1997: Part 2:2007 Eurocode 7 (Ref. 8).

The scope and rationale are summarised in *Table 3.0*.

Table 3.0 – Scope and Rationale of Fieldwork Undertaken

Exploratory Hole Type	Exploratory Hole Ref.	Exploratory Hole Depth (m bgl)	Rationale
Cable Percussion Boreholes	BH01 BH02 BH03 BH05	25.00 25.00 24.00 25.00	Confirm the shallow and deeper ground and groundwater conditions. Collect Soil Samples for chemical analysis. Collect samples for geotechnical soil testing. Gas and groundwater level monitoring.
Geobore S Boreholes	BH04	20.00	Confirm the shallow and deeper ground and groundwater conditions. Collect Soil Samples for chemical analysis. Collect samples for geotechnical soil testing. Gas and groundwater level monitoring.
Window Sample Boreholes	WS01 WS02 WS03 WS04 WS05 WS06 WS07 WS08 WS09	5.45 5.45 5.45 3.50 4.45 4.45 5.00 4.00 1.60	Confirm shallow ground and groundwater conditions. Collect Soil Samples for chemical analysis. Collect samples for geotechnical soil testing. Gas and groundwater level monitoring. Undertake borehole infiltration tests.
Hand Dug Foundation Pits	HP01 HP02 HP02A HP04 HP05 HP06 HP07 HP08 HP09 HP10 HP11 HP13 HP14 HP15 HP17	1.30 1.30 1.30 1.35 1.10 1.40 1.60 1.20 1.30 1.20 0.70 1.30 1.30 1.30 1.20	Confirm the ground conditions. Identify the type and size of foundations for existing buildings.

Exploratory Hole Type	Exploratory Hole Ref.	Exploratory Hole Depth (m bgl)	Rationale
Hand Dug Trial Pits	TP01	0.40	Confirm the ground conditions. Confirm construction make up of the car parks.
	TP02	1.20	
	TP03	0.75	
	TP04	1.00	
	TP05	1.20	

BH04 was drilled using Geobore S techniques, however due to the presence of granular sand material the borehole was unable to be advance past 20.00m bgl and therefore, this technique was only used on one location.

Originally planned positions HP03 and HP16 were not undertaken due to the presence of a basement at the location of the foundation pit. HP12 was not undertaken due to the identification of numerous existing services where the foundation pit was located.

For the location of the exploratory holes refer to Curtins drawing ref: 075856-CUR-00-XX-DR-GE-80006-P01. Exploratory hole locations were surveyed upon completion of the works, with the surveyed ground levels of the exploratory holes included on the logs, contained within *Appendix B*. Hand dug foundation pit logs are also included within *Appendix B*.

3.1 Soil Logging and Sampling

Exploratory hole arisings were logged onsite by a qualified Engineer from Curtins and in accordance with the requirements of BS5930 (Ref. 7). Observation of visual and olfactory indications of contamination were recorded in WS05. Exploratory hole logs are provided in *Appendix B*.

3.2 Monitoring Well Installations

Groundwater monitoring 50mm diameter slotted pipes were installed within the cable percussive and Geobore S exploratory holes (BH01 to BH05) and three of the window sample boreholes (WS02, WS05 and WS07). A bentonite seal was placed at the top and bottom of each of the exploratory holes, surrounding the screened sections of the pipe. A gravel surround was installed in the annulus between the sides of the borehole and the slotted sections of the pipe.

The monitoring wells were designed to assess the potential for ground gas and monitor groundwater levels in all exploratory holes. Groundwater samples were collected where possible in exploratory holes BH01 to BH02 and BH04 to BH05. The screened sections therefore focused on the more permeable deposits where encountered, where ground gas and groundwater may be encountered.

A summary of the response zone is presented in *Table 3.2*.

Table 3.2 – Monitoring Well Response Zones

Borehole Ref.	Response Zone(s) (m bgl) (m AOD)	Strata Description(s) (Principal Strata in Capitals)
BH01	15.00 – 18.00 (58.31 – 55.31)	Cohesive Glacial Till
BH02	14.50 – 17.50 (64.05 – 61.05)	Granular Glaciofluvial Deposits
BH03	17.00 – 20.00 (57.95 – 54.95)	Granular Glaciofluvial Deposits and Cohesive Glacial Till
BH04	15.00 – 20.00 (63.63 – 58.63)	Granular Glaciofluvial Deposits
BH05	17.00 – 20.00 (59.51 – 56.51)	Cohesive Glacial Till
WS02	1.00 – 3.00 (73.93 – 71.93)	Granular Glaciofluvial Deposits
WS05	1.00 – 4.00 (77.56 – 74.56)	Cohesive and Granular Glaciofluvial Deposits
WS07	0.70 – 3.00 (76.35 – 74.05)	Cohesive and Granular Glaciofluvial Deposits

A copy of the borehole logs can be referred to in *Appendix B* of this report.

3.3 Post-Investigation Monitoring

3.3.1 Groundwater and Ground Gas Monitoring

Six groundwater and ground gas monitoring visits over six weeks have been undertaken, to assess the groundwater and the ground gas conditions identified in *Section 2.0*.

The results of the groundwater level monitoring are detailed in *Section 5.8*.

4.0 Laboratory Testing

4.1 Geo-environmental Analysis

Representative soil samples were selected for laboratory chemical analysis to provide information about the encountered ground conditions.

Selected soil samples for chemical testing were placed in laboratory provided containers and stored in cool boxes prior to being transported to the nominated laboratory under the laboratory's chain of custody documentation. The laboratory selected by Curtins for chemical analysis was Envirolab (UKAS and MCERTS accredited) and for geotechnical analysis was Structural Soils (UKAS accredited).

Given the general lack of any obvious point sources of potential contamination the sampling positions were generally located in a non-targeted, systematic array to give adequate and representative coverage of the sites proposed end use and the immediate environmental setting, concentrated in the near surface deposits.

4.1.1 Soil Analysis

The source material of contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils), heavy metals, and asbestos. The presence of localised Semi/Volatile Organic Compounds (SVOCs & VOCs), Poly Chlorinated Biphenyls (PCBs) could also not be ruled out due to the present of the historic Workhouse (now NMGH) on the northern area of site.

The extent of the above is captured by the broad environmental testing suites listed in *Table 4.1.1* below.

Table 4.1.1 – Environmental Chemistry Analysis Suite: Soils

Suite Ref.	Analyte	LOD
Soils Suite A	Asbestos Screen, asbestos quantification (%), pH, 2;1 Water Soluble Sulphate & Soil Organic Matter (SOM)	-
	Arsenic, Chromium, Chromium VI, Copper, Lead, Selenium, Nickel	1 mg/kg
	Zinc	5 mg/kg
	Boron (water soluble)	1 mg/kg
	Cadmium	0.5 mg/kg
	Mercury	0.17 mg/kg
	Cyanide (total)	1 mg/kg
	Phenols (screen)	0.2 mg/kg

Suite Ref.	Analyte	LOD
	PAHs (USEPA 16)	0.01 to 0.08 mg/kg
	TPH (Aro/Alk Split)	0.01 to 1.0 mg/kg
Soil Suite B	Semi-volatile Organic Compounds (SVOC)	0.1 to 0.5 mg/kg
	Volatile Organic Compounds (VOC)	0.001 to 0.01mg/kg
	Speciated PCB-EC7 & WHO12	0.001 to 0.002µg/l
Soils Suite C	2 Stage Solid & Leachate Hazardous WAC Suite	0.001 to 40mg/kg

Soil samples were taken from the top 2.00m of exploratory hole locations (BH01 to BH05, WS01 to WS09 and TP02 to TP05); all were tested for Suite A. The samples at 0.25m and 0.50m bgl in WS05 and BH01, respectively, were also tested for Soils Suite B, VOCs and SVOCs, and speciated PCB-EC7 and WHO12 due to the presence of a hydrocarbon odour noted in the exploratory hole logs in WS05 and BH01 located where the greatest thickness of made ground was encountered.

Three samples were tested for soils suite C (WAC testing) where preliminary classification had identified them as hazardous waste for off-site disposal.

Copies of the environmental chemistry testing certificates are presented in *Appendix C*.

4.1.2 Groundwater Analysis

The source material of the contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils) and heavy metals the extent of which is captured by the broad environmental testing suite listed in *Table 4.1.2* below.

Table 4.1.2 – Environmental Chemistry Analysis Suite: Waters

Suite Ref.	Analyte	LOD
Water Suite A	pH	-
	Total Hardness	2 mg/l
	Arsenic, Lead, Nickel, Selenium, Zinc, Chromium, Copper, Cadmium	1 µg/l
	Mercury, Phenols (screen)	0.1 µg/l
	Boron (dissolved)	10 µg/l
	Cyanide	0.005 mg/l

	Sulphide	0.1 mg/l
	Sulphate	1 mg/l
	PAHs (USEPA16)	0.01 µg/l
	TPH (Aro/Alk Split)	1 - 5 µg/l

Groundwater samples were taken in four of the five deep exploratory holes (BH01, BH02, BH04 and BH05) and tested for Water Suite A.

Copies of the environmental chemistry testing certificates are presented in *Appendix C*.

4.1.3 Quality Assurance and Quality Control

Soil and groundwater chemical analysis was conducted by Envirolab Laboratories, a UKAS and MCERTS accredited laboratory. All samples were delivered in appropriate containers for the suites tested and analysed within designated holding times. No soil or groundwater samples were recorded to have exceeded the maximum holding time.

4.2 Geotechnical Testing

Soil samples for testing were prepared in accordance with BS1377: Part 1:2016 (Ref. 9). The undertaken geotechnical testing is summarised in *Table 4.2*.

Table 4.2 – Geotechnical Testing

Test Type	Quantity	Standard
In Situ Testing		
Standard Penetration Testing	107	BS 5930: 2015, Clause 41
Laboratory Testing		
Atterberg Limit	15	BS1377 1990, Part 2 (clause 4.5, 5.3 & 5.4)
Multistage Triaxial Compression Test	3	BS1377 1990, Part 7 (clause 9.0)
Water Soluble Sulphate	46	ISO 17025 MCERTS
pH Value	46	ISO 17025 MCERTS
Moisture Content	15	BS1377 1990, Part 2
PSD	13	BS1377 1990, Part 2 (clause 9.2)
One Dimensional Consolidation in Oedometer	1	BS1377 1990, Part 4 (clause 4.2 & 4.4)
Hand Vane Test	1	BS 5390:2015

The results of the geotechnical testing are summarised in *Section 6.0* of this report.

Copies of the geotechnical testing certificates are presented in *Appendix D*.

5.0 Ground Conditions

A summary of the ground conditions encountered during the site investigation works is presented below, with detailed information presented on the exploratory hole logs included in *Appendix B*.

A summary of the geotechnical test results recorded within the superficial deposits are presented in Section 6.0.

Full details of the geotechnical results can be found in *Appendix D*.

Table 5.1 – Summary of Ground Conditions Encountered

Stratum	Depth to top of strata, m bgl (m AOD)	Thickness (m)		Description
		Min	Max	
TOPSOIL/ MADE GROUND	0.00 (78.81 – 73.31)	0.40	1.60*	MADE GROUND: Tarmacadam or paving slab OR TOPSOIL: Brown to grey gravelly fine to coarse sand or slightly gravelly very sandy clay, both with frequent rootlets. Overlying Brown to grey slightly gravelly to very gravelly fine to coarse sand with low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of mixed lithologies. Cobbles are angular to subangular of brick and concrete. And/Or Dark grey to brown slightly sandy to very sandy slightly clayey angular to subrounded fine to coarse gravel of mixed lithologies. And/Or Brown slightly sandy slightly gravelly clay with low to moderate cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick, ceramics and dolomite hardcore. Cobbles are angular of brick and concrete.
SUPERFICIAL DEPOSITS – Granular Glaciofluvial	0.70 – 1.65 (77.93 – 71.81)	12.20	19.30*	Medium dense to very dense brown slightly gravelly slightly clayey or silty fine to coarse SAND with occasional interlaminated clay. Gravel is angular to subangular fine to medium of sandstone and rare coal.
SUPERFICIAL DEPOSITS – Cohesive Glaciofluvial	0.40 – 7.00 (77.56 – 71.63)	0.30	2.50	Firm grey to brown slightly sandy to sandy slightly gravelly to gravelly CLAY with interlaminations of sand. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone. And Soft to very stiff brownish grey slightly sandy to sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subrounded fine to medium of mudstone.
SUPERFICIAL DEPOSITS – Cohesive Glacial Till	13.70 – 23.00 (56.91 – 55.55)	2.00*	11.30*	Very stiff grey to brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone.

* Thickness not proved

5.1 Made Ground/Topsoil

Made Ground and/or Topsoil were encountered in all of the exploratory holes from ground level to depths between 0.40m and 1.60m bgl across the site. Where Topsoil was not encountered an upper layer of Made Ground comprised tarmacadam (BH01, BH02, BH04, BH05, WS02, WS05, WS07 to WS09, TP01 to TP05, HP01 to HP09, HP14 and HP15) or a paving slab (WS04, HP10 and HP13). Where Topsoil was encountered (BH03, WS01, WS03 and HP17) it generally comprised a brown to grey fine to coarse sand or slightly gravelly very sandy clay, both with frequent rootlets.

Deeper Made Ground generally comprised three different compositions which are variable in depths and thickness across the site. These were typically recorded as a brown to grey very slightly gravelly to very gravelly fine to coarse sand with a low cobble content, a dark grey to brown slightly sandy to very sandy slightly clayey gravel, and a brown slightly sandy slightly gravelly clay with low to moderate cobble content. The sand is generally fine to coarse, and the gravel is angular to subrounded, fine to coarse of mixed lithologies including ceramics, brick, tarmacadam, coal, clinker, dolomite hardcore, wood fragments, concrete and ash. Cobbles present are angular to subangular of brick and concrete.

In exploratory hole BH01 a thin layer of reddish-brown tiling and a layer of concrete were encountered at 0.15m bgl (0.05m thickness) and at 0.30m bgl (0.10m thickness), respectively.

In exploratory hole HP11 Pea Gravel was encountered between 0.05m and 0.60m bgl.

In exploratory holes HP02 and HP02A a layer of cobbles (brick) was encountered from 0.20m to 0.33m bgl

In exploratory holes TP01 to TP05 the sub-base of the car parking areas was encountered between 0.55m and 0.60m bgl. In WS09 a void was encountered at 0.60m bgl to 1.60m bgl. This is likely to be associated with an old service tunnel.

5.2 Glaciofluvial Deposits

Glaciofluvial deposits comprising cohesive and granular deposits were encountered directly underlying the made ground.

The deposits were highly variable and were encountered from depths of 0.40m and 1.60m bgl across the site, to proven depths of 13.70m bgl (59.61m AOD) and 23.00m bgl (55.55m AOD). The glaciofluvial deposits were typically encountered as granular deposits overlying cohesive deposits.

5.2.1 Granular Glaciofluvial Deposits

The granular glaciofluvial deposits were encountered in all exploratory holes, excluding HP06 to HP16, from depth between 0.50m and 2.00m bgl. It appears to be common near the surface based upon window sample and cable percussive borehole encounters, with the exception of

WS03, WS05, WS07 and WS08. The base of the deposit was encountered between 13.70m and 23.00m bgl (62.00m – 55.55m AOD) with the exception of BH04 which terminated in granular Glaciofluvial deposits at 20.00m bgl (58.63m AOD).

The deposits generally comprised medium dense to very dense brown slightly gravelly slightly clayey or silty fine to coarse Sand with occasional interlaminated clay. The gravel is angular to subangular fine to medium of sandstone and rare coal.

In BH02, BH03, WS03 and WS05 thin, extremely closely spaced laminations of coaly sand were encountered locally.

In WS02 a sand layer with a loose density is encountered between 2.20m and 3.50m bgl (72.73m – 71.43m AOD).

WS01, WS02 and WS04 in the centre and south east of the site recorded granular deposits underlying the made ground at 0.60m – 2.60m, 0.90m – 3.50m and 1.00m – 2.20m bgl respectively. A cohesive band was found to interbedded between the initial and second granular layer which extended from 3.20m (WS01), 3.50m (WS02) and 3.00m (WS04) to the 4.00m bgl, 4.80m bgl and 3.50m bgl (base of the borehole) respectively.

5.2.2 Cohesive Glaciofluvial Deposits

The cohesive glaciofluvial deposits were encountered in all exploratory holes, except WS09, HP01-08 and HP17. The cohesive deposits were predominantly encountered underlying granular till deposits with the exception of HP09, HP10, WS03, WS05, WS07 and WS08 where cohesive deposits were encountered underlying the made ground.

The cohesive layers of glaciofluvial deposits predominantly comprised firm grey to brown slightly sandy to sandy slightly gravelly to gravelly clay with occasional interlaminations of sand and a soft to very stiff brownish grey slightly sandy to sandy gravelly Silt. Typically, sand is fine to coarse, and gravel is angular to subrounded fine to coarse of mudstone and sandstone.

The silt layer is recorded as soft grey/ brown slightly sandy slightly gravelly silt in WS01 and WS03. The soft silt was encountered in WS01 at 2.60m – 3.20m bgl (73.14m – 72.54m AOD) and WS03 at 1.30m – 2.00m bgl (76.66m – 75.96m AOD).

The cohesive deposits in WS08, in the southern area of the site, recorded cohesive deposits underlying the made ground at 0.60m – 0.90m bgl. A granular band was found interbedded between the initial cohesive and second cohesive layers which extended from 3.30m to 4.00m bgl (base of the borehole).

5.3 Glacial Till

Glacial Till deposits were encountered in BH01, BH02, BH03 and BH05 underlying the glaciofluvial deposits.

The deposits were encountered from depths of 13.70m bgl (59.61m AOD) to 23.00m bgl (55.55m AOD). The base of the deposit was not encountered.

The deposit generally comprised stiff to very stiff brown grey slightly sandy slightly gravelly clay. Sand is typically fine to coarse. Gravel is typically angular to subangular, fine to coarse of sandstone.

In BH01, the clay was recorded to be frequently interbedded with thin to thick bands of medium to coarse sand.

5.4 Observed Potential Contamination

A hydrocarbon odour was noted in WS05 between 0.50 and 1.00m in the Made Ground, and a slight hydrocarbon odour at the top of the natural clay underlying the Made Ground in this borehole.

5.5 Obstructions Encountered

A summary of obstructions encountered are recorded below in *Table 5.6*.

Exploratory Hole Ref	Depth of Obstruction m bgl (m AOD)	Obstruction
WS09	0.60 (72.47)	Void – possible disused service tunnel associated with the hospital. Window sample terminated.
TP01	0.40 (73.00)	Concrete slab. Trial Pit terminated.

5.6 Foundations for Existing Buildings

Existing building foundations were identified at various depths comprising concrete and or brick of varying size and depth.

Hand dug trial pits logs should be read in conjunction with cross section sketches for each location, detailing the foundations encountered, both of which are enclosed in Appendix B.

5.7 Groundwater

A summary of the groundwater levels recorded during the siteworks is presented in *Table 5.7a*. Water flush was used during the drilling of BH04, and so groundwater strikes could not be recorded in this borehole.

Table 5.7a – Groundwater Noted During Site Investigation

Borehole Ref.	Water Strikes			
	Strike Depth m bgl (m AOD)	Water Depth after 20 mins m bgl (m AOD)	Strata	Notes
BH01	16.50 (56.81)	14.00 (58.31)	Cohesive Glacial Till	Rising
BH02	14.50 (64.05)	14.50 (64.05)	Granular Glaciofluvial	Stable
BH03	18.80 (56.15)	18.00 (56.95)	Cohesive Glacial Till	Rising
BH05	18.00 (58.51)	17.30 (59.21)	Cohesive Glacial Till	Rising
WS01	2.30 (73.44)	2.30 (73.44)	Granular Glaciofluvial	Stable
WS02	2.20 (72.73)	2.20 (72.73)	Granular Glaciofluvial	Stable

Six rounds groundwater monitoring have been undertaken between 1st September and 5th October 2020, the results of which are presented in *Table 5.7b*.

Table 5.7b – Groundwater Monitoring Results

Borehole Ref.	Installation Strata	Response Zone m bgl (m AOD)	01/09/20	08/09/20	17/09/20	25/09/20	01/10/20	05/10/20
			Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)
BH01	Cohesive Glacial Till	15.00 – 18.00 (58.31 – 55.31)	8.45 (64.86)	8.18 (65.13)	*	8.39 (64.92)	*	*
BH02	Granular Glaciofluvial Deposits	14.50 – 17.50 (64.05 – 61.05)	11.00 (67.55)	10.92 (67.63)	11.03 (67.52)	*	*	10.90 (67.65)
BH03	Granular Glaciofluvial Deposits and Cohesive Glacial Till	17.00 – 20.00 (57.95 – 54.95)	6.05 (68.90)	5.60 (69.35)	6.25 (68.70)	4.91 (70.04)	4.58 (70.37)	4.39 (70.56)
BH04	Granular Glaciofluvial Deposits	15.00 – 20.00 (63.63 – 58.63)	9.69 (68.94)	10.40 (68.23)	11.25 (67.38)	11.21 (67.42)	11.18 (67.45)	10.94 (67.69)
BH05	Cohesive Glacial Till	17.00 – 20.00 (59.51 – 56.51)	10.22 (66.29)	10.90 (65.61)	10.63 (65.88)	10.54 (65.97)	10.58 (65.93)	10.22 (66.29)
WS02	Granular Glaciofluvial Deposits	1.00 – 3.00 (71.93 – 71.93)	1.94 (72.99)	1.80 (73.13)	2.00 (72.93)	2.02 (72.91)	2.04 (72.89)	1.97 (72.96)
WS05	Cohesive and Granular Glaciofluvial Deposits	1.00 – 4.00 (77.56 – 74.56)	Dry	Dry	Dry	Dry	Dry	Dry

Borehole Ref.	Installation Strata	Response Zone m bgl (m AOD)	01/09/20	08/09/20	17/09/20	25/09/20	01/10/20	05/10/20
			Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)	Depth m bgl (m AOD)
WS07	Cohesive and Granular Glaciofluvial Deposits	0.70 – 3.00 (76.35 – 74.05)	2.60 (74.45)	2.49 (74.56)	2.78 (74.27)	2.84 (74.21)	2.68 (74.37)	2.64 (74.41)

*Unable to monitor as inaccessible

Throughout the monitoring period, the groundwater levels have stayed relatively consistent in boreholes however vary significantly comparatively between the boreholes across the site. It is considered the groundwater encountered is indicative of perched groundwater within the granular deposits.

6.0 Ground Model

6.1 Made Ground/Topsoil

Made Ground and/or Topsoil was encountered in all exploratory holes.

The geotechnical test results recorded within the Made Ground are summarised in *Table 6.1*. No laboratory geotechnical testing has been undertaken on this stratum due to its unsuitable properties for use as a founding stratum. Only one in-situ SPT N value was acquired within the Made Ground.

Table 6.1 – Summary of geotechnical test results – Made Ground

Parameter	No. of tests	Results
SPT 'N' Value	1	10
pH	17	Min: 6.23 Max: 11.13 Average: 8.41
Water Soluble Sulphate (mg/l)	17	Min: 10 Max: 230 Average: 40

6.2 Glaciofluvial Deposits

The made ground is underlain by glaciofluvial deposits and typically recorded as granular and cohesive strata.

6.2.1 Granular Glaciofluvial

The geotechnical test results recorded within the granular glaciofluvial deposits are summarised in *Table 6.2.1*.

Table 6.2.1 – Summary of geotechnical test results – Granular Glaciofluvial

Parameter	No. of Tests	Results
In-Situ Tests		
SPT 'N' Value ⁽¹⁾ – Granular	79	Min: 3 Max: 49 Average: 19.59
Laboratory Tests		
Moisture Content (%)	5	Min: 11 Max: 27 Average: 19
pH	19	Min: 6.34 Max: 8.73 Average: 7.95
Water Soluble Sulphate (mg/l)	19	Min: 10 Max: 120

Parameter	No. of Tests	Results
		Average: 36.32
Particle Size Distribution	13	Min/Max/Average:0
Cobbles		Min: 0 Max: 31 Average: 3.7
Gravel		Min: 36 Max: 91 Average: 70
Sand		Min: 9 Max: 64 Average: 26.2
Silt/Clay		

Five Atterberg Tests were completed on samples appearing as cohesive deposits on site, however proven to be more granular in the laboratory. The Atterberg Test results indicate deposits of a non-plastic Sand.

Seventy-nine SPT 'N' values were recorded in the granular strata, ranging between 3 and 49. The SPT 'N' results indicate a highly variable stratum, typically from very loose to very dense. The results are shown on *Figure 6.2.1a*.

The PSD results are generally consistent with the recorded findings during the site investigation works.

A moderately conservative unit weight of 18 kN/m³ is deemed suitable for granular soils above water and a unit weight of 20 kN/m³ is deemed suitable for deposits below groundwater, from a review of published values (Ref. 10).

The Angle of Internal Friction of 32° for the granular Glacial Till has been derived from a review of relationships with SPT N values (Ref. 10 & 12) and published values. The values are shown on *Figure 6.2.1b*.

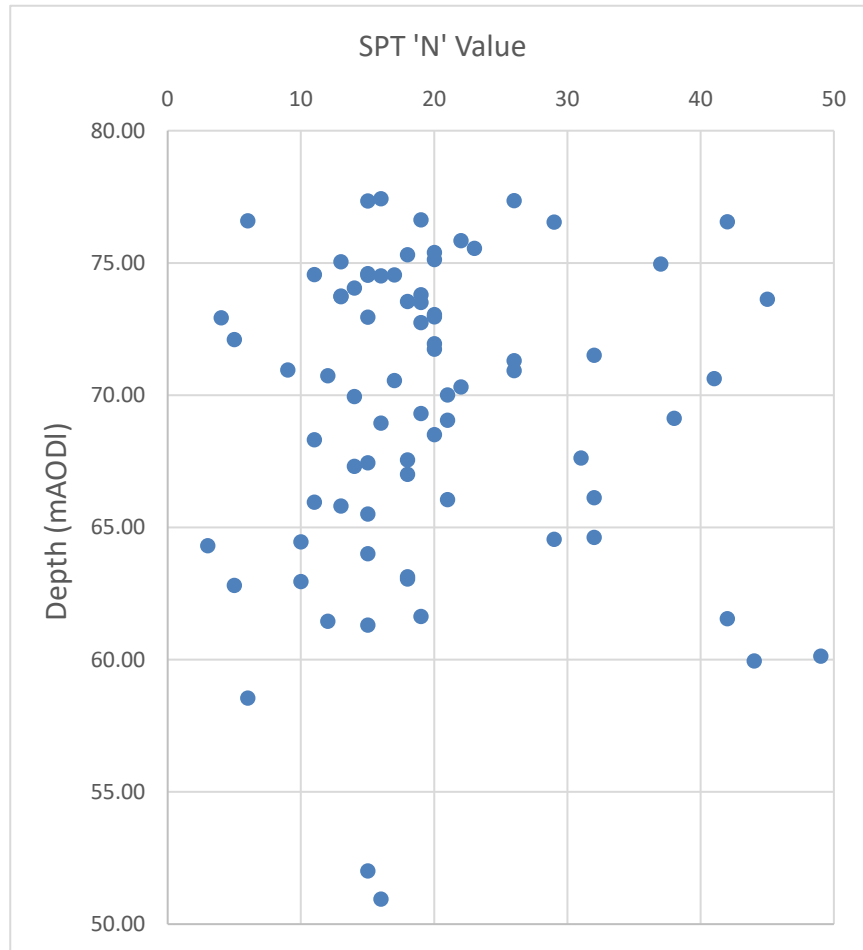


Figure 6.2.1a – Standard Penetration Test vs. Depth - Granular

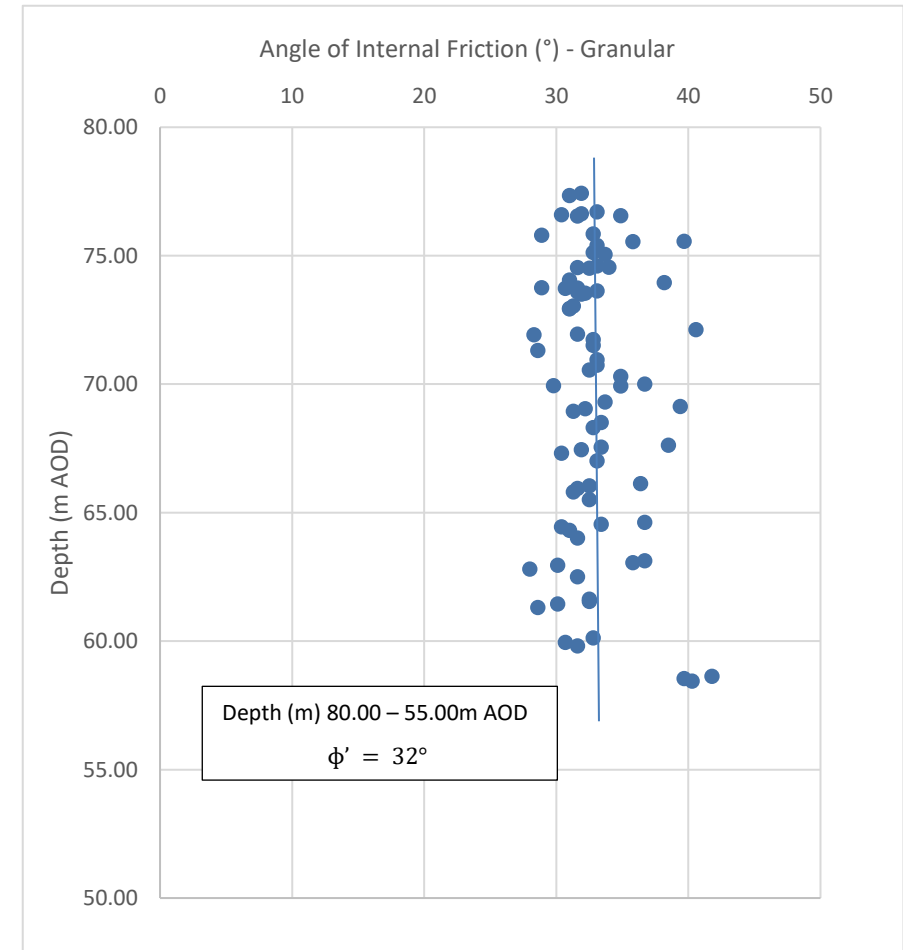


Figure 6.2.1b – Angle of Internal Friction (Granular) vs Depth

6.2.2 Cohesive Glaciofluvial

The geotechnical test results recorded within the cohesive glaciofluvial deposits are summarised in *Table 6.2.2*.

Table 6.2.2 – Summary of geotechnical test results – Cohesive Glaciofluvial

Parameter		No. of Tests	Results
In-Situ Tests			
SPT 'N' Value ⁽²⁾ – Cohesive		8	Min: 7 Max: 22 Average: 12.25
Laboratory Tests			
Atterberg Test	Liquid Limit (%) ¹	7	Min: 27 Max: 32 Average: 29
	Plastic Limit (%) ¹	7	Min: 13 Max: 16 Average: 14
	Plasticity Index (%) ¹	7	Min: 12 Max: 17 Average: 15
	Modified Plasticity Index (%) ³	7	Min: 9.72 Max: 16.66 Average: 13.0
Moisture Content (%)		7	Min: 11 Max: 27 Average: 19
pH		2	Min: 6.95 Max: 8.5 Average: 7.72
Water Soluble Sulphate (mg/l)		2	Min: 10 Max: 60 Average: 35
One Dimensional Consolidation in Oedometer		1	See Results in <i>Appendix D</i>
Hand Vane Test (kPa)		1	19

(1) Excludes non-plastic test result

(2) Only includes SPTs tests in which full penetration was achieved.

(3) Modified plasticity index is the plasticity of components <425µm.

Seven Atterberg Tests were completed on samples appearing as cohesive on site, however three of the samples proved to be more granular in the laboratory. The Atterberg Test results typically indicate all Low plasticity clays from the samples taken. The results of Atterberg Limits are presented on *Figure 6.2.2a*.

The SPT N results are presented on *Figure 6.2.2b*, showing a general increase in SPT values with depth.

A moderately conservative unit weight of 18 kN/m³ is deemed suitable for firm cohesive soils from a review of the published values (Ref. 10).

A moderately conservative Undrained Shear Strength, C_u , of cohesive soils can be estimated from the correlation between Plasticity Indices (PI) and SPT N values (Ref. 11) using Equation 1:

$$C_u = f_1 \times \text{SPT } N \quad \text{Equation 1}$$

Where:

C_u is the Undrained Shear Strength

f_1 is the Stroud Factor determined from Figure 1.5 (Ref. 12)

SPT N is Characteristic Standard Penetration Test Result

Using an f_1 factor of 6.8 for an average plasticity index of 15%, C_u values ranging between 47.6 and 149.6 kPa were determined. The majority of the estimated results indicate a medium to high strength clay, generally increasing with depth however, high lateral variation is observed. The values are presented in Figure 6.2.2c.

A moderately conservative Coefficient of Consolidation, M_v , of the cohesive soils can be estimated from the correlation between Plasticity Indices (PI) and SPT N values (Ref. 11) described by Equation 2:

$$M_v = 1 / (f_2 \times \text{SPT } N) \quad \text{Equation 2}$$

Where:

M_v is the coefficient of consolidation

f_2 is the Stroud Factor determined from Figure 1.5

SPT N is Characteristic Standard Penetration Test Result

Using an f_2 factor of 0.68 for an average plasticity index of 15%, M_v values typically range between 0.067 and 0.21 m²/MN. The majority of results indicate a low to medium compressibility clay. The values are presented in Figure 6.2.2d.

The Angle of Shearing Resistance, ϕ' , for the cohesive glaciofluvial deposits has been derived from the correlation with Plasticity Indices (Ref. 13) shown in Figure 6.2.2e.

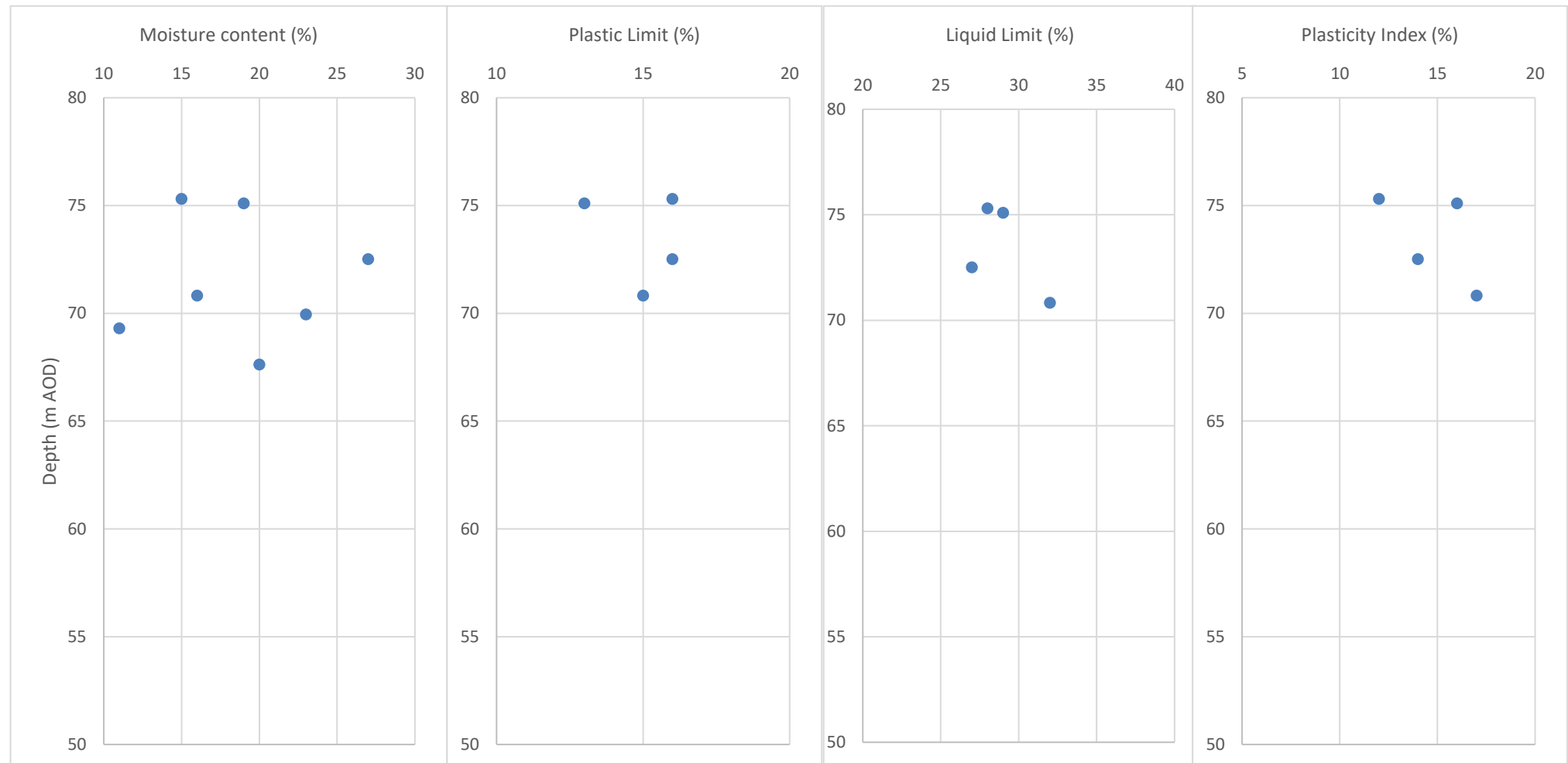


Figure 6.2.2a – Summary of Atterberg Test Results

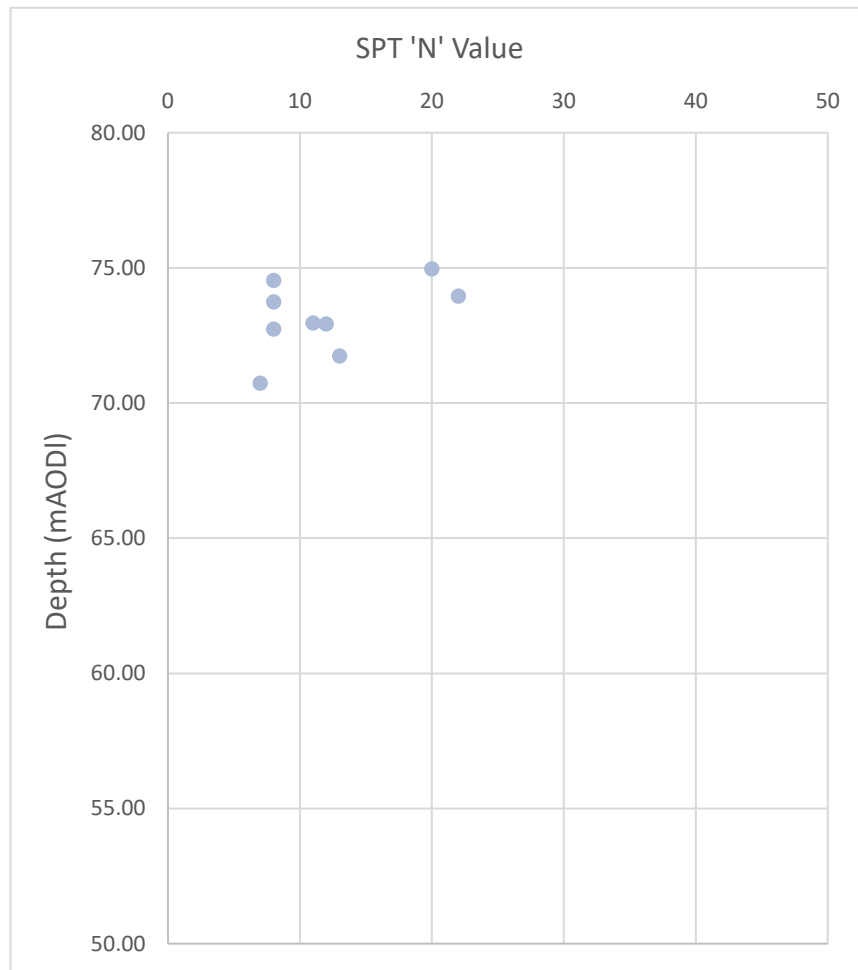


Figure 6.2.2b – Standard Penetration Test vs. Depth - Cohesive

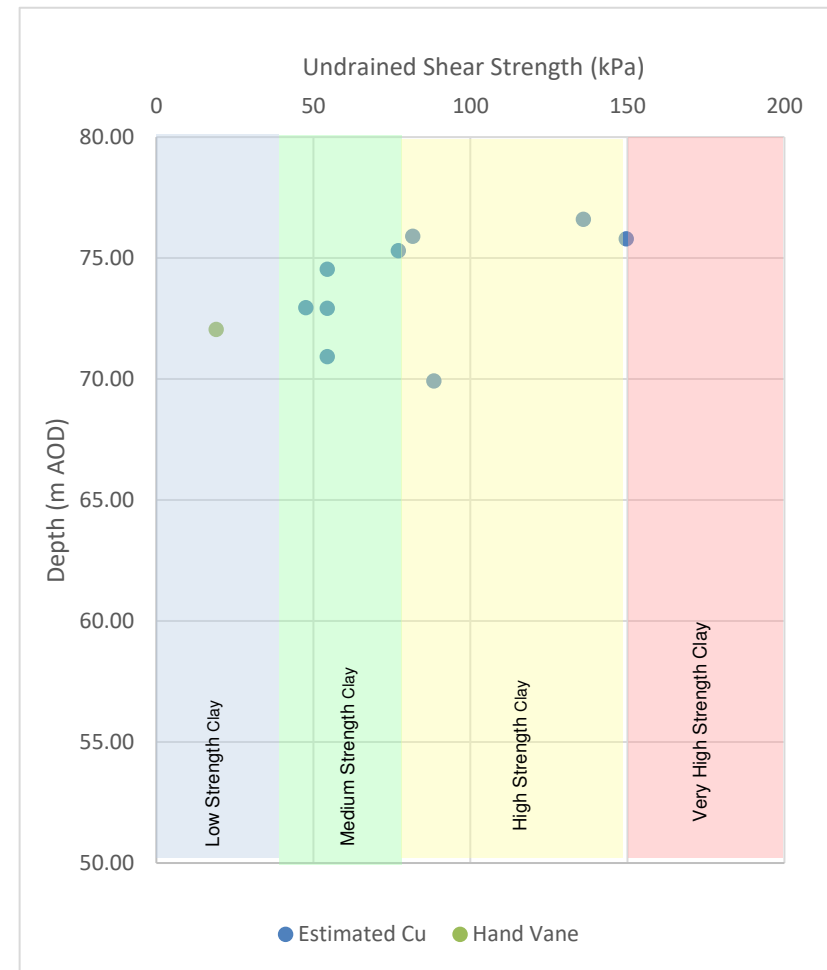


Figure 6.2.2c – Estimated Undrained Shear Strength vs Depth

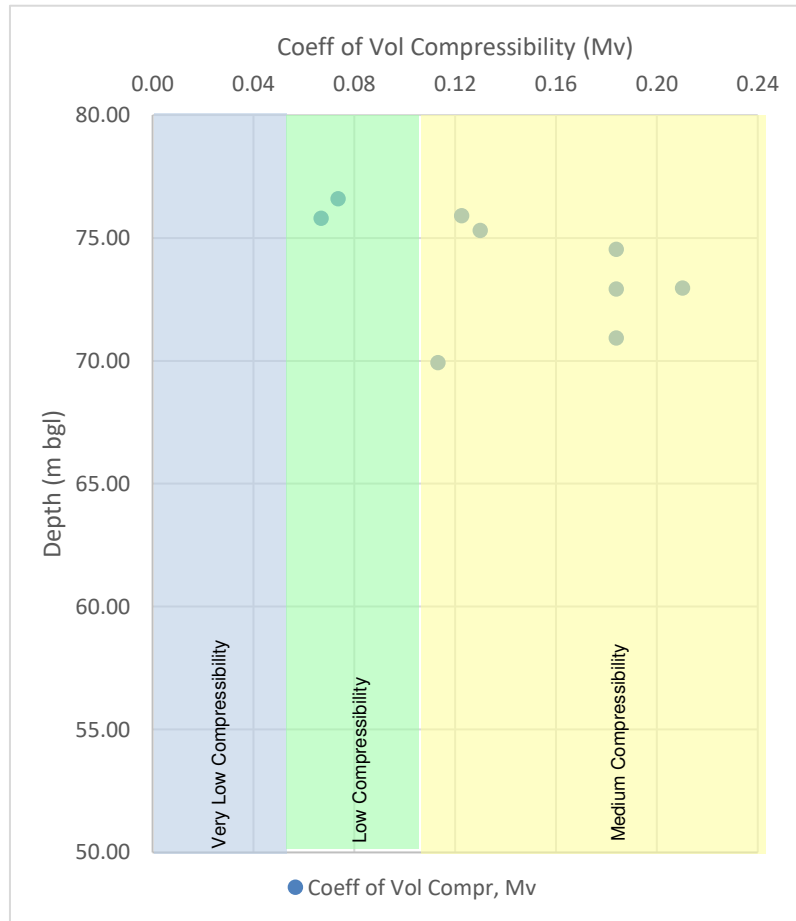


Figure 6.2.2d – Estimated Volume Compressibility Coefficients (Mv) vs Depth

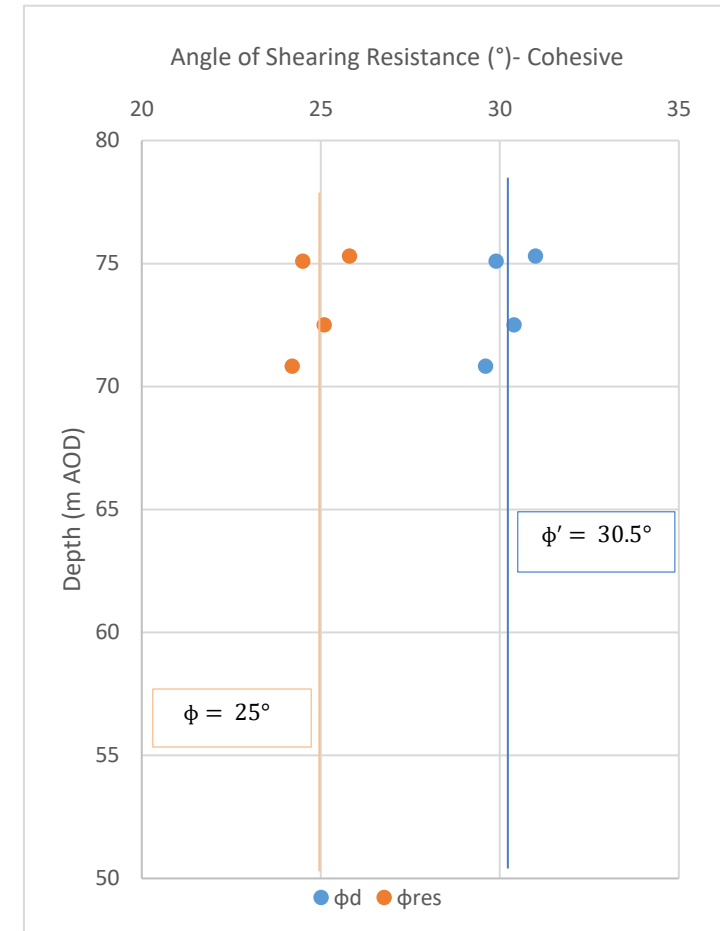


Figure 6.2.2e – Angle Shearing Resistance (Cohesive) vs Depth

6.3 Glacial Till Deposits

Glacial till deposits were encountered underlying the glaciofluvial deposits. The geotechnical tests undertaken within the cohesive glacial till deposits are summarised in *Table 6.3*.

Table 6.3 – Summary of geotechnical test results – Cohesive Glacial Till

Parameter		No. of Tests	Results
In-Situ Tests			
SPT 'N' Value ⁽²⁾ – Cohesive		7	Min: 19 Max: 51 Average: 42
Laboratory Tests			
Atterberg Test	Liquid Limit (%) ¹	8	Min: 26 Max: 32 Average: 29
	Plastic Limit (%) ¹	8	Min: 14 Max: 18 Average: 15
	Plasticity Index (%) ¹	8	Min: 10 Max: 17 Average: 13
	Modified Plasticity Index (%) ³	8	Min: 9.7 Max: 15.04 Average: 12.55
Moisture Content (%)		8	Min: 14 Max: 20 Average: 16
pH		5	Min: 8.63 Max: 8.72 Average: 8.67
Water Soluble Sulphate (mg/l)		5	Min: 30 Max: 60 Average: 38
Quick Undrained Multistage Triaxial		3	Min: 3 Max: 309 Average: 113.3

(1) Excludes non-plastic test result

(2) Only includes SPTs tests in which full penetration was achieved.

(3) Modified plasticity index is the plasticity of components <425µm.

The Atterberg Test results typically indicate all Low plasticity clays from the samples taken. The results of Atterberg Limits are presented on *Figure 6.3a*.

The SPT N results are presented on *Figure 6.3b*, showing a general increase in SPT values with depth.

A moderately conservative unit weight of 22 kN/m³ is deemed suitable for very stiff cohesive soils from a review of the published values (Ref. 10).

A moderately conservative Undrained Shear Strength, C_u , of cohesive soils can be estimated from the correlation between Plasticity Indices (PI) and SPT N values (Ref. 11) using Equation 1:

$$C_u = f_1 \times \text{SPT } N$$

Equation 1

Where:

C_u is the Undrained Shear Strength

f₁ is the Stroud Factor determined from Figure 1.5 (Ref. 12)

SPT N is Characteristic Standard Penetration Test Result

Using an f₁ factor of 7 for an average plasticity index of 13%, C_u values ranging between 287 and 420kPa were determined. The estimated results indicate a very high strength clay, generally increasing with depth however, high lateral variation is observed.

Three Quick Undrained Multi Stage Triaxial Tests were undertaken. One result in BH01 at 19.50m bgl recorded a C_u of 309kPa. Two of the Quick Undrained Multi Stage Trial Test Results, undertaken in BH01 at 15.00m bgl and BH03 at 17.00m bgl recorded values of 28kPa and 3kPa respectively indicating very low to low strength clay. A review of the drillers logs for BH01 at 15.00m bgl indicates full sample recovery and a blow of 120 which does not correlate with the geotechnical testing results. It is considered these results are not representative of the geotechnical strength properties of the soils are therefore have been omitted from further parametric analysis. The results are presented in *Figure 6.3c*.

A moderately conservative Coefficient of Consolidation, M_v, of the cohesive soils can be estimated from the correlation between Plasticity Indices (PI) and SPT N values (Ref. 11) described by Equation 2:

$$M_v = 1 / (f_2 \times \text{SPT } N)$$

Equation 2

Where:

M_v is the coefficient of consolidation

f₂ is the Stroud Factor determined from Figure 1.5

SPT N is Characteristic Standard Penetration Test Result

Using an f₂ factor of 0.7 for an average plasticity index of 13%, M_v values typically range between 0.024 and 0.075 m²/MN. The majority of results indicate a low to medium compressibility clay shown in *Figure 6.3d*.

The Angle of Shearing Resistance, φ', for the cohesive glaciofluvial deposits has been derived from the correlation with Plasticity Indices (Ref. 13) show in *Figure 6.3e*.

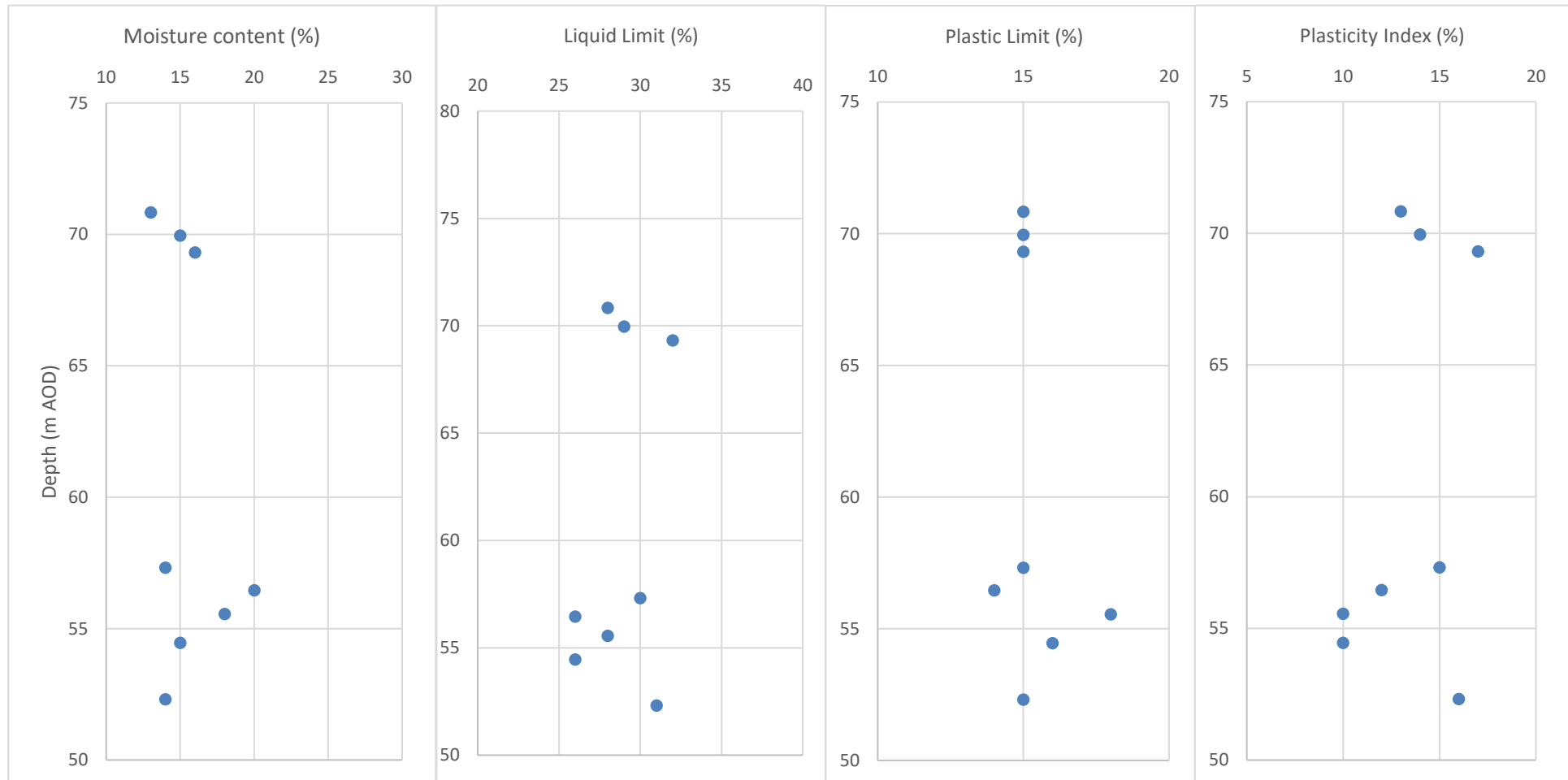


Figure 6.3a – Summary of Atterberg Test Results

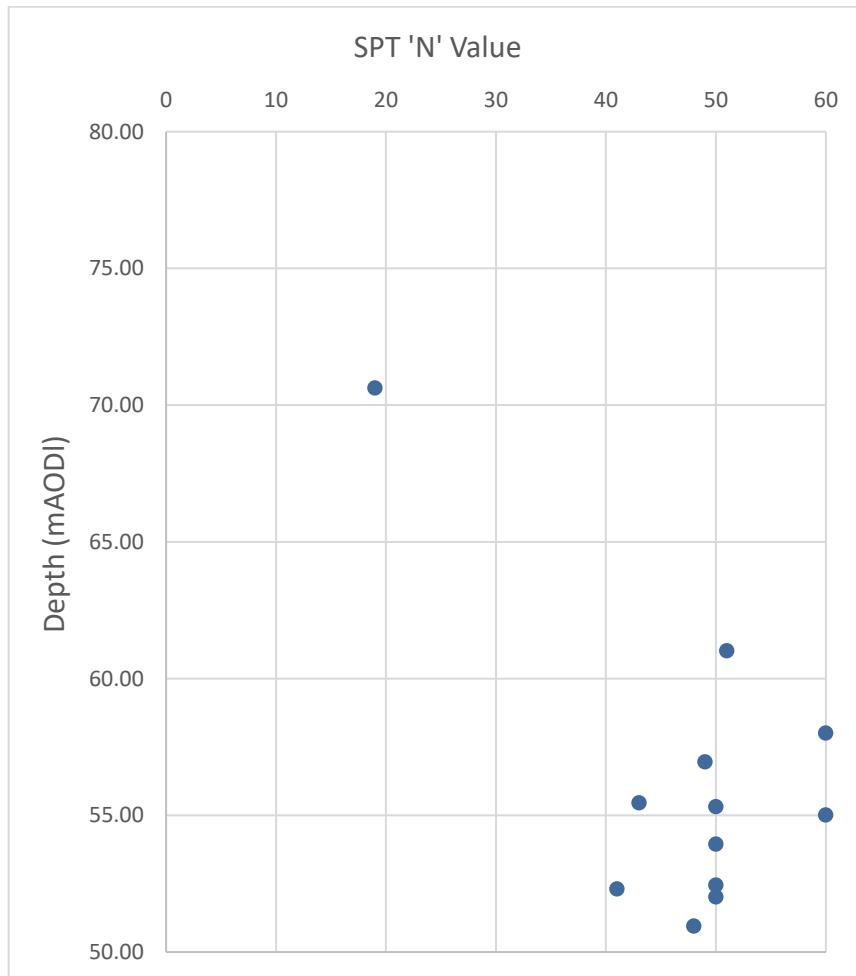


Figure 6.3b – Standard Penetration Test vs. Depth - Cohesive

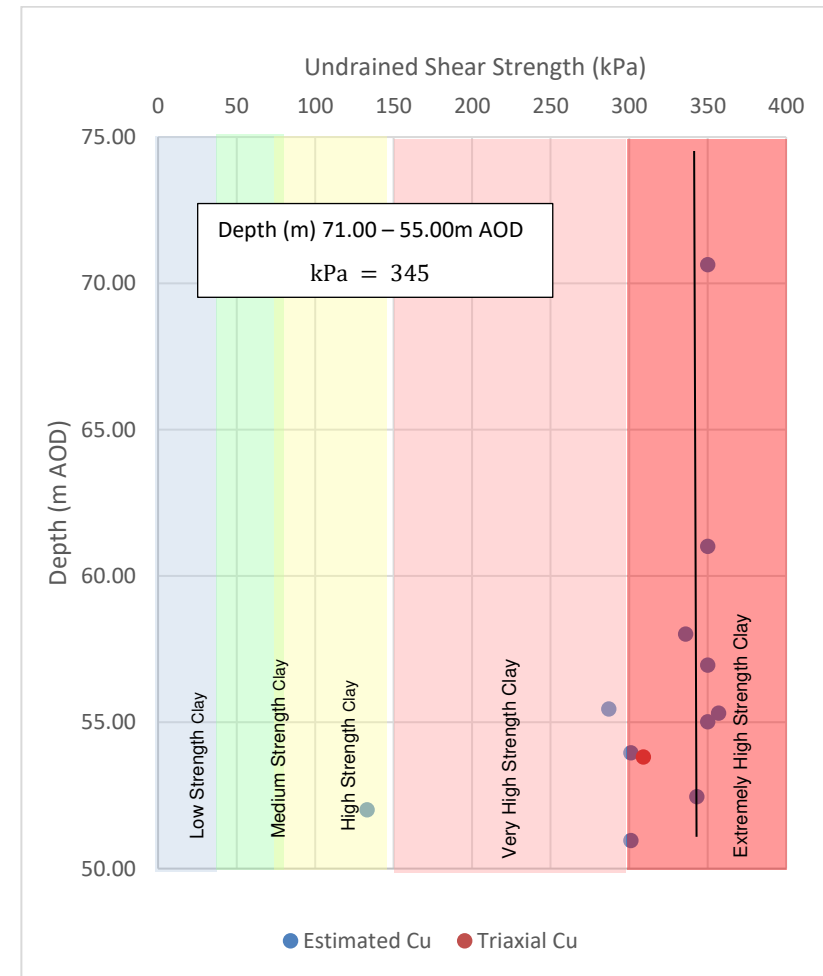


Figure 6.3c – Estimated Undrained Shear Strength vs Depth

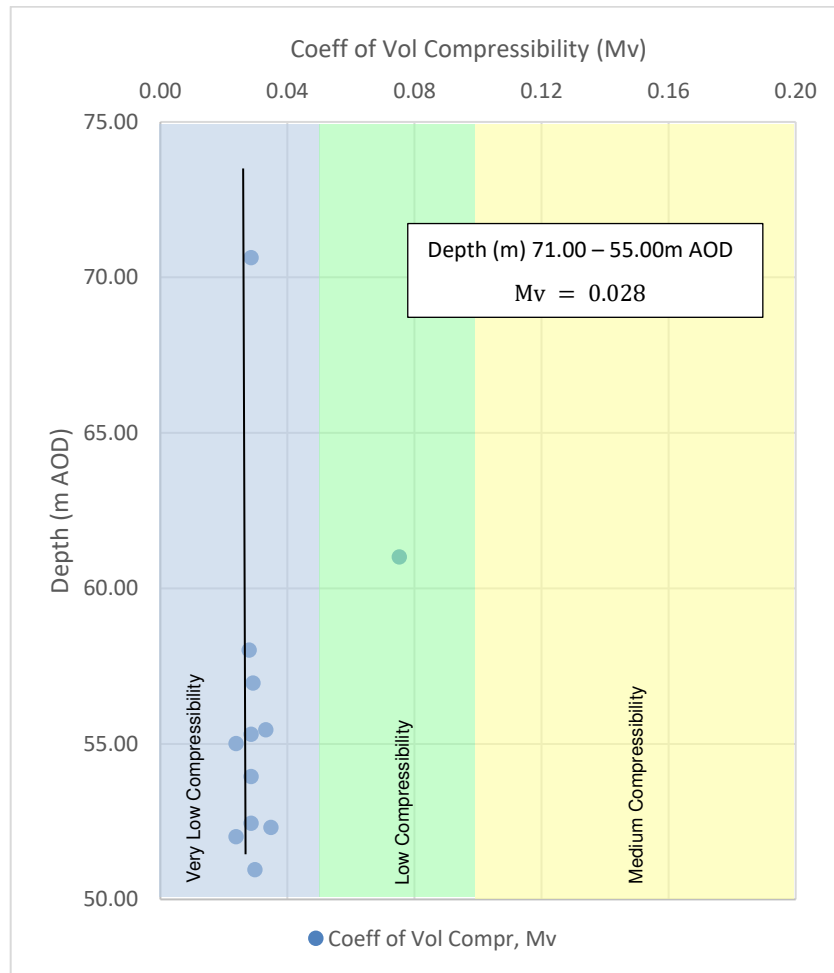


Figure 6.3d – Estimated Volume Compressibility Coefficients (Mv) vs Depth

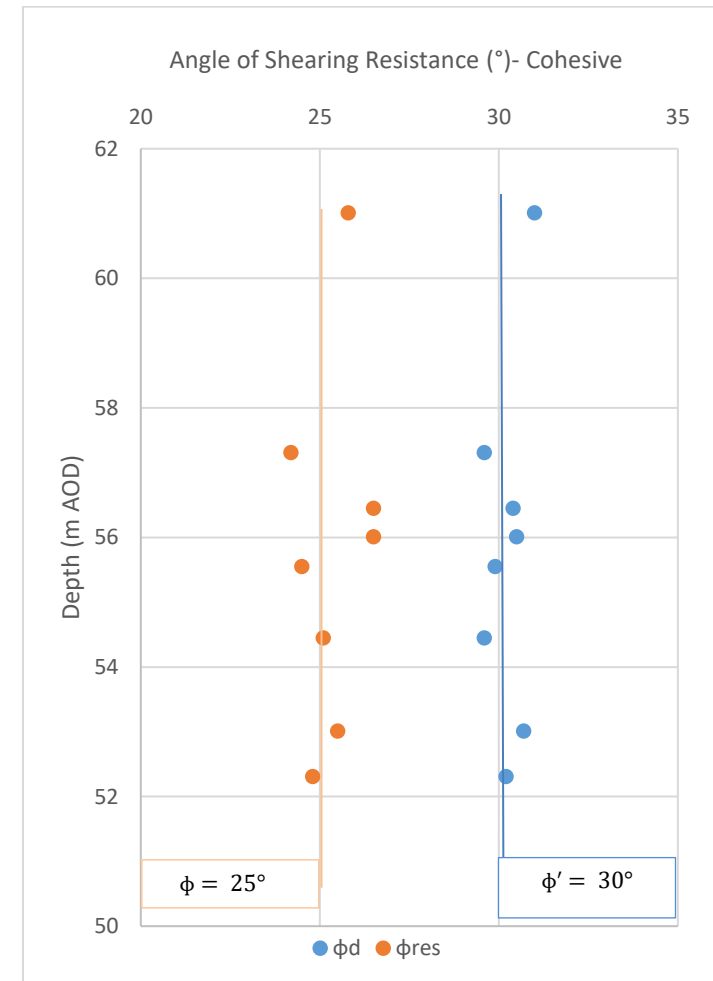


Figure 6.3e – Angle Shearing Resistance (Cohesive) vs Depth

6.4 Ground Model – Geotechnical Parametric Analysis Summary

The estimated parameters derived for the ground conditions are summarised in *Table 6.4*.

Table 6.4 – Material Properties

Strata	Parameter	Characteristic Value	Rationale	Reference
Cohesive Glaciofluvial	Unit Weight, γ (kN/m ³)	18	Published Values	Ref. 14 (Barnes 2016)
	Undrained Shear Strength, C_u (kN/m ²)	Highly Variable. Should be based on a location by location basis.	Geotechnical test results and correlation with SPT N values and Plasticity Index	Ref. 11 (Stroud, 1975)
	Volume Compressibility Coefficients (mv)	Highly Variable. Should be based on a location by location basis.	Correlation with SPT N values	Ref. 11 (Stroud, 1975)
	Angle of shearing resistance undrained, ϕ (°)	25	Correlation with Plasticity Index	Ref. 13 (Gibson, 1953)
	Angle of shearing resistance drained, ϕ' (°)	30	Correlation with Plasticity Index	Ref. 13 (Gibson, 1953)
Granular Glaciofluvial	Unit Weight, γ (kN/m ³)	20	Published Values	Ref. 14 (Barnes 2016)
	Angle of shearing resistance drained, ϕ' (°)	32	Correlation with SPT N Values	Ref. 11 (Peck et al., 1975)
Cohesive Glacial Till	Unit Weight, γ (kN/m ³)	22	Published Values	Ref. 14 (Barnes 2016)
	Undrained Shear Strength, C_u (kN/m ²)	345	Geotechnical test results and correlation with SPT N values and Plasticity Index	Ref. 11 (Stroud, 1975)
	Volume Compressibility Coefficients (mv)	0.028	Correlation with SPT N values	Ref. 11 (Stroud, 1975)
	Angle of shearing resistance undrained, ϕ (°)	25	Correlation with Plasticity Index	Ref. 13 (Gibson, 1953)
	Angle of shearing resistance drained, ϕ' (°)	30	Correlation with Plasticity Index	Ref. 13 (Gibson, 1953)

6.5 Aggressive Ground Conditions

The classification of the site in terms of concrete in aggressive ground is based on the guidance provided in Table C2 of the Building Research Establishment (BRE) Special Digest 1, 3rd edition of 2005 (Ref. 16). A summary of the results obtained as a part of the ground investigation are summarised in *Table 6.5a*, and *Table 6.5b* details the classification.

Table 6.5a –Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Test Type	Range
Made Ground/Topsoil	pH	6.23 – 11.13
	Water Soluble Sulphate (mg/l)	10 - 230
Glaciofluvial Deposits	pH	6.34 – 8.73
	Water Soluble Sulphate (mg/l)	10 – 120
Glacial Till	pH	8.63 – 8.72
	Water Soluble Sulphate (mg/l)	30 - 60

Table 6.5b –Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	ACEC Class ⁽¹⁾
Made Ground	DS-1	AC-1
Glaciofluvial Deposits	DS-1	AC-1
Glacial Till	DS-1	AC-1

(1) ACEC assessment was based on the *mobile* groundwater condition in a *natural soil* scheme area

7.0 Ground and Groundwater Contamination Assessment

7.1 Human Health

The soil results will be screened against the relevant Generic Assessment Criteria (GAC) where available, including:

- i) **Soil Guideline Values (SGVs):** These have been published by the Environment Agency and are trigger values for screening out low risk areas of land contamination. SGV's give an indication of representative average concentrations of chemicals in soil, below which long-term health risks are likely to be minimal. SGVs have been published for several contaminants including arsenic, cadmium, mercury, nickel, selenium, BTEX, phenols and dioxins, furans and dioxin-like PCB substances for land uses including residential, allotments and commercial. The SGVs have been developed for a sandy loam soil with 6% soil organic matter (SOM) content;
- ii) **Supplementary Screening Values (SSVs):** In addition to the SGVs developed by the EA, other third party organisations have derived SSVs for a wider range of contaminants and land uses using the CLEA Model. Curtins have adopted these numbers where applicable, including those developed by Atkins AtriskSoil™, the LQM/CIEH Suitable for Use Levels (S4UL) and EIC/AGS/CL:AIRE published thresholds;
- iii) **Category 4 Screening Levels (C4SLs):** In March 2014 Defra published C4SLs for arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead. These values were derived to support the revised Part 2A Statutory Guidance issued in 2012 (Ref. 17) in which four categories of contaminated land are included, ranging from Category 1 (significant/high risk) to Category 4 (low risk). C4SLs are not representative of significant possibility of significant harm (SPoSH) and are low risk levels which, and therefore where the C4SLs are not exceeded, land can be demonstrated to be in Category 4 and cannot be determined as contaminated land.

7.1.1 Adopted Soil Human Health GACs Screening Methodology

The proposed site use, as a new single storey, part two storey, 150 bed health care unit, is most analogous with a *Commercial* end-use scenario and so assessment has been undertaken against the following GACs, in order of preference:

1. Environment Agency Soil Guideline Values,
2. CL:AIRE, AGS, EIC. Soil Generic Assessment Criteria for Human Health Risk Assessments,
3. LQM/CIEH 2015 S4ULs for Human Health Risk Assessment, and
4. DEFRA Category 4 Screening Levels.

Atkins At Risk derived Commercial SSV thresholds have been supplemented for VOC and SVOC compounds where thresholds are not available in the GACs for listed above.

The soil organic matter (SOM) content has an influence on the volatilisation of organic contaminants (i.e. the higher the SOM, the lower the volatilisation rate and therefore inhalation exposure risk). Soil organic matter (SOM) values for soils ranged from 0.4% to 14.9%. The high organic content encountered in the soils is typically representative of the shallower Made Ground.

With consideration for a calculated geometric average, soils from the Made Ground determine a SOM of 2.91% while deeper soils maintain a lower valuation of 1.00%. As such, a comparison against Generic Assessment Criteria (GAC) thresholds for a conservative SOM of 2.5% for the Made Ground and 1.0% for the natural ground for *Commercial* end-use has been adopted for made ground and natural soil features respectively.

The adopted GAC's are listed in *Appendix F*.

7.1.2 Generic Assessment Criteria Screening of Soil Laboratory Results

The results of the environmental testing can be referred to in *Appendix C*.

With respect to the proposed *Commercial* end-use of the site, there are no exceedances noted within samples collected.

Concentrations of SVOCs and VOCs were recorded below thresholds where available with many determinands recorded below limits of detection. Concentrations of PCB's were recorded below the Environmental Agency Soil Guidance Values for dioxins, furans and dioxin-like PCBs in Soil.

All soil samples were screened for asbestos. No suspected Asbestos Containing Materials (ACMs) or loose fibres were identified within any of the exploratory hole logs or laboratory screening.

7.2 Controlled Waters

A model for assessing the potential for pollution of controlled waters and for deriving a safe concentration in ground and groundwater is the Environment Agency's publication "Remedial Targets Methodology - Hydrogeological Risk Assessment for Land Contamination" (Ref. 18).

In relation to the standards for controlled waters, there are currently no generic groundwater standards or surface water standards that are necessarily applicable to all sites.

However, dependant on the receptor identified as being at risk, the EU Drinking Water Standards (Ref. 19) and/or Water Framework Directive Ecology Quality Standards (WFD EQS) (Ref. 20) can be utilised as primary screening values in a Tier 1 assessment. These can also be supplemented by World Health Organisation (WHO) guidelines (Ref. 21), where WFD or DWS do not exist.

7.2.1 Adopted Controlled Waters Tier 1 Screening Values and Methodology

The results of laboratory analysis of the groundwater samples taken from BH01, BH02 and BH05 been assessed against UK/EU Drinking Water Standards due to the underlying aquifers (albeit classified as Secondary Undifferentiated/Secondary B/Secondary A and Principal). The adopted Tier 1 Screening Values are listed in *Appendix F*.

7.2.2 Tier 1 Screening of Groundwater Laboratory Results

The results of the environmental testing can be referred to in *Appendix C*. The groundwater samples in BH01 & BH05 were collected from the installation targeting the cohesive Glacial Till whilst the groundwater sample in BH02 was collection from the installation targeting the granular Glaciofluvial deposits.

With respect to the adopted thresholds detailed in *Section 7.3.1*, no exceedances were noted within the recovered groundwater sample for EU DWS thresholds.

8.0 Re-use of Site Soils and Waste Classification

8.1 Re-use of Site Soils

Based on the geochemical testing results presented, it is considered that there is currently no requirement to remove soils on site.

The re-use of site won soils may therefore be undertaken if the following principles are met:

- i) the geotechnical suitability of the material needs to be confirmed;
- ii) the re-use of the material needs to be covered as part of planning approval e.g. site levels maintained within agreed limits;
- iii) the volume of material being re-used needs to be confirmed and traceable; and
- iv) regulatory approval from the relevant authorities has been sought.

These principles are outlined within the CL:AIRE Definition of Waste Code of Practice (V2) and if and where the re-use of site-won soils is proposed as part of the development works it is recommended that a Materials Management Plan is produced in line with the Definition of Waste Code of Practice to detail and document the process.

The made ground and natural soils recorded do not indicate any clear signs that would result in being deemed unacceptable for re-use and re-engineering on site. In the absence of geotechnical classification testing at this stage, it should be assumed that some degree of sorting will be required to allow re-use of soils on site.

In addition all topsoil and material containing organics must be removed and not used as capping however, it is likely it may be possible to re-use as topsoil/Class 5 material elsewhere on site.

It is recommended that further investigation is undertaken to obtain bulk samples of made ground and natural soils to allow classification in accordance with The Specification for Highway Works Series 600 (Ref. 28). Given the large volumes of samples required samples should be obtained through machine excavated trial pits when all areas of the site are accessible.

8.2 Material Classification

Where any site soils are to be moved, disposed of or recovered, guidance on the movement of contaminated soils is provided within the following documents published by the Environment Agency, the Guidance on the classification and Assessment of Waste Technical Guidance WM3 (1st Edition 2015) (Environment Agency, 2015).

Guidance states that the principal contractor (or any other sub-contractor undertaking excavations) should, in conjunction with the proposed disposal facility, use where possible the relevant environmental chemistry analysis results to classify any surplus material identified for off-site disposal. However, it

should be noted that this information is for guidance only and material identified for disposal should be tested and assessed in accordance with WM3 to enable classification during the works.

An initial assessment for the waste classification of the Made Ground soils encountered on site has been carried out through a comparison of the soil testing results against the Tier 1 Thresholds and using the Waste Soils Characterisation Assessment Tool, Cat-WasteSoil developed by McArdle and Atkins. This online tool gives a rapid assessment of contaminated soils and their classification as either hazardous or non-hazardous (stable non-reactive hazardous waste) waste, it should be noted that this tool does not classify inert waste. Persistent Organic Pollutants (POP's) were not tested for as part of the investigation, however based on the Conceptual Site Model the risk of these being present on the site is considered Low.

The initial classification of seventeen Made Ground soil samples collected and analysed during the investigation indicates that fourteen samples may be classed as non-hazardous waste with respect to Environment Agency waste classes, using the guidance given in WM3. Whilst all three natural soil samples collected and analysed during the investigation may be classed as non-hazardous waste.

The initial classification classed three Made Ground samples as hazardous waste for off-site disposal, BH01 at 0.50m bgl, WS02 at 0.45m bgl and TP02 at 0.35m bgl. This is due to the recorded concentrations of hydrocarbons/oils.

Following receipt of chemical analysis results and the preliminary waste classification above, the three samples identified as hazardous were scheduled for Waste Acceptance Criteria (WAC) testing. Given the preliminary classification a 2 stage solid and leachate hazardous WAC suite was undertaken to assess acceptability of material for acceptance in a Hazardous or Stable Non-Reactive Hazardous Waste in Non-Hazardous Waste Landfill. The results are summarised in *Table 8.2* below.

Table 8.2 – Summary of WAC Testing Results

Exploratory Hole ID	Sample Depth (m bgl)	Preliminary Waste Classification	Possible Landfill Class	Notes
BH01	0.50 – 0.60	Hazardous	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	
WS02	0.45	Hazardous	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Total Organic Carbon values indicate hazardous waste landfill but Loss on Ignition does not.
TP02	0.35	Hazardous	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	-

Landfill operators are not obliged to accept waste and, if they were to do so, may have specific requirements beyond those outlined above prior to acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise.

Additional analysis of soils being removed from site may be required to confirm waste materials are compliant with the descriptions above.

9.0 Ground Gas Assessment

The assessment of risk presented by ground gases is assessed with reference to guidance published by CIRIA Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665 (Ref. 22), BSI Publication code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings BS8485:2015 (Ref. 23) and other broadly accepted references such as the Ground Gas Handbook 2009 (Ref. 24).

The gas risk assessment adopts a tiered approach. In the first instance this involves a re-evaluation of the Conceptual Site Model described within the Phase 1 Preliminary Risk Assessment (desk study) (Ref. 1) and thereafter validating this conceptual model with the ground gas data, the semi-quantitative risk assessment.

9.1 Ground Gas Monitoring Results

To characterise the site's ground gas regime and validate the qualitative assessment of ground gas risk standpipe installations were incorporated within all deep borehole locations and three window sample borehole locations as detailed in *Section 3.2*.

An initial programme of six gas monitoring visits over six weeks was proposed. Six gas monitoring visits have been undertaken between 1st September and 5th October 2020, with barometric pressure recorded between 987 and 1025mb. Falling barometric pressure was recorded on the first (01/09), third (17/09) and fourth (24/09) visits, steady on the second (08/09), and fifth (01/10) visits and rising on the sixth (05/10) visit.

The results log sheets are contained within *Appendix E* and summarised in *Table 9.1*.

Table 9.1 – Summary of Ground Gas Monitoring Results

Exploratory Hole ID	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Steady Oxygen Concentration (%)	Maximum Peak Gas Flow (l/hr)	Maximum Steady State Gas Flow (l/hr)
BH01	<0.0	<0.1	20.8	0.1	0.0
BH02	<0.0	0.2	18.0	2.1	0.0
BH03	<0.0	3.8	13.9	20.4	-0.5
BH04	<0.0	0.6	19.7	33.8	0.0
BH05	<0.0	0.5	19.5	26.8	1.5
WS02	<0.0	1.5	16.6	0.0	0.0
WS05	<0.0	0.5	20.3	0.0	0.0
WS07	<0.0	4.2	16.6	0.0	0.0

Methane (CH₄) was recorded below the instrument's detection limit within all the monitoring wells.

Maximum carbon dioxide (CO₂) concentrations were recorded at 4.2% in WS07 on the sixth monitoring visit. Gas flow was recorded at a maximum peak flow rate of 33.8 l/hr in BH04 on the sixth visit, with a maximum steady state flow rate of 1.5l/hr recorded in BH05 on the second visit.

All elevated peak flow rates were consistently recorded in the deep boreholes where the response zone was consistently flooded. It is considered that the high flow rates in these boreholes is likely to be linked to rising shallow groundwater in the solid section of the well installation causing an increase in internal pressure within the pipework, which is released, and subsequently equalised, when the valve tap is opened, resulting in the high observed peak flows preceding the considerably lower steady flow. This affect is detailed within BS8485:2015 (Ref. 23) and CL:AIRE Research Bulletin RB 17 (Ref. 27). These peak flow rates are therefore considered misrepresentative and have been discounted from the hazardous gas screening value calculations in section 9.2, where steady state flow rates have been included instead.

Elevated hydrogen sulphide and carbon monoxide readings were recorded in BH02, with a maximum of 106ppm and 407ppm recorded respectively on the first visit. The source of the high concentrations of hydrogen sulphide and carbon monoxide is unknown however, concentrations of reduced on each monitoring visit, with only 2ppm and 3ppm recorded respectively by the sixth and final visit in BH02. Furthermore, this borehole targets the deep granular Glaciofluvial deposits. Maximum hydrogen sulphide and carbon monoxide concentrations in the shallow monitoring wells were recorded at 2ppm and 7ppm respectively a viable pathway is therefore not considered to exist from this isolated occurrence of elevated hydrogen sulphide and carbon monoxide to the proposed building.

9.2 Ground Gas Assessment

The Conceptual Site Model presented in *Section 2.7* highlighted the Made Ground and infilled land of unknown composition as potential sources of ground gas generation. The report suggests no records of organic rich drift deposits (e.g. peat) being present however historically infilled land of unknown material is recorded 9m southwest of the site. Noxious and asphyxiate gases were attributed to include, but not limited to, carbon dioxide, carbon monoxide, methane and hydrogen sulphide. The Phase 1 identified a **Moderate/Low** Risk.

Made Ground soils were encountered to maximum depths of 1.60m bgl. The ground investigation revealed ground model generally consistent with the preliminary conceptual site model. The natural deposits encountered were Glaciofluvial deposits overlying Glacial Till at depth, with limited organic content identified.

In accordance with BS8485:2015 (Ref. 23) consideration of the recorded soil gas flow rates, presented below, enables hazardous gas flow rates (Q_{hg}) to be evaluated. Q_{hg} can be derived for both 'borehole' and 'worst case check' scenarios and a comparison made in support of an appropriate assessment of ground gas risk. For a 'borehole' scenario (highest hazardous gas flow rate recorded in a single

borehole on any one occasion) steady state flow rates and maximum gas concentrations are adopted, whilst for a 'worst case' scenario (highest Q_{hg} across the entire dataset irrespective of location and discrete monitoring events) peak flows and gas concentrations are adopted, discounting those which have been deemed to be unrepresentative.

Evaluation of the 'borehole' scenario (highest hazardous gas flow rate in a single borehole) records a maximum Q_{hg} of 0.0038 l/hr for carbon dioxide in BH03 on visit 6 within the soils across the site where maximum steady state readings were used. Methane was recorded below the instruments detection limit.

Evaluation of the 'worst case check' scenario (highest Q_{hg} across the entire dataset irrespective of location and discrete monitoring events, discounting those which have been deemed to be unrepresentative) records a maximum Q_{hg} of 0.057 l/hr for carbon dioxide.

Given the completed data set from across the site, with ground gas monitoring completed on six occasions over a period of six weeks and varying atmospheric conditions, the 'borehole' Q_{hg} scenario is deemed representative and has been adopted as the sites GSVs. The hazardous gas flow rates for both carbon dioxide and methane indicate a Characteristic Situation1 (CS1) classification for the site.

The potential risks from ground gases to the excavations are to be dealt with by the Contractor, in accordance with the Confined Space Regulations, during construction. Appropriate ground gas monitoring and safety measures should be in place during the works, as the potential presence of ground gases could pose a risk in any confined spaces of deep excavations.

10.0 Revised Conceptual Site Model

The Preliminary Conceptual Site Model (PCSM) presented *Section 2.7* and discussed in *Section 2.0* of this report has been revised following the GQRA in *Section 7.0* above. The Revised Conceptual Site Model (CSM) is summarised in the table overleaf.

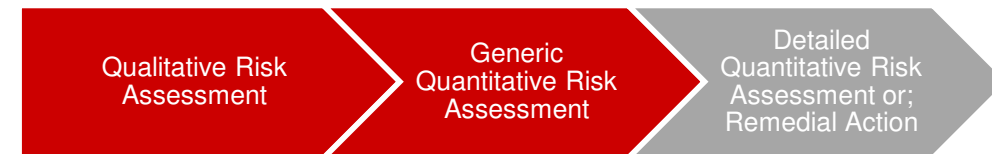
The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified as relevant for the site. The GQRA details the associated level of risk relating to these potential pollutant linkages.

The CSM follows the framework outlined within CIRIA C552 (Ref. 25) which is summarised within *Appendix G*.

The 'risk rating' within the CSM refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

Risks presented by Unexploded Ordnance is discussed and assessed in *Section 2.5*.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 (Ref. 26) which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements and therefore construction workers involved in the building works at the site have been discounted as a human receptor in the conceptual site model. Reference should be given to the environmental testing results discussed within *Section 7.0* and presented within *Appendix C*.



- The table below represents the Second stage in the land quality risk assessment process; the Revised Conceptual Site Model following the Quantitative Risk Assessment.
- For a development site to be deemed 'suitable for use' the level of risk needs to be brought down to acceptable levels, i.e. low to very low risk. The purpose of each stage of risk assessment is ultimately to establish if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.
- In the absence of specific site data, a Generic Quantitative Risk Assessment is invariably recommended.

Conceptual Site Model			Generic Qualitative Risk Assessment			Comments	Action
Identified Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating		
Potential organic and inorganic contamination within Made Ground soils. Hydrocarbon odour observed in WS05 between 0.50m and 1.00m in the Made Ground.	Direct contact and dermal uptake, soil and dust ingestion, dust and migration inhalation (indoor & outdoor air)	Commercial end users	Medium Human Health Risk	Unlikely	Low	No evidence of free product or gross contamination was evident during the ground investigation.	Ensure suitable PPE, sanitary facilities and environmental controls are in place during construction.
		Construction and maintenance workers				No exceedances in the Made Ground and natural when compared to Commercial end-use thresholds including in sample taken from WS05 where a hydrocarbon odour was observed.	
	Soil dust ingestion/inhalation produced during construction	Adjacent residents				No exceedances identified within SVOC, VOC or speciated PCB test results.	
	Vertical and horizontal migration of soluble phase contamination through groundwater.	Controlled Waters (Surface Water) Nearest surface water is the River Irk 270m east.	Mild	Unlikely	Very Low	No evidence of free product or gross contamination was evident during the ground investigation. Significant distance for contamination to migrate to reach the River Irk.	No further action required.
	Vertical and horizontal migration of soluble phase contamination through superficial deposits and bedrock.	Controlled Waters (Groundwater) Secondary Undifferentiated and Secondary B Aquifers (Superficial) Secondary A and Principal Aquifer (Bedrock) Not within a Source Protection Zone (SPZ).	Medium	Unlikely	Low	No evidence of free product or gross contamination was evident during the ground investigation. Three water samples were taken at depth within BH01, BH02 and BH05; no exceedances were noted when screened against DWS thresholds.	
Potential ground gas generation from Made Ground containing organic/putrescible content on site and off site.	Ground gas & vapour migration and inhalation. Vertical and horizontal migration through existing service corridors and the underlying superficial deposits.	Site End Users	Medium Human Health Risk	Unlikely	Low	Using the 'borehole' scenario, due to a full data set within varying pressures, the calculated Q_{hg} for the site was 0.0038 l/hr for carbon dioxide. Methane was recorded below the instruments limit of detection. Characteristic Gas Situation is assessed as CS1 no gas protection measures are required in accordance with BS8485.	No further action required.

10.1 Summary of Potential Pollutant Linkages

A **Low** risk rating is identified to site end-users and construction workers from contamination in made ground soils through direct contact, dermal uptake, inhalation and ingestion of soil derived dust. No further action is required.

A **Low** and **Very Low** risk rating is identified to controlled waters (Groundwater and Surface Waters) following the ground investigation given; no major sources of contamination were identified in soils, the site is not situated within a source protection zone, no exceedances of EU DWS were recorded in obtained groundwater samples and the significant distance to nearest surface water feature.

A **Low** risk rating is identified to site end users from ground gases arising from Made Ground and natural soils migrating into buildings and subsequent inhalation by on-site employees. This corresponds to a Characteristic Gas Situation assessed as CS1, therefore no gas protection measures are required.

11.0 Geotechnical Assessment and Recommendations

11.1 Introduction

This section will discuss the ground conditions encountered across the site and provide recommendations for geotechnical engineering design. The proposed development plan is contained within *Appendix A*.

At the time of writing this report, preliminary structural loadings had been provided as follows; Circa 750kN maximum foundation loads on the western side (two storey) and circa 350 kN maximum foundation loads on the eastern side (single storey). Any changes in the development of designs beyond the issue of this Ground Investigation Report to the client, should be further investigated by the Construction Designer.

11.2 Summary of Ground Conditions

The ground conditions at the site generally comprised Made Ground, overlying granular and cohesive Glaciofluvial deposits overlying cohesive Glacial Till deposits at depth. The superficial deposits comprise a firm to stiff slightly sandy to sandy slightly gravelly to gravelly Clay, a soft to very stiff slightly sandy to sandy slightly gravelly Silt, or a medium dense to very dense slightly gravelly clayey or silty fine to coarse Sand. Bedrock was not encountered.

11.3 Foundation Solutions

It is understood that the proposed development comprises a new single storey, part two storey, 150 bed health care centre following demolition and a cut and fill operation.

Groundwater levels during the monitoring visits were recorded between 1.80m and 11.25m bgl.

The ground conditions were determined to predominantly comprise Made Ground to a maximum depth of 1.60m bgl, underlain by a firm cohesive glaciofluvial deposits and medium dense to very dense granular glaciofluvial deposit to depths of between 13.70m – 23.00m bgl. The glaciofluvial deposits were underlain by very stiff cohesive glacial till deposits to the base of the boreholes.

However, in a number of window sample boreholes, soft and loose deposits were encountered to depths of up to 3m bgl. In addition, a number of layers indicating extremely low strength and very low strength clays were encountered at depth, determined based on the lab results and the log descriptions. Therefore, it is anticipated that the ground conditions across the site are highly variable both laterally and vertically. In addition, a cut and fill exercise is proposed across the site, which will result in potential changes in net load across the site. The cut and fill areas in relation to the foundation dimensions and

founding levels are currently unknown. During detailed design, assessment of foundations, levels, shape and founding stratum will be required to be completed.

Preliminary assessments indicate that an allowable bearing capacity of 90kPa for 1m wide strips or pads is acceptable, overlaying the dense granular deposits, outside influence zone of groundwater level. However, any changes to the foundation width, shape or founding level will result in a change in these capacities. In addition, any changes to site levels could result in changes to the acceptable loads to be founded on the ground, as the net loads may increase or decrease. Where foundations are to be placed at close proximity to the cohesive deposits (i.e. within 3 times the width of a foundation), settlement assessment must be undertaken on a foundation by foundation basis.

In addition, currently, the area of soft to loose deposits recorded to 3m bgl should be excavated prior to constructions works, however they may be eliminated as a part of the cut and fill exercise. If these are in locations where fill is to be undertaken, they may require some form of improvement to achieve a better less compressible state.

In addition, where cut and fill exercises result in the foundations being placed within the groundwater influence zones, the bearing capacities can be up to half the presumed values.

The foundations shall be designed carefully to mitigate any issues relevant to differential settlement. This is therefore required further detailed design by a geotechnical engineer, once cut and fill areas in relation to the proposed foundations shape and loads are known. The foundations cannot span over granular and cohesive fill. They also must be carefully designed where some foundations are placed across areas of fill and some are placed across areas of cut.

Topsoil, Made Ground and areas of soft compressible material, at foundation level must be removed and replaced with suitable compacted granular fill, in accordance with Series 600 Specification for Highways Works (SHW).

A qualified experienced engineer must inspect the founding stratum prior to commencement of the construction works.

11.4 Ground Floor Slabs

Proposed slab loads are understood to be in the region of 13.5 kN/m². The suitable ground floor slabs for the proposed care unit development is dependent on the foundation solution.

Ground bearing floor slabs should not span granular and made ground soils due to potential for differential settlement. For this reason, a suspended floor slab should be considered.

It may be possible to re-engineer the existing made ground to adopt a ground bearing floor slab, subject to proposed review of founding levels, loadings, detailed settlement analysis and additional laboratory/ in-situ testing.

11.5 Soakaways

Three falling head tests were undertaken within two window sample locations with the results included in Table 11.5. The falling head log test sheets are included within Appendix E.

Location	Test 1 Permeability Coefficient	Test 1 Permeability Coefficient	Test 1 Permeability Coefficient
WS02	1.24×10^{-4} m/s	9.63×10^{-5} m/s	1.17×10^{-4} m/s
WS05	1.23×10^{-4} m/s	1.83×10^{-5} m/s	1.21×10^{-5} m/s

The results suggest soakaway drainage may be feasible in parts of the site within shallow granular Glaciofluvial deposits. Where soakaways are being considered it is recommended that soakaway test are undertaken in accordance with BRE 365 at the proposed locations and depths.

11.6 Chemical Attack on Buried Concrete

The site has been classified in accordance with BRE Special Digest 1 (Ref. 16) and laboratory testing undertaken accordingly in *Section 7.0*. Based on the laboratory test results it is considered that a Design Sulphate Class may be taken as DS-1 with an ACEC class of AC-2 for the Made Ground, and DS-1 with an ACEC class of AC-1 for the glaciofluvial deposits and glacial till deposits.

11.7 Excavation and Support

Based on observations on site, together with the results of in-situ and laboratory test results, it is considered that excavations to <1.20m bgl should stand unsupported in the short term at suitable where required. Local instability should be expected where greater proportions of degradable or unsuitable material are encountered. Attention should be given to limiting the duration over which excavations remain exposed to water ingress as both the residual soils and bedrock deposits may undergo rapid loss of strength and possible heave if wetted excessively.

In accordance with Health and Safety Regulations, side support for safety purposes should be provided to all excavations which appear unstable and those more than 1.20m deep. Excavations shallower than 1.20m deep, requiring personnel access, will require closed side support.

Where slopes are required as a part of the temporary works, a specialist temporary works designer must be consulted to advise on suitable battering angles.

Excavation through layers of Made Ground and Glacial Till should be feasible using conventional site plant. Following periods of heavy rainfall, the use of a tracked excavator may be required to prevent plant subsidence.

Groundwater may be encountered as seepages in shallow excavations for foundations or services as perched water present. It is considered that groundwater inflows, if encountered, may be controlled by pumping from sumps.

12.0 Geo-environmental Conclusions & Recommendations

12.1 Conclusions

12.1.1 Ground and Groundwater Contamination

The environmental chemistry soil results have been compared with the Generic Assessment Criteria (GAC) for soils with respect to human health against “*Commercial*” thresholds.

With respect to the proposed end-use of the site no exceedances are been noted with respect to the GAC thresholds.

No suspected asbestos containing materials (ACMs) or loose fibres were identified within any of the exploratory hole logs or laboratory screening.

A **Low** risk rating is identified to site end-users and construction workers from direct contact and dermal uptake and/or inhalation and ingestion of soil derived dust. No remedial action is recommended however it is advised that construction workers are provided with suitable PPE and sanitary facilities.

Three water samples were taken at depth within BH01, BH02 and BH05; no exceedances were noted when screened against EU DWS thresholds.

A **Very Low** and **Low** risk rating is therefore identified to controlled waters (Groundwater and Surface Waters) also considering the lack of sources identified in the ground investigation and the significant distance to nearest surface water feature.

During the ground gas monitoring programme methane (CH₄) was recorded below the instrument’s detection limit within all the monitoring wells.

Maximum carbon dioxide (CO₂) concentrations were recorded at 4.2% in WS07 on the sixth monitoring visit. Gas flow was recorded at a maximum peak flow rate of 33.8 l/hr in BH04 on the sixth visit.

A Gas Screening Value of 0.0038 l/hr for carbon dioxide, while methane was recorded below the detection limit. The site has therefore been classified as Characteristic Situation 1.

A **Low** risk rating is identified to site end users from ground gases arising from Made Ground and natural soils migrating into buildings and subsequent inhalation by on-site employees. This corresponds to a Characteristic Gas Situation assessed as CS1, therefore no gas protection measures are required.

12.2 Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

- 1) Further geotechnical classification testing for made ground and natural soils to inform re-use, to be undertaken as part of demolition works. Testing requirements to be detailed in an earthworks specification.
- 2) It is recommended that construction workers ensure suitable environmental controls are in place and provide staff with appropriate PPE and sanitary facilities, with reference to the environmental testing results presented herein and within *Appendix C*.
- 3) Should unexpected contamination be observed during construction advice should be obtained from a Geo-environmental Engineer.

13.0 References

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Appendix A – Drawings

- Curtins (2020) Exploratory Hole Location Plan
- Development Plans



CABLE PERCUSSIVE BOREHOLE LOCATION



WINDOW SAMPLE BOREHOLE LOCATION



HAND EXCAVATED FOUNDATION PIT LOCATION



HAND EXCAVATED TRIAL PIT LOCATION

Rev:	Description:	Date:	By:	Chkd:
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Status:

INFORMATION

Project:

NEW PARK HOUSE

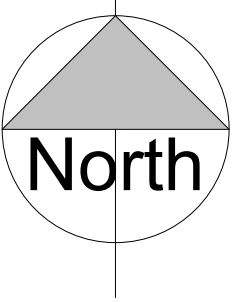
Drg Title:

EXPLORATORY HOLE LOCATION PLAN

Scale:	Size:	First Issue:	Drawn:	Checked:
NTS	A3	27/08/2020	MH	ZH

Drg No:	Rev:
075856-CUR-00-XX-DR-GE-80006	V01

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t: 01257 260070 f: 01257 260071

Client Name:



PSCP:



Site Name:

Land at Trust HQ building, North Manchester General Hospital

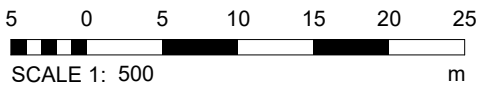
Project Name:

New Park House

Drawing Title:

Planning - Proposed Site Plan

Project No: 8360	Sheet Size: A1	Scale: 1 : 500	Purpose of Issue: Planning
Drawn by: KW	Checked by: RG	Approved by: AA	Revision: P01
Suitability: For Information			Status: S2
Drawing Number: NMGNPH-GDA-ZZ-ZZ-DR-A-9003			



Appendix B – Exploratory Hole Logs

- Cable Percussive Borehole Logs
- Window Sample Borehole Logs
- Hand Dug Trial Pit Logs
- Hand Dug Foundation Pit Logs
- Hand Dug Foundation Pit Cross Section Sketches



Borehole Log

Borehole No.

BH01

Sheet 1 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384918.48 - 402256.61

Hole Type
CP

Location: North Manchester General Hospital

Level: 73.31

Scale
1:50

Client: North Manchester General Hospital

Dates: 20/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
1		0.15 - 0.30	B		0.15	73.16		MADE GROUND: Black tarmacadam.	
		0.30 - 1.20	B		0.30	73.01		MADE GROUND: Reddish brown tiling over dark grey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of tarmac, brick and tile.	
		0.50 - 0.60	ES		0.40	72.91		MADE GROUND: Concrete.	
		1.20 - 1.60	B	N=10 (1,2/3,3,2,2)	1.50	71.81		MADE GROUND: Brownish grey gravelly fine to coarse sand with low cobble content. Gravel is angular to subangular fine to coarse of brick. Cobbles are subangular of brick.	1
		2.00 - 2.45	B	N=5 (1,1/1,1,1,2)				Medium dense brown slightly gravelly fine to coarse SAND with occasional sandy clay bands. Gravel is angular to subangular fine to medium of sandstone.	2
		2.50 - 2.60	ES					From 1.50 to 2.00m loose.	
		3.00 - 3.45	B	N=26 (3,3/4,5,8,9)				From 3.00 to 3.50m dense.	3
		3.00 - 3.45	D						
		4.00 - 4.45	B	N=22 (5,6/5,5,6,6)					4
		4.00 - 4.45	D						
		5.00 - 5.45	B	N=19 (4,4/4,5,5,5)					5
		5.00 - 5.45	D						
		6.00 - 6.45	B	N=11 (2,2/3,3,2,3)					6
		6.00 - 6.45	D						
		7.00 - 7.95	B	N=14 (1,1/2,3,3,6)					7
		7.00 - 7.95	D						
		8.50 - 9.45	B	N=13 (2,2/3,3,4,3)					8
		8.50 - 9.45	D						
		9.00 - 9.45	B						9
		9.00 - 9.45	D						
		10.00	D						10

Continued on next sheet

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 16.50m.





Borehole Log

Borehole No.

BH01

Sheet 2 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384918.48 - 402256.61

Hole Type
CP

Location: North Manchester General Hospital

Level: 73.31

Scale
1:50

Client: North Manchester General Hospital

Dates: 20/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 10.50 - 10.95 10.50 - 10.95	B D	N=4 (3,3/1,1,1,1)	13.70	59.61		From 10.50 to 13.50m loose.	
		11.50	D						
		12.00 12.00 - 12.45	B	N=5 (1,1,1,1,2)					
		13.00	D						
		13.50 13.50 - 13.95 13.50 - 13.95	B D	N=15 (1,1/3,3,3,6)					
		14.50	D						
		15.00 - 15.45	U	Ublow=120					
		15.50	D						
		16.00	D						
		16.50 16.50 - 16.95 16.50 - 16.95	B D	50 (6,6/50 for 295mm)					
		17.50	D						
		18.00 18.00 - 18.45 18.00 - 18.45	B D	N=50 (8,8/50 for 285mm)					
		19.00	D						
		19.50 - 19.95	U	Ublow=105					
		20.00	D						

Continued on next sheet

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 16.50m.





Borehole Log

Borehole No.

BH01

Sheet 3 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384918.48 - 402256.61

Hole Type
CP

Location: North Manchester General Hospital

Level: 73.31

Scale
1:50

Client: North Manchester General Hospital

Dates: 20/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		21.00 21.00 21.00 - 22.00	D B	N=41 (8,9/9,10,11,11)					21
		22.50 - 22.95 23.00	U D	Ublow=110					22 23
		24.00 24.00 24.00 24.00 - 25.00	D D D B	N=43 (7,8/10,11,10,12)	25.00	48.31			24
									25
								End of borehole at 25.00 m	25
									26
									27
									28
									29
									30

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 16.50m.





Borehole Log

Borehole No.

BH02

Sheet 1 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384998.01 - 402197.17

Hole Type
CP

Location: North Manchester General Hospital

Level: 78.55

Scale
1:50

Client: North Manchester General Hospital

Dates: 19/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20	78.35		MADE GROUND: Black tarmacadam.	
		0.50			0.50	78.05		MADE GROUND: Brown and grey sandy angular to subangular fine to coarse gravel of dolomite hardcore and tarmacadam. Sand is fine to coarse.	
		1.00	ES		1.00	77.55		MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of brick.	1
		1.20		N=13 (3,3/3,4,3,3)	1.20	77.35		MADE GROUND: Brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick and terracotta.	
		2.00	B					Medium dense greyish brown slightly clayey fine to coarse SAND frequently interbedded with thin to thick bands of clay.	2
		2.00		N=15 (3,3/4,3,4,4)					
		2.00 - 2.45	D						
		3.00	B						3
		3.00		N=29 (6,5/6,7,8,8)					
		3.00 - 3.45	D						
		4.00	B						4
		4.00		N=23 (5,6/5,4,8,6)					
		4.00 - 4.45	D						
		5.00	B						5
		5.00		N=17 (4,4/4,5,4,4)					
		5.00 - 5.45	D						
		6.50 - 6.95	U	Ublow=42					6
		7.00	D						7
		8.00		N=18 (3,4/4,4,5,5)					8
		8.00 - 8.45	D					From 8.00 to 11.00m thinly to thickly spaced thin laminations of black sand.	
		9.00 - 9.95	D						9
		9.50		N=17 (4,4/4,4,4,5)					10

Continued on next sheet

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 14.50m.





Borehole Log

Borehole No.

BH02

Sheet 2 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384998.01 - 402197.17

Hole Type
CP

Location: North Manchester General Hospital

Level: 78.55

Scale
1:50

Client: North Manchester General Hospital

Dates: 19/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		11.00 11.00 - 11.45	D	N=21 (5,5/6,5,5,5)				From 14.90 to 15.00m soft grey slightly sandy silty clay. Sand is fine to medium.	11			
		12.50 12.50 - 12.95	D	N=18 (4,4/4,4,5,5)					12			
		14.00 14.00 - 14.45	D	N=21 (4,5/5,5,6,5)					13			
		15.50 15.50 - 15.95	D	N=29 (6,6/6,7,8,8)					14			
		17.00 17.00 - 17.45	D	N=18 (4,4/4,5,4,5)					15			
		18.50 - 18.95	U	Ublow=100					16			
		19.00	D						17			
		20.00		N=42 (6,6/7,9,11,15)					18			
		Continued on next sheet										

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 14.50m.





Borehole Log

Borehole No.

BH02

Sheet 3 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384998.01 - 402197.17

Hole Type
CP

Location: North Manchester General Hospital

Level: 78.55

Scale
1:50

Client: North Manchester General Hospital

Dates: 19/08/2020 - 21/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00 - 20.45	D						21
		21.50 - 21.95	U	Ublow=100					22
		23.00 - 23.45	D		23.00	55.55		Very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone.	23
					25.00	53.55		End of borehole at 25.00 m	25
									26
									27
									28
									29
									30

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 14.50m.





Borehole Log

Borehole No.

BH03

Sheet 1 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384886.26 - 402160.40

Hole Type
CP

Location: North Manchester General Hospital

Level: 74.95

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 18/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.50	74.45		Grass over TOPSOIL: Brown slightly sandy slightly gravelly clay with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to medium of brick and slate.	
					0.70	74.25		MADE GROUND: Dark brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick.	1
		1.20		N=6 (1,1/1,2,1,2)				Dense brown slightly gravelly clayey fine to coarse SAND intermittently interbedded with thin to thick clay bands. Gravel is angular to subangular fine to coarse of sandstone.	
		1.20 - 1.65	D						
		2.00	B						2
		2.00		N=13 (2,3/3,3,4,3)					
		2.00 - 2.45	D						
		3.00	B						3
		3.00		N=15 (2,3/3,4,4,4)				From 3.00 to 4.00m slightly sandy gravelly clay.	
		3.00 - 3.45	D						
		4.00		N=20 (3,4/5,4,6,5)					4
		4.00 - 4.45	D						
		5.00	B						5
		5.00		9 (3,3/9 for 225mm) Ublow=67					
		5.00 - 5.45	U						
		5.50	D					From 5.50 to 7.00m thinly to thickly spaced thin laminations of black sand.	
		6.00		N=14 (3,4/3,4,3,4)					6
		6.50 - 6.95	D						7
		7.50		N=16 (3,3/6,4,3,3)					
		8.00 - 8.45	D						8
		9.00		N=15 (3,3/4,3,4,4)					9
		9.50 - 9.95	D						10

Continued on next sheet

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.80m.





Borehole Log

Borehole No.

BH03

Sheet 2 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384886.26 - 402160.40

Hole Type
CP

Location: North Manchester General Hospital

Level: 74.95

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 18/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50		N=11 (1,1/1,3,3,4)					
		11.00 - 11.45	D						11
		12.00		N=10 (1,2/2,2,3,3)					12
		12.50	D						13
		13.50		N=10 (1,2/3,2,3,2)					14
		14.00 - 14.45	D						15
		15.00		N=12 (2,3/2,3,3,4)					16
		15.50 - 15.95	D						17
		16.50		N=44 (6,7/9,11,11,13)					18
		17.00 - 17.45	U						19
		17.50	D						20
		18.00		N=49 (7,9/10,12,12,15)	17.80	57.15		Very stiff brown silty CLAY.	18
		18.50 - 18.95	D						19
		19.50		N=43 (7,7/7,10,12,14)					20
		20.00 - 20.45	U		20.00	54.95		Continued on next sheet	20

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.80m.





Borehole Log

Borehole No.

BH03

Sheet 3 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384886.26 - 402160.40

Hole Type
CP

Location: North Manchester General Hospital

Level: 74.95

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 18/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.50	D					Very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone.	21
		21.00		N=50 (8,10/50 for 290mm)					
		21.50 - 21.95	D						22
		22.50		N=50 (10,10/50 for 265mm)					23
		24.00		N=48 (8,10/10,12,12,14)	24.00	50.95			24
								End of borehole at 24.00 m	25
									26
									27
									28
									29
									30

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.80m.





Borehole Log

Borehole No.

BH04

Sheet 1 of 2

Project Name: New Park House

Project No.
075856

Co-ords: 384932.21 - 402071.46

Hole Type
CP

Location: North Manchester General Hospital

Level: 78.63

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 18/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	78.53		MADE GROUND: Black tarmacadam.	
		0.40 - 0.50	ES		0.35	78.28		MADE GROUND: Dark grey very sandy angular to subrounded fine to coarse gravel of brick and dolomite hardcore. Sand is fine to coarse.	
		1.00 - 1.10	ES		0.70	77.93		MADE GROUND: Brown mottled black slightly sandy gravelly clay with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick and dolomite hardcore. Cobbles are angular of brick.	1
		1.20		N=16 (1,3,4,4,5)				Medium dense brown slightly gravelly fine to coarse SAND. Gravel is subangular fine of sandstone.	
		1.40	D					From 0.70 to 0.80m very clayey.	
		2.00		N=16 (2,2/4,4,5,5)				From 1.20 to 1.40m firm slightly sandy slightly gravelly clay.	2
								From 1.40 to 2.00m no recovery.	
								From 2.00 to 2.10m firm slightly sandy slightly gravelly clay.	
								From 2.10 to 3.50m no recovery.	
									3
		3.50		N=19 (2,3/5,2,3,9)				From 2.50 to 4.50m firm slightly sandy slightly gravelly clay.	
									4
		4.50	D					From 4.50 to 5.00m no recovery.	
		5.00		N=20 (2,1/4,4,4,8)				From 5.00 to 5.20m firm slightly sandy slightly gravelly clay.	5
								From 5.20 to 7.00m no recovery.	
									6
		6.50		N=45 (2,4/6,11,14,14)				From 6.50 to 8.00m very dense.	
					7.00	71.63		Very stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to medium of mudstone.	7
		7.80	D					From 7.00 to 8.00m stiff slightly sandy slightly gravelly clay.	
		8.00		N=50 (3,3/50 for 235mm)					8
		9.50	D						9
		9.50		N=41 (1,3/5,7,13,16)	9.50	69.13		Dense slightly silty fine to coarse SAND.	10
								From 9.50 to 9.70m no recovery.	
								From 9.70 to 9.85m firm brown sandy clay.	
								Continued on next sheet	

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Open hole from 17.00m. Groundwater unable to be recorded.





Borehole Log

Borehole No.

BH04

Sheet 2 of 2

Project Name: New Park House

Project No.
075856

Co-ords: 384932.21 - 402071.46

Hole Type
CP

Location: North Manchester General Hospital

Level: 78.63

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 18/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00 11.00	D	N=52 (4,9/52 for 190mm)				From 9.85 to 11.00m no recovery.	11
		12.50		N=31 (2,5/6,7,8,10)				From 11.00 to 20.00m interbedded sand (no recovery) with thin clay bands.	12
		14.00		N=32 (2,4/6,6,10,10)					13
		15.50		N=32 (2,2/7,7,8,10)					14
		17.00		N=28 (3,5/9,9,4,6)					15
		18.50		N=29 (3,5/7,7,7,8)					16
		20.00		N=49 (3,4/7,9,13,20)	20.00	58.63		End of borehole at 20.00 m	17
									18
									19
									20

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Open hole from 17.00m. Groundwater unable to be recorded.





Borehole Log

Borehole No.

BH05

Sheet 1 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384851.68 - 402084.88

Hole Type
CP

Location: North Manchester General Hospital

Level: 76.51

Scale
1:50

Client: North Manchester General Hospital

Dates: 12/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.40	ES		0.20	76.31		MADE GROUND: Black tarmacadam with decorative gravel.	
					0.70	75.81		MADE GROUND: Light grey mottled brown very gravelly fine to coarse sand with low cobble content. Gravel is angular to subangular fine to coarse of brick, concrete and dolomite hardcore.	
		1.20		N=11 (2,3/2,2,3,4)				Firm brown mottled grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to medium of sandstone.	1
		1.20 - 1.65	D		1.65	74.86			
		2.00	B					Medium dense brown slightly gravelly clayey fine to coarse SAND. Gravel is angular to subangular fine to coarse of sandstone.	2
		2.00 - 2.45	D	N=18 (3,3/4,4,4,6)					
		2.50	B						
		3.00		N=16 (3,4/4,3,4,5)					3
		3.00 - 3.45	D						
		4.00 - 4.45	B	Ublow=56					4
		4.50	D						
		5.00		N=19 (4,4/5,5,4,5)					5
		5.00 - 5.45	D						
		6.50		N=35 (5,10/35 for 235mm)					6
		6.50 - 6.95	D						
		8.00		N=21 (4,4/5,5,5,6)					8
		8.00 - 8.45	D						
		9.50		N=20 (4,5/5,4,5,6)					9
		9.50 - 9.95	D						
									10

Continued on next sheet

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.00m.





Borehole Log

Borehole No.

BH05

Sheet 2 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384851.68 - 402084.88

Hole Type
CP

Location: North Manchester General Hospital

Level: 76.51

Scale
1:50

Client: North Manchester General Hospital

Dates: 12/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00 11.00 - 11.45	D	N=18 (3,3/4,4,5,5)	14.50	62.00		Stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of sandstone.	11
									12
		12.50 12.50 - 12.95	D	N=15 (4,4/3,4,4,4)					13
		14.00 14.00	D	N=15 (3,3/4,4,3,4)					14
		15.50 15.50 - 15.95	D	N=19 (4,4/5,4,5,5)					15
									16
		17.00 - 17.45	B	Ublow=46					17
		17.50	D						18
		18.50 18.50 - 18.95	D	N=51 (7,9/12,12,12,15)			<i>From 18.50 to 21.50m very stiff.</i>	19	
		20.00 - 20.50	B	Ublow=100				20	
Continued on next sheet									

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.00m.





Borehole Log

Borehole No.

BH05

Sheet 3 of 3

Project Name: New Park House

Project No.
075856

Co-ords: 384851.68 - 402084.88

Hole Type
CP

Location: North Manchester General Hospital

Level: 76.51

Scale
1:50

Client: North Manchester General Hospital

Dates: 12/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.50	D						21
		21.50		N=60 (10,15/60 for 105mm)					22
		21.50 - 21.95	D						23
		23.00 - 23.45	B	Ublow=100					24
		23.50	D						25
		24.50		N=60 (10,12/60 for 95mm)					26
		24.50 - 24.95	D		25.00	51.50			27
								End of borehole at 25.00 m	28
									29
									30

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.
Groundwater encountered at 18.00m.





Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 385005.67 - 402230.60

Hole Type
WS

Location: North Manchester General Hospital

Level: 75.74

Scale
1:50

Client: North Manchester General Hospital

Dates: 18/08/2020 - 18/08/2020

Logged By
MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.32	75.42		Grass over TOPSOIL: Dark brown slightly silty fine and medium sand. Frequent rootlets, occasional roots.	
		1.20			0.60	75.14		MADE GROUND: Brown sandy slightly gravelly clay and clayey slightly gravelly sand. Gravel is fine and medium angular to subangular brick. (Reworked)	1
		1.20 - 2.00	B	N=15 (2,2/3,3,4,5)				Medium dense light brown fine and medium SAND. Pockets of silty fine and medium sand.	
		2.00		N=15 (3,3/5,4,4,2)					2
		3.00		N=8 (3,1/2,2,2,2)	2.60	73.14		Soft brown sandy SILT. Rare gravel of fine, angular to subangular sandstone and coal.	3
		4.00		N=19 (4,4/4,5,5,5)	3.20	72.54		Medium dense brown silty slightly gravelly fine and medium SAND. Gravel is fine angular to subangular sandstone and coal.	4
		5.00		N=20 (5,5/5,6,5,4)	4.00	71.74		Medium dense light brown fine and medium SAND.	5
					5.45	70.28		End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.





Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384957.30 - 402201.91

Hole Type
WS

Location: North Manchester General Hospital

Level: 74.93

Scale
1:50

Client: North Manchester General Hospital

Dates: 18/08/2020 - 18/08/2020

Logged By
MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.12	ES		0.12	74.81		MADE GROUND: Black tarmacadam.	
		0.25			0.25	74.68		MADE GROUND: Yellowish grey sandy gravel.	
		0.30			0.30	74.63		MADE GROUND: Reddish brown gravelly fine to coarse sand.	
		0.50			0.50	74.43		MADE GROUND: Black tarmacadam.	
		0.90	N=12 (3,3/2,3,4,3)		0.90	74.03		MADE GROUND: Reddish brown gravelly fine to coarse sand.	
		1.20			1.20			MADE GROUND: Reddish brown gravelly fine to coarse sand.	
		2.00			2.00			MADE GROUND: Reddish brown gravelly fine to coarse sand.	
		2.40 - 3.00	B		2.20	72.73		Loose brown clayey fine and medium SAND.	
		3.00			3.00			Loose brown clayey fine and medium SAND.	
		3.50	D		3.50	71.43		Soft brown silty slightly sandy CLAY.	
		4.00			4.00			Soft brown silty slightly sandy CLAY.	
		4.80			4.80	70.13		Medium dense brown clayey fine and medium SAND.	
		5.00			5.00			Medium dense brown clayey fine and medium SAND.	
		5.45			5.45	69.48		End of borehole at 5.45 m	

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.





Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384918.90 - 402148.01

Hole Type
WS

Location: North Manchester General Hospital

Level: 77.96

Scale
1:50

Client: North Manchester General Hospital

Dates: 17/08/2020 - 17/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.40	ES		0.40	77.56		Grass over TOPSOIL: Dark grey gravelly fine to coarse sand with frequent rootlets. Gravel is subangular fine to coarse of brick.	1
		1.20 1.40	D	N=8 (2,2/2,1,2,3)	1.30	76.66		Firm brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of sandstone and mudstone.	
		2.00		N=13 (2,2/2,3,4,4)	2.00	75.96		Soft grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of mudstone.	2
		3.00		N=51 (8,10/10,12,13,16)	3.00	74.96		Firm to stiff brownish grey sandy CLAY. Sand is fine to medium.	3
		4.00		N=37 (10,12/8,9,10,10)				Dense brown fine to coarse SAND with occasional very closely spaced thin laminations of dark grey coaly sand.	4
		5.00		N=70 (8,10/13,19,18,20)					5
					5.45	72.51		End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl.





Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384974.24 - 402118.08

Hole Type
WS

Location: North Manchester General Hospital

Level: 77.91

Scale
1:50

Client: North Manchester General Hospital

Dates: 17/08/2020 - 17/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	77.76		MADE GROUND: Paving slab.	
		0.40 - 0.50	ES					MADE GROUND: Brown slightly gravelly slightly clayey fine to coarse sand. Gravel is angular to subrounded fine to coarse of slate ad brick.	
								From 0.70 to 1.20m very clayey.	1
		1.20		N=20 (5,4/5,5,5,5)	1.10	76.81		Dense brown fine to coarse SAND.	
		2.00		N=7 (1,1/2,1,2,2)	2.00	75.90		Firm grey sandy CLAY. Sand is fine to coarse.	2
		2.00 - 2.50	B					From 2.70 to 3.00m very sandy.	
		3.00		N=65 (8,13/15,16,16,18)	3.00	74.90		Very dense brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium of mudstone.	3
					3.50	74.40		End of borehole at 3.50 m	4
									5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. Refusal at 3.00m, unable to advance past 3.50m.





Borehole Log

Borehole No.

WS05

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384972.87 - 402159.96

Hole Type
WS

Location: North Manchester General Hospital

Level: 78.56

Scale
1:50

Client: North Manchester General Hospital

Dates: 17/08/2020 - 17/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25 - 0.30	ES		0.10 0.25	78.46 78.31		MADE GROUND: Black tarmacadam. MADE GROUND: Dark grey gravelly fine to coarse sand., Gravel is angular to subangular fine to coarse of brick and tarmacadam. MADE GROUND: Brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick, slate and dolomite hardcore. Slight hydrocarbon odour noted. Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone. Slight hydrocarbon odour noted.	1
		1.20 1.20	D	N=12 (2,2/2,3,3,4)	1.00	77.56			
		2.00		N=26 (5,5/6,6,7,7)	2.00	76.56			2
		3.00		N=42 (6,5/6,11,13,12)					3
		3.50	B						
		4.00		N=79 (7,10/12,15,20,32)					4
					4.45	74.11		End of borehole at 4.45 m	5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. Terminated at 4.00m due to refusal, unable to advance.





Borehole Log

Borehole No.

WS06

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384910.29 - 402120.75

Hole Type
WS

Location: North Manchester General Hospital

Level: 77.80

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 0.60	ES		0.30	77.50		MADE GROUND: Concrete slab with rebar.	
					1.00	76.80		MADE GROUND: Brown and black gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of concrete, brick and dolomite hardcore.	1
		1.20		N=11 (1,2/3,3,3,2)				Medium dense brown slightly clayey fine to coarse SAND.	2
		2.00		N=6 (1,1/1,2,1,2)					
		2.70	D		2.50	75.30		Firm dark grey sandy CLAY. Sand is fine to coarse.	3
		3.00		N=20 (3,4/5,4,6,5)					
		4.00		N=22 (4,7/6,7,5,4)					4
					4.45	73.35		End of borehole at 4.45 m	5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. No SPT at 5.00m due to collapse of hole to 3.40m.





Borehole Log

Borehole No.

WS07

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384893.84 - 402062.25

Hole Type
WS

Location: North Manchester General Hospital

Level: 77.05

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30			0.30	76.74		MADE GROUND: Black tarmacadam with decorative gravel.	
		0.70			0.70	76.34		MADE GROUND: Light grey mottled brown very gravelly fine to coarse sand with low cobble content. Gravel is angular to subangular fine to coarse of brick, concrete and dolomite hardcore.	
		1.10			1.10	75.94		Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of sandstone.	1
		2.00			2.00			Medium dense brown slightly gravelly clayey fine to coarse SAND. Gravel is angular to subangular fine to coarse of sandstone.	2
		3.00			3.00			From 3.00 to 3.30m slightly clayey.	3
		4.00			4.00			From 3.00 to 3.30m slightly clayey.	4
		4.50 - 5.00	B		5.00	72.04		End of borehole at 5.00 m	5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. No SPT at 5.00m due to collapse of hole to 3.40m.





Borehole Log

Borehole No.

WS08

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384844.57 - 402044.95

Hole Type
WS

Location: North Manchester General Hospital

Level: 76.60

Scale
1:50

Client: North Manchester General Hospital

Dates: 14/08/2020 - 14/08/2020

Logged By
ZH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 0.55	ES		0.30	76.30		MADE GROUND: Black tarmacadam with decorative gravel.	
					0.60	76.00		MADE GROUND: Light grey mottled brown very gravelly fine to coarse sand with low cobble content. Gravel is angular to subangular fine to coarse of brick, concrete and dolomite hardcore.	
		1.20		N=20 (2,3/4,4,5,7)	0.90	75.70		Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of sandstone.	1
		2.00	B					Medium dense brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of sandstone.	2
		2.00		N=20 (2,2/4,6,4,6)				<u>From 1.20 to 1.40m clayey.</u>	
		3.00		N=15 (3,4/3,2,6,4)				<u>From 2.75 to 2.90m clayey.</u>	3
		3.50	D		3.30	73.30		Soft brownish grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of sandstone.	
					4.00	72.60		End of borehole at 4.00 m	4
									5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. No SPT at 4 or 5m due to continuous collapse of hole.





Borehole Log

Borehole No.

WS09

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384903.64 - 402193.24

Hole Type
WS

Location: North Manchester General Hospital

Level: 74.07

Scale
1:50

Client: North Manchester General Hospital

Dates: 18/08/2020 - 18/08/2020

Logged By
MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.10	73.97		MADE GROUND: Black tarmacadam.	1
					0.47	73.60		MADE GROUND: Light brown gravelly fine to coarse SAND. Gravel is fine to coarse angular to subrounded concrete, brick and sandstone. Rare brick cobbles.	
					0.60	73.47		MADE GROUND: Layered brick cobbles. Top of possibly disused tunnel.	
								VOID.	
					1.60	72.47		End of borehole at 1.60 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

GPR service clearance prior to progression of exploratory hole. Service clearance pit hand excavated to 1.20m bgl. Void encountered at 0.60m - hole terminated.





Trial Pit Log

Trialpit No

TP01

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords:	384946.79 - 402254.71
Level:	73.40

Date
24/08/2020

Location: North Manchester General Hospital

Dimensions (m): 0.3

Scale
1:20

Client: North Manchester General Hospital

Depth
0.40

2.

0.3

Logged
ZH

[illegible]

Remarks:	GPR service clearance prior to progression of exploratory hole. Terminated at 0.40m due to concrete slab.
----------	---

Stability: Stable.





Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384911.79 - 402226.51

Level: 73.40

Date

24/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.25

Depth
1.20

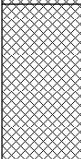
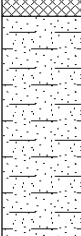
0.25

Scale

1:20

Logged
ZH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.35	ES		0.15	73.24		MADE GROUND: Black tarmacadam.
							MADE GROUND: Brown mottled grey gravelly slightly clayey fine to coarse sand with medium cobble content. Gravel is angular to subangular fine to coarse of brick, concrete and dolomite hardcore. Cobbles are angular to subangular of brick and concrete. [Base is presumed sub-level of car park].
				0.60	72.80		Loose brown slightly clayey fine to coarse SAND.
				1.20	72.19		End of pit at 1.20 m

1

2

3

4

Remarks: GPR service clearance prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

TP03

Sheet 1 of 1

Project Name:	New Park House
---------------	----------------

Project No.
075856

Co-ords:	384960.92 - 402223.79
----------	-----------------------

Level: 74.93

Date

24/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

Depth	0.75
-------	------

3

Scale
1:20

Logged
ZH

Client: North Manchester General Hospital

[illegible]

Remarks:	GPR service clearance prior to progression of exploratory hole.
----------	---

Stability: Stable.





Trial Pit Log

Trialpit No

TP04

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384949.99 - 402085.89

Level: 78.81

Date

24/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

Depth
1.00

0.3

Scale
1:20Logged
ZH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.55	ES		0.10	78.71		MADE GROUND: Black tarmacadam.
				0.30	78.51		MADE GROUND: Dark grey mottled brown sandy slightly clayey angular to subangular fine to coarse gravel of brick and tarmacadam with low cobble content. Sand is fine to coarse. Cobbles are angular to subangular of brick.
				0.60	78.21		MADE GROUND: Dark brown mottled grey sandy gravelly clay with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of brick, concrete and tarmacadam. Cobbles are subangular of concrete and brick. [Base is presumed sub-level of car park].
				1.00	77.81		Loose brown slightly gravelly fine to coarse SAND. Gravel is subangular fine of sandstone.
							End of pit at 1.00 m

Remarks: GPR service clearance prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

TP05

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords: 384882.01 - 402093.72

Level: 77.03

Date

24/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.25

Client: North Manchester General Hospital

Depth
1.20

0.25

Scale

1:20

Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.30	76.73		MADE GROUND: Decorative gravel over tarmacadam.
				0.55	76.48		MADE GROUND: Grey very gravelly slightly clayey fine to coarse sand with medium cobble content. Gravel is angular to subangular fine to coarse of dolomite hardcore and concrete. Cobbles are subangular of concrete and dolomite hardcore. [Base is presumed sub-level of car park].
							Loose brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of sandstone.
				1.20	75.83		End of pit at 1.20 m

Remarks: GPR service clearance prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP01

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 74.55Date
18/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.6

Depth
1.30

0.5

Scale
1:20Logged
MH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.06	74.49		MADE GROUND: Black tarmacadam.
				0.23	74.32		MADE GROUND: Yellowish grey sandy gravel. Gravel is fine to coarse angular to subangular concrete.
				0.55	74.00		MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subrounded concrete, brick and rare coal.
				1.30	73.25		Medium dense light brown slightly gravelly fine to coarse SAND. Gravel is fine angular coal. Occasional pockets of black medium and coarse sand of coal.
							End of pit at 1.30 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP02

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 74.79Date
18/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.5

Depth
1.30

0.32

Scale
1:20Logged
MH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.17	74.62		MADE GROUND: Black tarmacadam.
				0.20	74.59		MADE GROUND: Grey sand and gravel. Gravel is fine and medium angular to subangular concrete. MADE GROUND: Layered brick cobbles.
				0.40	74.39		Medium dense light brown fine and medium SAND with pockets of sand and fine angular gravel of coal.
				1.30	73.49		End of pit at 1.30 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP02A

Sheet 1 of 1

Project Name: New Park House

Project No.
075856

Co-ords:	-
Level:	75.14

Date
18/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

1.2

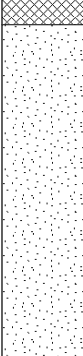
Scale
1:20

Client: North Manchester General Hospital

Depth
1.30

0.55

Logged
MH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.06	75.08		MADE GROUND: Black tarmacadam.
							MADE GROUND: Grey sand and gravel. Gravel is fine and medium angular to subangular concrete.
				0.21	74.93		MADE GROUND: Black tarmacadam.
				0.33	74.81		MADE GROUND: Layered brick cobbles.
				0.40	74.74		Medium dense light brown fine to coarse SAND. Rare pockets of fine angular gravel of coal.
				1.30	73.84	End of pit at 1.30 m	

Remarks:	Service clearance with CAT Scanner prior to progression of exploratory hole.
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Stability: Stable.





Trial Pit Log

Trialpit No

HP04

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 78.00Date
18/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.5

0.5

Depth
1.35Scale
1:20Logged
MH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10	77.90		MADE GROUND: Black tarmacadam.
				0.32	77.68		MADE GROUND: Dark brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular brick, clinker, ash and concrete.
							MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subrounded brick, concrete and wood fragments. Occasional rootlets.
				1.10	76.90		Medium dense light brown fine to coarse SAND.
				1.35	76.65		End of pit at 1.35 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.







Trial Pit Log

Trialpit No

HP06

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 78.00Date
19/08/2020

Location: North Manchester General Hospital

Dimensions (m): 0.25

Client: North Manchester General Hospital

Depth
1.40

0.25

Scale
1:20Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10	77.90		MADE GROUND: Black tarmacadam.
							MADE GROUND: Brown slightly gravelly fine to coarse sand with frequent roots and rootlets. Gravel is angular to subangular fine to coarse of brick. From 0.10 to 0.20m brownish black.
							At 1.00m subangular cobbles of brick.
				1.40	76.60		End of pit at 1.40 m

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP07

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 77.48Date
19/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.2

Client: North Manchester General Hospital

Depth
1.60

0.35

Scale
1:20Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10	77.38		MADE GROUND: Black tarmacadam.
							MADE GROUND: Brown slightly gravelly fine to coarse sand with frequent roots and rootlets. Gravel is angular to subangular fine to coarse of brick.
				1.60	75.88		End of pit at 1.60 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP08

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 78.47Date
19/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.35

Depth
1.20

0.4

Scale
1:20Logged
ZH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15	78.32		MADE GROUND: Black tarmacadam.
							MADE GROUND: Black mottled brown slightly gravelly slightly clayey fine to coarse sand with low cobble content. Gravel is angular to subangular fine to coarse of brick and tarmacadam. Cobbles are angular of brick. <i>From 0.15 to 0.30m rootlets frequent.</i>
				0.80	77.67		MADE GROUND: Brown gravelly fine to coarse sand with low cobble content. Gravel is angular to subrounded fine to coarse of brick. Cobbles are angular of brick.
				1.20	77.27		End of pit at 1.20 m

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP10

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 78.09Date
19/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

0.35

Scale
1:20

Client: North Manchester General Hospital

Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.05	78.04		MADE GROUND: Paving slab. MADE GROUND: Grey sandy angular to subangular fine to coarse gravel of dolomite hardcore. Sand is fine to coarse.
				1.00	77.09		Firm brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to medium of sandstone.
				1.20	76.89		End of pit at 1.20 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP13

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 74.65Date
20/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

Client: North Manchester General Hospital

Depth
1.30

0.3

Scale
1:20Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.05	74.60		MADE GROUND: Paving slab. MADE GROUND: Brown slightly gravelly fine to coarse sand. Gravel is angular to subangular fine to medium of brick. From 0.05 to 0.30m subangular cobbles of brick.
				1.30	73.35		End of pit at 1.30 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP14

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 74.28Date
20/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

0.4

Depth
1.30Scale
1:20Logged
ZH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10	74.18		MADE GROUND: Black tarmacadam.
							MADE GROUND: Concrete slab.
				0.25	74.03		MADE GROUND: Brown mottled dark grey slightly gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of brick and concrete.
				0.50	73.78		MADE GROUND: Brown fine to coarse SAND with low cobble content. Cobbles are subangular of brick.
				1.30	72.98		End of pit at 1.30 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP15

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 74.29Date
20/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

Depth
1.30

0.4

Scale
1:20Logged
ZH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15	74.14		MADE GROUND: Decorative gravel over tarmacadam.
							MADE GROUND: Dark greyish brown sandy slightly clayey angular to subangular fine to coarse gravel of brick, porcelain and concrete with low cobble content. Sand is fine to coarse. Cobbles are angular of brick and concrete.
				1.30	72.99		End of pit at 1.30 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.





Trial Pit Log

Trialpit No

HP17

Sheet 1 of 1

Project Name: New Park House

Project No.
075856Co-ords: -
Level: 75.44Date
20/08/2020

Location: North Manchester General Hospital

Dimensions
(m):

0.3

0.35

Depth
1.20Scale
1:20Logged
ZH

Client: North Manchester General Hospital

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20	75.24		Grass over TOPSOIL: Dark grey slightly gravelly very sandy clay with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to medium of stone.
				1.10	74.34		MADE GROUND: Dark grey slightly gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of brick, terracotta and chalk.
				1.20	74.24		Loose brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is angular to subangular fine to medium of sandstone.
							End of pit at 1.20 m

1

2

3

4

Remarks: Service clearance with CAT Scanner prior to progression of exploratory hole.

Stability: Stable.



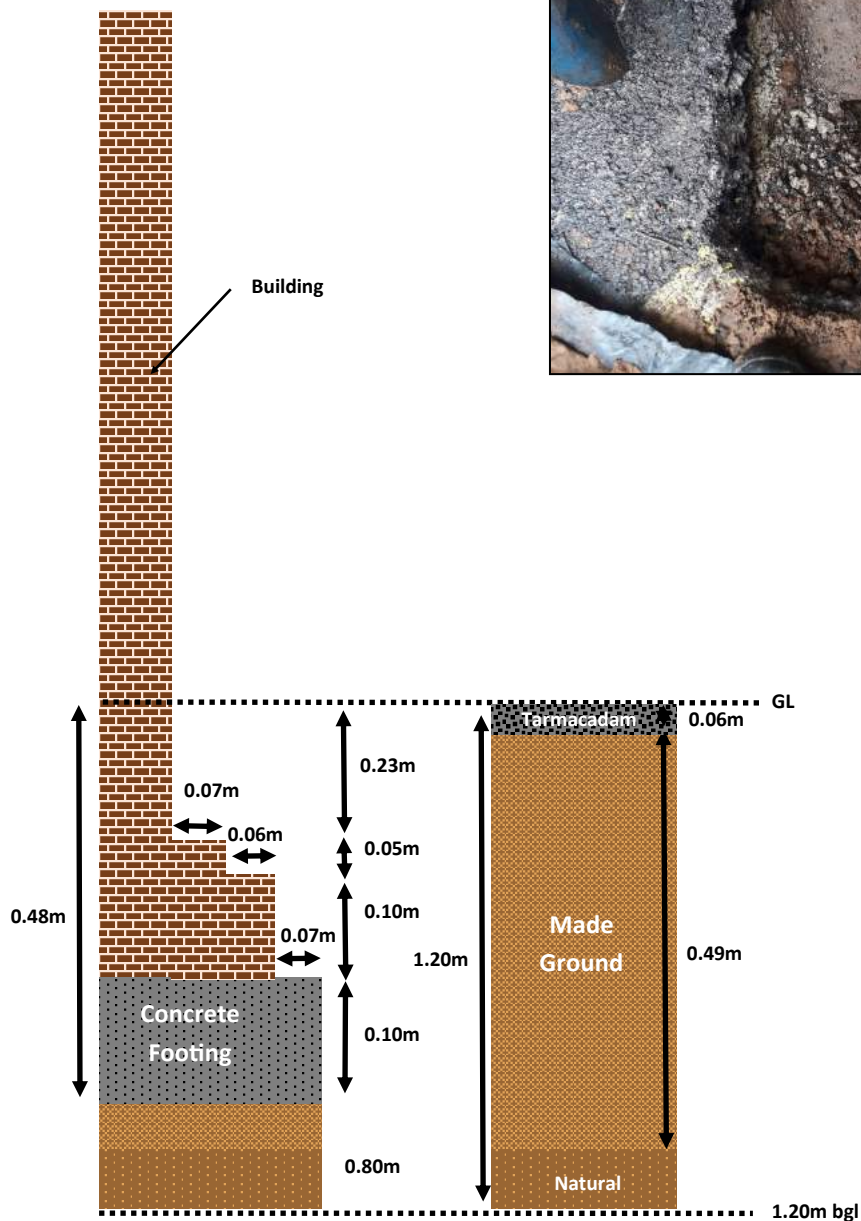
075856-CUR-00-XX-DR-GE-80007-P01



New Park House

Foundation Pit Cross Sectional Sketches

HP01



Comments:

Not to scale.

Trial pit edge unstable in Made Ground.

Groundwater not encountered.

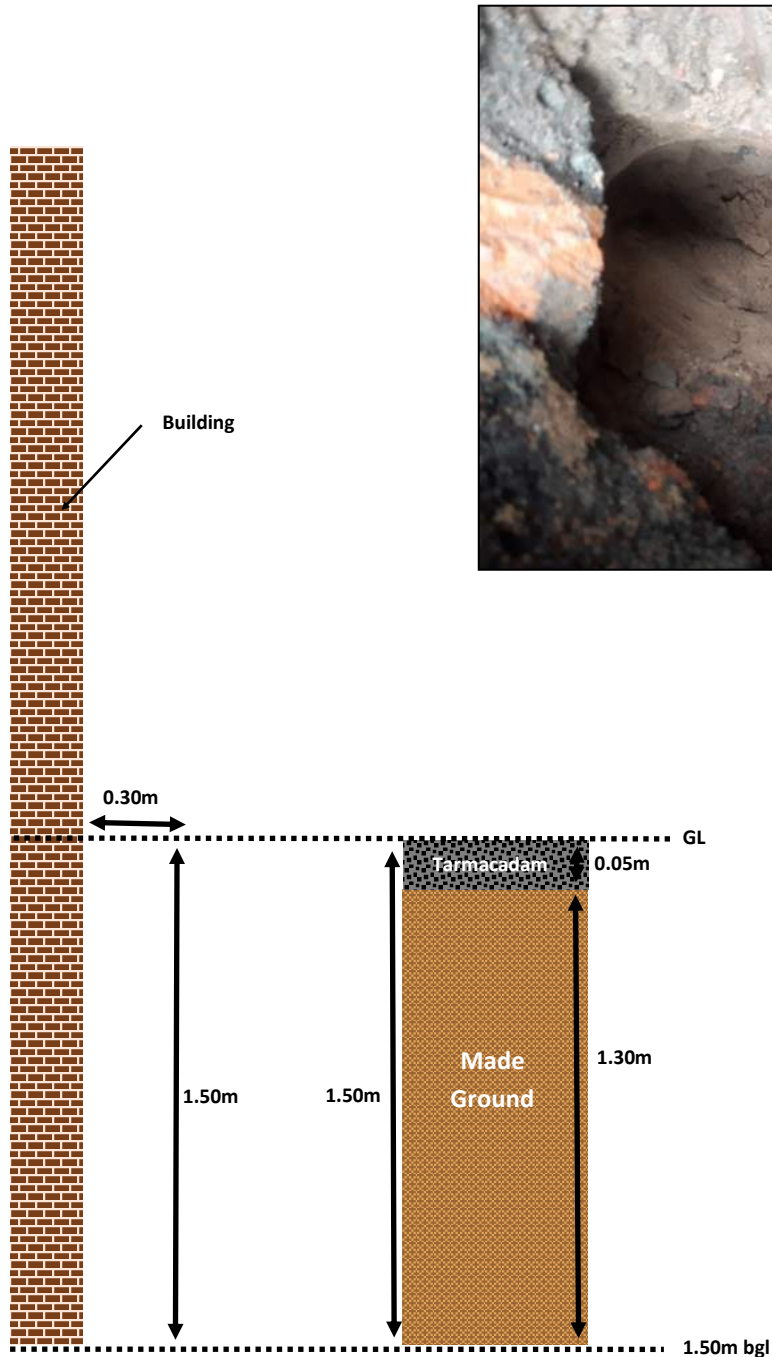
Further detailed information in log HP01

Terminated at 1.20m bgl due to base of foundation being encountered

New Park House

Foundation Pit Cross Sectional Sketches

HP02



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

Further detailed information in log HP02

Terminated at 1.30m bgl due to absence of footings. Possible basement encountered.

HP02A

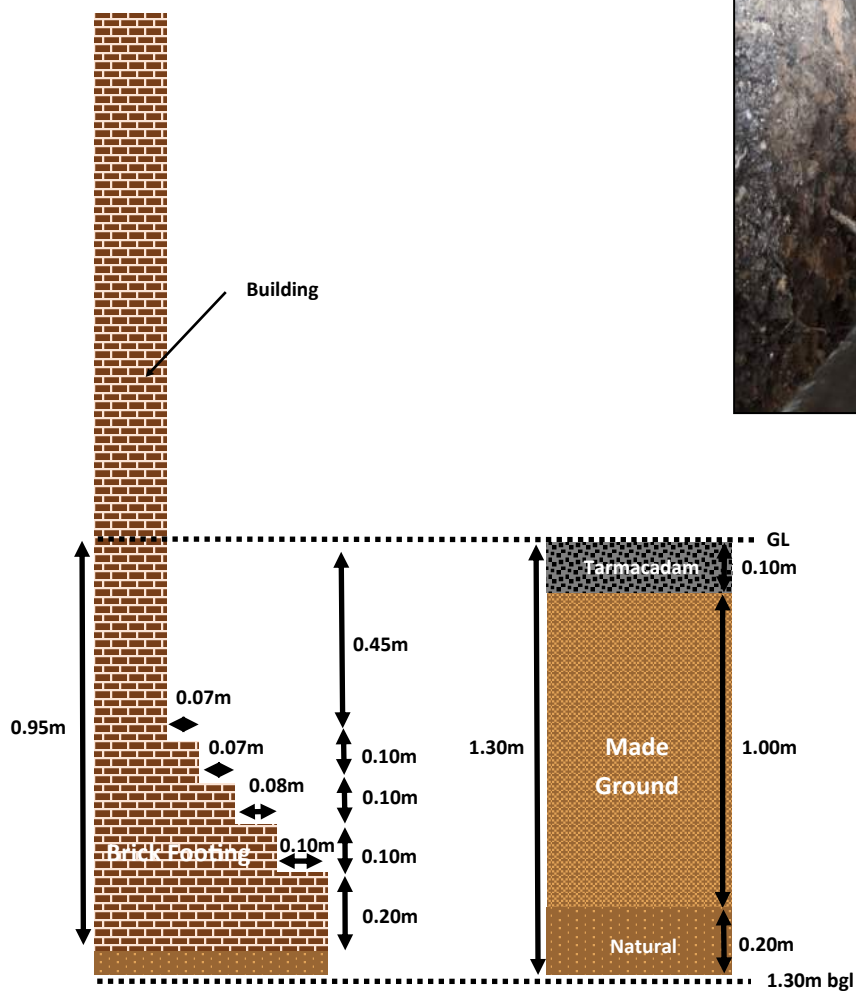


Terminated at 0.70m bgl due to base of foundation being encountered

New Park House

Foundation Pit Cross Sectional Sketches

HP04



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

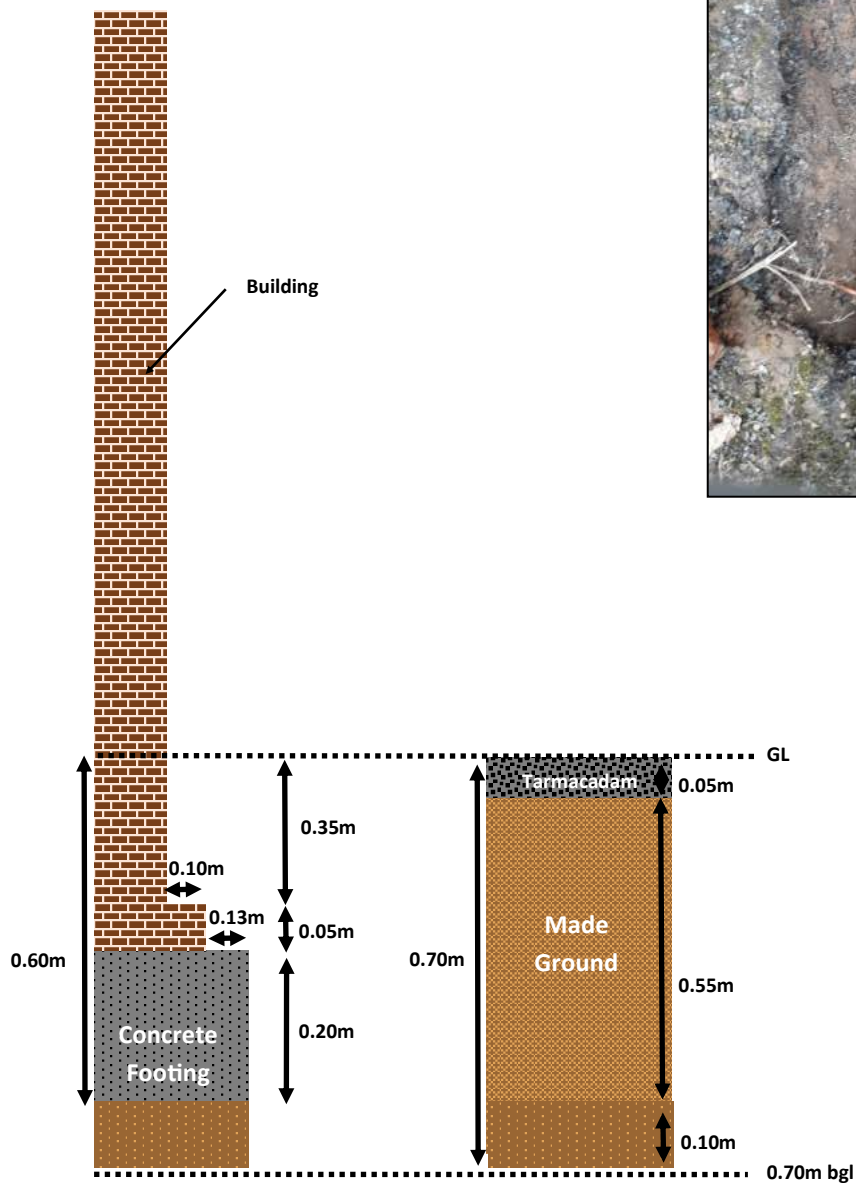
Further detailed information in log HP04

Terminated at 1.20m bgl due to base of foundation being encountered.

Foundation Pit Cross Sectional Sketches



HP05

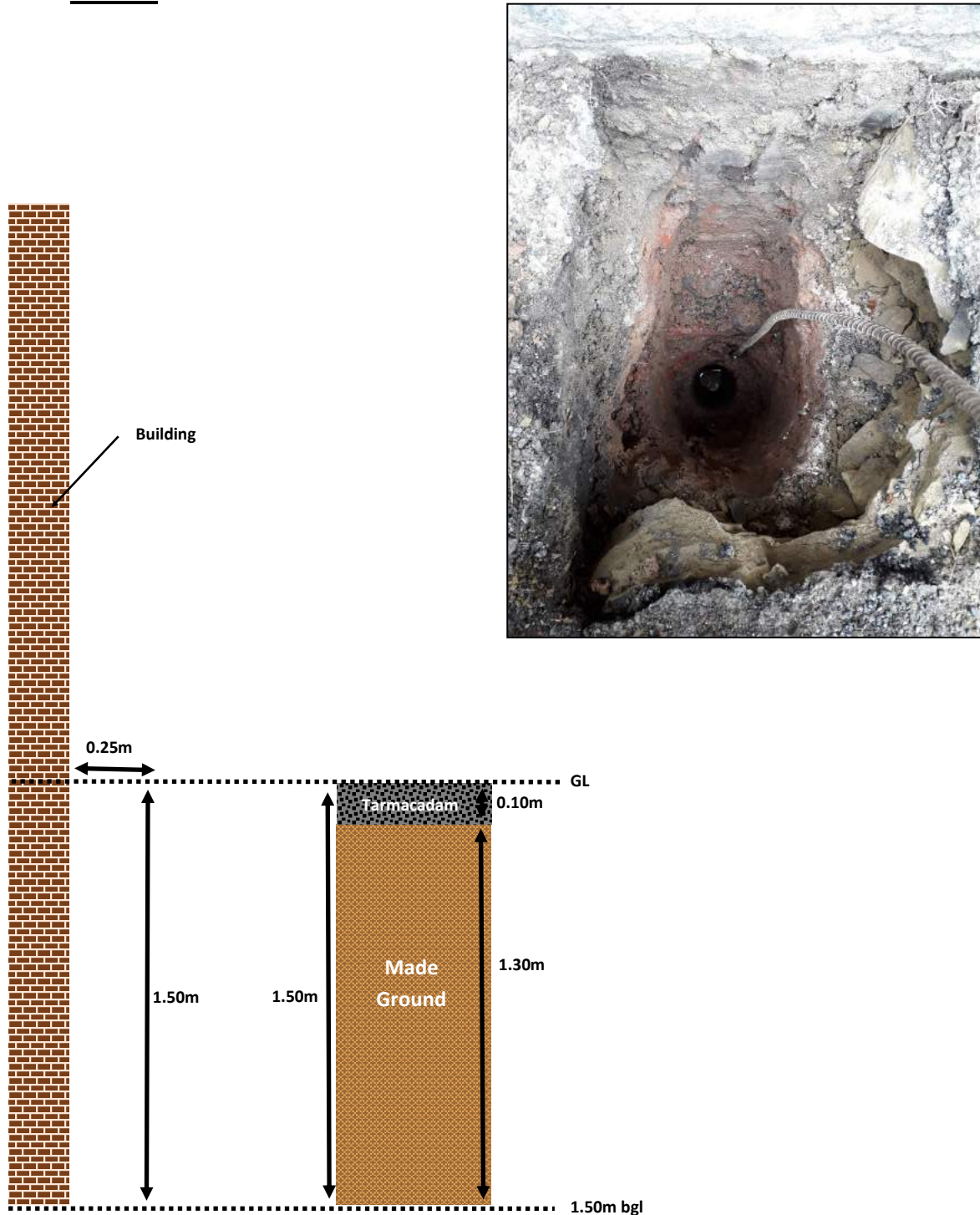


Terminated at 0.70m bgl due to base of foundation being encountered

New Park House

Foundation Pit Cross Sectional Sketches

HP06



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

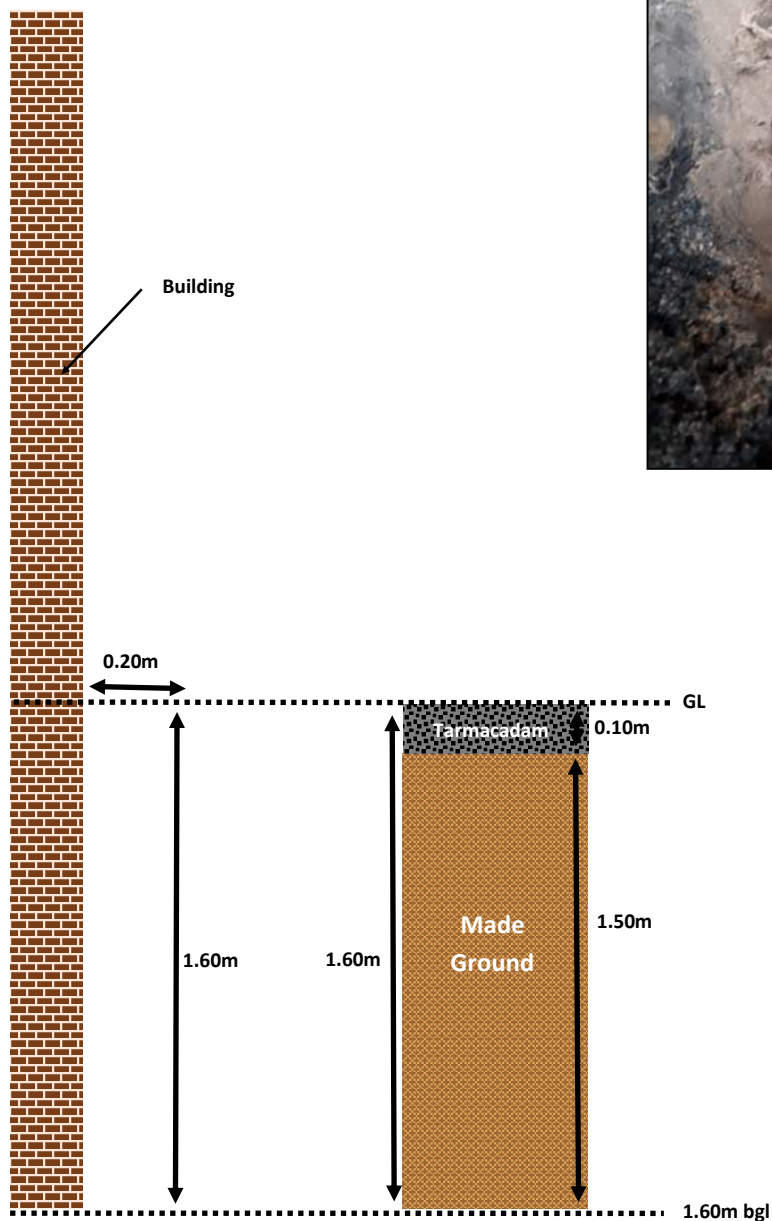
Further detailed information in log HP06

Terminated at 1.50m bgl due to absence of footings. Possible basement encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP07



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

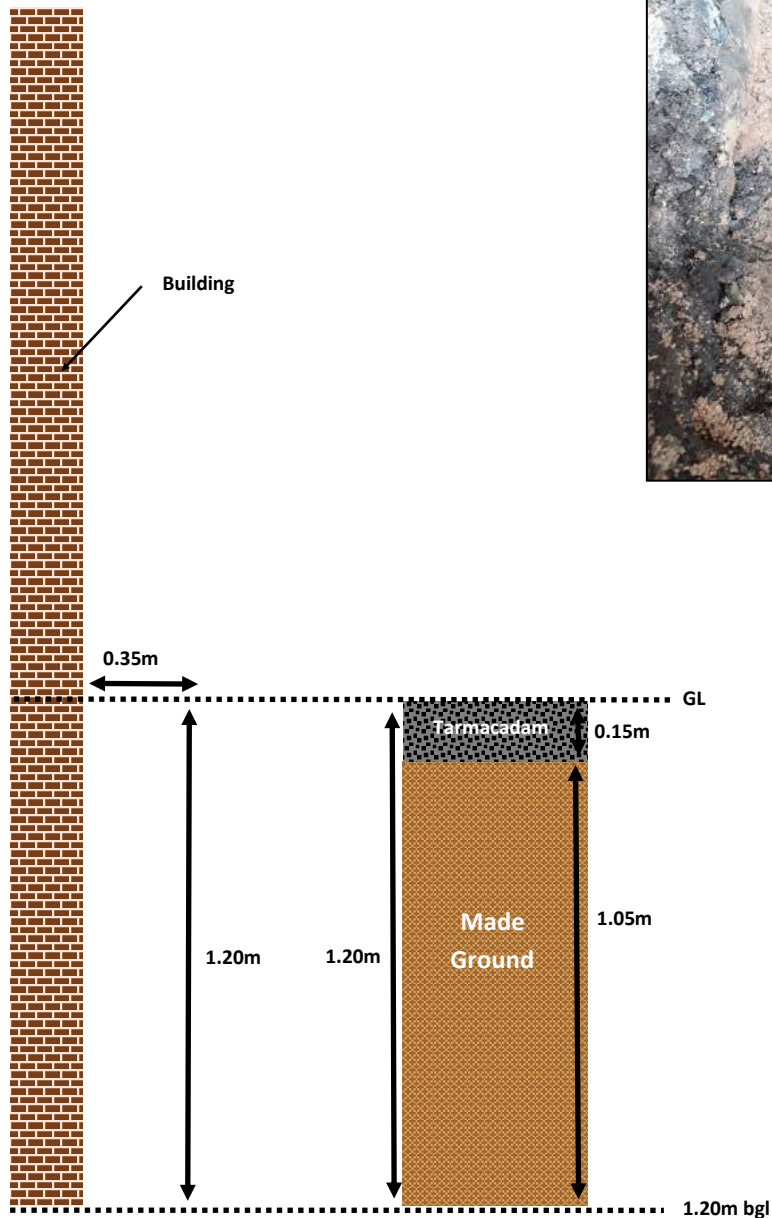
Further detailed information in log HP07.

Terminated at 1.60m bgl due to absence of footings. Possible basement encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP08



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

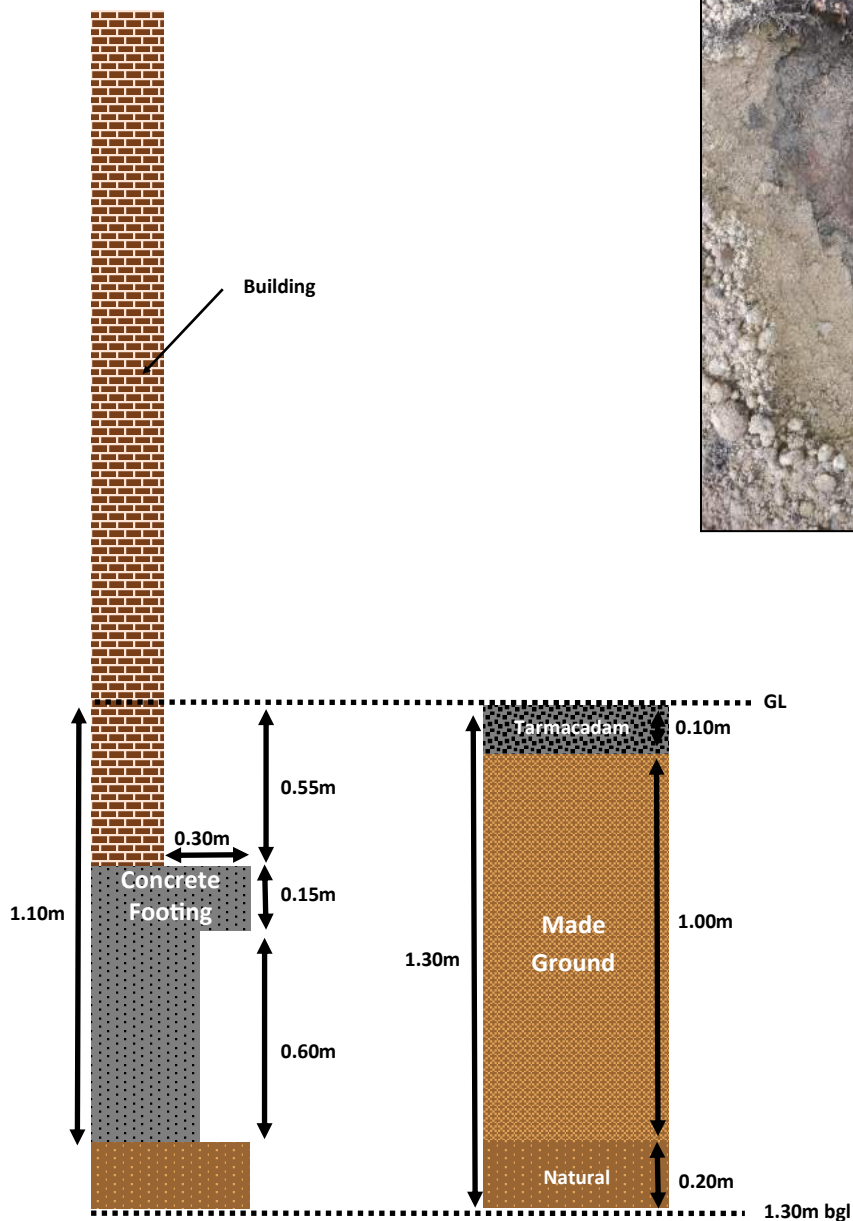
Groundwater not encountered.

Further detailed information in log HP08.

Terminated at 1.20m bgl due to absence of footings. Possible basement encountered.



HP09



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

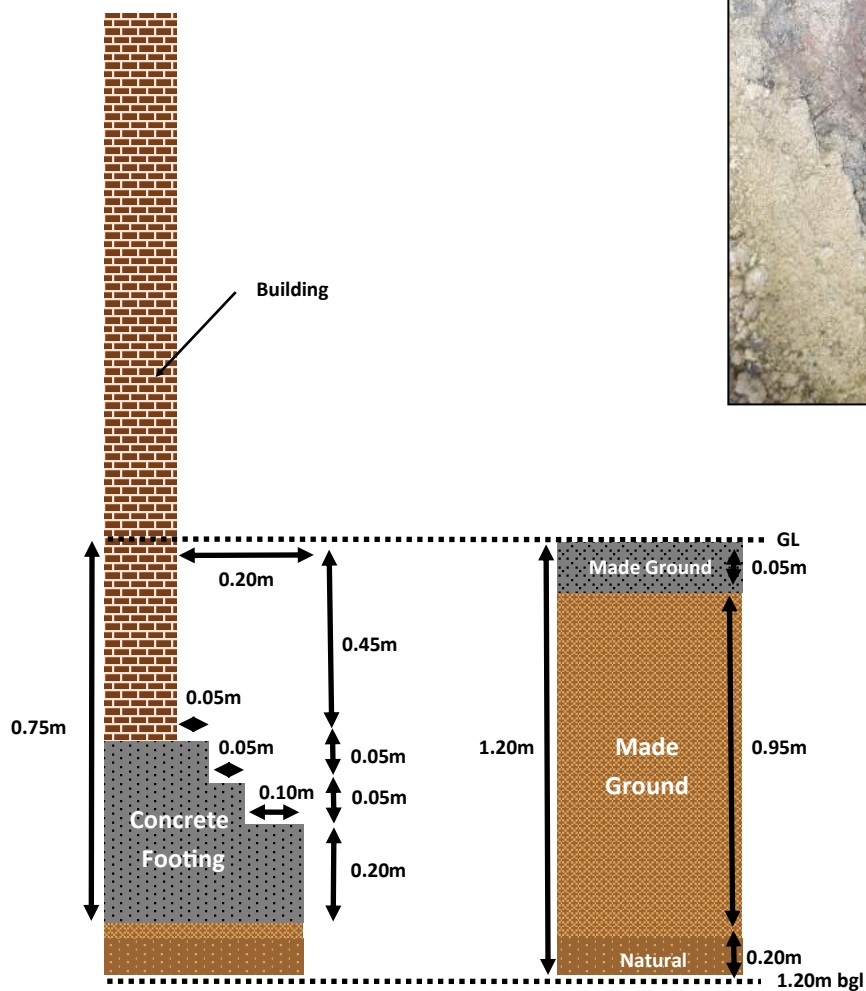
Further detailed information in log HP09

Terminated at 1.30m bgl due to base of foundation being encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP10



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

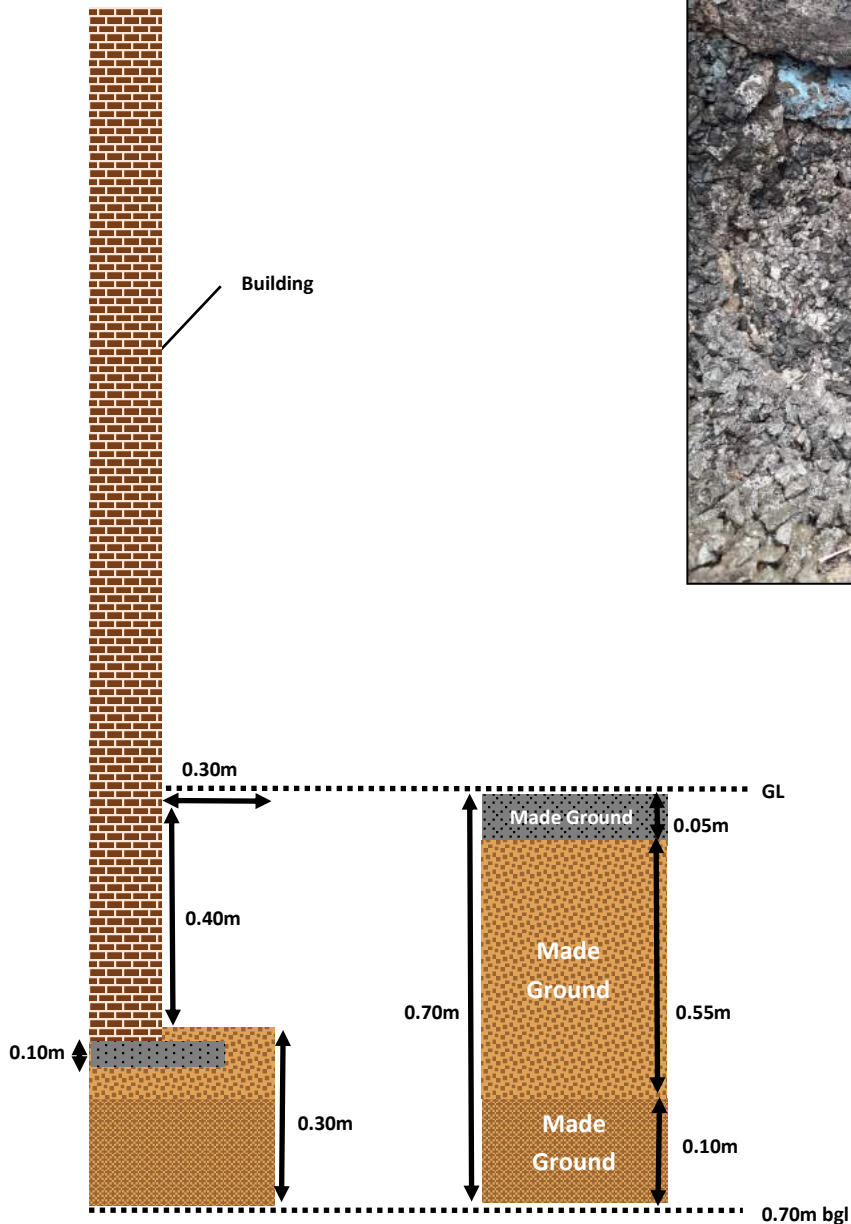
Further detailed information in log HP10

Terminated at 1.20m bgl due to base of foundation being encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP11



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

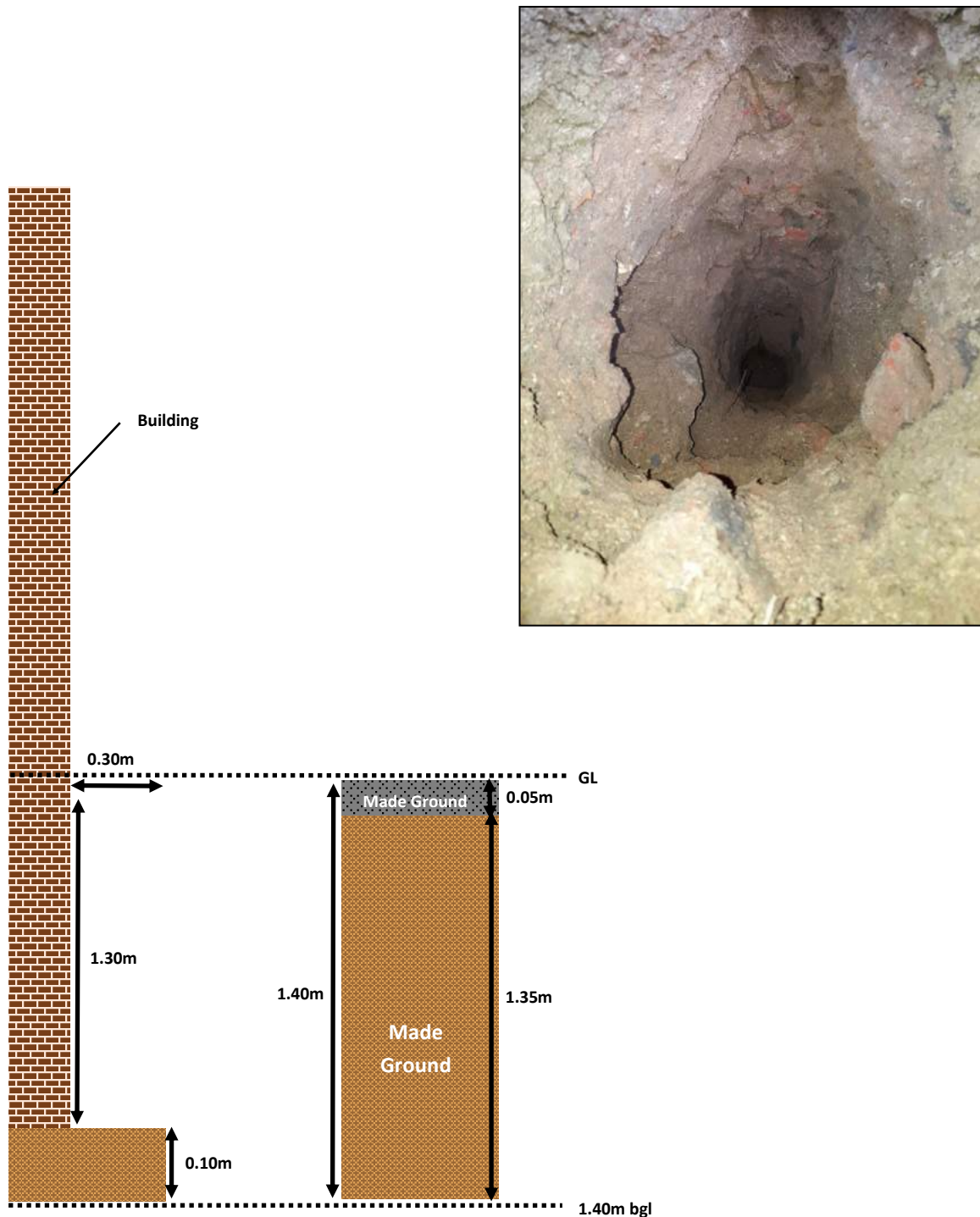
Further detailed information in log HP11.

Terminated at 0.70m bgl due to underside of foundations encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP13



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

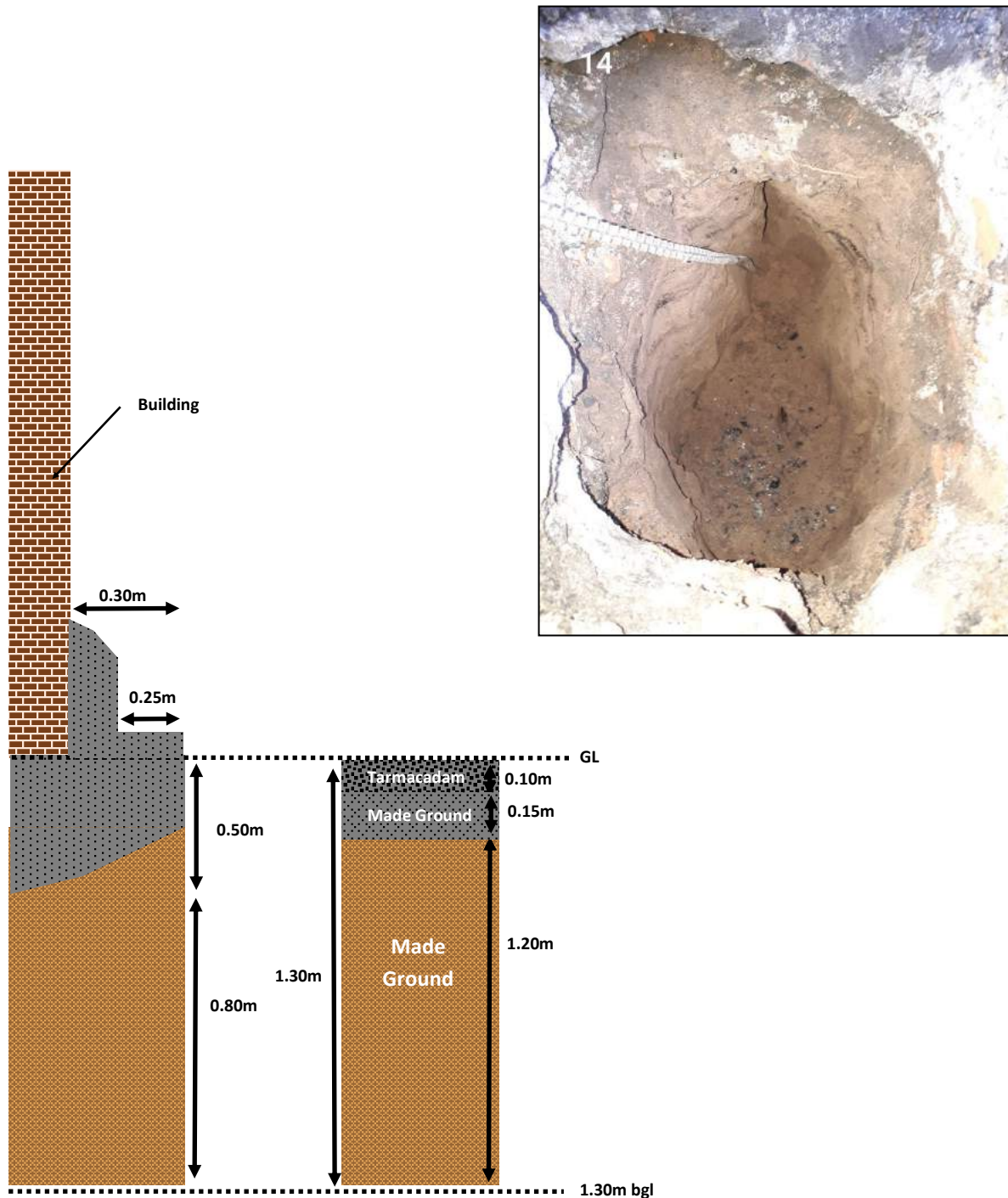
Further detailed information in log HP13.

Terminated at 1.40m bgl—no foundation encountered, bottom of brick wall encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP14



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

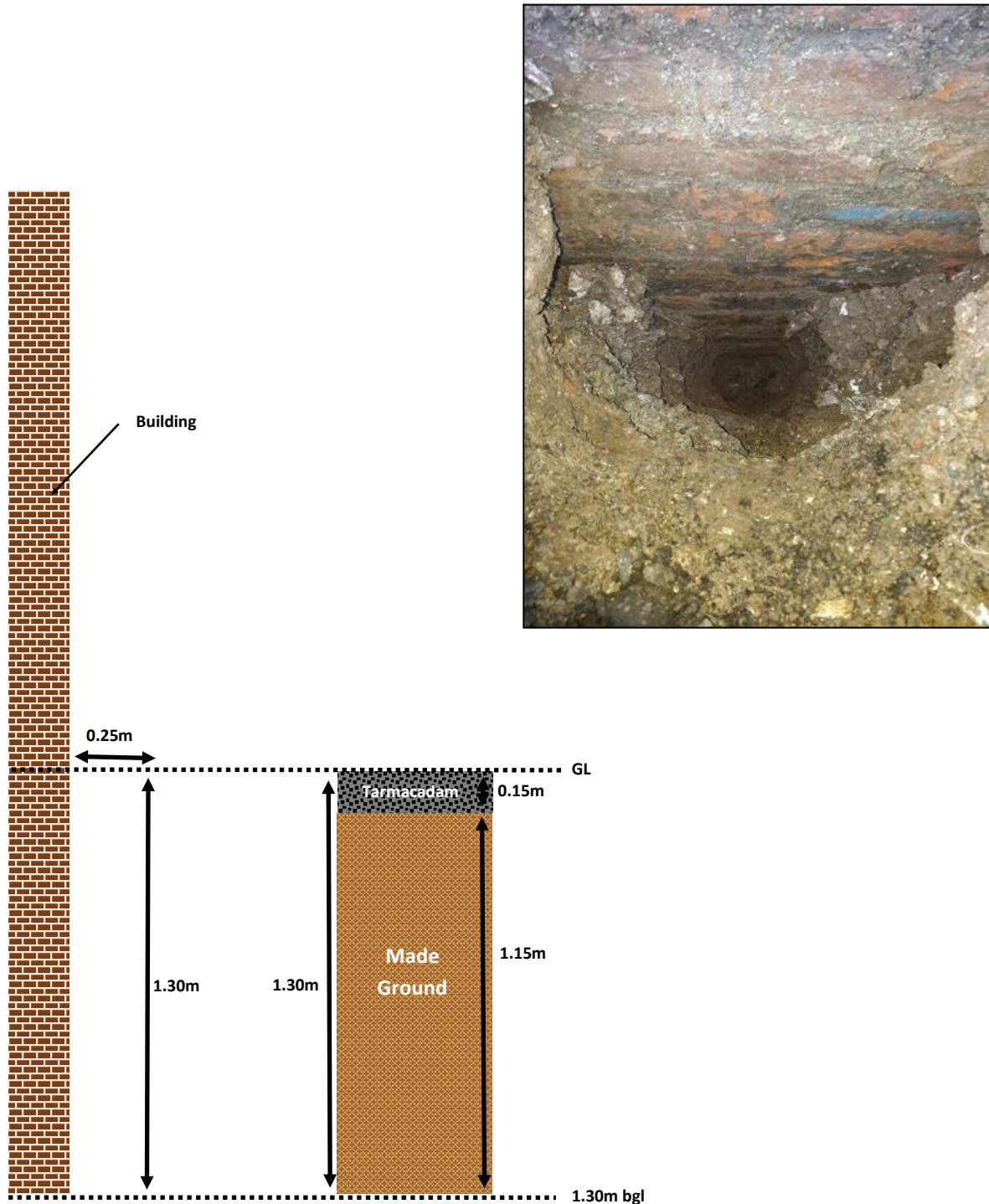
Further detailed information in log HP14.

Terminated at 1.30m bgl due to base of foundation being encountered.

New Park House

Foundation Pit Cross Sectional Sketches

HP15



Comments:

Not to scale.

Trial pit edge stable in Made Ground.

Groundwater not encountered.

Further detailed information in log HP15.

Terminated at 1.30m bgl due to absence of footings. Possible basement encountered.

Appendix C – Chemical Laboratory Testing Results

- Envirolab, Environmental Chemistry Analysis Results, Soils
- Envirolab, Environmental Chemistry Analysis Results, Groundwater

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/07124/1

Amendments: Request for project/sample information change

Envirolab Job Number: 20/07124
Issue Number: 2

Date: 03 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2483
Date Samples Received: 24/08/20
Date Instructions Received: 26/08/20
Date Analysis Completed: 02/09/20

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2						Units	Limit of Detection	Method ref
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
% Stones >10mm _A	3.2	<0.1						% w/w	0.1	A-T-044
pH _D ^{M#}	10.26	8.11						pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.07	0.03						g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1						mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2						mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	10.1	2.1						% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	<1	5						mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	<1.0						mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	<0.5						mg/kg	0.5	A-T-024s
Copper _D ^{M#}	31	18						mg/kg	1	A-T-024s
Chromium _D ^{M#}	23	13						mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1						mg/kg	1	A-T-040s
Lead _D ^{M#}	7	25						mg/kg	1	A-T-024s
Mercury _D	0.94	<0.17						mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	19	13						mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1						mg/kg	1	A-T-024s
Zinc _D ^{M#}	64	30						mg/kg	5	A-T-024s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2						Units	Limit of Detection	Method ref
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A								A-T-045

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2						Units	Limit of Detection	Method ref
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
PAH-16MS										
Acenaphthene _A ^{M#}	0.05	<0.01						mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01						mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.12	<0.02						mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.26	<0.04						mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.35	<0.04						mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.47	<0.05						mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.39	<0.05						mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.15	<0.07						mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.66	<0.06						mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.10	<0.04						mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.46	<0.08						mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.05	<0.01						mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.17	<0.03						mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03						mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.70	<0.03						mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.56	<0.07						mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	4.49	<0.08						mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2								
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
Speciated PCB-EC7 & WHO12										
PCB BZ 28 ^{M#}	<0.002	-						mg/kg	0.002	A-T-004s
PCB BZ 52 ^{M#}	<0.002	-						mg/kg	0.002	A-T-004s
PCB BZ 81 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 101 ^{M#}	<0.004	-						mg/kg	0.004	A-T-004s
PCB BZ 105 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 114 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 118 ^{M#}	<0.007	-						mg/kg	0.007	A-T-004s
PCB BZ 123 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 126 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 138 ^{M#}	<0.006	-						mg/kg	0.006	A-T-004s
PCB BZ 153 ^{M#}	<0.004	-						mg/kg	0.004	A-T-004s
PCB BZ 156 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 157 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 167 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 169 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 180 ^{M#}	<0.004	-						mg/kg	0.004	A-T-004s
PCB BZ 189 _A	<0.005	-						mg/kg	0.005	A-T-004s
PCB BZ 77 _A	<0.005	-						mg/kg	0.005	A-T-004s
Total Speciated PCB-EC7 & WHO12 _A	<0.007	-						mg/kg	0.002	A-T-004s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2								
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5	<1						mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5	<1						mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	6	<1						mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	21	<1						mg/kg	1	A-T-055s
Ali >C21-C35 _A	1100	9						mg/kg	1	A-T-055s
Total Aliphatics _A	1130	9						mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	7	<1						mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	8	<1						mg/kg	1	A-T-055s
Aro >C12-C16 _A	14	<1						mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	48	<1						mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	860	6						mg/kg	1	A-T-055s
Total Aromatics _A	937	6						mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	2070	15						mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2								
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
SVOC										
Hexachlorobenzene _A	<100	-						µg/kg	100	A-T-052s
Diethyl phthalate _A	<100	-						µg/kg	100	A-T-052s
Dimethyl phthalate _A	<100	-						µg/kg	100	A-T-052s
Dibenzofuran _A	<100	-						µg/kg	100	A-T-052s
Carbazole _A	<100	-						µg/kg	100	A-T-052s
Butylbenzyl phthalate _A	<100	-						µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate _A	1600	-						µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane _A	<100	-						µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether _A	<100	-						µg/kg	100	A-T-052s
4-Nitrophenol _A	<100	-						µg/kg	100	A-T-052s
3+4-Methylphenol _A	<100	-						µg/kg	100	A-T-052s
4-Chloro-3-methylphenol _A	<100	-						µg/kg	100	A-T-052s
2-Nitrophenol _A	<100	-						µg/kg	100	A-T-052s
2-Methylphenol _A	<100	-						µg/kg	100	A-T-052s
2-Chlorophenol _A	<100	-						µg/kg	100	A-T-052s
2,6-Dinitrotoluene _A	<100	-						µg/kg	100	A-T-052s
2,4-Dinitrotoluene _A	<100	-						µg/kg	100	A-T-052s
2,4-Dimethylphenol _A	<100	-						µg/kg	100	A-T-052s
2,4-Dichlorophenol _A	<100	-						µg/kg	100	A-T-052s
2,4,6-Trichlorophenol _A	<100	-						µg/kg	100	A-T-052s
2,4,5-Trichlorophenol _A	<100	-						µg/kg	100	A-T-052s
2-Chloronaphthalene _A	<100	-						µg/kg	100	A-T-052s
2-Methylnaphthalene _A	<100	-						µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether _A	<100	-						µg/kg	100	A-T-052s
Phenol _A	<100	-						µg/kg	100	A-T-052s
Pentachlorophenol (SVOC) _A	<100	-						µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine _A	<100	-						µg/kg	100	A-T-052s
n-Diethylphthalate _A	<500	-						µg/kg	500	A-T-052s
n-Dibutylphthalate _A	<100	-						µg/kg	100	A-T-052s
Nitrobenzene _A	<100	-						µg/kg	100	A-T-052s
Isophorone _A	<100	-						µg/kg	100	A-T-052s
Hexachloroethane _A	<100	-						µg/kg	100	A-T-052s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2						Units	Limit of Detection	Method ref
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
Hexachlorocyclopentadiene _A	<100	-						µg/kg	100	A-T-052s
Perylene _A	225	-						µg/kg	100	A-T-052s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2								
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
VOC										
Dichlorodifluoromethane _A	<1	-						µg/kg	1	A-T-006s
Chloromethane _A	<10	-						µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene) _A [#]	<1	-						µg/kg	1	A-T-006s
Bromomethane _A [#]	<1	-						µg/kg	1	A-T-006s
Chloroethane _A [#]	<1	-						µg/kg	1	A-T-006s
Trichlorofluoromethane _A [#]	<1	-						µg/kg	1	A-T-006s
1,1-Dichloroethene _A [#]	<1	-						µg/kg	1	A-T-006s
Carbon Disulphide _A [#]	<1	-						µg/kg	1	A-T-006s
Dichloromethane _A	<10	-						µg/kg	5	A-T-006s
trans 1,2-Dichloroethene _A [#]	<1	-						µg/kg	1	A-T-006s
1,1-Dichloroethane _A [#]	<1	-						µg/kg	1	A-T-006s
cis 1,2-Dichloroethene _A [#]	<1	-						µg/kg	1	A-T-006s
2,2-Dichloropropane _A [#]	<1	-						µg/kg	1	A-T-006s
Bromochloromethane _A [#]	<5	-						µg/kg	5	A-T-006s
Chloroform _A [#]	<1	-						µg/kg	1	A-T-006s
1,1,1-Trichloroethane _A [#]	<1	-						µg/kg	1	A-T-006s
1,1-Dichloropropene _A [#]	<1	-						µg/kg	1	A-T-006s
Carbon Tetrachloride _A [#]	<1	-						µg/kg	1	A-T-006s
1,2-Dichloroethane _A [#]	<2	-						µg/kg	2	A-T-006s
Benzene _A [#]	<1	-						µg/kg	1	A-T-006s
Trichloroethene _A [#]	<1	-						µg/kg	1	A-T-006s
1,2-Dichloropropane _A [#]	<1	-						µg/kg	1	A-T-006s
Dibromomethane _A [#]	<1	-						µg/kg	1	A-T-006s
Bromodichloromethane _A [#]	<10	-						µg/kg	10	A-T-006s
cis 1,3-Dichloropropene _A [#]	<1	-						µg/kg	1	A-T-006s
Toluene _A [#]	<1	-						µg/kg	1	A-T-006s
trans 1,3-Dichloropropene _A [#]	<1	-						µg/kg	1	A-T-006s
1,1,2-Trichloroethane _A [#]	<1	-						µg/kg	1	A-T-006s
1,3-Dichloropropane _A [#]	<1	-						µg/kg	1	A-T-006s
Tetrachloroethene _A [#]	<1	-						µg/kg	1	A-T-006s
Dibromochloromethane _A [#]	<3	-						µg/kg	3	A-T-006s
1,2-Dibromoethane _A [#]	<1	-						µg/kg	1	A-T-006s

Envirolab Job Number: 20/07124

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07124/1	20/07124/2						Units	Limit of Detection	Method ref
Client Sample No	ES1	ES6								
Client Sample ID	BH01	BH01								
Depth to Top	0.50	2.50								
Depth To Bottom	0.60	2.60								
Date Sampled	20-Aug-20	20-Aug-20								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
Chlorobenzene _A [#]	<1	-						µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane _A	<1	-						µg/kg	1	A-T-006s
Ethylbenzene _A [#]	<1	-						µg/kg	1	A-T-006s
m & p Xylene _A [#]	2	-						µg/kg	1	A-T-006s
o-Xylene _A [#]	<1	-						µg/kg	1	A-T-006s
Styrene _A [#]	<1	-						µg/kg	1	A-T-006s
Bromoform _A [#]	<1	-						µg/kg	1	A-T-006s
Isopropylbenzene _A [#]	<1	-						µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane _A	<1	-						µg/kg	1	A-T-006s
1,2,3-Trichloropropane _A [#]	<1	-						µg/kg	1	A-T-006s
Bromobenzene _A [#]	<1	-						µg/kg	1	A-T-006s
n-Propylbenzene _A [#]	<1	-						µg/kg	1	A-T-006s
2-Chlorotoluene _A [#]	<1	-						µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene _A [#]	1	-						µg/kg	1	A-T-006s
4-Chlorotoluene _A [#]	<1	-						µg/kg	1	A-T-006s
tert-Butylbenzene _A [#]	<2	-						µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene _A [#]	4	-						µg/kg	1	A-T-006s
sec-Butylbenzene _A [#]	<1	-						µg/kg	1	A-T-006s
4-Isopropyltoluene _A [#]	<1	-						µg/kg	1	A-T-006s
1,3-Dichlorobenzene _A	<1	-						µg/kg	1	A-T-006s
1,4-Dichlorobenzene _A [#]	<1	-						µg/kg	1	A-T-006s
n-Butylbenzene _A [#]	<1	-						µg/kg	1	A-T-006s
1,2-Dichlorobenzene _A [#]	<1	-						µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP) _A	<2	-						µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene _A	<3	-						µg/kg	3	A-T-006s
Hexachlorobutadiene _A [#]	<1	-						µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene _A	3	-						µg/kg	3	A-T-006s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/07124
Project:	New Park House	Date Received:	26/08/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	15.8

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/06681/1

Amendments: Request for split report

Envirolab Job Number: 20/06681
Issue Number: 2

Date: 03 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2483
Date Samples Received: 12/08/20
Date Instructions Received: 13/08/20
Date Analysis Completed: 21/08/20

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/06681

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06681/3							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	BH05									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	12-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	6ABE									
% Stones >10mm _A	10.9							% w/w	0.1	A-T-044
pH _D ^{M#}	7.44							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01							g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	3.8							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	8							mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.9							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	29							mg/kg	1	A-T-024s
Chromium _D ^{M#}	15							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Lead _D ^{M#}	200							mg/kg	1	A-T-024s
Mercury _D	0.47							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	18							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	53							mg/kg	5	A-T-024s

Envirolab Job Number: 20/06681

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06681/3							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	BH05									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	12-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	6ABE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 20/06681

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06681/3							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	BH05									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	12-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	6ABE									
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.14							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.17							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.22							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.13							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.16							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.23							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.14							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.12							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.23							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	1.57							mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/06681

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06681/3									
Client Sample No	ES1									
Client Sample ID	BH05									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	12-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	6ABE									
TPH CWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	3							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2							mg/kg	1	A-T-055s
Ali >C21-C35 _A	28							mg/kg	1	A-T-055s
Total Aliphatics _A	33							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	2							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	11							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	11							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	65							mg/kg	1	A-T-055s
Total Aromatics _A	90							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	123							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/06681
Project:	New Park House	Date Received:	13/08/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	29.4

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/06993/2

Amendments: Request for project/sample information change

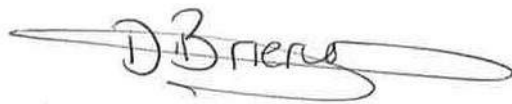
Envirolab Job Number: 20/06993
Issue Number: 4

Date: 28 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: TBC
Date Samples Received: 20/08/20
Date Instructions Received: 21/08/20
Date Analysis Completed: 24/09/20

Prepared by:



Danielle Brierley
Client Manager

Approved by:



Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/06993

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06993/1	20/06993/2	20/06993/3	20/06993/4	20/06993/5			Units	Limit of Detection	Method ref
Client Sample No					D3					
Client Sample ID	WS09	WS02	WS01	BH02	WS02					
Depth to Top	0.20	0.45	0.40	1.00	4.00					
Depth To Bottom										
Date Sampled	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1AB	4AB	4ABE	5AE	5A					
% Stones >10mm _A	39.9	15.3	3.3	7.6	<0.1			% w/w	0.1	A-T-044
pH _D ^{M#}	9.76	11.13	7.55	8.02	8.39			pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01	0.23	<0.01	<0.01	0.06			g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	-			mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	-			mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	0.4	9.1	2.9	5.5	-			% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	<1	<1	4	13	-			mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	1.4	<1.0	<1.0	-			mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	3.2	0.8	0.6	-			mg/kg	0.5	A-T-024s
Copper _D ^{M#}	2	15	15	32	-			mg/kg	1	A-T-024s
Chromium _D ^{M#}	4	17	12	17	-			mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	-			mg/kg	1	A-T-040s
Lead _D ^{M#}	5	67	31	92	-			mg/kg	1	A-T-024s
Mercury _D	1.27	3.62	<0.17	1.91	-			mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	4	9	14	21	-			mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	-			mg/kg	1	A-T-024s
Zinc _D ^{M#}	10	236	43	61	-			mg/kg	5	A-T-024s
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	-	-	Appended			%	1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	-	-	Appended			%	0.1	Subcon SS

Envirolab Job Number: 20/06993

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06993/1	20/06993/2	20/06993/3	20/06993/4	20/06993/5			Units	Limit of Detection	Method ref
Client Sample No					D3					
Client Sample ID	WS09	WS02	WS01	BH02	WS02					
Depth to Top	0.20	0.45	0.40	1.00	4.00					
Depth To Bottom										
Date Sampled	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1AB	4AB	4ABE	5AE	5A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	-					A-T-045

Envirolab Job Number: 20/06993

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06993/1	20/06993/2	20/06993/3	20/06993/4	20/06993/5			Units	Limit of Detection	Method ref
Client Sample No					D3					
Client Sample ID	WS09	WS02	WS01	BH02	WS02					
Depth to Top	0.20	0.45	0.40	1.00	4.00					
Depth To Bottom										
Date Sampled	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1AB	4AB	4ABE	5AE	5A					
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	1.42	<0.01	<0.01	-			mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.02	<0.01	<0.01	-			mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	0.72	0.02	<0.02	-			mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	1.35	0.13	<0.04	-			mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	0.89	0.12	<0.04	-			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	1.18	0.16	0.05	-			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	0.47	0.09	<0.05	-			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.32	<0.07	<0.07	-			mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	1.96	0.14	<0.06	-			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.14	<0.04	<0.04	-			mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	4.76	0.24	<0.08	-			mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	0.41	<0.01	<0.01	-			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	0.35	0.09	<0.03	-			mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.10	<0.03	<0.03	-			mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	1.93	0.12	0.05	-			mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	6.45	0.23	<0.07	-			mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	22.4	1.34	0.10	-			mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/06993

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06993/1	20/06993/2	20/06993/3	20/06993/4	20/06993/5			Units	Limit of Detection	Method ref
Client Sample No					D3					
Client Sample ID	WS09	WS02	WS01	BH02	WS02					
Depth to Top	0.20	0.45	0.40	1.00	4.00					
Depth To Bottom										
Date Sampled	18-Aug-20	18-Aug-20	18-Aug-20	18-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1AB	4AB	4ABE	5AE	5A					
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<10	<1	<1	-			mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<10	<1	<1	-			mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	31	<1	<1	-			mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	93	<1	<1	-			mg/kg	1	A-T-055s
Ali >C21-C35 _A	8	1650	2	17	-			mg/kg	1	A-T-055s
Total Aliphatics _A	8	1770	2	17	-			mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	1	52	<1	1	-			mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	10	<1	<1	-			mg/kg	1	A-T-055s
Aro >C12-C16 _A	<1	80	<1	1	-			mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	<1	444	<1	1	-			mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	8	1680	3	15	-			mg/kg	1	A-T-055s
Total Aromatics _A	10	2260	3	18	-			mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	18	4040	5	35	-			mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	-			mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG
Project: New Park House
Clients Project No: B075856
Project No: 20/06993
Date Received: 21/08/2020 (am)
Cool Box Temperatures (°C): 19.7

Lab Sample ID	20/06993/5
Client Sample No	D3
Client Sample ID/Depth	WS02 4.00m
Date Sampled	
Deviation Code	
E (no date)	✓

Key
E (no date) No sampling date provided (all results affected if not provided)

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/06881/1

Amendments: Request for project/sample information change

Envirolab Job Number: 20/06881
Issue Number: 2

Date: 03 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: EBMA/Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2483
Date Samples Received: 19/08/20
Date Instructions Received: 19/08/20
Date Analysis Completed: 25/08/20

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
% Stones >10mm _A	8.8	8.8	<0.1	1.9	13.9	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	6.23	8.30	7.13	7.94	9.38	7.95	8.08	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.05	0.05	0.03	<0.01	0.08	0.01	0.04	g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	<0.2	mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	0.9	2.6	0.4	6.4	0.9	0.9	1.1	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	<1	<1	<1	6	3	4	1	mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	16	25	11	36	14	28	22	mg/kg	1	A-T-024s
Chromium _D ^{M#}	31	35	12	18	18	15	21	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead _D ^{M#}	16	50	8	59	46	42	12	mg/kg	1	A-T-024s
Mercury _D	<0.17	0.47	<0.17	0.37	0.50	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	20	23	11	17	17	18	19	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	35	59	26	62	38	51	43	mg/kg	5	A-T-024s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
PAH-16MS										
Acenaphthene _A ^{M#}	0.01	0.27	<0.01	0.34	<0.01	<0.01	0.71	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.05	<0.01	0.02	<0.01	<0.01	0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.02	0.85	<0.02	0.57	<0.02	<0.02	0.78	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.11	4.58	0.08	1.92	<0.04	<0.04	1.29	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.10	4.69	0.08	1.81	<0.04	<0.04	0.95	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.12	6.21	0.10	2.24	<0.05	<0.05	1.33	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.07	2.78	0.06	0.95	<0.05	<0.05	0.52	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	2.12	<0.07	0.72	<0.07	<0.07	0.44	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.10	4.47	0.07	1.90	<0.06	<0.06	1.39	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.75	<0.04	0.26	<0.04	<0.04	0.13	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.18	8.44	0.09	4.39	<0.08	<0.08	3.55	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	0.21	<0.01	0.24	<0.01	<0.01	0.52	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.07	3.08	0.06	1.04	<0.03	<0.03	0.57	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	0.09	<0.03	<0.03	1.71	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.10	2.38	<0.03	2.89	0.04	<0.03	3.78	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.17	7.26	0.08	4.14	<0.07	<0.07	2.83	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	1.05	48.1	0.62	23.5	<0.08	<0.08	20.5	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
Speciated PCB-EC7 & WHO12										
PCB BZ 28 _A	-	-	-	-	-	-	<0.002	mg/kg	0.002	A-T-004s
PCB BZ 52 _A ^{M#}	-	-	-	-	-	-	<0.002	mg/kg	0.002	A-T-004s
PCB BZ 81 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 101 _A ^{M#}	-	-	-	-	-	-	<0.004	mg/kg	0.004	A-T-004s
PCB BZ 105 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 114 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 118 _A ^{M#}	-	-	-	-	-	-	<0.007	mg/kg	0.007	A-T-004s
PCB BZ 123 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 126 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 138 _A ^{M#}	-	-	-	-	-	-	<0.006	mg/kg	0.006	A-T-004s
PCB BZ 153 _A ^{M#}	-	-	-	-	-	-	<0.004	mg/kg	0.004	A-T-004s
PCB BZ 156 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 157 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 167 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 169 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 180 _A ^{M#}	-	-	-	-	-	-	<0.004	mg/kg	0.004	A-T-004s
PCB BZ 189 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
PCB BZ 77 _A	-	-	-	-	-	-	<0.005	mg/kg	0.005	A-T-004s
Total Speciated PCB-EC7 & WHO12 _A	-	-	-	-	-	-	<0.007	mg/kg	0.002	A-T-004s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	1	<1	2	4	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	2	<1	15	9	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35 _A	2	15	2	21	8	<1	2	mg/kg	1	A-T-055s
Total Aliphatics _A	2	18	2	38	22	<1	2	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1	<1	1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	<1	3	<1	7	2	<1	3	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	<1	32	4	33	5	<1	7	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	4	185	25	87	7	<1	11	mg/kg	1	A-T-055s
Total Aromatics _A	4	220	30	127	15	<1	23	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	6	238	32	165	37	<1	25	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
SVOC										
Hexachlorobenzene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Diethyl phthalate _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Dimethyl phthalate _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Dibenzofuran _A	-	-	-	-	-	-	275	µg/kg	100	A-T-052s
Carbazole _A	-	-	-	-	-	-	222	µg/kg	100	A-T-052s
Butylbenzyl phthalate _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Bis(2-ethylhexyl)phthalate _A	-	-	-	-	-	-	<500	µg/kg	500	A-T-052s
Bis(2-chloroethoxy)methane _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Bis(2-chloroethyl)ether _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
4-Nitrophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
3+4-Methylphenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
4-Chloro-3-methylphenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Nitrophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Methylphenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Chlorophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,6-Dinitrotoluene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dinitrotoluene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dimethylphenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4-Dichlorophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4,6-Trichlorophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2,4,5-Trichlorophenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Chloronaphthalene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
2-Methylnaphthalene _A	-	-	-	-	-	-	234	µg/kg	100	A-T-052s
Bis(2-chloroisopropyl)ether _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Phenol _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Pentachlorophenol (SVOC) _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
n-Nitroso-n-dipropylamine _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
n-Dioctylphthalate _A	-	-	-	-	-	-	<500	µg/kg	500	A-T-052s
n-Dibutylphthalate _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Nitrobenzene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Isophorone _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Hexachloroethane _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
Hexachlorocyclopentadiene _A	-	-	-	-	-	-	<100	µg/kg	100	A-T-052s
Perylene _A	-	-	-	-	-	-	307	µg/kg	100	A-T-052s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
VOC										
Dichlorodifluoromethane _A	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloromethane _A	-	-	-	-	-	-	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene) _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromomethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloroethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Disulphide _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dichloromethane _A	-	-	-	-	-	-	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromochloromethane _A [#]	-	-	-	-	-	-	<5	µg/kg	5	A-T-006s
Chloroform _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane _A [#]	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
Benzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichloroethene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromomethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromodichloromethane _A [#]	-	-	-	-	-	-	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Toluene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Tetrachloroethene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromochloromethane _A [#]	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/1	20/06881/2	20/06881/3	20/06881/4	20/06881/5	20/06881/6	20/06881/7	Units	Limit of Detection	Method ref
Client Sample No	ES1	ES1	ES2	ES1	ES1	ES1	ES1			
Client Sample ID	WS08	BH04	BH04	BH03	WS06	WS04	WS05			
Depth to Top	0.50	0.40	1.00	0.00	0.50	0.40	0.25			
Depth To Bottom	0.55	0.50	1.10	0.30	0.60	0.50	0.35			
Date Sampled	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	14-Aug-20	17-Aug-20	17-Aug-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AE	5A	4A	6AE	6AB	4A	5A			
Chlorobenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane _A	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Ethylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
m & p Xylene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
o-Xylene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Styrene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromoform _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Isopropylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane _A	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromobenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Propylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
2-Chlorotoluene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Chlorotoluene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
tert-Butylbenzene _A [#]	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
sec-Butylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene _A	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Butylbenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP) _A	-	-	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene _A	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene _A [#]	-	-	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene _A	-	-	-	-	-	-	<3	µg/kg	3	A-T-006s

Envirolab Job Number: 20/06881/8

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/8							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS03									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	17-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
% Stones >10mm _A	14.6							% w/w	0.1	A-T-044
pH _D ^{M#}	7.59							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01							g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	5.0							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	9							mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	27							mg/kg	1	A-T-024s
Chromium _D ^{M#}	15							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Lead _D ^{M#}	69							mg/kg	1	A-T-024s
Mercury _D	<0.17							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	15							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	51							mg/kg	5	A-T-024s

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/8							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS03									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	17-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 20/06881

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/8							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS03									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	17-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.10							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.09							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.13							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.05							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.11							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.17							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.06							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.08							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.17							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	0.96							mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/06881/8

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06881/8									
Client Sample No	ES1									
Client Sample ID	WS03									
Depth to Top	0.30									
Depth To Bottom	0.40									
Date Sampled	17-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
TPH CWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C21-C35 _A	4							mg/kg	1	A-T-055s
Total Aliphatics _A	4							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	<1							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	2							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	8							mg/kg	1	A-T-055s
Total Aromatics _A	10							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	14							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/06881
Project:	New Park House	Date Received:	19/08/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	17.3

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/06773/2

Amendments: Request for split report

Envirolab Job Number: 20/06773
Issue Number: 3

Date: 03 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2483
Date Samples Received: 14/07/20
Date Instructions Received: 17/08/20
Date Analysis Completed: 26/08/20

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/06773

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06773/6							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS07									
Depth to Top	0.80									
Depth To Bottom	0.90									
Date Sampled	14-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	7.36							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.06							g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	1.2							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	3							mg/kg	1	A-T-024s
Boron (water soluble) _D	1.1							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.4							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	28							mg/kg	1	A-T-024s
Chromium _D ^{M#}	34							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Lead _D ^{M#}	13							mg/kg	1	A-T-024s
Mercury _D	<0.17							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	44							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	65							mg/kg	5	A-T-024s

Envirolab Job Number: 20/06773

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06773/6							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS07									
Depth to Top	0.80									
Depth To Bottom	0.90									
Date Sampled	14-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 20/06773

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06773/6							Units	Limit of Detection	Method ref
Client Sample No	ES1									
Client Sample ID	WS07									
Depth to Top	0.80									
Depth To Bottom	0.90									
Date Sampled	14-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
PAH-16MS										
Acenaphthene _A ^{M#}	0.02							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.06							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.26							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.23							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.30							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.14							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.09							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.28							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.54							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.15							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.27							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.53							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.88							mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/06773

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/06773/6									
Client Sample No	ES1									
Client Sample ID	WS07									
Depth to Top	0.80									
Depth To Bottom	0.90									
Date Sampled	14-Aug-20									
Sample Type	Soil - ES									
Sample Matrix Code	5AE									
TPH CWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C21-C35 _A	13							mg/kg	1	A-T-055s
Total Aliphatics _A	13							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	1							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	2							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	4							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	32							mg/kg	1	A-T-055s
Total Aromatics _A	39							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	52							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/06773
Project:	New Park House	Date Received:	17/08/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	20.0

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/07085/1

Amendments: Request for project/sample information change

Envirolab Job Number: 20/07085
Issue Number: 2

Date: 03 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2483
Date Samples Received: 24/08/20
Date Instructions Received: 25/08/20
Date Analysis Completed: 02/09/20

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 20/07085

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07085/1	20/07085/2	20/07085/3	20/07085/4				Units	Limit of Detection	Method ref
Client Sample No	ES1		ES1	ES1						
Client Sample ID	TP02	TP03	TP04	TP05						
Depth to Top	0.35	0.50	0.55	0.40						
Depth To Bottom										
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6ABE	6ABE	5AE	6AE						
% Stones >10mm _A	14.5	5.8	<0.1	4.8				% w/w	0.1	A-T-044
pH _D ^{M#}	8.94	8.67	8.03	7.63				pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.02	0.04	<0.01	0.02				g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1				mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2				mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	3.7	14.9	2.4	5.3				% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	<1	10	6	13				mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	<1.0	<1.0				mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.6	0.9	0.8	0.8				mg/kg	0.5	A-T-024s
Copper _D ^{M#}	17	61	132	40				mg/kg	1	A-T-024s
Chromium _D ^{M#}	17	12	21	15				mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1				mg/kg	1	A-T-040s
Lead _D ^{M#}	89	207	155	288				mg/kg	1	A-T-024s
Mercury _D	2.18	0.95	<0.17	0.22				mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	17	27	24	23				mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1				mg/kg	1	A-T-024s
Zinc _D ^{M#}	48	118	79	84				mg/kg	5	A-T-024s

Envirolab Job Number: 20/07085

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07085/1	20/07085/2	20/07085/3	20/07085/4				Units	Limit of Detection	Method ref
Client Sample No	ES1		ES1	ES1						
Client Sample ID	TP02	TP03	TP04	TP05						
Depth to Top	0.35	0.50	0.55	0.40						
Depth To Bottom										
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6ABE	6ABE	5AE	6AE						
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A						A-T-045

Envirolab Job Number: 20/07085

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07085/1	20/07085/2	20/07085/3	20/07085/4				Units	Limit of Detection	Method ref
Client Sample No	ES1		ES1	ES1						
Client Sample ID	TP02	TP03	TP04	TP05						
Depth to Top	0.35	0.50	0.55	0.40						
Depth To Bottom										
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6ABE	6ABE	5AE	6AE						
PAH-16MS										
Acenaphthene _A ^{M#}	0.05	0.10	0.04	0.11				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	0.02				mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.11	0.21	0.11	0.29				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.32	1.05	0.40	0.70				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.40	1.03	0.54	0.60				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.50	1.44	0.55	0.72				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.32	0.70	0.40	0.31				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.13	0.46	0.19	0.27				mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.53	1.20	0.41	0.75				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.09	0.20	0.08	0.09				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.61	1.93	0.54	1.34				mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.04	0.04	0.02	0.11				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.22	0.67	0.39	0.35				mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.09	<0.03	0.06				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.45	1.02	0.39	1.13				mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.71	1.76	0.64	1.39				mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	4.48	11.9	4.70	8.24				mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/07085

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07085/1	20/07085/2	20/07085/3	20/07085/4				Units	Limit of Detection	Method ref
Client Sample No	ES1		ES1	ES1						
Client Sample ID	TP02	TP03	TP04	TP05						
Depth to Top	0.35	0.50	0.55	0.40						
Depth To Bottom										
Date Sampled	24-Aug-20	24-Aug-20	24-Aug-20	24-Aug-20						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6ABE	6ABE	5AE	6AE						
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5	3	<1	<1				mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5	3	<1	<1				mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	6	7	<1	<1				mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	10	8	<1	<1				mg/kg	1	A-T-055s
Ali >C21-C35 _A	654	98	5	3				mg/kg	1	A-T-055s
Total Aliphatics _A	670	119	5	3				mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	7	8	1	2				mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<5	4	<1	<1				mg/kg	1	A-T-055s
Aro >C12-C16 _A	8	14	2	3				mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	32	22	5	10				mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	782	126	19	29				mg/kg	1	A-T-055s
Total Aromatics _A	829	174	27	45				mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	1500	293	32	48				mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-022s

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The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/07085
Project:	New Park House	Date Received:	25/08/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	18.4

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Final Test Report

Envirolab Job Number: 20/06993
Issue Number: 1

Date: 28-Oct-20

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2577

Date Samples Received: 20-Aug-20
Date Instructions Received: 21-Aug-20
Date Analysis Completed: 28-Oct-20

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

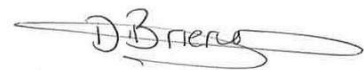
Please contact us if you need any further information.

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



Danielle Brierley
Client Manager

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/06993/2						
Client Sample Number							Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				WS02						
Depth to Top				0.45						
Depth to Bottom										
Date Sampled				18/08/2020						
Sample Type				Soil - ES						
Sample Matrix Code				4AB						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	11.13				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.76				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.14				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	6.4				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	6.63				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N					100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N					500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N					1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N					6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.5	2	25
Barium	A-T-025	N	N	0.025	0.013	0.053	0.150	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.124	0.021	0.263	0.330	0.5	10	70
Copper	A-T-025	N	N	0.012	0.002	0.025	0.030	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.012	0.001	0.025	0.020	0.5	10	30
Nickel	A-T-025	N	N	0.004	<0.001	0.008	<0.01	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.001	<0.001	0.002	<0.01	0.06	0.7	5
Selenium	A-T-025	N	N	0.001	<0.001	0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.002	0.003	0.004	0.030	4	50	200
Chloride	A-T-026	N	N	65	7	137	135	800	15000	25000
Fluoride	A-T-026	N	N	0.3	0.3	0.6	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	59	27	125	314	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	516	148	1093	1918	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	33.4	<20.0	71	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	11.8	11.1					
Conductivity (µS/cm)	A-T-037	N	N	1031	295					
Mass Sample (kg)				0.196						
Dry Matter (%)	A-T-044	N	N	89.4						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.200						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Final Test Report

Envirolab Job Number: 20/07085
Issue Number: 1

Date: 28-Oct-20

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: Decant Village & New Park House
Project Ref: B075856
Order No: EBMA2577

Date Samples Received: 24-Aug-20
Date Instructions Received: 25-Aug-20
Date Analysis Completed: 28-Oct-20

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

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All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



Holly Neary-King
Client Services Supervisor

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/07085/1						
Client Sample Number				ES1			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				TP02						
Depth to Top				0.35						
Depth to Bottom										
Date Sampled				24/08/2020						
Sample Type				Soil - ES						
Sample Matrix Code				6ABE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	8.94				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.62				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.09				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	3.8				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	2.38				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N					100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N					500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N					1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N					6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.002	0.002	0.004	0.020	0.5	2	25
Barium	A-T-025	N	N	0.064	0.059	0.135	0.600	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.002	0.001	0.004	0.010	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.013	0.002	0.028	0.030	0.5	10	30
Nickel	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40
Lead	A-T-025	N	N	0.014	0.016	0.030	0.160	0.5	10	50
Antimony	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.008	0.005	0.017	0.050	4	50	200
Chloride	A-T-026	N	N	2	<1.00	5	<10	800	15000	25000
Fluoride	A-T-026	N	N	1.0	0.2	2.0	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	22	3	46	53	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	87	38	184	440	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	8.3	8.7					
Conductivity (µS/cm)	A-T-037	N	N	175	76					
Mass Sample (kg)				0.195						
Dry Matter (%)	A-T-044	N	N	89.6						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.200						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Final Test Report

Envirolab Job Number: 20/07124
Issue Number: 1

Date: 28-Oct-20

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: Decant Village & New Park House
Project Ref: B075856
Order No: EBMA2577

Date Samples Received: 24-Aug-20
Date Instructions Received: 26-Aug-20
Date Analysis Completed: 28-Oct-20

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

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All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

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Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



Holly Neary-King
Client Services Supervisor

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/07124/1						
Client Sample Number				ES1			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH01						
Depth to Top				0.5						
Depth to Bottom				0.60						
Date Sampled				20/08/2020						
Sample Type				Soil - ES						
Sample Matrix Code				6AE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	10.26				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.09				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.09				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	8.4				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	5.64				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N					100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N					500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N					1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N					6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.002	0.001	0.004	0.010	0.5	2	25
Barium	A-T-025	N	N	0.034	0.019	0.070	0.210	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.010	0.002	0.021	0.030	0.5	10	70
Copper	A-T-025	N	N	0.002	<0.001	0.004	<0.01	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.005	<0.001	0.010	<0.01	0.5	10	30
Nickel	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.002	0.003	0.004	0.030	4	50	200
Chloride	A-T-026	N	N	23	1	48	39	800	15000	25000
Fluoride	A-T-026	N	N	0.5	0.2	1.0	2.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	64	9	133	152	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	168	52	348	656	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	9.8	9.6					
Conductivity (µS/cm)	A-T-037	N	N	336	104					
Mass Sample (kg)				0.187						
Dry Matter (%)	A-T-044	N	N	93.4						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.200						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/07660
Issue Number: 1

Date: 17 September, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

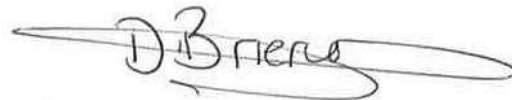
Project Manager: Rebecca Tidsey/Zoe Henderson
Project Name: New Park House
Project Ref: B075856
Order No: EBMA2503
Date Samples Received: 11/09/20
Date Instructions Received: 11/09/20
Date Analysis Completed: 17/09/20

Prepared by:



Sophie France
Client Service Manager

Approved by:



Danielle Brierley
Client Manager

Envirolab Job Number: 20/07660

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07660/1	20/07660/2	20/07660/4					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH05							
Depth to Top	8.18	10.92	10.9							
Depth To Bottom										
Date Sampled	08-Sep-20	08-Sep-20	08-Sep-20							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
pH (w) _A [#]	7.88	7.83	7.83					pH	0.01	A-T-031w
Hardness Total _A [#]	209	349	195					mg/l Ca CO ₃	2	A-T-049w
Sulphate (w) _A [#]	75	64	46					mg/l	1	A-T-026w
Cyanide (total) (w) _A [#]	<0.005	<0.005	<0.005					mg/l	0.005	A-T-042wTCN
Phenols - Total by HPLC (w) _A	<0.01	<0.01	<0.01					mg/l	0.01	A-T-050w
Sulphide (w) _A	<0.1	<0.1	<0.1					mg/l	0.1	A-T-S2-w
DOC (w) _A [#]	1.9	1.7	7.2					mg/l	0.2	A-T-032w
Arsenic (dissolved) _A [#]	<1	<1	1					µg/l	1	A-T-025w
Boron (dissolved) _A [#]	95	107	37					µg/l	10	A-T-025w
Cadmium (dissolved) _A [#]	<0.2	<0.2	<0.2					µg/l	0.2	A-T-025w
Calcium (dissolved) _A [#]	56	84	59					mg/l	1	A-T-049w
Copper (dissolved) _A [#]	2	2	2					µg/l	1	A-T-025w
Chromium (dissolved) _A [#]	<1	1	<1					µg/l	1	A-T-025w
Lead (dissolved) _A [#]	<1	<1	<1					µg/l	1	A-T-025w
Mercury (dissolved) _A [#]	0.1	0.1	<0.1					µg/l	0.1	A-T-025w
Nickel (dissolved) _A [#]	2	4	2					µg/l	1	A-T-025w
Selenium (dissolved) _A [#]	<1	3	1					µg/l	1	A-T-025w
Zinc (dissolved) _A [#]	3	14	2					µg/l	1	A-T-025w

Envirolab Job Number: 20/07660

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07660/1	20/07660/2	20/07660/4					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH05							
Depth to Top	8.18	10.92	10.9							
Depth To Bottom										
Date Sampled	08-Sep-20	08-Sep-20	08-Sep-20							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
PAH-16MS (w)										
Naphthalene (w) _A [#]	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Acenaphthylene (w) _A [#]	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Acenaphthene (w) _A [#]	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Fluorene (w) _A [#]	<0.01	<0.01	<0.01					µg/l	0.01	A-T-019w
Phenanthrene (w) _A [#]	<0.01	<0.01	0.06					µg/l	0.01	A-T-019w
Anthracene (w) _A [#]	<0.01	<0.01	0.01					µg/l	0.01	A-T-019w
Fluoranthene (w) _A [#]	<0.01	<0.01	0.10					µg/l	0.01	A-T-019w
Pyrene (w) _A [#]	<0.01	<0.01	0.11					µg/l	0.01	A-T-019w
Benzo(a)anthracene (w) _A [#]	<0.01	<0.01	0.06					µg/l	0.01	A-T-019w
Chrysene (w) _A [#]	<0.01	<0.01	0.10					µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (w) _A [#]	<0.01	<0.01	0.09					µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (w) _A [#]	<0.01	<0.01	0.03					µg/l	0.01	A-T-019w
Benzo(a)pyrene (w) _A [#]	<0.01	<0.01	0.07					µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (w) _A [#]	<0.01	<0.01	0.08					µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (w) _A [#]	<0.01	<0.01	0.01					µg/l	0.01	A-T-019w
Benzo(ghi)perylene (w) _A [#]	<0.01	<0.01	0.07					µg/l	0.01	A-T-019w
Total PAH-16MS (w) _A [#]	<0.01	<0.01	0.79					µg/l	0.01	A-T-019w

Envirolab Job Number: 20/07660

Client Project Name: New Park House

Client Project Ref: B075856

Lab Sample ID	20/07660/1	20/07660/2	20/07660/4					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH05							
Depth to Top	8.18	10.92	10.9							
Depth To Bottom										
Date Sampled	08-Sep-20	08-Sep-20	08-Sep-20							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
TPH CWG (w)										
Ali >C5-C6 (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
Ali >C6-C8 (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
Ali >C8-C10 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Ali >C10-C12 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Ali >C12-C16 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Ali >C16-C21 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Ali >C21-C35 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Total Aliphatics (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Aro >C5-C7 (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
Aro >C7-C8 (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
Aro >C8-C10 (w) _A	<5	<5	<5					µg/l	5	A-T-055w
Aro >C10-C12 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Aro >C12-C16 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Aro >C16-C21 (w) _A [#]	<5	<5	<5					µg/l	5	A-T-055w
Aro >C21-C35 (w) _A [#]	<10	<10	<10					µg/l	10	A-T-055w
Total Aromatics (w) _A	<10	<10	<10					µg/l	10	A-T-055w
TPH (Ali & Aro >C5-C35) (w) _A	<10	<10	<10					µg/l	10	A-T-055w
BTEX - Benzene (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
BTEX - Toluene (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
BTEX - Ethyl Benzene (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
BTEX - m & p Xylene (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
BTEX - o Xylene (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w
MTBE (w) _A [#]	<1	<1	<1					µg/l	1	A-T-022w

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	20/07660
Project:	New Park House	Date Received:	11/09/2020 (am)
Clients Project No:	B075856	Cool Box Temperatures (°C):	14.0 & 14.6

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Appendix D – Geotechnical Laboratory Testing Results

- Structural Soils, Geotechnical Analysis Results

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/07345
Issue Number: 1

Date: 01 October, 2020

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Rob Allen/Zoe Henderson
Project Name: New Park House
Project Ref: B075658
Order No: EBMA2482
Date Samples Received: 24/08/20
Date Instructions Received: 03/09/20
Date Analysis Completed: 01/10/20

Prepared by:



Sophie France
Client Service Manager

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/1	20/07345/2	20/07345/3	20/07345/5	20/07345/6	20/07345/7	20/07345/9	Units	Limit of Detection	Method ref
Client Sample No	B2	B2	D2	B3	B2	D2	D3			
Client Sample ID	WS02	WS01	WS03	WS05	WS04	WS06	WS08			
Depth to Top	2.40	1.20	1.40	3.50	2.00	2.70	3.50			
Depth To Bottom	3.00	2.00			2.50					
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code			5AE	4A			5AE			
% Stones >10mm _A	-	-	11.5	<0.1	-	-	0.6	% w/w	0.1	A-T-044
pH _D ^{M#}	-	-	6.95	7.46	-	-	8.50	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	-	<0.01	<0.01	-	-	0.06	g/l	0.01	A-T-026s
1.10a PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _A [#]	Appended	Appended	-	-	-	-	-	%	0.1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	-	-	-	Appended	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	-	-	-	Appended	-	%	1	Subcon SS
1.10c PSD (3.35mm-2um clay)(Sedimentation by Pipette/Hydrometer)BS1377 1990 pt2cl9.4/9.5 _A [#]	-	-	-	-	Appended	-	-	%	0.1	Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/10	20/07345/14	20/07345/15	20/07345/17	20/07345/18	20/07345/21	20/07345/22	Units	Limit of Detection	Method ref
Client Sample No	B2	D7 + B8	D9 + B10	D13 + B14	D15	D19 + B20	D21			
Client Sample ID	WS07	BH01	BH01	BH01	BH01	BH01	BH01			
Depth to Top	4.50	3.00	4.00	6.00	7.00	9.00	10.00			
Depth To Bottom	5.00	3.45	4.45	6.45		9.45				
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code		4A			4		4A			
% Stones >10mm _A	-	<0.1	-	-	<0.1	-	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	-	6.82	-	-	7.54	-	7.46	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	0.08	-	-	0.02	-	0.04	g/l	0.01	A-T-026s
1.10a PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _A [#]	Appended	Appended	-	Appended	-	Appended	-	%	0.1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	Appended	-	-	-	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	Appended	-	-	-	-	%	1	Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/25	20/07345/26	20/07345/29	20/07345/30	20/07345/31	20/07345/35	20/07345/36	Units	Limit of Detection	Method ref
Client Sample No	B26	D27	U31	D32	D33	D39 + B38	U40			
Client Sample ID	BH01	BH01	BH01	BH01	BH01	BH01	BH01			
Depth to Top	12.00	13.00	15.00	15.50	16.00	19.00	19.50			
Depth To Bottom	12.45		15.45				19.95			
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code		5A		5A		5A				
% Stones >10mm _A	-	<0.1	-	<0.1	-	<0.1	-	% w/w	0.1	A-T-044
pH _D ^{M#}	-	8.11	-	8.63	-	8.65	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	0.02	-	0.03	-	0.03	-	g/l	0.01	A-T-026s
1.10a PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _A [#]	Appended	-	-	-	-	-	-	%	0.1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	-	-	Appended	-	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	-	-	Appended	-	-	%	1	Subcon SS
5.02c QUT Multistage (100mm) BS1377 1990 pt7 cl9 (Undrained Shear Strength) _A [#]	-	-	Appended	-	-	-	Appended	N/A		Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/38	20/07345/41	20/07345/44	20/07345/45	20/07345/50	20/07345/52	20/07345/53	Units	Limit of Detection	Method ref
Client Sample No	D42	D45	D2	B3	D8	B10	U11			
Client Sample ID	BH01	BH01	BH02	BH02	BH02	BH02	BH02			
Depth to Top	21.00	23.00	1.20	2.00	4.00	5.00	6.5			
Depth To Bottom			1.65		4.45		6.95			
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code		5A	6AE		4A					
% Stones >10mm _A	-	<0.1	13.7	-	<0.1	-	-	% w/w	0.1	A-T-044
pH _D ^{M#}	-	8.66	8.37	-	8.21	-	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	0.03	<0.01	-	<0.01	-	-	g/l	0.01	A-T-026s
1.10a PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _A [#]	-	-	-	Appended	-	Appended	-	%	0.1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	Appended	-	-	-	-	-	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	Appended	-	-	-	-	-	-	%	1	Subcon SS
4.01 Dimensional Consolidation (5 stages) (75mm) BS1377-5:3 _A [#]	-	-	-	-	-	-	Appended	N/A		Subcon SS
4.06a potential remoulding charge at as received moisture _A	-	-	-	-	-	-	Appended	N/A		Subcon SS
5.02c QUT Multistage (100mm) BS1377 1990 pt7 cl9 (Undrained Shear Strength) _A [#]	-	-	-	-	-	-	Appended	N/A		Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/55	20/07345/59	20/07345/65	20/07345/68	20/07345/69	20/07345/72	20/07345/73	Units	Limit of Detection	Method ref
Client Sample No	D13 + B14	D18	D24	D4	B5	B8	B9			
Client Sample ID	BH02	BH02	BH02	BH03	BH03	BH03	BH03			
Depth to Top	8.00	15.50	23.00	2.00	3.00	5.00	5.00			
Depth To Bottom	8.45	15.95	23.45	2.45			5.45			
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A		4A						
% Stones >10mm _A	<0.1	<0.1	-	<0.1	-	-	-	% w/w	0.1	A-T-044
pH _D ^{M#}	8.46	7.94	-	7.68	-	-	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01	0.01	-	0.02	-	-	-	g/l	0.01	A-T-026s
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	Appended	-	-	Appended	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	Appended	-	-	Appended	-	%	1	Subcon SS
1.10c PSD (3.35mm-2um clay)(Sedimentation by Pipette/Hydrometer)BS1377 1990 pt2cl9.4/9.5 _A [#]	-	-	-	-	Appended	-	Appended	%	0.1	Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/74	20/07345/79	20/07345/82	20/07345/83	20/07345/84	20/07345/86	20/07345/88	Units	Limit of Detection	Method ref
Client Sample No	D10	D15	U18	D19	D20	D22	D3			
Client Sample ID	BH03	BH03	BH03	BH03	BH03	BH03	BH04			
Depth to Top	5.50	12.50	17.00	17.50	18.50	20.50	1.30			
Depth To Bottom			17.45		18.95					
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5A	4A		5AE			5AE			
% Stones >10mm _A	<0.1	<0.1	-	<0.1	-	-	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	8.48	8.61	-	8.73	-	-	7.97	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.03	0.02	-	0.04	-	-	0.04	g/l	0.01	A-T-026s
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	-	-	-	Appended	Appended	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	-	-	-	Appended	Appended	-	%	1	Subcon SS
5.02c QUT Multistage (100mm) BS1377 1990 pt7 cl9 (Undrained Shear Strength) _A [#]	-	-	Appended	-	-	-	-	N/A		Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/89	20/07345/90	20/07345/91	20/07345/92	20/07345/93	20/07345/95	20/07345/96	Units	Limit of Detection	Method ref
Client Sample No	D4	D5	D6	D7 + B8	D2	D4	B5			
Client Sample ID	BH04	BH04	BH04	BH04	BH05	BH05	BH05			
Depth to Top	4.50	7.80	9.50	11.00	1.20	2.00	2.50			
Depth To Bottom					1.65	2.45				
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5A		5A			5A				
% Stones >10mm _A	<0.1	-	<0.1	-	-	<0.1	-	% w/w	0.1	A-T-044
pH _D ^{M#}	8.55	-	8.60	-	-	6.34	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.05	-	0.06	-	-	0.11	-	g/l	0.01	A-T-026s
1.10a PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _A [#]	-	-	-	-	-	-	Appended	%	0.1	Subcon SS
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	-	Appended	-	Appended	Appended	-	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	-	Appended	-	Appended	Appended	-	-	%	1	Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/98	20/07345/99	20/07345/103	20/07345/107	20/07345/109	20/07345/112	20/07345/113	Units	Limit of Detection	Method ref
Client Sample No	B7	D8	D12	D16	D18	D21	D22			
Client Sample ID	BH05	BH05	BH05	BH05	BH05	BH05	BH05			
Depth to Top	4.00	4.50	9.50	15.50	17.50	20.50	21.50			
Depth To Bottom			9.95	15.95			21.95			
Date Sampled										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code		5A	4A		5A		5A			
% Stones >10mm _A	-	<0.1	<0.1	-	0.2	-	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	-	8.40	8.57	-	8.72	-	8.72	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	0.12	0.02	-	0.06	-	0.04	g/l	0.01	A-T-026s
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	Appended	-	-	Appended	-	Appended	-	%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	Appended	-	-	Appended	-	Appended	-	%	1	Subcon SS

Envirolab Job Number: 20/07345

Client Project Name: New Park House

Client Project Ref: B075658

Lab Sample ID	20/07345/115							Units	Limit of Detection	Method ref
Client Sample No	D24									
Client Sample ID	BH05									
Depth to Top	23.50									
Depth To Bottom										
Date Sampled										
Sample Type	Soil									
Sample Matrix Code										
1.01 % Moisture BS1377 1990 pt2 cl3.2 _A [#]	Appended							%	0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _A [#]	Appended							%	1	Subcon SS

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG **Project No:** 20/07345
Project: New Park House **Date Received:** 03/09/2020 (am)
Clients Project No: B075658 **Cool Box Temperatures (°C):** 14.8

Lab Sample ID	20/07345/1	20/07345/2	20/07345/3	20/07345/5	20/07345/6	20/07345/7	20/07345/9	20/07345/10	20/07345/14	20/07345/15	20/07345/17	20/07345/18
Client Sample No	B2	B2	D2	B3	B2	D2	D3	B2	D7 + B8	D9 + B10	D13 + B14	D15
Client Sample ID/Depth	WS02 2.40-3.00m	WS01 1.20-2.00m	WS03 1.40m	WS05 3.50m	WS04 2.00-2.50m	WS06 2.70m	WS08 3.50m	WS07 4.50-5.00m	BH01 3.00-3.45m	BH01 4.00-4.45m	BH01 6.00-6.45m	BH01 7.00m
Date Sampled												
Deviation Code												
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	20/07345/21	20/07345/22	20/07345/25	20/07345/26	20/07345/29	20/07345/30	20/07345/31	20/07345/35	20/07345/36	20/07345/38	20/07345/41	20/07345/44
Client Sample No	D19 + B20	D21	B26	D27	U31	D32	D33	D39 + B38	U40	D42	D45	D2
Client Sample ID/Depth	BH01 9.00-9.45m	BH01 10.00m	BH01 12.00-12.45m	BH01 13.00m	BH01 15.00-15.45m	BH01 15.50m	BH01 16.00m	BH01 19.00m	BH01 19.50-19.95m	BH01 21.00m	BH01 23.00m	BH02 1.20-1.65m
Date Sampled												
Deviation Code												
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	20/07345/45	20/07345/50	20/07345/52	20/07345/53	20/07345/55	20/07345/59	20/07345/65	20/07345/68	20/07345/69	20/07345/72	20/07345/73	20/07345/74
Client Sample No	B3	D8	B10	U11	D13 + B14	D18	D24	D4	B5	B8	B9	D10
Client Sample ID/Depth	BH02 2.00m	BH02 4.00-4.45m	BH02 5.00m	BH02 6.5-6.95m	BH02 8.00-8.45m	BH02 15.50-15.95m	BH02 23.00-23.45m	BH03 2.00-2.45m	BH03 3.00m	BH03 5.00m	BH03 5.00-5.45m	BH03 5.50m
Date Sampled												
Deviation Code												
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	20/07345/79	20/07345/82	20/07345/83	20/07345/84	20/07345/86	20/07345/88	20/07345/89	20/07345/90	20/07345/91	20/07345/92	20/07345/93	20/07345/95
Client Sample No	D15	U18	D19	D20	D22	D3	D4	D5	D6	D7 + B8	D2	D4
Client Sample ID/Depth	BH03 12.50m	BH03 17.00-17.45m	BH03 17.50m	BH03 18.50-18.95m	BH03 20.50m	BH04 1.30m	BH04 4.50m	BH04 7.80m	BH04 9.50m	BH04 11.00m	BH05 1.20-1.65m	BH05 2.00-2.45m
Date Sampled												

Deviation Code												
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Lab Sample ID	20/07345/96	20/07345/98	20/07345/99	20/07345/103	20/07345/107	20/07345/109	20/07345/112	20/07345/113	20/07345/115
Client Sample No	B5	B7	D8	D12	D16	D18	D21	D22	D24
Client Sample ID/Depth	BH05 2.50m	BH05 4.00m	BH05 4.50m	BH05 9.50-9.95m	BH05 15.50-15.95m	BH05 17.50m	BH05 20.50m	BH05 21.50-21.95m	BH05 23.50m
Date Sampled									
Deviation Code									
E (no date)	✓	✓	✓	✓	✓	✓	✓	✓	✓

Key

E (no date)

No sampling date provided (all results affected if not provided)

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.



STRUCTURAL SOILS LTD
TEST REPORT



Report No. 784632 R1

Date 01-October-2020 Contract 20/07345

Client Envirolab Ltd
Address Units 7 & 8 Sandpits Business Park
Mottram Road
Hyde
SK14 3AR

For the Attention of Holly Neary-King

Samples submitted by client 04/09/2020
Testing Started 07/09/2020
Testing Completed 01/10/2020

Client Reference 20/07345
Client Order No.
Instruction Type Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2 (superseded) **
Liquid Limit (definitive method) BS1377:Part 2:1990,clause 4.3
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4
Particle Size Distribution wet sieve method BS1377:Part 2:1990,clause 9.2
One-dimensional data logged consolidation BS1377:Part 5:1990,clause 3.5
Undrained shear strength triaxial compression without pore pressure measurement
(multistage loading) BS1377:Part 7:1990,clause 8.5

Hand Vane

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

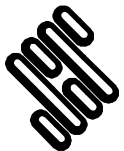
Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail luke.fisher@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Description of Sample
BH01	20/07345/15	D	4.00	11	NP	NP	NP	98	Brown SAND
BH01	20/07345/31	D	16.00	16	32	15	17	88	Brown sandy slightly gravelly CLAY
BH01	20/07345/38	D	21.00	14	30	15	15	97	Brown slightly sandy slightly gravelly CLAY
BH02	20/07345/65	D	23.00	14	31	15	16	94	Brown slightly sandy slightly silty CLAY
BH03	20/07345/72	D	5.00	23	NP	NP	NP	94	Brown sandy CLAY
BH03	20/07345/84	D	18.50	18	28	18	10	99	Brown silty CLAY
BH03	20/07345/86	D	20.50	15	29	15	14	92	Brown slightly sandy slightly gravelly CLAY
BH04	20/07345/90	D	7.80	16	32	15	17	98	Brown slightly sandy CLAY



**STRUCTURAL
SOILS LTD**

Contract:

20/07345

Contract Ref:

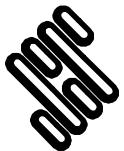
784632



SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Description of Sample
BH04	20/07345/92	D	11.00	20	NP	NP	NP	100	Brown silty SAND
BH05	20/07345/93	B	1.20	15	28	16	12	81	Brown slightly sandy slightly gravelly CLAY
BH05	20/07345/98	D	4.00	27	27	13	14	91	Brown CLAY
BH05	20/07345/107	D	15.50	20	26	14	12	93	Brown slightly sandy slightly silty CLAY
BH05	20/07345/112	D	20.50	15	26	16	10	97	Brown silty CLAY
BH05	20/07345/116	D	23.50	13	28	15	13	94	Brown slightly sandy slightly gravelly CLAY
WS06	20/07345/7	D	2.70	19	29	13	16	84	Brown sandy slightly gravelly CLAY



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Contract:

20/07345

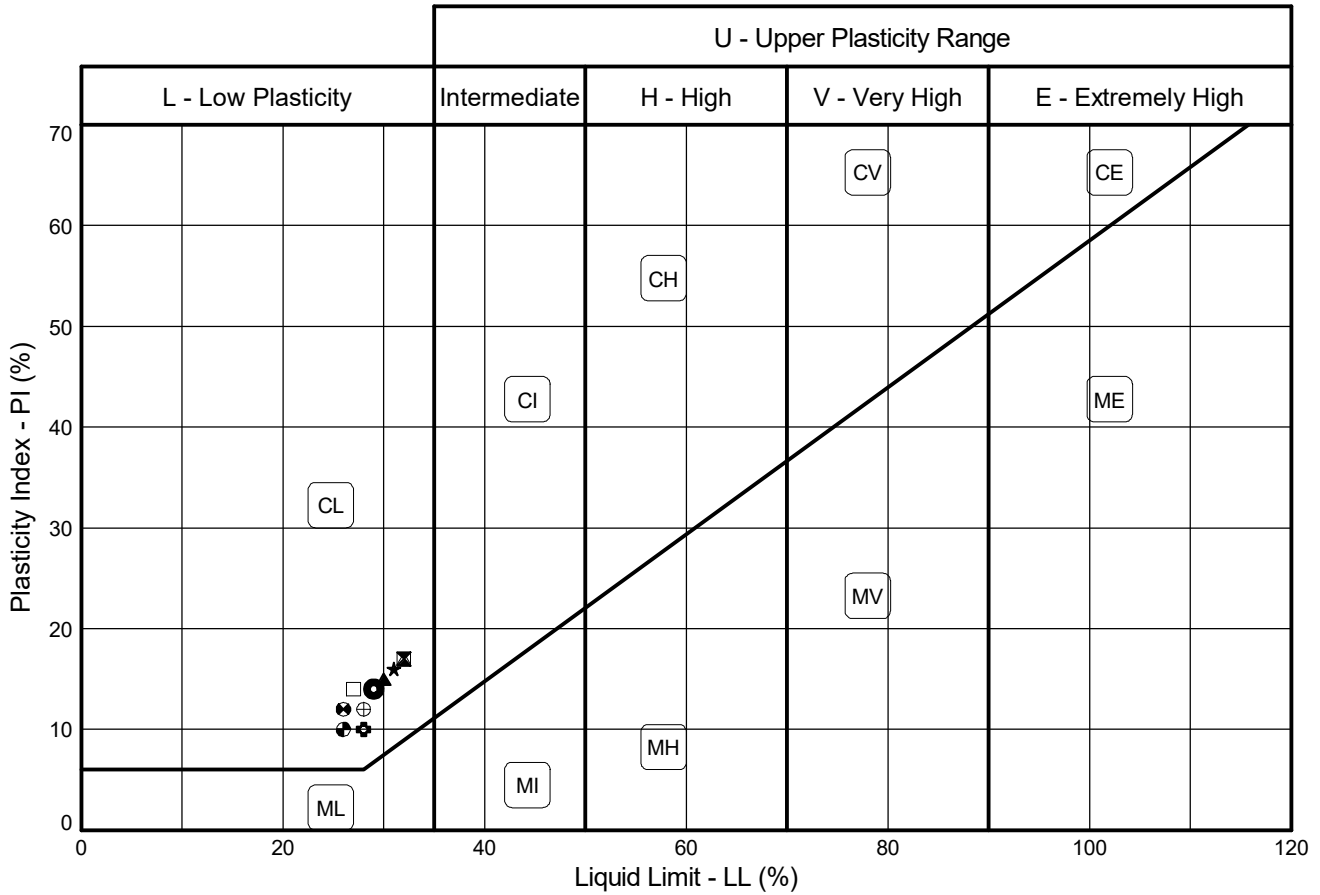
Contract Ref:

784632



PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425µm %	Lab location	Notes
Exploratory Position ID	Sample	Depth (m)										
⊗	BH01	20/07345/15D	4.00	3.2/4.3/5.3/5.4	4.2.4	11	NP	NP	NP	98	C	
⊗	BH01	20/07345/31D	16.00	3.2/4.3/5.3/5.4	4.2.4	16	32	15	17	88	C	
▲	BH01	20/07345/38D	21.00	3.2/4.3/5.3/5.4	4.2.4	14	30	15	15	97	C	
★	BH02	20/07345/65D	23.00	3.2/4.3/5.3/5.4	4.2.4	14	31	15	16	94	C	
	BH03	20/07345/72D	5.00	3.2/4.3/5.3/5.4	4.2.4	23	NP	NP	NP	94	C	
⊗	BH03	20/07345/84D	18.50	3.2/4.3/5.3/5.4	4.2.4	18	28	18	10	99	C	
⊗	BH03	20/07345/86D	20.50	3.2/4.3/5.3/5.4	4.2.4	15	29	15	14	92	C	
△	BH04	20/07345/90D	7.80	3.2/4.3/5.3/5.4	4.2.4	16	32	15	17	98	C	
	BH04	20/07345/92D	11.00	3.2/4.3/5.3/5.4	4.2.4	20	NP	NP	NP	100	C	
⊕	BH05	20/07345/93B	1.20	3.2/4.3/5.3/5.4	4.2.4	15	28	16	12	81	C	
□	BH05	20/07345/98D	4.00	3.2/4.3/5.3/5.4	4.2.4	27	27	13	14	91	C	
⊗	BH05	20/07345/107D	15.50	3.2/4.3/5.3/5.4	4.2.4	20	26	14	12	93	C	
⊗	BH05	20/07345/112D	20.50	3.2/4.3/5.3/5.4	4.2.4	15	26	16	10	97	C	

Tested in accordance with the following clauses of BS1377-2:1990.

- 3.2 - Moisture Content
- 4.3 - Cone Penetrometer Method
- 4.4 - One Point Cone Penetrometer Method
- 4.6 - One Point Casagrande Method
- 5.3 - Plastic Limit Method
- 5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

- 4.2.3 - Natural State
- 4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

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LORNA WHITWORTH

Date

01/10/20

Contract

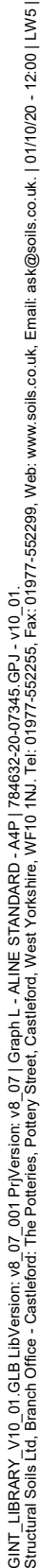
20/07345

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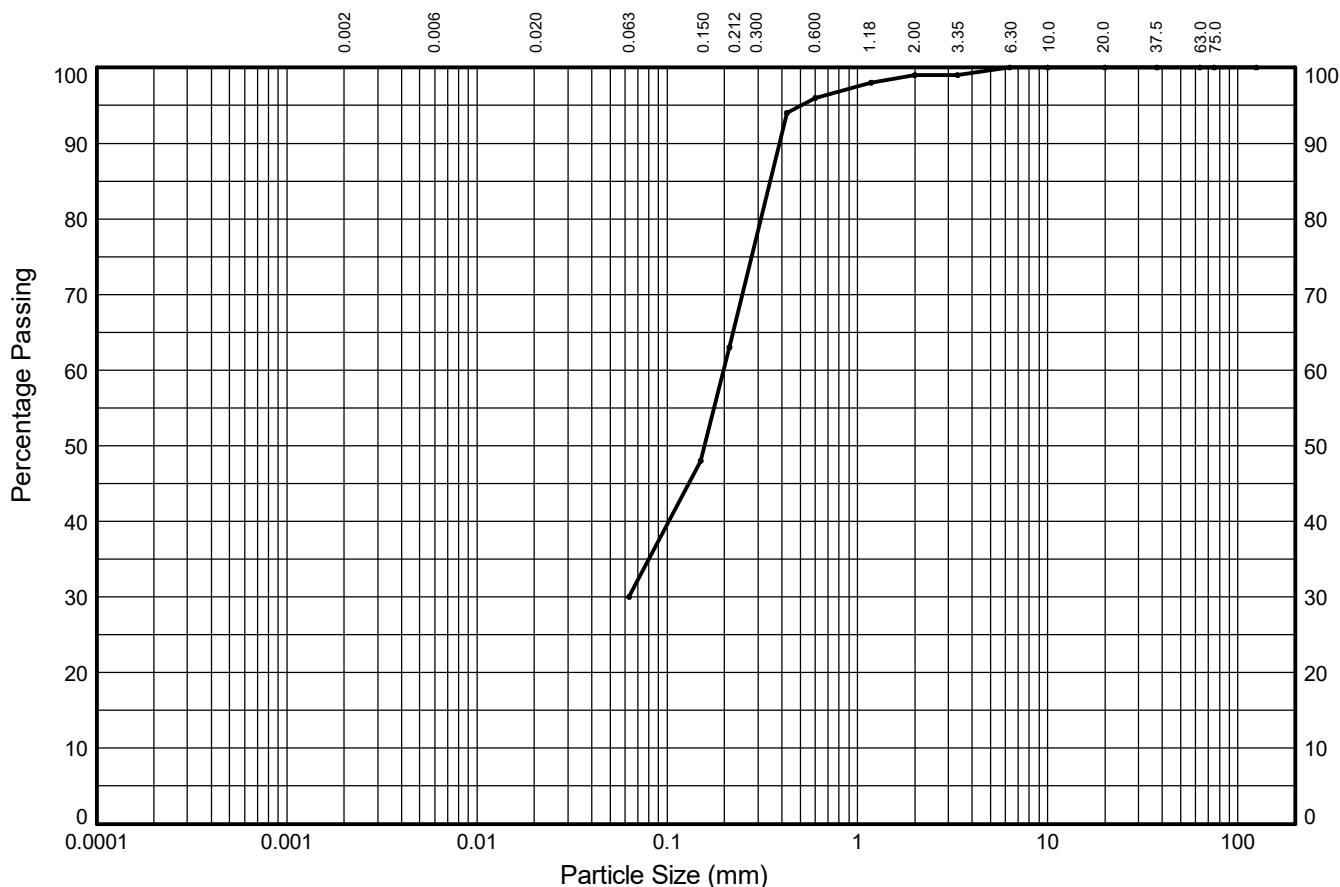


In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **3.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	30%	36%	3%	1%	0%	0%	
	SILT			SAND			GRAVEL			
30%				69%			1%			0%

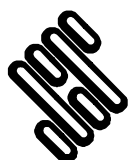
Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	99
2.00	99
1.18	98
0.600	96
0.425	94
0.212	63
0.150	48
0.063	30

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Coefficients	
D_{10} (mm)	NA
D_{15} (mm)	NA
D_{30} (mm)	0.063
D_{50} (mm)	0.157
D_{60} (mm)	0.198
D_{85} (mm)	0.347
D_{90} (mm)	0.389
C_u	NA
C_c	NA

Brown slightly gravelly very clayey SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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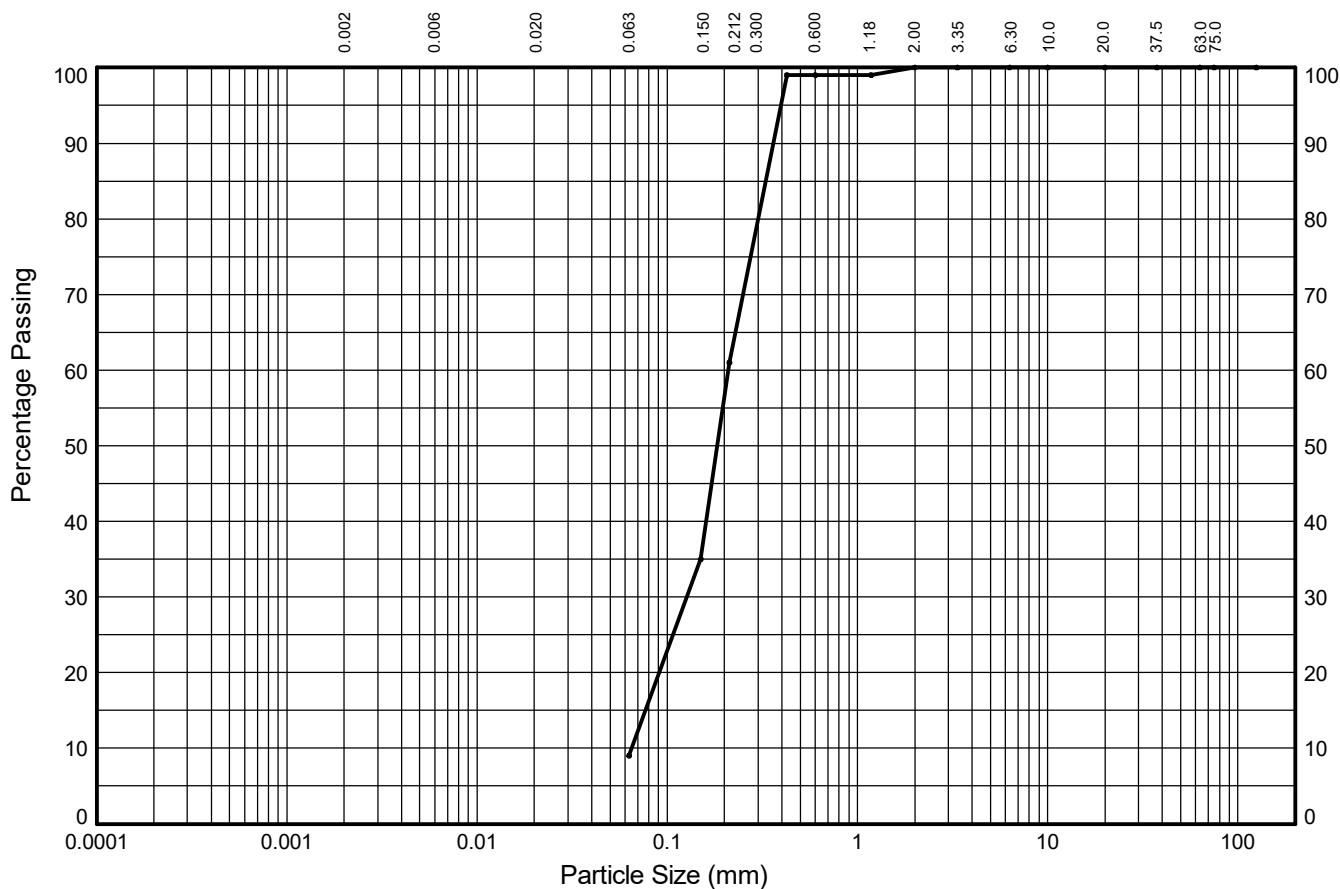
Contract Ref:

784632



In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **6.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	47%	43%	1%	0%	0%	0%	
	SILT			SAND			GRAVEL			
9%				91%			0%			0%

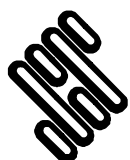
Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	99
0.600	99
0.425	99
0.212	61
0.150	35
0.063	9

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Coefficients	
D_{10} (mm)	0.065
D_{15} (mm)	0.077
D_{30} (mm)	0.127
D_{50} (mm)	0.183
D_{60} (mm)	0.209
D_{85} (mm)	0.329
D_{90} (mm)	0.360
C_U	3.2
C_C	1.2

Soil Description:
Brown clayey SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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PARTICLE SIZE DISTRIBUTION TEST

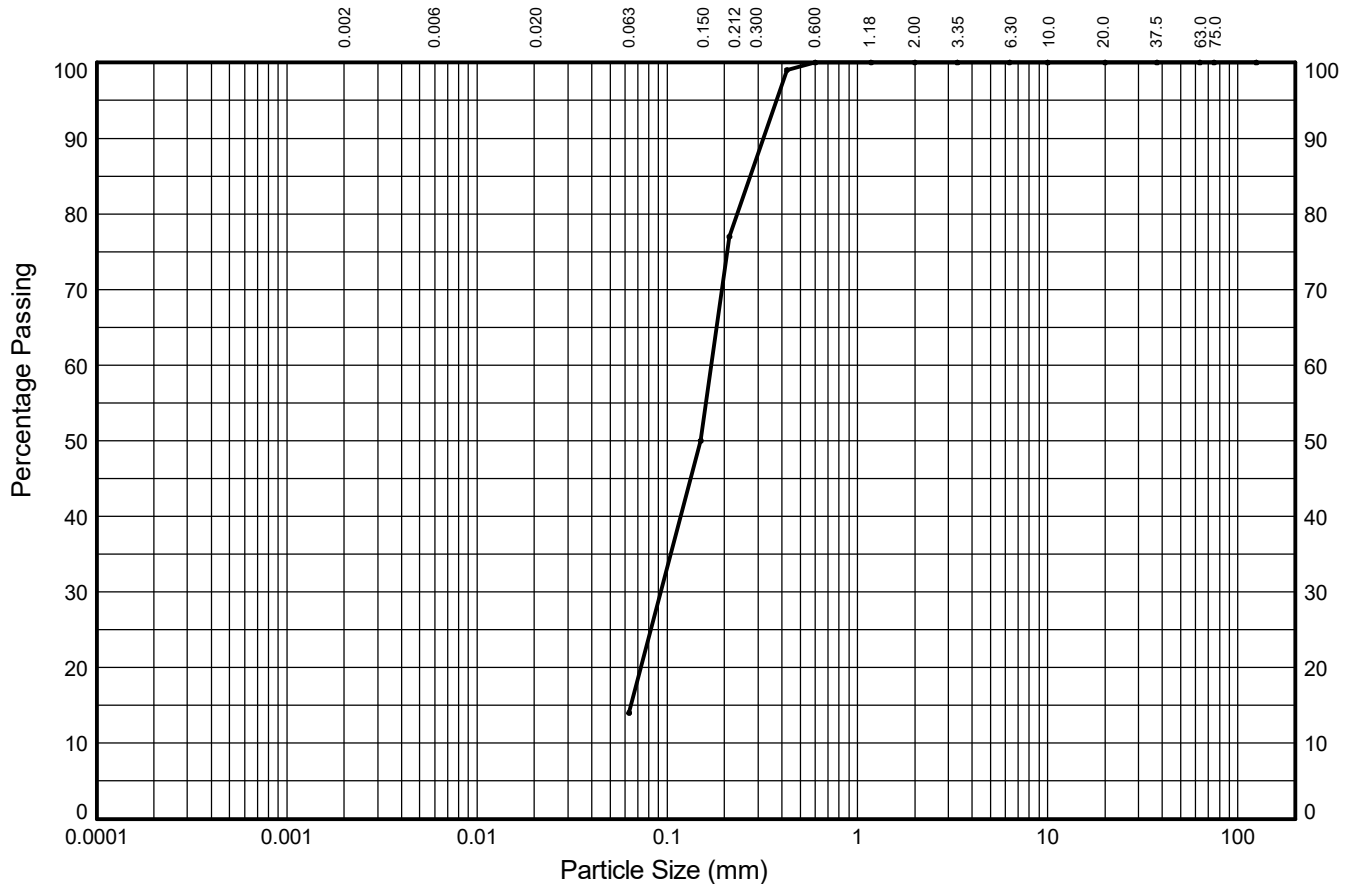
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH01**

Sample Ref: **20/07345/21**

Sample Type: **B**

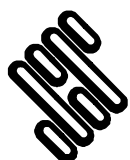
Depth (m): **9.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	58%	28%	0%	0%	0%	0%	
	SILT			SAND			GRAVEL			
14%				86%			0%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients		
125.0	100			D ₁₀ (mm)	NA	
75.0	100			D ₁₅ (mm)	0.065	
63.0	100			D ₃₀ (mm)	0.093	
37.5	100			D ₅₀ (mm)	0.150	
20.0	100			D ₆₀ (mm)	0.171	
10.0	100			D ₈₅ (mm)	0.273	
6.30	100			D ₉₀ (mm)	0.320	
3.35	100			Sedimentation sample was not pre-treated	C _U	NA
2.00	100				C _C	NA
1.18	100			Soil Description: Brown clayey SAND		
0.600	100					
0.425	99					
0.212	77					
0.150	50					
0.063	14					

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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PARTICLE SIZE DISTRIBUTION TEST

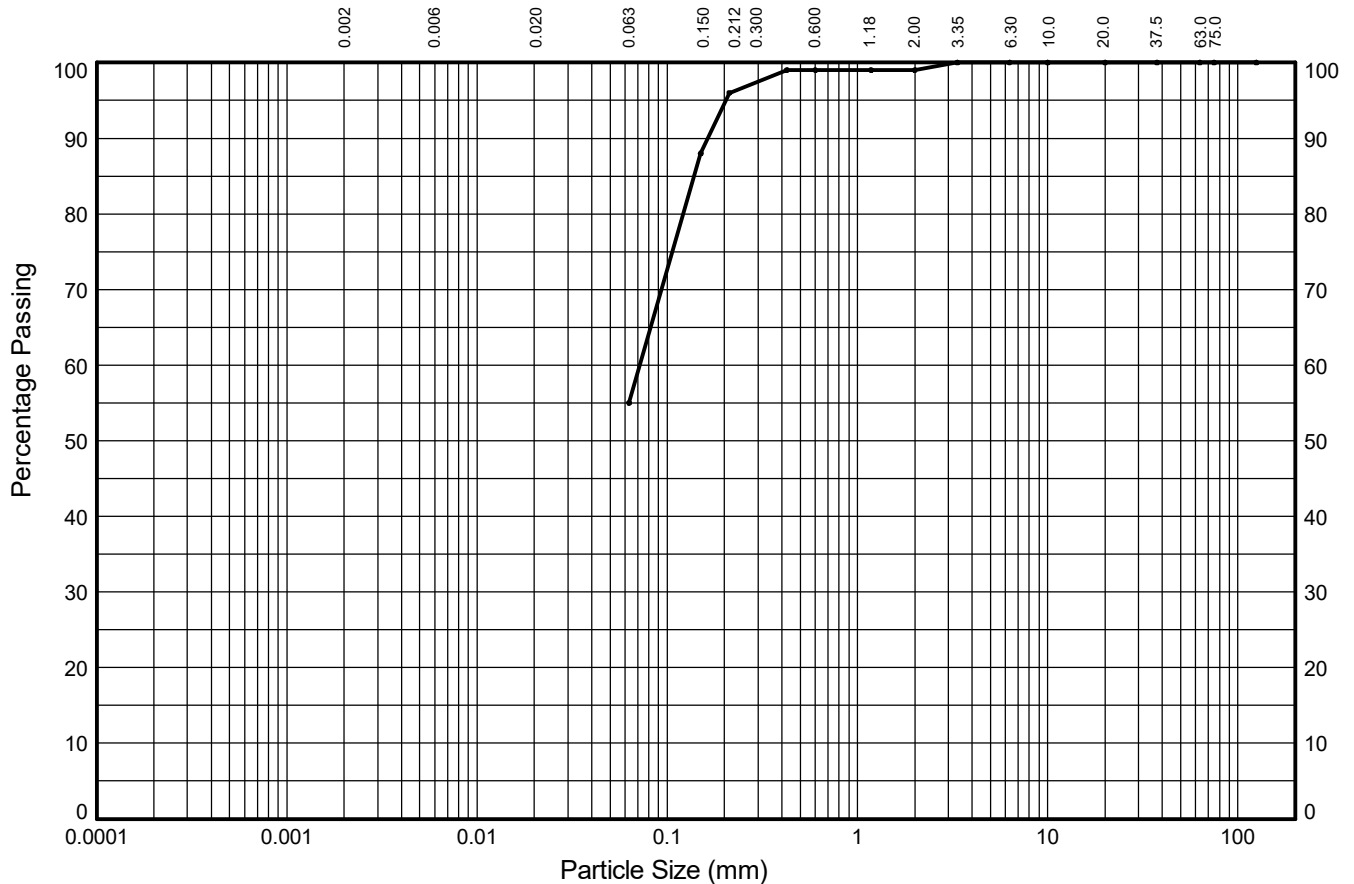
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH01**

Sample Ref: **20/07345/25**

Sample Type: **B**

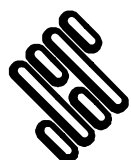
Depth (m): **12.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	39%	5%	0%	1%	0%	0%	
	SILT			SAND			GRAVEL			
55%				44%			1%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients		
125.0	100			D ₁₀ (mm)	NA	
75.0	100			D ₁₅ (mm)	NA	
63.0	100			D ₃₀ (mm)	NA	
37.5	100			D ₅₀ (mm)	NA	
20.0	100			D ₆₀ (mm)	0.072	
10.0	100			D ₈₅ (mm)	0.139	
6.30	100			D ₉₀ (mm)	0.164	
3.35	100			Sedimentation sample was not pre-treated	C _U	NA
2.00	99				C _C	NA
1.18	99					
0.600	99					
0.425	99					
0.212	96					
0.150	88					
0.063	55					
Soil Description: Brown slightly gravelly sandy CLAY						

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



STRUCTURAL SOILS
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W. Yorkshire WF10 1NJ

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[Signature]

LORNA WHITWORTH

Date

01/10/20

Contract

20/07345

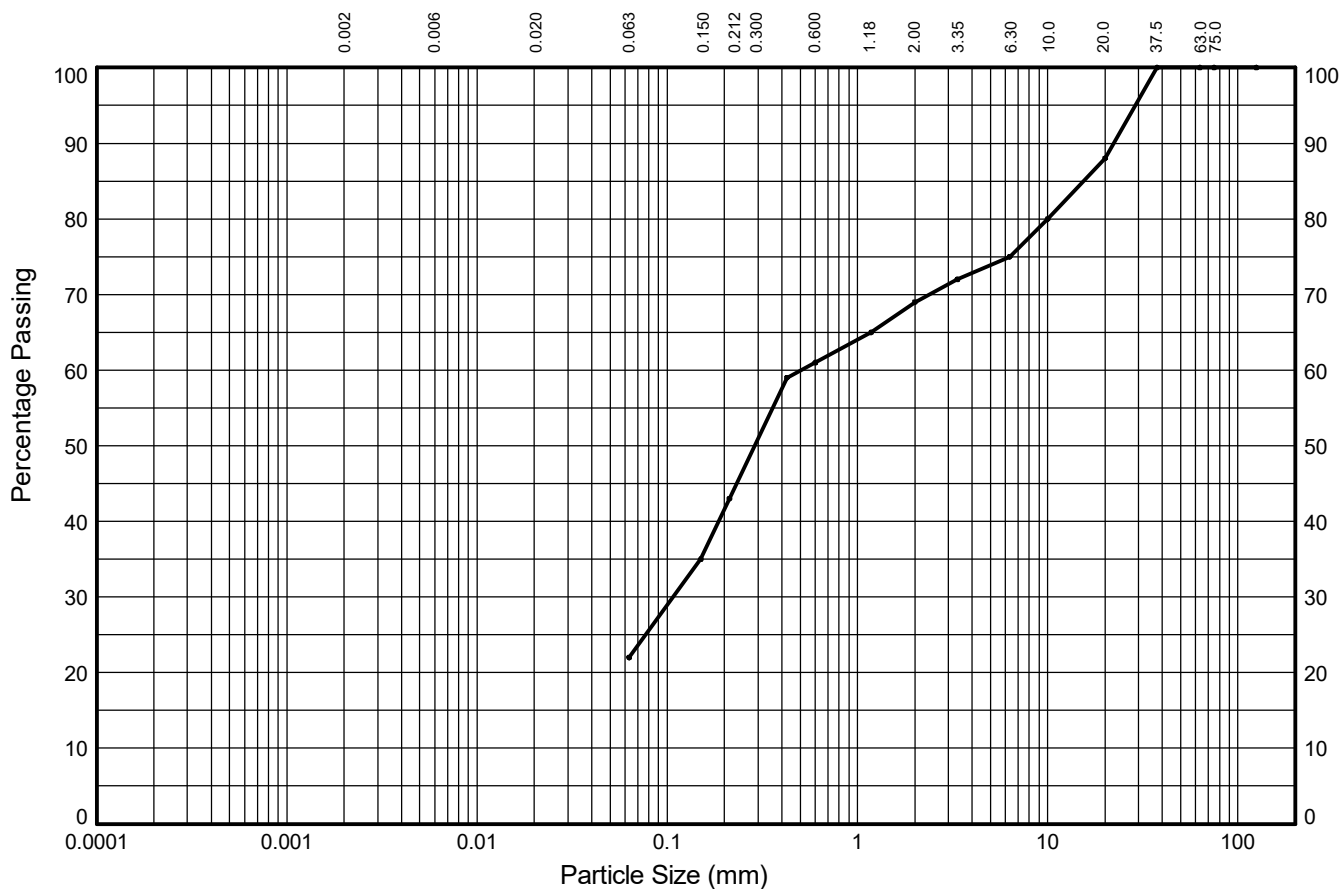
Contract Ref:

784632



In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **2.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	19%	20%	8%	6%	13%	12%	
	SILT			SAND			GRAVEL			
22%				47%			31%			0%

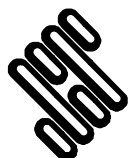
Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	88
10.0	80
6.30	75
3.35	72
2.00	69
1.18	65
0.600	61
0.425	59
0.212	43
0.150	35
0.063	22

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	NA
D ₁₅ (mm)	NA
D ₃₀ (mm)	0.107
D ₅₀ (mm)	0.287
D ₆₀ (mm)	0.505
D ₈₅ (mm)	15.422
D ₉₀ (mm)	22.209
C _U	NA
C _C	NA

Brown clayey very gravelly SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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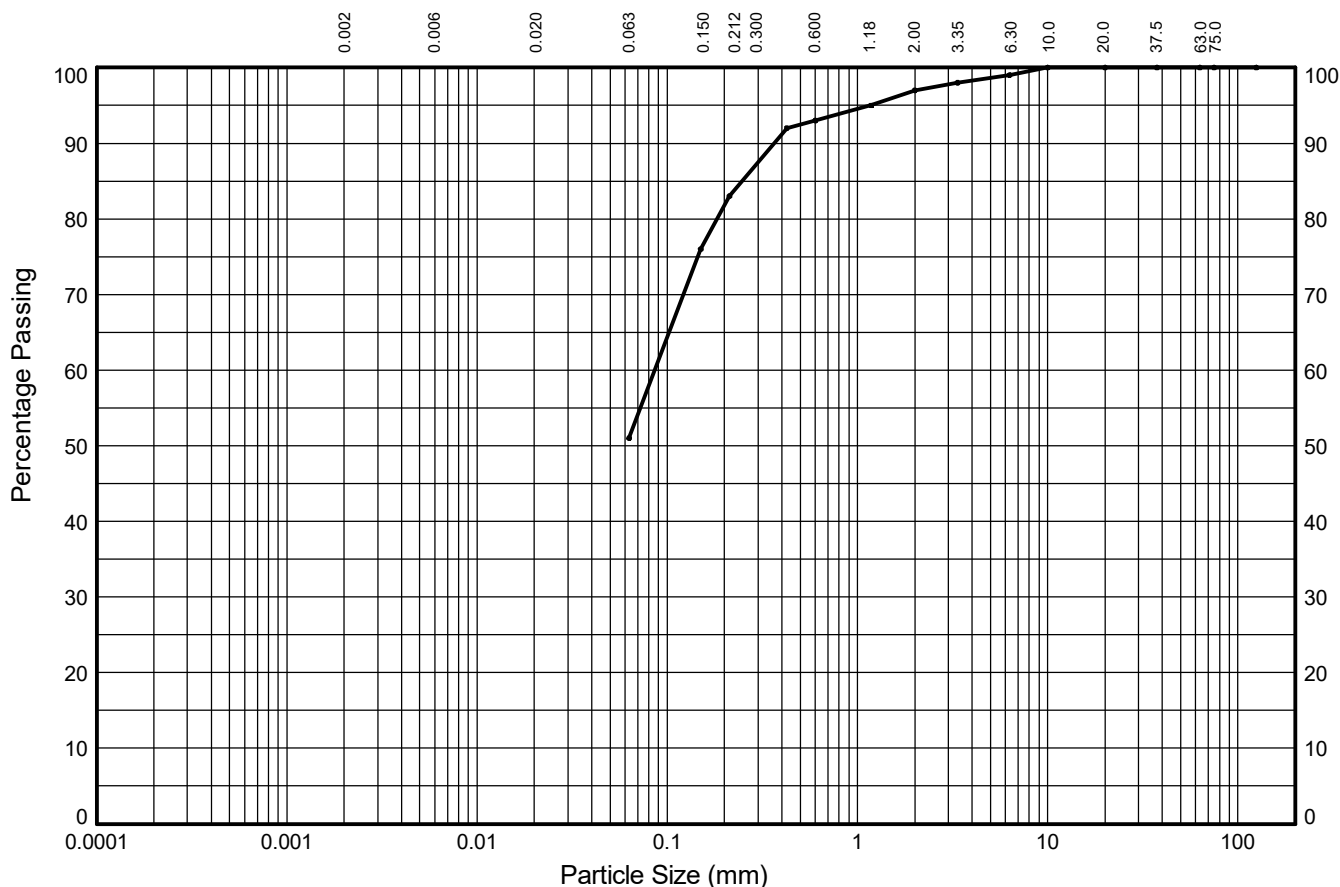
Contract Ref:

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In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **5.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	31%	11%	4%	2%	1%	0%	
	SILT			SAND			GRAVEL			
51%				46%			3%			0%

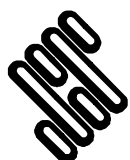
Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	99
3.35	98
2.00	97
1.18	95
0.600	93
0.425	92
0.212	83
0.150	76
0.063	51

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Coefficients	
D_{10} (mm)	NA
D_{15} (mm)	NA
D_{30} (mm)	NA
D_{50} (mm)	NA
D_{60} (mm)	0.086
D_{85} (mm)	0.247
D_{90} (mm)	0.364
C_u	NA
C_c	NA

Brown slightly gravelly sandy CLAY

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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PARTICLE SIZE DISTRIBUTION TEST

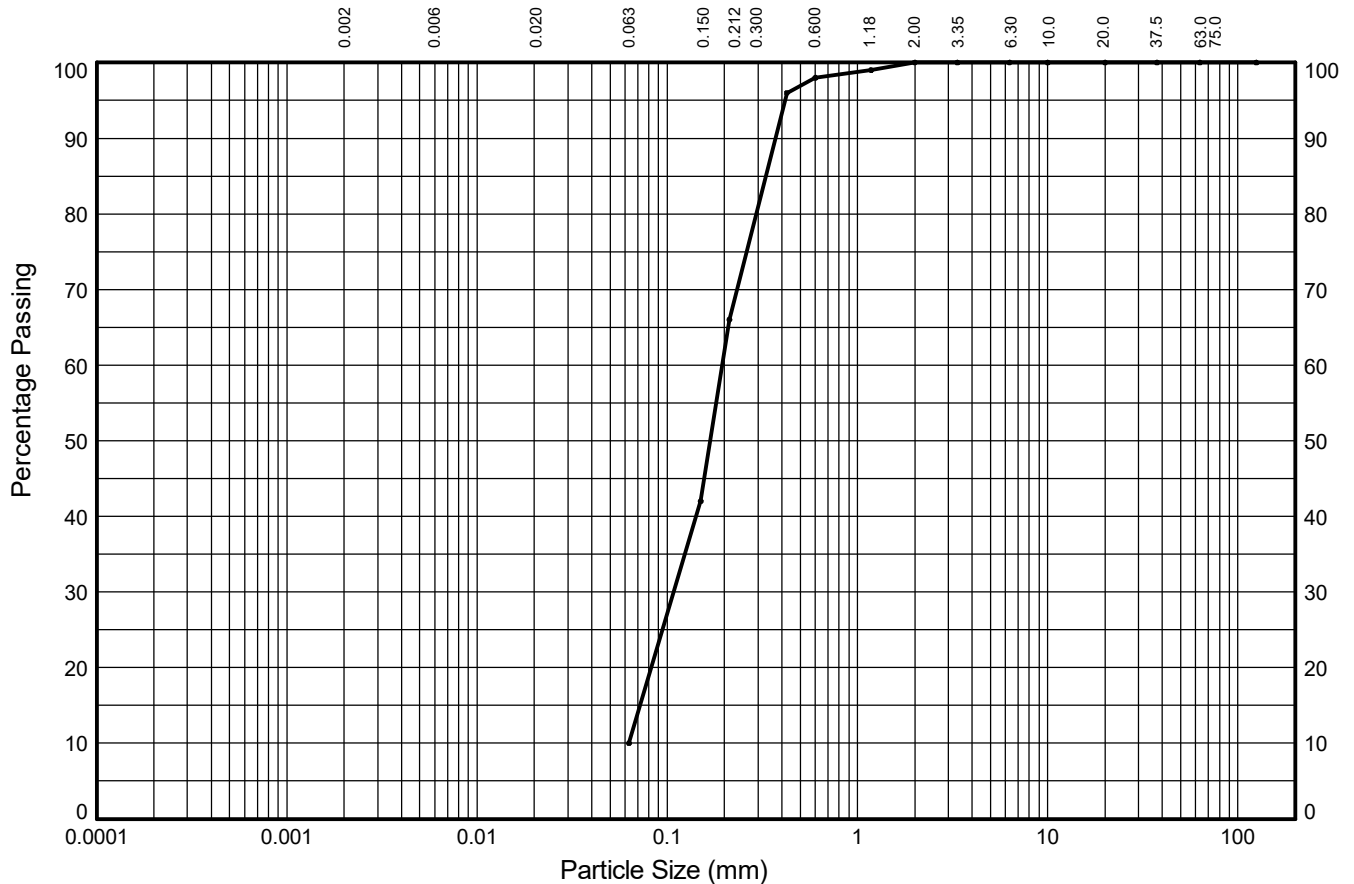
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH03**

Sample Ref: **20/07345/69**

Sample Type: **B**

Depth (m): **3.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	51%	37%	2%	0%	0%	0%	
	SILT			SAND			GRAVEL			
10%				90%			0%			0%

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	99
0.600	98
0.425	96
0.212	66
0.150	42
0.063	10

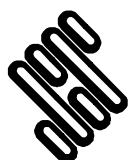
Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Coefficients	
D ₁₀ (mm)	0.063
D ₁₅ (mm)	0.072
D ₃₀ (mm)	0.108
D ₅₀ (mm)	0.168
D ₆₀ (mm)	0.194
D ₈₅ (mm)	0.329
D ₉₀ (mm)	0.370
C _U	3.1
C _C	0.96

Soil Description:

Brown clayey SAND

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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PARTICLE SIZE DISTRIBUTION TEST

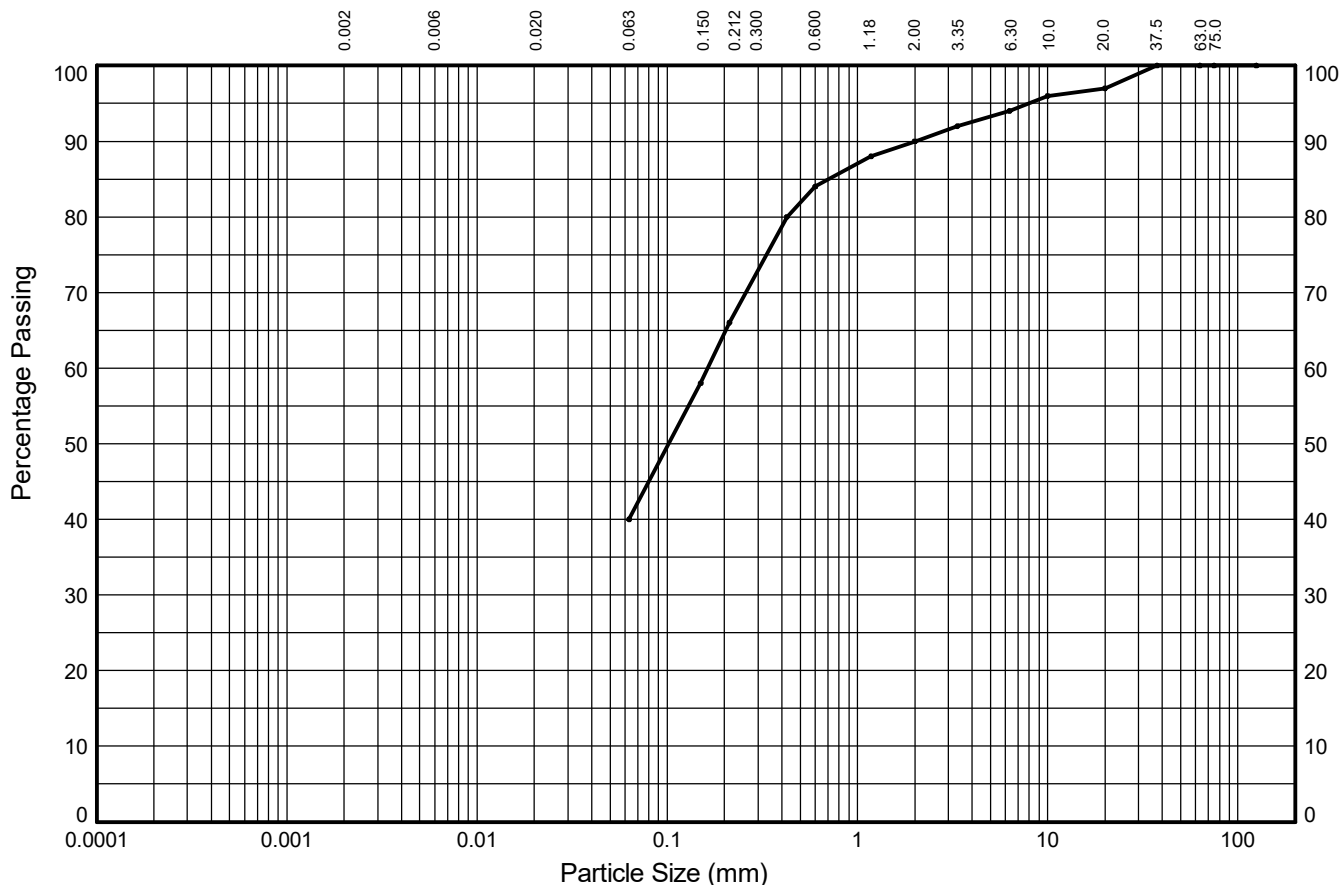
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH03**

Sample Ref: **20/07345/73**

Sample Type: **B**

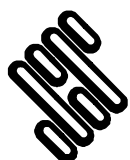
Depth (m): **5.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	24%	20%	6%	4%	3%	3%	
SILT				SAND			GRAVEL			
40%				50%			10%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients	
125.0	100			D ₁₀ (mm)	NA
75.0	100			D ₁₅ (mm)	NA
63.0	100			D ₃₀ (mm)	NA
37.5	100			D ₅₀ (mm)	0.102
20.0	97			D ₆₀ (mm)	0.164
10.0	96			D ₈₅ (mm)	0.711
6.30	94			D ₉₀ (mm)	2.000
3.35	92			C _U	NA
2.00	90			C _C	NA
1.18	88			Sedimentation sample was not pre-treated Soil Description: Brown slightly gravelly very clayey SAND	
0.600	84				
0.425	80				
0.212	66				
0.150	58				
0.063	40				

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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PARTICLE SIZE DISTRIBUTION TEST

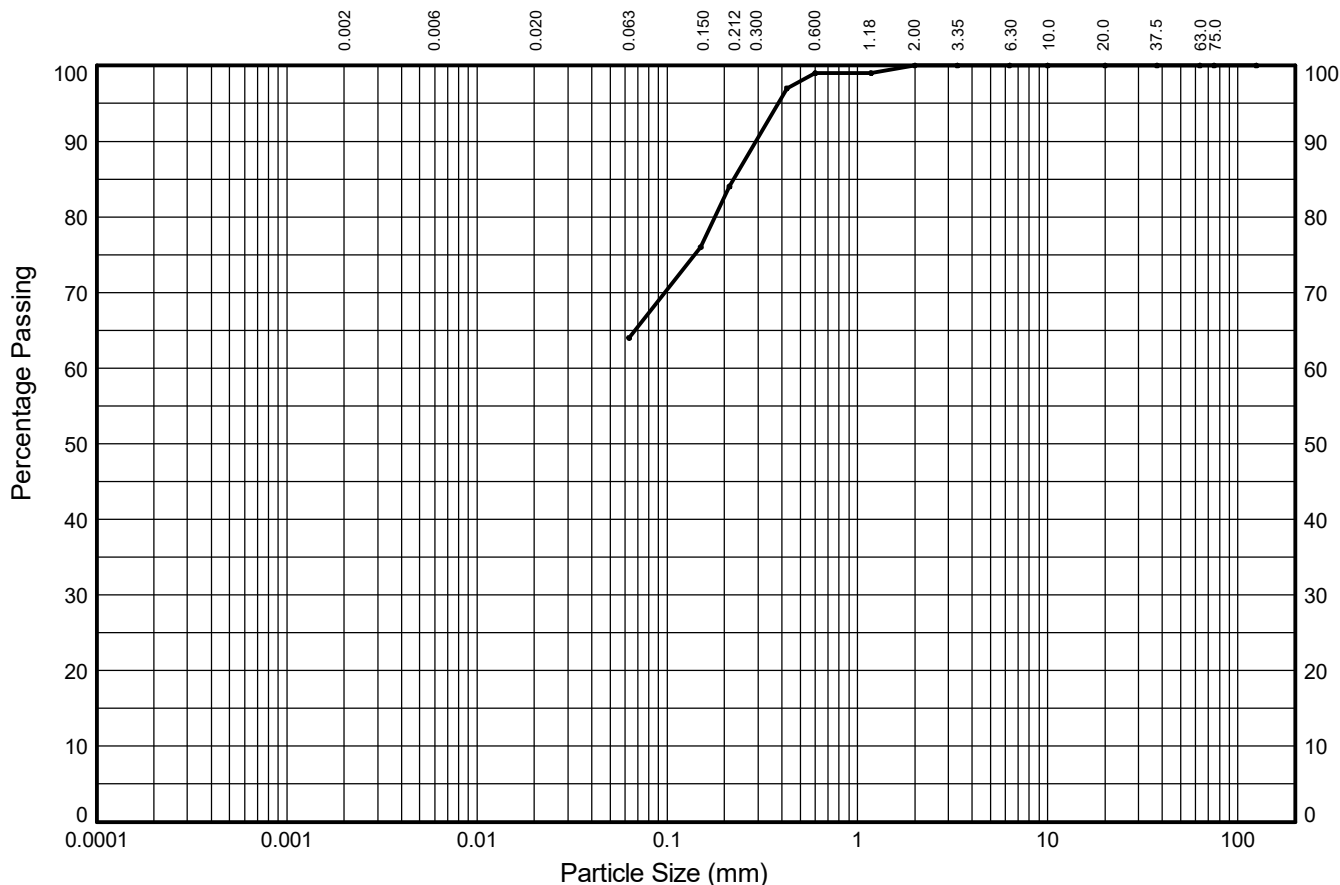
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH05**

Sample Ref: **20/07345/96**

Sample Type: **D**

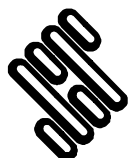
Depth (m): **2.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	18%	17%	1%	0%	0%	0%	
	SILT			SAND			GRAVEL			
64%				36%			0%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients	
125.0	100			D ₁₀ (mm)	NA
75.0	100			D ₁₅ (mm)	NA
63.0	100			D ₃₀ (mm)	NA
37.5	100			D ₅₀ (mm)	NA
20.0	100			D ₆₀ (mm)	NA
10.0	100			D ₈₅ (mm)	0.224
6.30	100			D ₉₀ (mm)	0.292
3.35	100			C _U	NA
2.00	100			C _C	NA
1.18	99			Sedimentation sample was not pre-treated	
0.600	99				
0.425	97				
0.212	84				
0.150	76				
0.063	64			Soil Description: Brown slightly sandy CLAY	

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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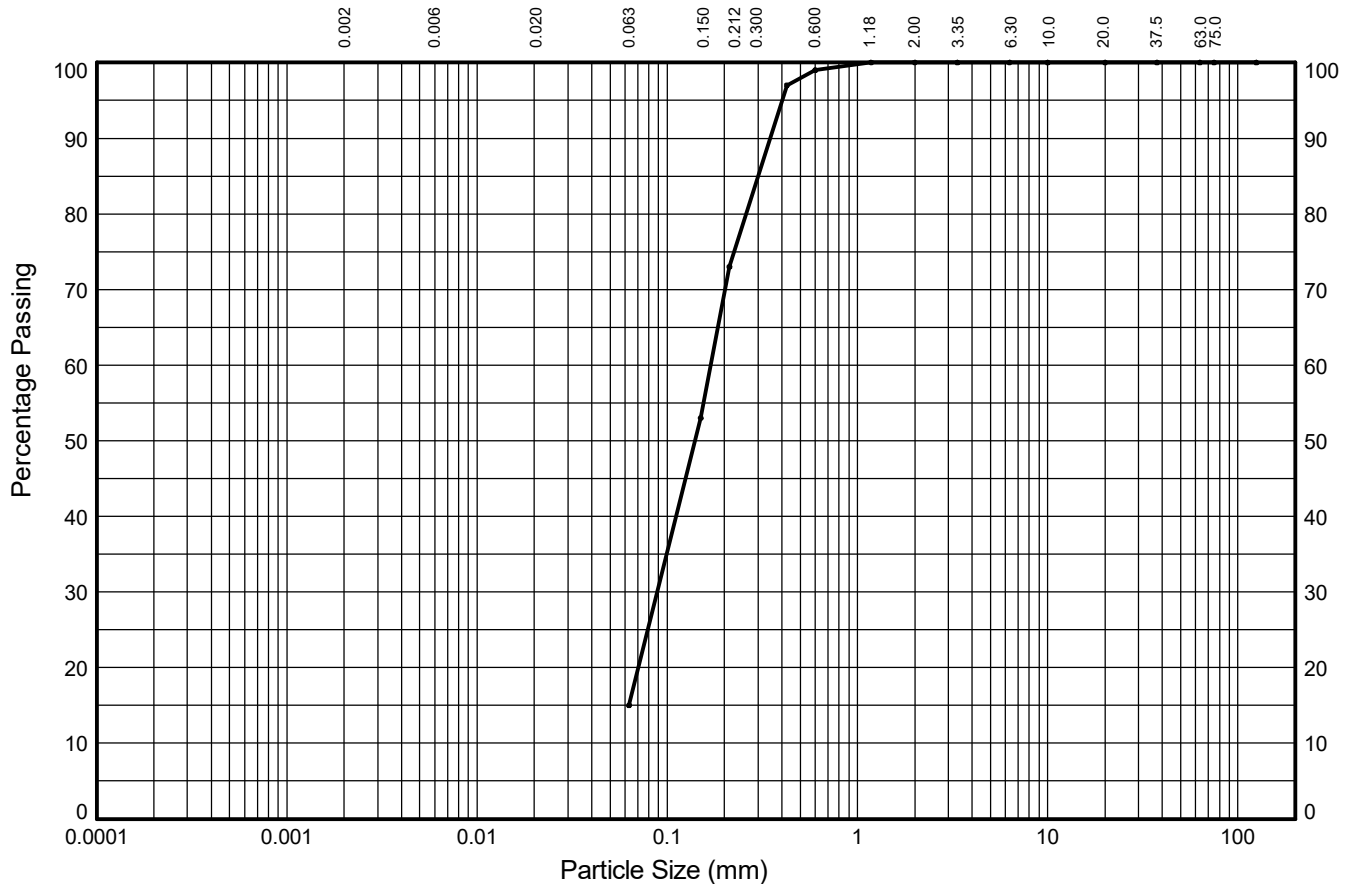
In accordance with clauses 9.2 of BS1377:Part 2:1990

Window Sample: **WS01**

Sample Ref: **20/07345/2**

Sample Type: **B**

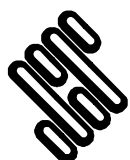
Depth (m): **1.20**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	54%	30%	1%	0%	0%	0%	
	SILT			SAND			GRAVEL			
15%				85%			0%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients	
125.0	100			D ₁₀ (mm)	NA
75.0	100			D ₁₅ (mm)	0.063
63.0	100			D ₃₀ (mm)	0.089
37.5	100			D ₅₀ (mm)	0.140
20.0	100			D ₆₀ (mm)	0.169
10.0	100			D ₈₅ (mm)	0.300
6.30	100			D ₉₀ (mm)	0.347
3.35	100			C _U	NA
2.00	100			C _C	NA
1.18	100			Soil Description: Brown clayey SAND	
0.600	99				
0.425	97				
0.212	73				
0.150	53				
0.063	15				
		Sedimentation sample was not pre-treated			

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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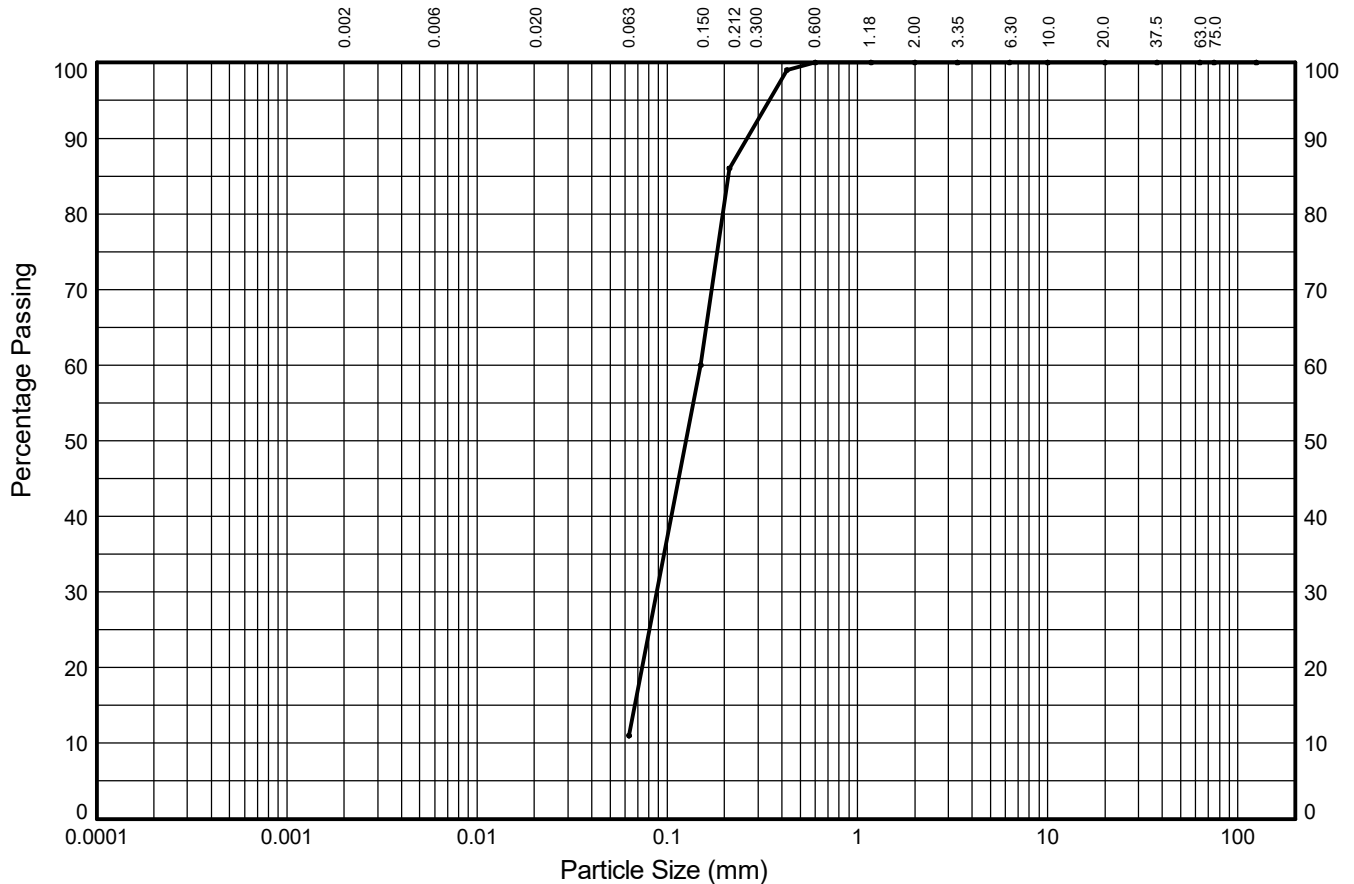
In accordance with clauses 9.2 of BS1377:Part 2:1990

Window Sample: **WS02**

Sample Ref: **20/07345/1**

Sample Type: **B**

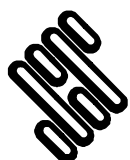
Depth (m): **2.40**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	70%	19%	0%	0%	0%	0%	
	SILT			SAND			GRAVEL			
11%				89%			0%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients			
125.0	100			D ₁₀ (mm)	NA		
75.0	100			D ₁₅ (mm)	0.068		
63.0	100			D ₃₀ (mm)	0.088		
37.5	100			D ₅₀ (mm)	0.126		
20.0	100			D ₆₀ (mm)	0.150		
10.0	100			D ₈₅ (mm)	0.209		
6.30	100			D ₉₀ (mm)	0.263		
3.35	100			Sedimentation sample was not pre-treated	C _U	NA	
2.00	100				C _C	NA	
1.18	100			Soil Description: Brown clayey SAND			
0.600	100						
0.425	99						
0.212	86						
0.150	60						
0.063	11						

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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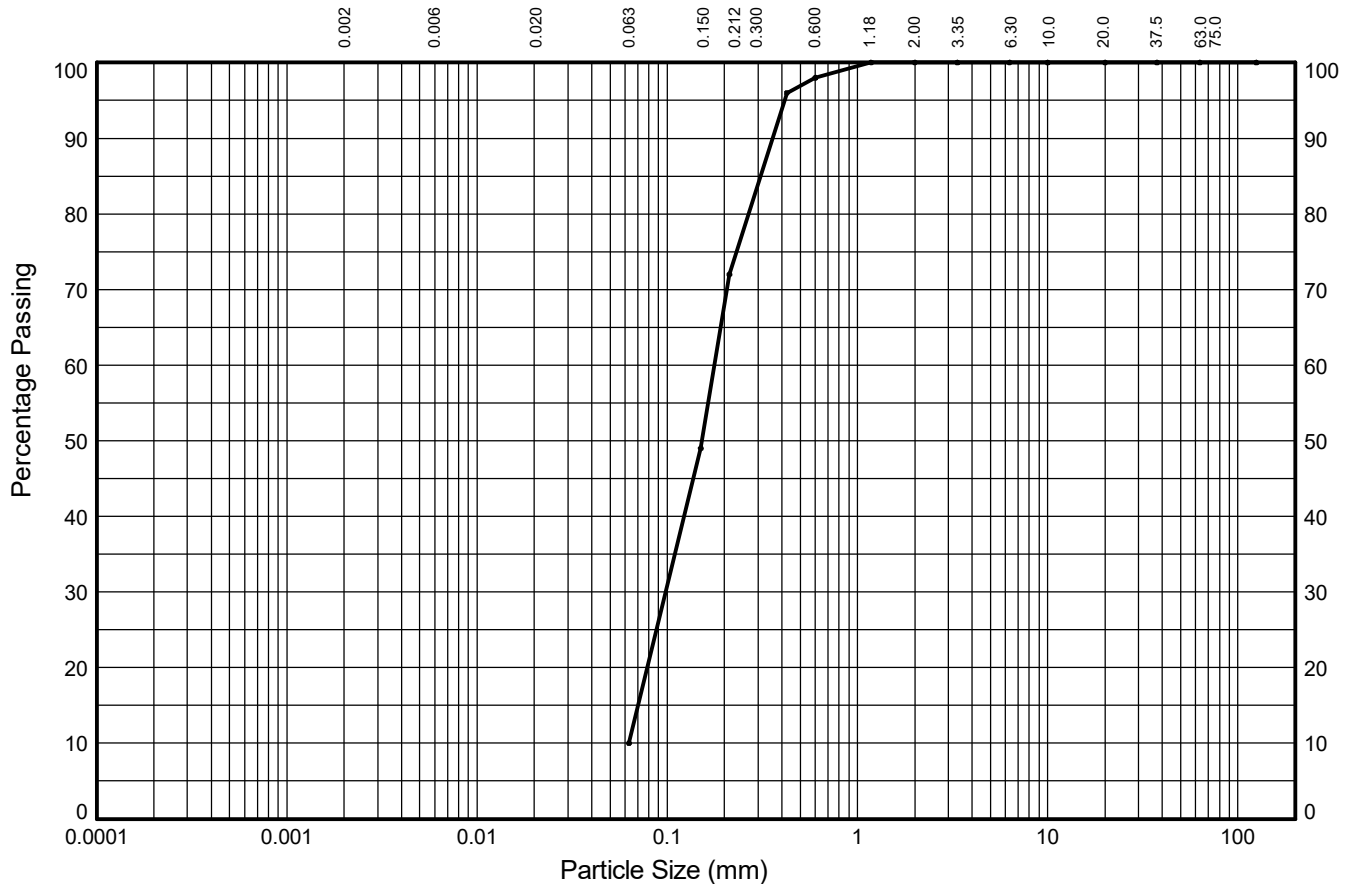
In accordance with clauses 9.2 of BS1377:Part 2:1990

Window Sample: **WS04**

Sample Ref: **20/07345/6**

Sample Type: **B**

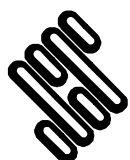
Depth (m): **2.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	58%	31%	2%	0%	0%	0%	
	SILT			SAND			GRAVEL			
10%				90%			0%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients	
125.0	100			D ₁₀ (mm)	0.063
75.0				D ₁₅ (mm)	0.070
63.0	100			D ₃₀ (mm)	0.098
37.5	100			D ₅₀ (mm)	0.152
20.0	100			D ₆₀ (mm)	0.177
10.0	100			D ₈₅ (mm)	0.309
6.30	100			D ₉₀ (mm)	0.357
3.35	100				
2.00	100				
1.18	100				
0.600	98	Sedimentation sample was not pre-treated		C _U	2.8
0.425	96			C _C	0.87
0.212	72	Soil Description: Brown clayey SAND			
0.150	49				
0.063	10				

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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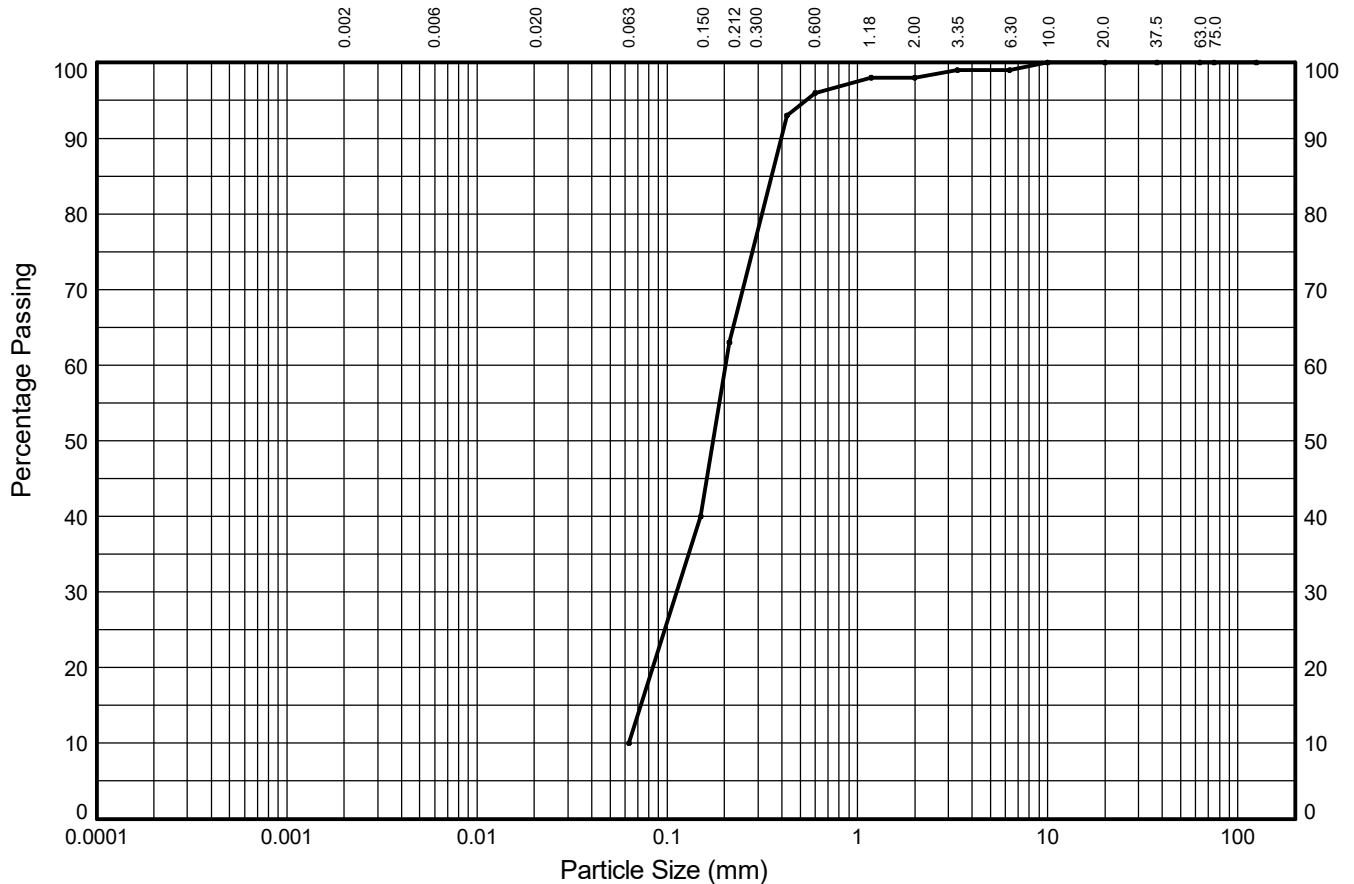
In accordance with clauses 9.2 of BS1377:Part 2:1990

Window Sample: **WS07**

Sample Ref: **20/07345/10**

Sample Type: **B**

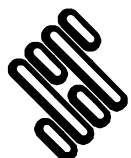
Depth (m): **4.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	-	-	-	49%	38%	2%	1%	1%	0%	
SILT				SAND			GRAVEL			
10%				88%			2%			0%

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Coefficients	
125.0	100			D ₁₀ (mm)	0.063
75.0	100			D ₁₅ (mm)	0.073
63.0	100			D ₃₀ (mm)	0.112
37.5	100			D ₅₀ (mm)	0.174
20.0	100			D ₆₀ (mm)	0.203
10.0	100			D ₈₅ (mm)	0.353
6.30	99			D ₉₀ (mm)	0.396
3.35	99			C _U	3.2
2.00	98			C _C	0.99
1.18	98			Sedimentation sample was not pre-treated Soil Description: Brown slightly gravelly clayey SAND	
0.600	96				
0.425	93				
0.212	63				
0.150	40				
0.063	10				

Key: C_U = Uniformity coefficient. C_C = Coefficient of curvature as defined in BS EN ISO 14688-2



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ONE DIMENSIONAL CONSOLIDATION TEST

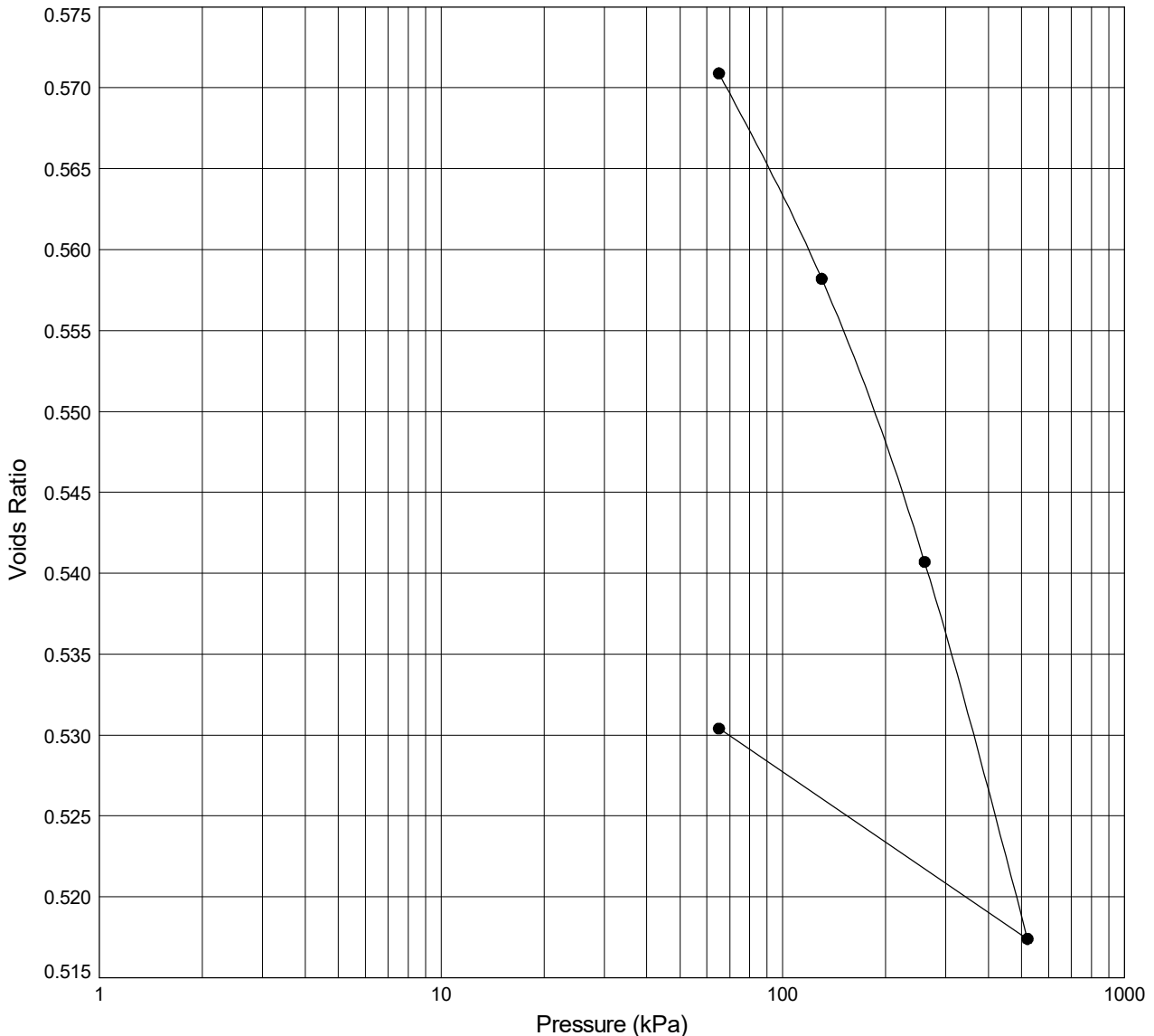
In accordance with BS1377 Part 5 Clause 3

Borehole: **BH02**

Sample Ref: **20/07345/45**

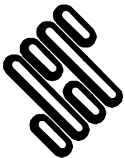
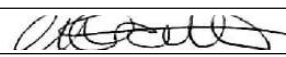
Sample Type: **B**

Depth (m): **2.00**



Initial Specimen Condition		Final Specimen Condition		Test Results			
Moisture Content (%)	: 24	Moisture Content (%)	: 23	Pressure Range (kPa)	Mv (m ² /MN)	Cv (m ² /yr)	Voids Ratio
Bulk Density (Mg/m ³)	: 2.03	Bulk Density (Mg/m ³)	: 2.12	0 - 65	0.48	33	0.5709
Dry Density (Mg/m ³)	: 1.63	Dry Density (Mg/m ³)	: 1.72	65 - 130	0.12	0.44	0.5582
Void Ratio	: 0.6219	Void Ratio	: 0.5304	130 - 260	0.086	0.52	0.5407
Specimen Details Description Brown clayey very gravelly SAND				260 - 520	0.058	0.25	0.5174
				520 - 65	0.019	0.25	0.5304
				Height (mm)	: 19.07		
				Diameter (mm)	: 75.07		
				Particle Density (Mg/m ³) (assumed)	: 2.65		
				Swelling Pressure (kPa)	: NA		

Notes: Method of time-setting used: **T90**. Temperature range during test (degC): **17.5 - 23.1**.

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SUMMARY OF HAND PENETROMETER & HAND VANE & TORVANE TEST RESULTS

[illegible]

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

Key : HVP = Hand Vane (Peak), HVR = Hand Vane (Remoulded), PP = Pocket Penetrometer, TV = Torvane.

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date	Contract Ref: 784632
		LORNA WHITWORTH	01.10.20	
	Contract: 20/07345			

UNCONSOLIDATED QUICK UNDRAINED (MULTI-STAGE) TRIAXIAL COMPRESSION TEST

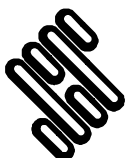
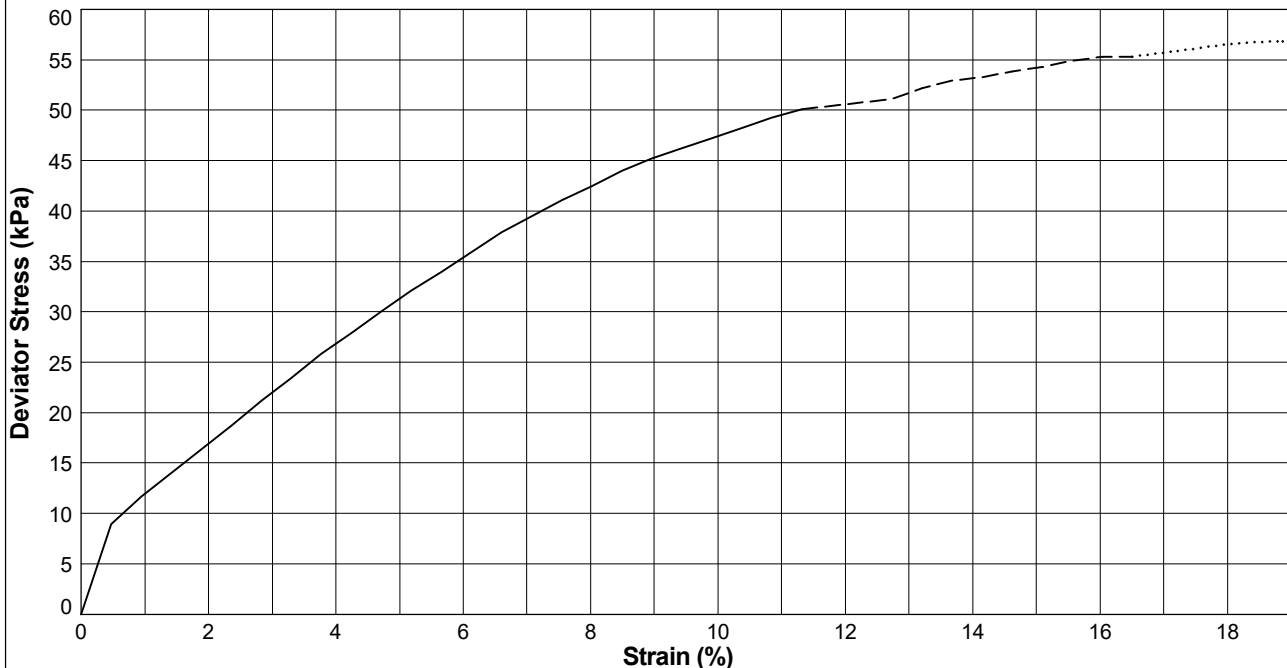
In accordance with BS1377 Part 7 Clause 9

Borehole: **BH01** Sample Ref: **20/07345/29** Sample Type: **B** Depth (m): **15.00**

Description : **Dark brown slightly sandy slightly gravelly CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	Sample Condition	Undisturbed		
	Orientation of sample	Vertical		
	Diameter (mm)	256.00		
	Height (mm)	212.00		
	Moisture Content (%)	16		
	Bulk Density (Mg/m ³)	0.35		
	Dry Density (Mg/m ³)	0.30		
TEST DETAILS	Membrane Type	Rubber	Rubber	Rubber
	Membrane Thickness (mm)	0.30	0.30	0.30
	Rate of Axial Displacement (%/min)	2.00	2.00	2.00
	Cell Pressure (kPa)	150	300	600
	Membrane Correction (kPa)	0.29	0.38	0.43
	Corrected Deviator Stress (kPa)	50	55	57
	Undrained Shear Strength (kPa)	25	28	28
FAILURE DETAILS	Strain at Failure (%)	11.3	16.0	18.9
	Mode of Failure			
	Semi-plastic (intermediate)			

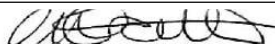
Key: Stage 1 Stage 2 Stage 3



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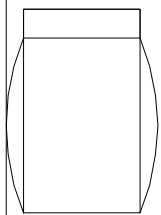


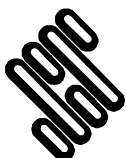
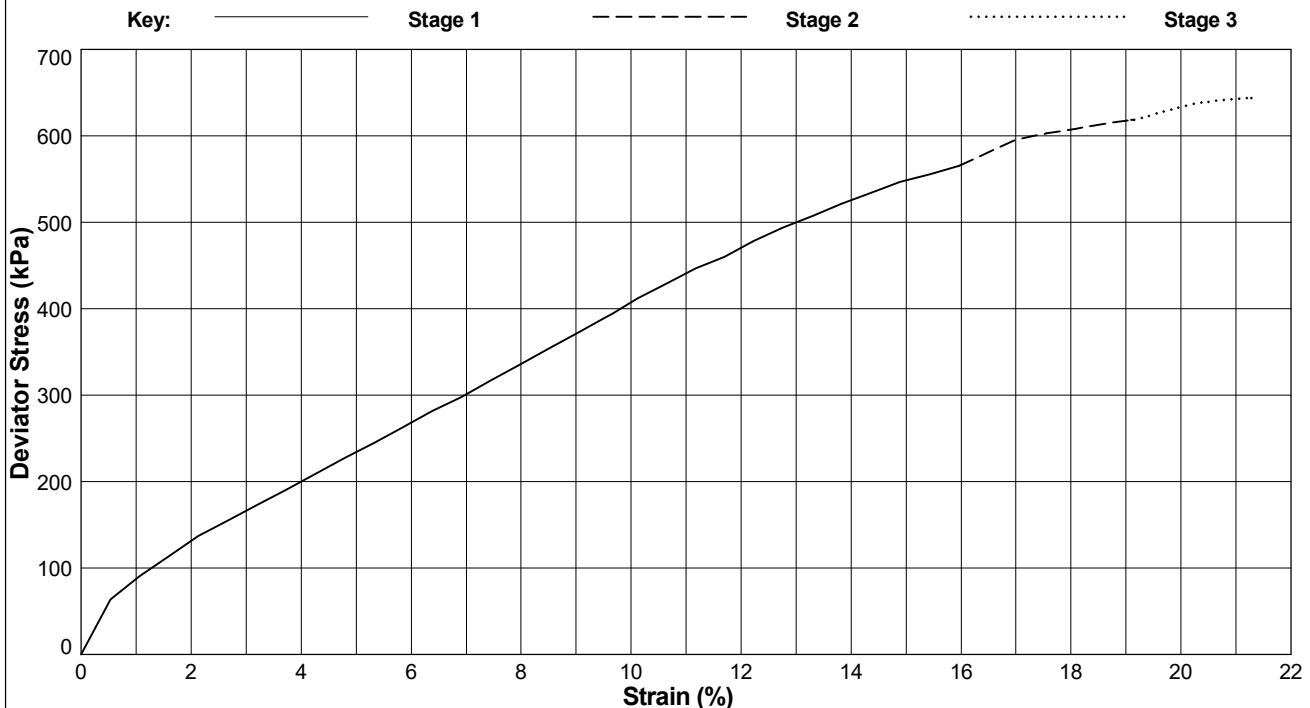
UNCONSOLIDATED QUICK UNDRAINED (MULTI-STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377 Part 7 Clause 9

Borehole: **BH01** Sample Ref: **20/07345/36** Sample Type: **B** Depth (m): **19.50**

Description : **Dark brown slightly sandy slightly gravelly CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	Sample Condition	Undisturbed		
	Orientation of sample	Vertical		
	Diameter (mm)	103.33		
	Height (mm)	188.00		
	Moisture Content (%)	14		
	Bulk Density (Mg/m ³)	2.23		
	Dry Density (Mg/m ³)	1.97		
TEST DETAILS	Membrane Type	Rubber	Rubber	Rubber
	Membrane Thickness (mm)	0.30	0.30	0.30
	Rate of Axial Displacement (%/min)	2.00	2.00	2.00
	Cell Pressure (kPa)	95	390	780
	Membrane Correction (kPa)	0.93	1.07	1.16
	Corrected Deviator Stress (kPa)	565	619	644
	Undrained Shear Strength (kPa)	282	309	322
FAILURE DETAILS	Strain at Failure (%)	16.0	19.2	21.3
	Mode of Failure			
	Plastic (Barrelling)			



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Date

LORNA WHITWORTH

01/10/20

Contract

20/07345

Contract Ref:

784632



UNCONSOLIDATED QUICK UNDRAINED (MULTI-STAGE) TRIAXIAL COMPRESSION TEST

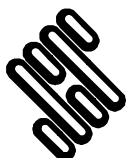
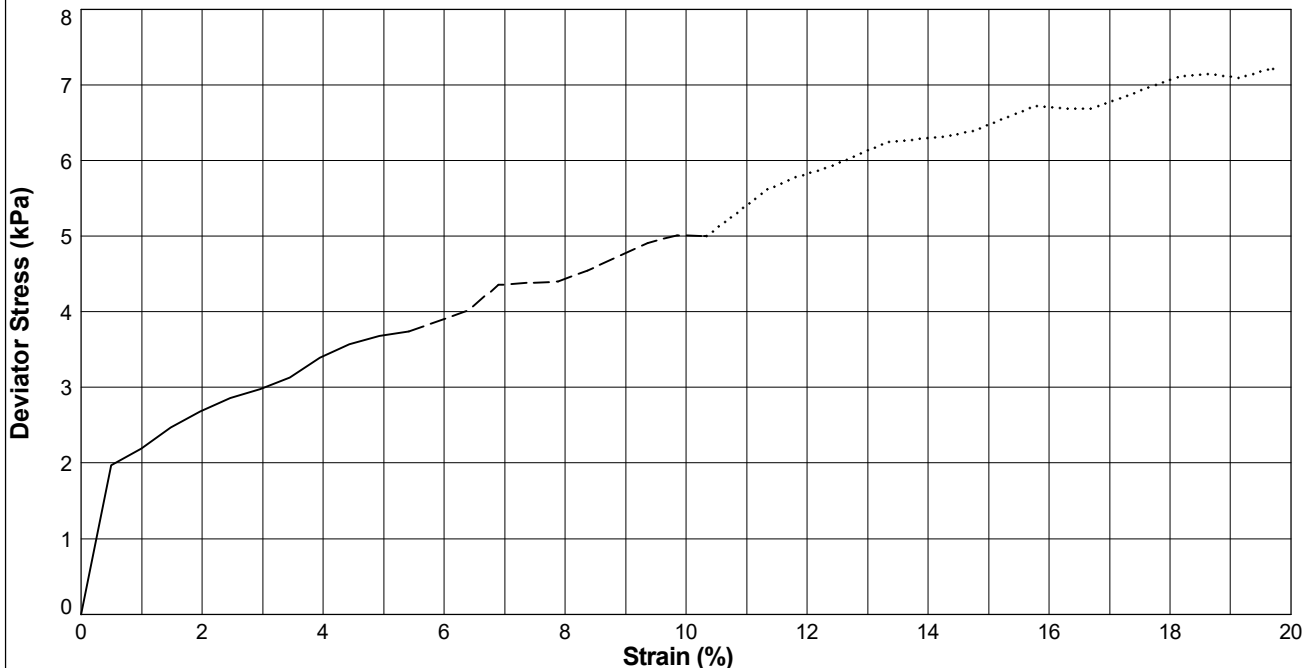
In accordance with BS1377 Part 7 Clause 9

Borehole: **BH03** Sample Ref: **20/07345/82** Sample Type: **B** Depth (m): **17.00**

Description : **Dark brown slightly sandy slightly gravelly CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	Sample Condition	Undisturbed		
	Orientation of sample	Vertical		
	Diameter (mm)	271.00		
	Height (mm)	203.00		
	Moisture Content (%)	19		
	Bulk Density (Mg/m ³)	0.33		
	Dry Density (Mg/m ³)	0.28		
TEST DETAILS	Membrane Type	Rubber	Rubber	Rubber
	Membrane Thickness (mm)	0.30	0.30	0.30
	Rate of Axial Displacement (%/min)	2.00	2.00	2.00
	Cell Pressure (kPa)	170	340	680
	Membrane Correction (kPa)	0.16	0.25	0.42
	Corrected Deviator Stress (kPa)	4	5	7
	Undrained Shear Strength (kPa)	2	3	4
FAILURE DETAILS	Strain at Failure (%)	5.4	9.8	19.7
	Mode of Failure			
	Semi-plastic (intermediate)			

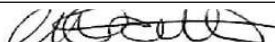
Key: Stage 1 Stage 2 Stage 3



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Date



LORNA WHITWORTH

01/10/20

Contract

20/07345

Contract Ref:

784632



TESTING VERIFICATION CERTIFICATE



1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **01/10/2020 12:22:40**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory
Luke Fisher (Materials Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
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Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU



**STRUCTURAL
SOILS LTD**

Contract:

20/07345

Job No:

784632





STRUCTURAL SOILS LTD
TEST REPORT



Report No. 784636 R1

Date 24-September-2020 Contract 20/06993

Client Envirolab Ltd
Address Units 7 & 8 Sandpits Business Park
Mottram Road
Hyde
SK14 3AR

For the Attention of Holly Neary-King

Samples submitted by client 07/09/2020
Testing Started 07/09/2020
Testing Completed 24/09/2020

Client Reference 20/06993
Client Order No.
Instruction Type Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2 (superseded) **
Liquid Limit (definitive method) BS1377:Part 2:1990,clause 4.3
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail luke.fisher@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Description of Sample
WS02	20/06993/5	D	4.00	30	42	21	21	98	Brown CLAY

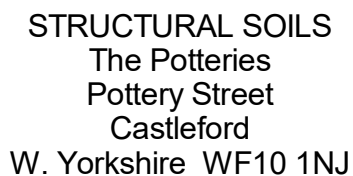
In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990

[illegible]

- 3.2 - Moisture Content
- 4.3 - Cone Penetrometer Method
- 4.4 - One Point Cone Penetrometer Method
- 4.6 - One Point Casagrande Method
- 5.3 - Plastic Limit Method
- 5.4 - Plasticity Index

4.2.3 - Natural State
4.2.4 - Wet Sieved

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)



TESTING VERIFICATION CERTIFICATE



1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **24/09/2020 13:05:30**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory
Luke Fisher (Materials Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU



**STRUCTURAL
SOILS LTD**

Contract:

20/06993

Job No:

784636



Appendix E –Monitoring Results

- Ground Gas Monitoring and Groundwater Level Visits 1 – 6
- Falling Head Test Calculation Sheets

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
 Tel: 0161 236 2394
 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

Project:	New Park House	Date:	01/09/2020
Job Number:	B075856	Visit:	1
Client:	Finance Shared Service Centre	Weather:	Suuny
Barometric State:	Falling	Ground Conditions:	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	1012	0.1	0.0	0.0	0.0	0.0	0.0	20.8	2	0	8.45	17.07	
BH02	1010	0.0	0.0	0.0	0.0	0.2	0.1	18.0	106	407	11.00	16.70	
BH03	1014	2.6	0.0	0.0	0.0	3.4	3.3	16.6	3	0	6.05	13.03	1
BH04	1010	0.0	0.0	0.0	0.0	0.0	0.0	20.9	1	1	9.69	11.25	
BH05	1008	-7.8	0.0	0.0	0.0	0.4	0.4	20.0	0	7	10.22	17.92	1
WS02	1012	0.0	0.0	0.0	0.0	1.3	1.3	17.8	2	3	1.94	3.56	
WS05	1011	0.0	0.0	0.0	0.0	0.3	0.3	20.7	0	0	Dry	4.05	
WS07	1008	0.0	0.0	0.0	0.0	3.1	3.1	16.9	0	7	2.60	3.14	

Notes

1 Steady state air flow rate achieved after 1 minute.

Logged by

MH

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
 Tel: 0161 236 2394
 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

Project:	New Park House	Date:	08/09/2020
Job Number:	B075856	Visit:	2
Client:	Finance Shared Service Centre	Weather:	Overcast
Barometric State:	Steady	Ground Conditions:	Damp

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	1016	0.0	0.0	0.0	0.0	0.0	0.0	21.40	1	0	8.18	16.97	
BH02	1015	0.0	0.0	0.0	0.0	0.0	0.0	20.50	6	77	10.92	15.10	
BH03	1016	-6.3	-0.5	0.0	0.0	0.0	0.0	21.30	0	0	5.60	13.00	3
BH04	-	-	-	-	-	-	-	-	-	-	10.40	11.30	2
BH05	1015	26.8	1.5	0.0	0.0	0.2	0.1	20.90	1	0	10.90	15.59	1
WS02	1016	0.0	0.0	0.0	0.0	1.4	1.4	18.1	1	1	1.80	3.45	
WS05	1015	0.0	0.0	0.0	0.0	0.0	0.0	21.3	6	19	Dry	3.93	
WS07	1015	0.0	0.0	0.0	0.0	2.2	2.2	18.4	2	1	2.49	2.97	

Notes

- 1 Steady State Flow reached after 4 minutes.
- 2 Borehole Flooded.
- 3 Steady State Flow reached after 2 minutes.

Logged by

RT

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

GAS MONITORING LOG SHEET

Project: New Park House **Date:** 17/09/2020
Job Number: B075856 **Visit:** 3
Client: Finance Shared Service Centre **Weather:** Sunny
Barometric State: Falling **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	1022	0.0	0.0	0.0	0.0	0.0	0.0	21.3	2	1	-	-	1
BH02	1024	0.0	0.0	0.0	0.0	0.0	0.0	20.6	3	17	11.03	14.80	
BH03	1021	0.0	0.0	0.0	0.0	0.2	0.2	20.6	2	1	6.25	13.10	2
BH04	1025	0.0	0.0	0.0	0.0	0.0	0.0	21.1	1	0	11.25	11.68	
BH05	1025	6.7	0.0	0.0	0.0	0.1	0.0	20.9	1	3	10.63	15.37	
WS02	1023	0.0	0.0	0.0	0.0	0.4	0.4	20.4	3	1	2.00	3.53	
WS05	1024	0.0	0.0	0.0	0.0	0.0	0.0	21.2	0	0	Dry	4.07	
WS07	1025	0.0	0.0	0.0	0.0	0.5	0.5	20.5	2	0	2.78	3.10	

Notes

- 1 Borehole part-covered by car, could not dip groundwater level
 2 Tap was filled with mud, unblocked post-monitoring

Logged by

SH

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
 Tel: 0161 236 2394
 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

Project:	New Park House	Date:	24/09/2020
Job Number:	B075856	Visit:	4
Client:	Finance Shared Service Centre	Weather:	Sunny
Barometric State:	Falling	Ground Conditions:	Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	983	0.0	0.0	0.0	0.0	0.0	0.0	20.9	0	1	8.39	17.12	1
BH02	-	-	-	-	-	-	-	-	-	-	-	-	
BH03	983	4.5	0.0	0.0	0.0	0.7	0.0	20.1	1	1	4.91	13.05	2
BH04	982	12.6	0.0	0.0	0.0	0.2	0.1	20.6	1	3	11.21	11.67	
BH05	983	4.0	0.0	0.0	0.0	0.5	0.5	19.5	2	8	10.54	15.35	3
WS02	983	0.0	0.0	0.0	0.0	0.3	0.1	20.6	2	1	2.02	3.52	
WS05	982	0.0	0.0	0.0	0.0	0.1	0.0	20.9	2	1	Dry	4.07	
WS07	983	0.0	0.0	0.0	0.0	0.4	0.4	20.5	1	1	2.84	3.12	

Notes

- 1 Borehole covered by car, inaccessible
- 2 Steady State Flow reached after 2 minutes.
- 3 Steady State Flow reached after 1 minute

Logged by

SH

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
 Tel: 0161 236 2394
 Fax: 0161 228 7902



GAS MONITORING LOG SHEET

Project:	New Park House	Date:	01/10/2020
Job Number:	B075856	Visit:	5
Client:	Finance Shared Service Centre	Weather:	Sunny
Barometric State:	Steady	Ground Conditions:	Damp

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	-	-	-	-	-	-	-	-	-	-	-	-	3
BH02	-	-	-	-	-	-	-	-	-	-	-	-	
BH03	902	-	-	0.0	0.0	0.5	0.1	20.5	0	0	4.58	12.57	2
BH04	902	0.0	0.0	0.0	0.0	0.0	0.0	20.9	1	1	11.18	11.68	
BH05	902	5.6	0.0	0.0	0.0	0.3	0.3	19.8	0	0	10.58	15.25	1
WS02	902	0.0	0.0	0.0	0.0	0.0	0.0	20.8	0	0	2.04	3.54	
WS05	902	0.0	0.0	0.0	0.0	0.0	0.0	20.7	0	0	DRY	4.05	
WS07	902	0.0	0.0	0.0	0.0	0.8	0.8	20.2	1	0	2.68	3.12	

Notes

- 1 Steady state flow reached after 3 minutes
- 2 Borehole flooded
- 3 Car parked over borehole

Logged by

PN

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902



GAS MONITORING LOG SHEET

Project:	New Park House	Date:	05/10/2020
Job Number:	B075856	Visit:	6
Client:	Finance Shared Service Centre	Weather:	Rain
Barometric State:	Rising	Ground Conditions:	Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
BH01	-	-	-	-	-	-	-	-	-	-	-	-	1
BH02	984	2.1	0.0	0.0	0.0	0.1	0.1	19.5	2	3	10.90	14.61	2
BH03	985	20.4	0.0	0.0	0.0	3.8	3.8	13.9	0	1	4.39	12.35	3
BH04	984	33.8	0.0	0.0	0.0	0.6	0.6	19.7	3	1	10.94	11.53	
BH05	983	0.2	0.0	0.0	0.0	0.3	0.3	19.6	2	3	10.22	15.12	
WS02	985	0.0	0.0	0.0	0.0	1.5	1.5	16.6	2	1	1.97	3.53	
WS05	984	0.0	0.0	0.0	0.0	0.5	0.5	20.3	2	1	Dry	4.05	
WS07	984	0.0	0.0	0.0	0.0	4.2	4.2	16.6	2	0	2.64	3.09	

Notes

- 1 - Borehole located under a parked vehicle. Not monitored.
 1 - Steady state flow rate achieved after 1 minute.
 2 - Steady state flow rate achieved after 3 minutes 30 seconds.

Logged by

MH

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

CALCULATION SHEET - SOIL INFILTRATION RATE

Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS02 Test 1
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	3	Medium dense light brown fine to coarse SAND & Loose brown clayey fine and medium SAND
0.1	0.12	2.88	
0.2	0.24	2.76	
0.3	0.36	2.64	
0.4	0.48	2.52	
0.5	0.6	2.4	
1	1.2	1.8	
1.5	1.44	1.56	
2	1.68	1.32	
2.5	1.7	1.3	
3	1.73	1.27	
3.5	1.79	1.21	
4	1.84	1.16	
4.5	1.85	1.15	
5	1.85	1.15	
6	1.86	1.14	

50.00 mm

3.00 m

0.002 m²

1.78E-01

2.87

1.24E-04 m/s

Internal borehole diameter

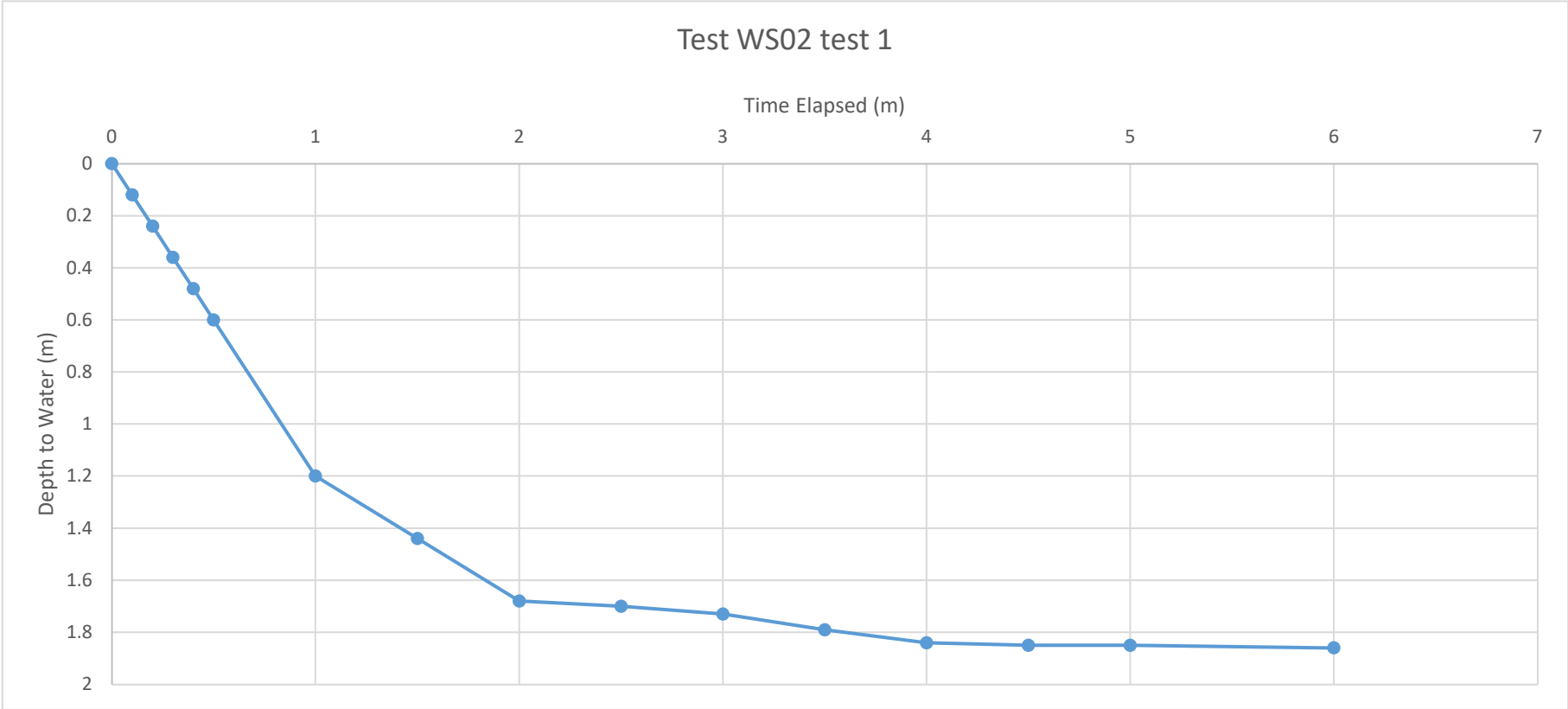
Depth (total) of borehole

Area of borehole base

Linear regression line

Shape factor

Permeability Coefficient (k)





CALCULATION SHEET - SOIL INFILTRATION RATE

Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS02 Test 2
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	3	Medium dense light brown fine to coarse SAND & Loose brown clayey fine and medium SAND
0.1	0.28	2.72	
0.2	0.56	2.44	
0.3	0.84	2.16	
0.4	1.12	1.88	
0.5	1.4	1.6	
1	1.73	1.27	
1.5	1.75	1.25	
2	1.77	1.23	
2.5	1.8	1.2	
3	1.83	1.17	
3.5	1.84	1.16	
4	1.85	1.15	
4.5	1.85	1.15	
5	1.85	1.15	
6	1.86	1.14	

50.00 mm

3.00 m

0.002 m²

1.38E-01

2.87

9.63E-05 m/s

Internal borehole diameter

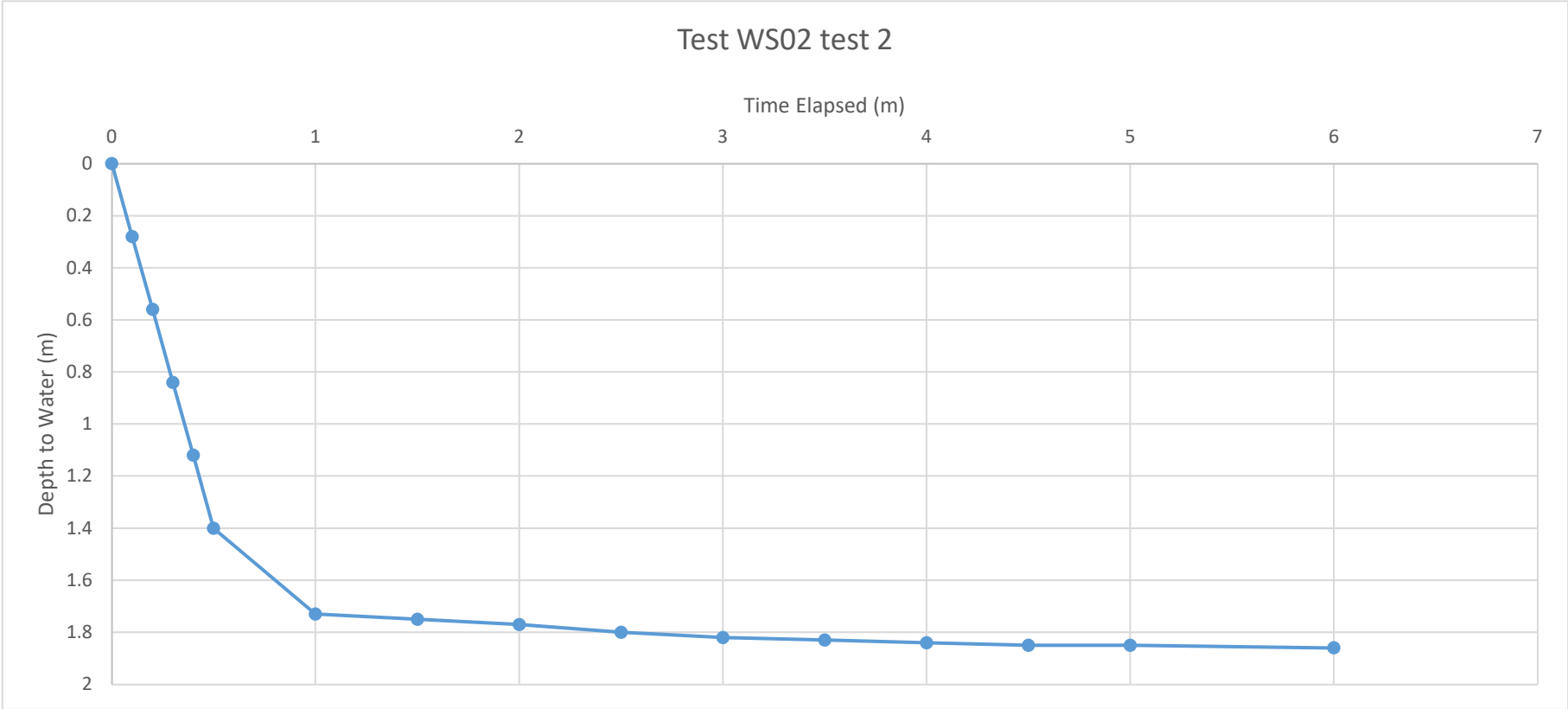
Depth (total) of borehole

Area of borehole base

Linear regression line

Shape factor

Permeability Coefficient (k)





CALCULATION SHEET - SOIL INFILTRATION RATE

Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS02 Test 3
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	3	Medium dense light brown fine to coarse SAND & Loose brown clayey fine and medium SAND
0.1	0.15	2.85	
0.2	0.3	2.7	
0.3	0.45	2.55	
0.4	0.6	2.4	
0.5	0.76	2.24	
1	1.51	1.49	
1.5	1.63	1.37	
2	1.74	1.26	
2.5	1.76	1.24	
3	1.79	1.21	
3.5	1.81	1.19	
4	1.83	1.17	
4.5	1.84	1.16	
5	1.85	1.15	
6	1.86	1.14	

50.00 mm

3.00 m

0.002 m²

1.68E-01

2.87

Internal borehole diameter

Depth (total) of borehole

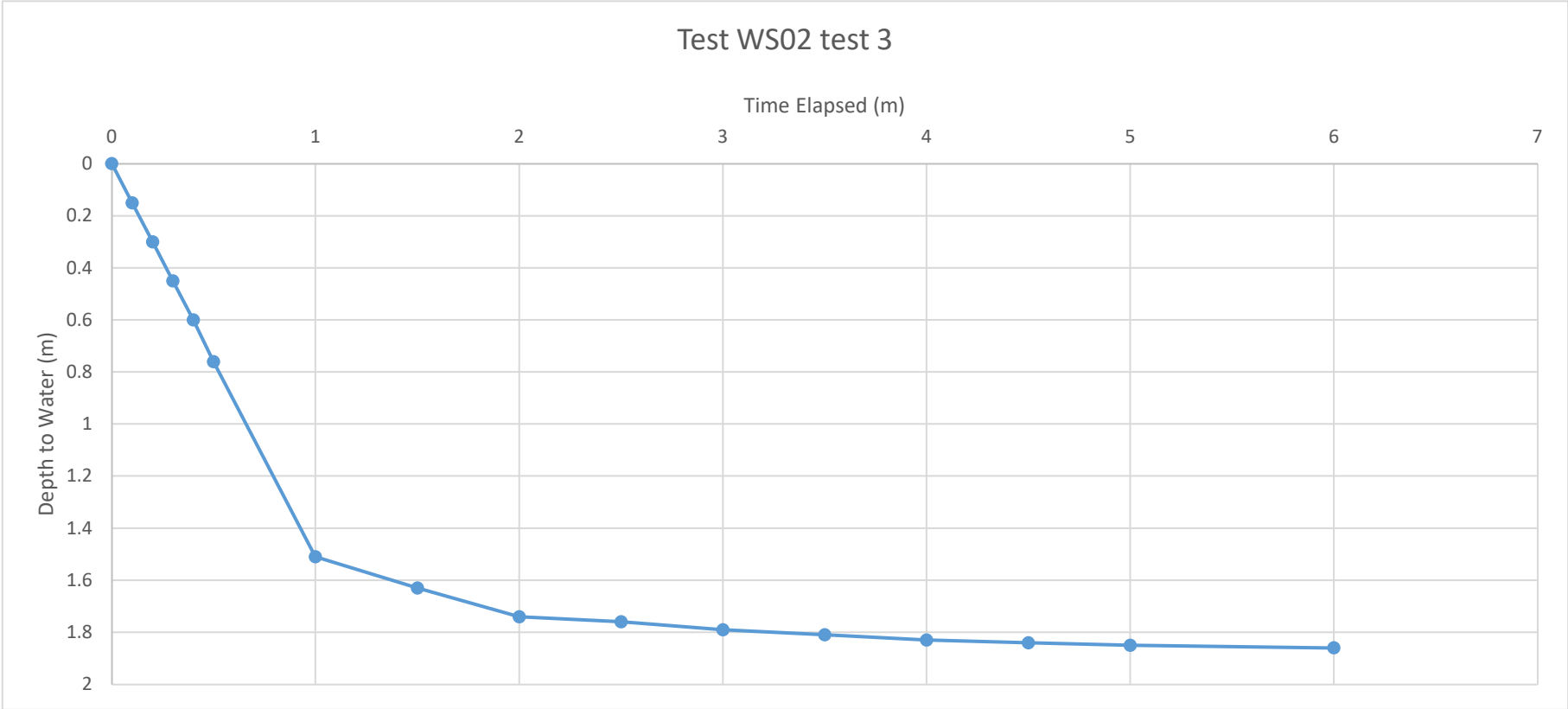
Area of borehole base

Linear regression line

Shape factor

1.17E-04 m/s

Permeability Coefficient (k)



CALCULATION SHEET - SOIL INFILTRATION RATE

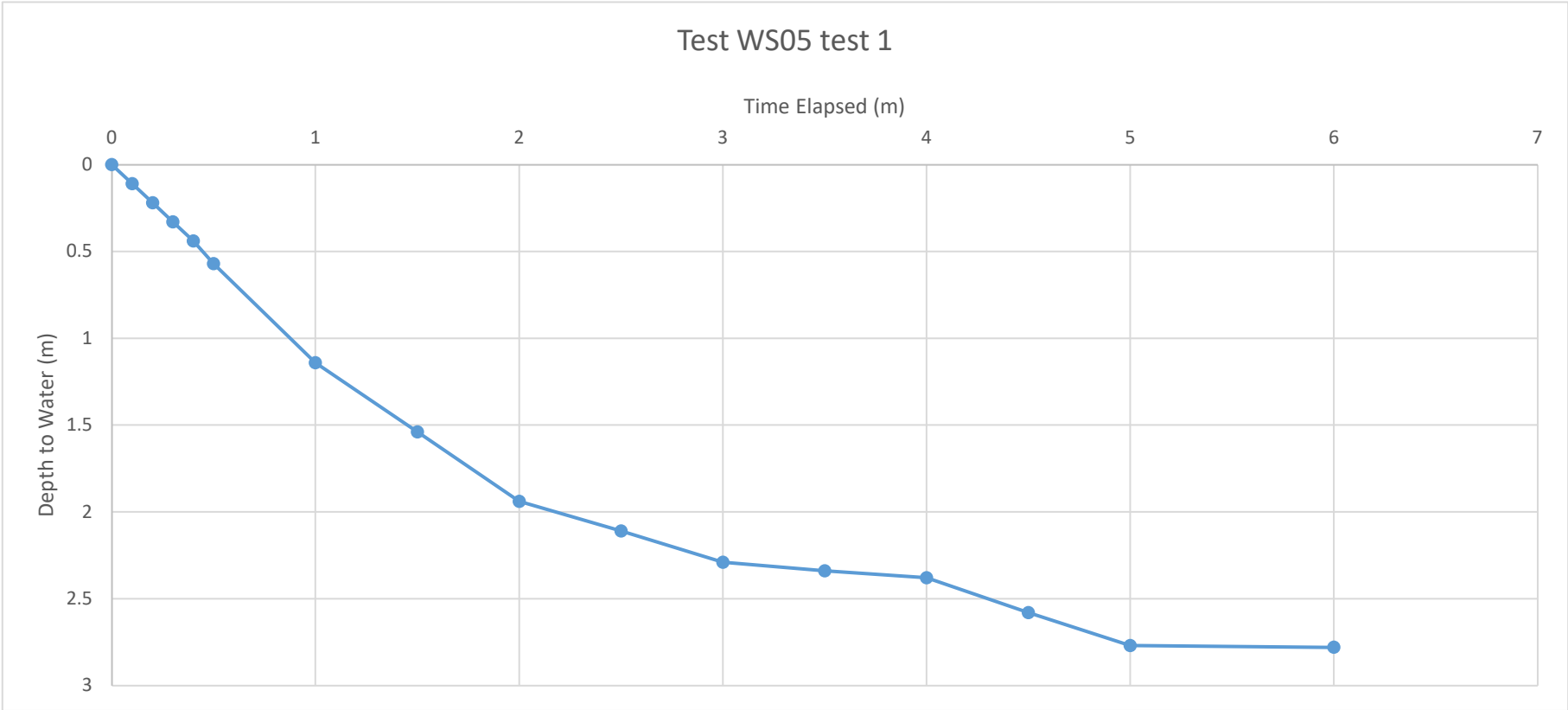
Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS05 Test 1
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	4	Dense brown fine to coarse SAND
0.1	0.11	3.89	
0.2	0.22	3.78	
0.3	0.33	3.67	
0.4	0.44	3.56	
0.5	0.57	3.43	
1	1.14	2.86	
1.5	1.54	2.46	
2	1.94	2.06	
2.5	2.11	1.89	
3	2.29	1.71	
3.5	2.34	1.66	
4	2.38	1.62	
4.5	2.58	1.42	
5	2.77	1.23	
6	2.78	1.22	
7	2.92	1.08	
8	2.94	1.06	
9	3	1	
10	3.93	0.07	

50.00 mm Internal borehole diameter
4.00 m Depth (total) of borehole
0.002 m² Area of borehole base
2.43E-01 Linear regression line
3.94 Shape factor

1.23E-04 m/s Permeability Coefficient (k)



CALCULATION SHEET - SOIL INFILTRATION RATE

Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS05 Test 2
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	4	Dense brown fine to coarse SAND
0.1	0.12	3.88	
0.2	0.24	3.76	
0.3	0.36	3.64	
0.4	0.48	3.52	
0.5	0.6	3.4	
1	1.14	2.86	
1.5	1.48	2.52	
2	1.83	2.17	
2.5	1.92	2.08	
3	2.01	1.99	
3.5	2.12	1.88	
4	2.22	1.78	
4.5	2.27	1.73	
5	2.32	1.68	
6	2.38	1.62	
7	2.46	1.54	
8	2.49	1.51	
9	2.53	1.47	
10	2.57	1.43	
12	2.63	1.37	
15	2.78	1.22	
30	3.08	0.92	
45	3.25	0.75	

50.00 mm

4.00 m

0.002 m²

3.60E-02

3.94

Internal borehole diameter

Depth (total) of borehole

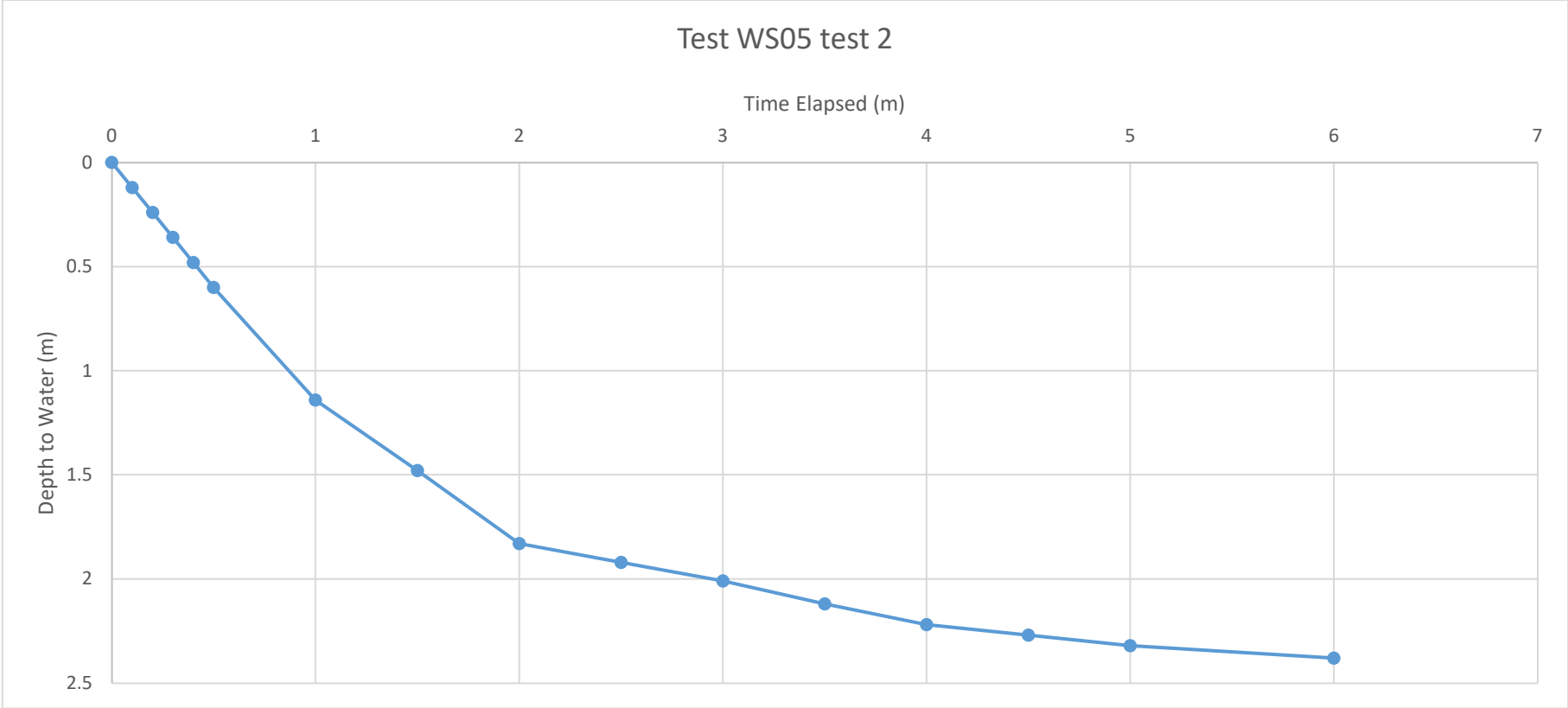
Area of borehole base

Linear regression line

Shape factor

1.83E-05 m/s

Permeability Coefficient (k)





CALCULATION SHEET - SOIL INFILTRATION RATE

Project: New Park House
Job Number: 75856
Author: RA

Test Ref.: WS05 Test 3
Test Date: 13/11/2020

Raw Data			
Time elapsed (m)	Depth to water (m)	Head (m)	Stratum
0	0	4	Dense brown fine to coarse SAND
0.1	0.12	3.88	
0.2	0.24	3.76	
0.3	0.36	3.64	
0.4	0.48	3.52	
0.5	0.57	3.43	
1	1.14	2.86	
1.5	1.46	2.54	
2	1.78	2.22	
2.5	1.85	2.15	
3	1.92	2.08	
3.5	2.06	1.94	
4	2.2	1.8	
4.5	2.22	1.78	
5	2.23	1.77	
6	2.29	1.71	
7	2.3	1.7	
8	2.34	1.66	
9	2.37	1.63	
10	2.43	1.57	
12	2.47	1.53	
15	2.53	1.47	
30	2.84	1.16	
45	3.05	0.95	
60	3.2	0.8	

50.00 mm

4.00 m

0.002 m²

2.38E-02

3.94

Internal borehole diameter

Depth (total) of borehole

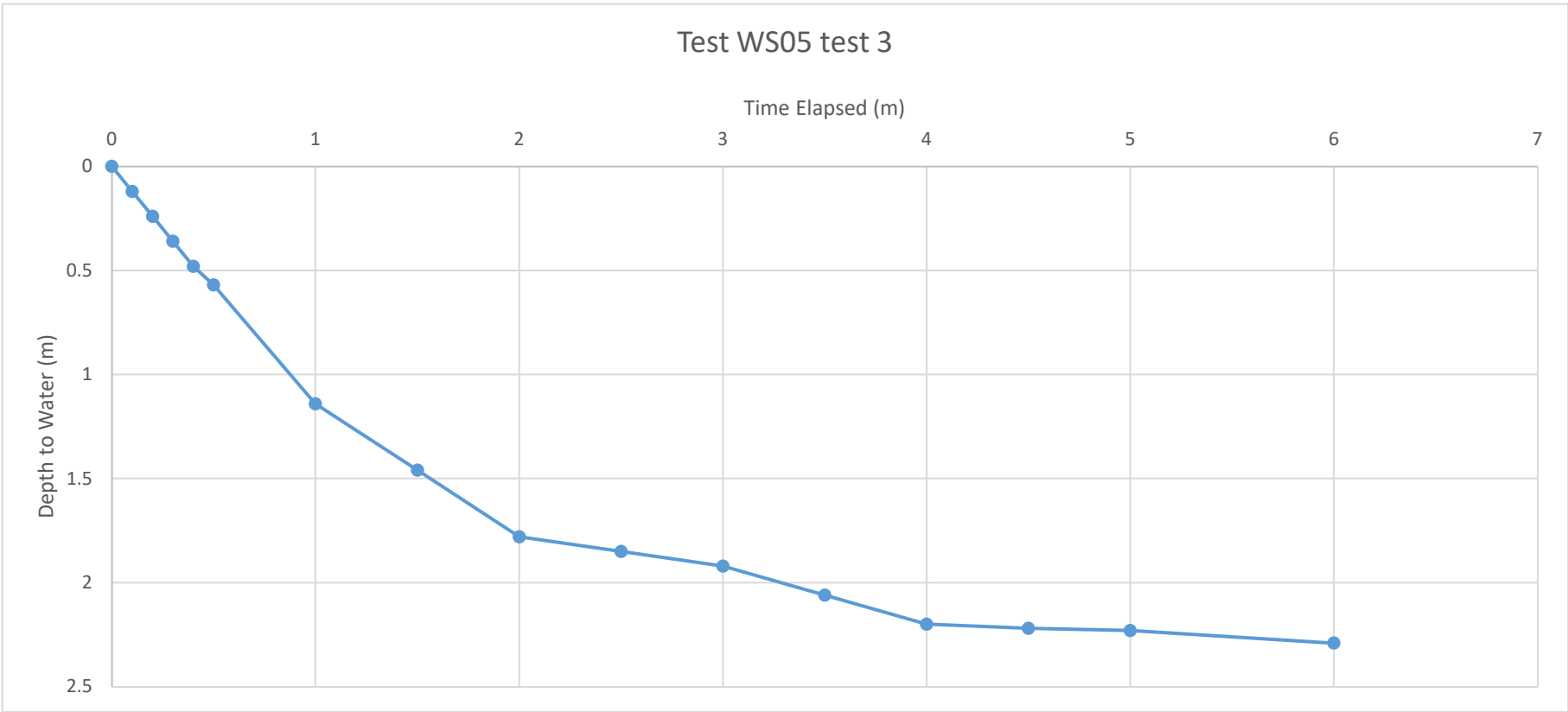
Area of borehole base

Linear regression line

Shape factor

1.21E-05 m/s

Permeability Coefficient (k)



Appendix F – GAC Screening Thresholds

- Curtins GAC Commercial Thresholds for 1.0% SOM.
- Curtins GAC Commercial Thresholds for 2.5% SOM.
- Atkins At Risk SSVs Commercial.
- Curtins Tier 1 Thresholds for Water Contaminants.

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (<i>elemental</i>)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (<i>inorganic</i>)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₅ - EC ₆	42	42	730	3200	570000	95000
EC ₆₋₆ - EC ₈	100	100	2300	7800	600000	150000
EC ₈₋₈ - EC ₁₀	27	27	320	2000	13000	14000
EC ₁₀₋₁₀ - EC ₁₂	130	130	2200	9700	13000	21000
EC ₁₂₋₁₂ - EC ₁₆	1100	1100	11000	59000	13000	25000
EC ₁₆₋₁₆ - EC ₃₅	65000	65000	260000	1600000	250000	450000
EC ₃₅₋₃₅ - EC ₄₄	65000	65000	260000	1600000	250000	450000
Aromatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₅ - EC ₇	70	370	13	26000	56000	76000
EC ₇₋₇ - EC ₈	130	860	22	56000	56000	87000
EC ₈₋₈ - EC ₁₀	34	47	8.6	3500	5000	7200
EC ₁₀₋₁₀ - EC ₁₂	74	250	13	16000	5000	9200
EC ₁₂₋₁₂ - EC ₁₆	140	1800	23	36000	5100	10000
EC ₁₆₋₁₆ - EC ₂₁	260	1900	46	28000	3800	7600
EC ₂₁₋₂₁ - EC ₃₅	1100	1900	370	28000	3800	7800
EC ₃₅₋₃₅ - EC ₄₄	1100	1900	370	28000	3800	7800
Aliph + Arom EC >44-70	1600	1900	1200	28000	3800	7800
Aromatic						
Benzene	0.08	0.3	0.017	28	72	90
Ethyl benzene	65	170	16	520⁽⁸⁾ [17000]	520⁽⁸⁾ [24000]	520⁽⁸⁾ [17000]
Toluene	120	610	22	860⁽⁸⁾ [59000]	860⁽⁸⁾ [56000]	860⁽⁸⁾ [87000]
Xylene ⁽⁹⁾	41	53	28	480⁽⁸⁾ [69000]	480⁽⁸⁾ [41000]	480⁽⁸⁾ [17000]
Phenol	180	310	66	760⁽¹⁴⁾ (31000)	760⁽¹⁴⁾ (10000)	760⁽¹⁴⁾ (7600)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	2.3	2.3	4.1	190	4900	1200
Acenaphthylene	170	2900	28	83000	15000	29000
Acenaphthene	210	3000	34	84000	15000	29000
Fluorene	170	2800	27	63000	9900	20000
Phenanthrene	95	1300	15	22000	3100	6200
Anthracene	2400	31000	380	520000	74000	150000
Fluoranthene	280	1500	52	23000	3100	6300
Pyrene	620	3700	110	54000	7400	15000
Benz(a)anthracene	7.2	11	2.9	170	29	49
Chrysene	15	30	4.1	350	57	93
Benzo(b)fluoranthene	2.6	3.9	0.99	44	7.1	13
Benzo(k)fluoranthene	77	110	37	1200	190	370
Benzo(a)pyrene	2.2	3.2	0.97	35	5.7	11
Indeno(123cd)pyrene	27	45	9.5	500	82	150
Dibenzo(ah)anthracene	0.24	0.31	0.14	3.5	0.57	1.1
Benzo(ghi)perylene	320	360	290	3900	640	1400
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00064	0.00077	0.00055	0.059	3.5	4.8
Trichloroethene (TCE)	0.016	0.017	0.041	1.2	120	70
1,1,1,2 Tetrachlorethane	1.2	1.5	0.79	110	1400	1500
Tetrachlorethane (PCE)	0.18	0.18	0.65	19	1400	810
1,1,1 Trichlorethane	8.8	9	48	660	140000	57000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs**
- Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 <u>21</u>	6 <u>21</u>	1.8 <u>170</u>	33 <u>49</u>	7.7 <u>21</u>	220 <u>250</u>
Lead	<u>200</u>	<u>310</u>	<u>80</u>	<u>2,300</u>	<u>630</u>	<u>1,300</u>
Mercury (elemental)	1	1	26	26	16	26 ⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 <u>79</u>	170 <u>170</u>
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₆	78	78	1700	5900	590000	130000
EC ₆ - EC ₈	230	230	5600	17000	610000	220000
EC ₈ - EC ₁₀	65	65	770	4800	13000	18000
EC ₁₀ - EC ₁₂	330	330	4400	23000	13000	23000
EC ₁₂ - EC ₁₆	2400	2400	13000	82000	13000	25000
EC ₁₆ - EC ₃₅	92000	92000	270000	1700000	250000	480000
EC ₃₅ - EC ₄₄	92000	92000	270000	1700000	250000	480000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₇	140	690	27	46000	56000	84000
EC ₇ - EC ₈	290	1800	51	110000	56000	95000
EC ₈ - EC ₁₀	83	110	21	8100	5000	8500
EC ₁₀ - EC ₁₂	180	590	31	28000	5000	9700
EC ₁₂ - EC ₁₆	330	2300	57	37000	5100	10000
EC ₁₆ - EC ₂₁	540	1900	110	28000	3800	7700
EC ₂₁ - EC ₃₅	1500	1900	820	28000	3800	7800
EC ₃₅ - EC ₄₄	1500	1900	820	28000	3800	7800
Aliph + Arom EC >44-70	1800	1900	2100	28000	3800	7800
<i>Aromatic</i>						
Benzene	0.16	0.49	0.035	50	72	100
Ethyl benzene	150	380	39	1200⁽⁸⁾ [35000]	1200⁽⁸⁾ [24000]	1200⁽⁸⁾ [22000]
Toluene	270	1300	51	1900⁽⁸⁾ [110000]	1900⁽⁸⁾ [56000]	1900⁽⁸⁾ [95000]
Xylene ⁽⁹⁾	98	120	70	1200⁽⁸⁾ [14000]	1200⁽⁸⁾ [42000]	1200⁽⁸⁾ [23000]
Phenol	290	420	140	1500⁽¹⁴⁾ (35000)	1500⁽¹⁴⁾ (10000)	1500⁽¹⁴⁾ (8300)
<i>Polycyclic Aromatic Hydrocarbons (PAH)</i>						
Naphthalene	5.6	5.6	10	460	4900	1900
Acenaphthylene	420	4600	69	97000	15000	30000
Acenaphthene	510	4700	85	97000	15000	30000
Fluorene	400	3800	67	68000	9900	20000
Phenanthrene	220	1500	38	22000	3100	6200
Anthracene	5400	35000	950	540000	74000	150000
Fluoranthene	560	1600	130	23000	3100	6300
Pyrene	1200	3800	270	54000	7400	15000
Benz(a)anthracene	11	14	6.5	170	29	56
Chrysene	22	31	9.4	350	57	110
Benzo(b)fluoranthene	3.3	4.0	2.1	44	7.2	15
Benzo(k)fluoranthene	93	110	75	1200	190	410
Benzo(a)pyrene	2.7	3.2	2	35	5.7	12
Indeno(123cd)pyrene	36	46	21	510	82	170
Dibenzo(ah)anthracene	0.28	0.32	0.27	3.6	0.57	1.3
Benzo(ghi)perylene	340	360	470	4000	640	1500
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00087	0.001	0.001	0.077	3.5	5
Trichloroethene (TCE)	0.034	0.036	0.091	2.6	120	91
1,1,1,2 Tetrachlorethane	2.8	3.5	1.9	250	1400	1800
Tetrachlorethane (PCE)	0.39	0.4	1.5	42	1400	1100
1,1,1 Trichlorethane	18	18	110	1300	140000	76000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Author Atkins
Revision 4
Date 08/01/2015

Title SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use

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Compound	SSV mg/kg	Notes
1,1,1-Trichloroethane	325	
1,1,1,2-Tetrachloroethane	52.4	
1,1,2,2-Tetrachloroethane	131	
1,1,2-Trichloroethane	42.5	
1,1-Dichloroethane	122	
1,1-Dichloroethene	12.6	
1,2-Dichloroethane	0.294	
1,2,4-Trimethylbenzene	175	
1,2-Dichloropropane	1.43	
2,4-Dichloro-o-cresol	55000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 861 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,4-Dimethylphenol	35600	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1330 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,4-Dinitrotoluene	3740	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 132 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-bis(1,1-dimethyl)-4-(1-methylpropyl)-phenol	2170	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.7 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-Dinitrotoluene	1850	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 271 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2-Chloronaphthalene	60200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 113 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2-Methylphenol	187000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 14200 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
3-Methylphenol	187000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 25300 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.

Title SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use

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Compound	SSV mg/kg	Notes
4-Methylphenol	185000	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 25800 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Acenaphthene	109000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 157 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Anthracene	536000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 3.48 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Antimony	4830	
Arsenic	640	Value presented is the Environment Agency Arsenic SGV published in May 2009. The commercial assessment criterion will not change with soil type or SOM. The SGV is the lower of the oral or inhalation assessment criteria.
Barium	22100	
Benzene	13.1	Based on information within the Environment Agency Benzene SGV report published in March 2009.
Benzo(a)anthracene	131	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.71 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(a)pyrene	14.3	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.911 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(b)fluoranthene	142	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.22 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(g,h,i)perylene	1440	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0187 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(k)fluoranthene	1430	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.686 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Beryllium	1010	
Biphenyl	71900	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 34.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Bis (2-ethylhexyl) phthalate	85200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 8.66 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Bromobenzene	44.7	
Chlorobenzene	0.907	

Title SSVs derived using CLEA for 1% SOM and sand soil type, Commercial land use

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Compound	SSV mg/kg	Notes
Bromoform	347	
Butyl benzyl phthalate	941000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 26.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalate should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Cadmium	230	Value presented is the Environment Agency Cadmium SGV published in July 2009. The commercial assessment criterion will not change with soil type or SOM.
Carbon disulphide	11.6	
Carbon tetrachloride	1.44	
Chlorobenzene	533	
Chloroethane	463	
Chloroform / Trichloromethane	48.0	
Chloromethane	0.480	
Chromium III	213000	
Chromium VI		The SSV for chromium VI has been temporarily withdrawn following a recent appraisal of the toxicological basis for this value and is pending further review.
Chrysene	14000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.44 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Cis-1,2-dichloroethene	6.37	
Copper	109000	
Cyanide	34.0	Based on acute exposure for a 0-6 year old child, using 5th percentile bodyweight from CLR10. Information is not available in SR3 and supporting documents regarding the 5th percentile bodyweight of SR3 bodyweight data. It is not considered likely that new data would significantly affect the SSV.
DDD	984	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 49.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Dibenz(a,h)anthracene	14.3	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.00393 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Dibromochloromethane	9.83	
Dichloromethane	116	
Diethyl phthalate	377000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 12.8 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalate should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-butyl phthalate	15400	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 4.62 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the approach published by the EIC, the lower of the oral and inhalation assessment criteria has been selected. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-octyl phthalate	89100	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 32.6 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.

Author Atkins
Revision 4
Date 08/01/2015

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Compound	SSV mg/kg	Notes
Dinoseb	7.53	
Ethylbenzene	180000	Based on information within the Environment Agency Ethylbenzene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 508 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Fluoranthene	72300	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Fluorene	66800	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 125 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Formaldehyde	463	
Hexachloroethane	510	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 8.13 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Indeno(1,2,3-c,d)pyrene	142	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0614 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Iso-propylbenzene	180000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 388 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Lead		The SSV for lead has been withdrawn following a recent appraisal of the toxicological basis for this value and the publication of the Category 4 Screening Levels (C4SLs) by DEFRA in March 2014.
Mercury (elemental)	4.30	Based on information in the Environment Agency Mercury SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the lower of the aqueous and the vapour saturation based limit as calculations are based on inhalation exposure only.
Mercury (inorganic)	3600	Value presented is the Environment Agency inorganic mercury SGV published in March 2009. The commercial assessment criterion will not change with soil type or SOM.
Mercury (methyl)	414	Based on information in the Environment Agency Mercury SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 66.4 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Methyl tert-butyl ether	3340	
Molybdenum	17700	
m-Xylene	276000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 613 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Naphthalene	8180	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 75 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Nickel	1800	Value presented is the Environment Agency Nickel SGV published in May 2009. The commercial assessment criterion will not change with soil type or SOM. The oral and inhalation assessment criteria are derived independently and the SGV is the lower value of the two.
Nicotine	857	

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Compound	SSV mg/kg	Notes
o-Xylene	296000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 467 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Phenol	686	Based on information within the Environment Agency Phenol SGV report published in July 2009. The SSV presented assumes 1% soil organic matter and uses the linear media partitioning model within the CLEA software which estimates the corresponding soil water concentration for phenol to be 1% by weight. The value presented is based on a threshold protective of direct skin contact with phenol. A long term exposure value of 28900 mg/kg was derived by the CLEA v.1.04 model and is provided for illustration only. Derived by comparing oral exposure to the oral HCV, and dermal and inhalation exposure to the inhalation HCV.
Prochloraz	12500	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.116 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Propylbenzene	187000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 399 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
p-Xylene	279000	Based on information within the Environment Agency Xylene SGV report published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each xylene isomer may be chosen to compare to the total xylene concentration. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 564 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Pyrene	54200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 2.20 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Selenium	13000	Value presented is the Environment Agency selenium SGV published in March 2009. The commercial assessment criterion will not change with soil type or SOM.
Styrene	22200	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 607 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Sum of PCDDs, PCDFs and dioxin-like PCBs	No SSV. Due to publication of the Dioxins, Furans and Dioxin-like PCB SGVs in September 2009, please see the Frequently Asked Questions for more information.	
Tetrachloroethene	75.8	
Toluene	414000	Based on information within the Environment Agency Toluene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 835 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C10-C12	171000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 49.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C12-C16	171000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 21.0 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C16-C35	≤ 1 kg/kg	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997). Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Please see the Frequently Asked Questions for more information on free product.

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Compound	SSV mg/kg	Notes
TPH aliphatic C5-C6	≤ 1 kg/kg	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 327 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C6-C8	≤ 1 kg/kg	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Modelling indicates that a chronic long term risk would not be present at concentrations above this. However at >1 kg/kg free product would be anticipated and further assessment may be required (e.g. this value is unlikely to be protective of dermal contact). Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 158 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C8-C10	167000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 82.5 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C10-C12	68300	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 370 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C12-C16	68400	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 155 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C16-C21	28400	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C21-C35	28400	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C5-C7	13.1	Benzene is the only constituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency Benzene SGV report published in March 2009.
TPH aromatic C7-C8	414000	Toluene is the only constituent of this fraction (TPHCWG 1997). Based on information in the Environment Agency Toluene SGV report published in March 2009. The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 835 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C8-C10	58600	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 614 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Trans-1,2-dichloroethene	10.1	
Tributyl tin oxide	123	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 40.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Trichloroethene		The SSV for trichloroethene has been temporarily withdrawn following a recent re-evaluation of the toxicological basis for this value and is pending further review.
Trichloromethylbenzene	0.0266	
Vanadium	7530	
Vinyl chloride	0.0329	
Zinc	≤1 kg/kg	

Note:

All values provided are rounded to 3 significant figures.

It is noted for some compounds that the SSV is sufficiently high that free product is likely to be encountered. Please see the Frequently Asked Questions for more advice.

In some instances the risk based value may be lower than the laboratory detection limit. Please see the Frequently Asked Questions for more advice.

Tier 1 Thresholds

Water Contaminants: Initial Assessment of Risk



Introduction

The Generic Assessment Criteria (GAC) employed as Tier 1 Controlled Water Screening criteria are given in Tables 1 and 2. The more conservative available Drinking Water Standards (DWS) and Environmental Quality Standards (EQS) (Freshwater and Saltwater), applicable in England and Wales have been included in the tables.

The list of determinands is non-industry specific and it should be recognised that additional site specific determinands may need to be taken into account. The applicability of these criteria, with regard to the developed Conceptual Site Model, is discussed within the relevant section of the preceding report. Further details on individual GAC can be obtained in the referenced source legislation.

Generic Assessment Criteria

Table 1 – Inorganic Contaminant Controlled Waters Generic Assessment Criteria

Contaminant	Units	Hardness Banding (mg/l CaCO ₃)	EQS (Freshwater)	EQS (Saltwater)	EU DWS	WHO
Arsenic	µg/l	-	50	25	10	10
Boron	µg/l	-	2000	7000	1000	0.3
Cadmium	µg/l	<40	0.08	0.2	5	3
		40- <50	0.08			
		50- <100	0.09			
		100- <200	0.15			
		>200	0.25			
Chromium III	µg/l	-	4.7	-	50	50
Chromium VI	µg/l	-	3.4	0.6		
Copper	µg/l	-	1 bioavailable ⁱ	3.76 Where DOC ⁱⁱ ≤ 1mg	2000	2000
				3.76 + (2.677 x ((DOC/2)-0.5)) Where DOC ⁱⁱ >1mg/l		
Cyanide (Free)	µg/l	-	1	1		
Cyanide (Total)	µg/l	-	1	1	50	70
Iron	µg/l	-	1000	1000	200	300
Lead	µg/l		1.2	1.3	10	10
Mercury	µg/l	-	0.07 ⁱⁱⁱ	0.07 ⁱⁱⁱ	1	1
Nickel	µg/l	-	4 bioavailable ⁱ	8.6	20	70

Tier 1 Thresholds

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Contaminant	Units	Hardness Banding (mg/l CaCO ₃)	EQS (Freshwater)	EQS (Saltwater)	EU DWS	WHO
Selenium	µg/l	-	-	-	10	10
Sulphate	mg/l	-	400	-	250	-
Sulphide	µg/l	-	0.25	-	-	-
Zinc	µg/l	-	10.9 bioavailable ⁱⁱ + ABC ^v	6.8 dissolved ^{iv} + ABC	5000	3000

i - fraction likely to have toxic effect as determined using the UKTAG Metal Bioavailability Assessment Tool

ii - concentration of dissolved organic carbon in mg/l of the receiving water (as identified in the Conceptual Site Model)

iii - in absence on Annual Average the Maximum Allowable Concentration Used

iv - total dissolved as reported

v - Average Background Concentration (ABC) as listed in Part 2 Table 2 in Ref. 1.

Table 2 – Organic Contaminant Controlled Waters Generic Assessment Criteria

Contaminant	Units	EQS (Freshwater)	EQS (Saltwater)	EU DWS	WHO
Organics					
Phenol (total)	µg/l	7.7	7.7	0.5	-
MTBE	µg/l	-	-	-	15
Total Petroleum Hydrocarbons (TPH)					
Aliphatic C5-C6	µg/l	-	-	-	15000
Aliphatic C6-C8	µg/l	-	-	-	15000
Aliphatic C8-C10	µg/l	-	-	-	300
Aliphatic C10-C12	µg/l	-	-	-	300
Aliphatic C12-C16	µg/l	-	-	-	300
Aliphatic C16-C21	µg/l	-	-	-	300
Aliphatic C21-C35	µg/l	-	-	-	300
Aromatic C6-C7 (benzene)	µg/l	10	8	1	10
Aromatic C7-C8 (toluene)	µg/l	74	74	-	700
Aromatic C8-C10 (ethylbenzene)	µg/l	20	20	-	300
Aromatic C10-C12	µg/l	-	-	-	100
Aromatic C12-C16	µg/l	-	-	-	100
Aromatic C16-C21	µg/l	-	-	-	90
Aromatic C21-C35	µg/l	-	-	-	90
Total Hydrocarbons (Dissolved / Emulsion)	µg/l	-	-	10 (revoked)	300

Tier 1 Thresholds

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Contaminant	Units	EQS (Freshwater)	EQS (Saltwater)	EU DWS	WHO
BTEX Compounds					
Benzene	µg/l	10	8	1	10
Toluene	µg/l	74	74	-	700
Ethyl-benzene	µg/l	20	20	-	300
Xylene (o+p+m)	µg/l	30	30	-	-
Polycyclic Aromatic Hydrocarbons (PAH)					
Anthracene	µg/l	0.1	0.1	-	-
Benzo(a)pyrene	µg/l	0.00017	0.00017	0.01	0.01
Napthalene	µg/l	2	2	-	-
PAHs Sum of four-benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene	µg/l	-	-	0.1	-

References

- 1 The Water Framework Directive, (Standards and Classification) Directions (England and Wales) [2015]
- 2 Council Directive 76/464/EEC, Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) [1976]
- 3 Council Directive 98/83/EC on the quality of water intended for human consumption [1998]
- 4 World Health Organisation (WHO), Guidelines for Drinking Water Quality. Third edition [2004]

Appendix G – Risk Assessment Methodology

The site-specific risk assessment, presented in this report, follows the principle of establishing whether there is a viable linkage between a contaminant source to a potential receptor, via an exposure pathway.

The risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of contaminant source on a site does not necessarily mean there is a risk.

The risk assessment considers the likelihood of an event taking place (accounting for the presence of the source and receptor and the viability of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment, the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
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 resource. Catastrophic damage to buildings/property. A short-term risk to an ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in an ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	There is a pollution linkage and an event that either 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 that it is probable that an event will occur. Circumstances are such that an 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 that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a <i>high probability</i> that <i>severe harm</i> could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	<i>Harm is likely to arise</i> to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	<i>It is possible</i> that without appropriate further action <i>harm could arise</i> to a designated receptor. It is relatively <i>unlikely</i> that any such harm would be <i>severe</i> , and if any harm were to occur it is <i>more likely</i> that such harm would be <i>relatively mild</i> .
Low Risk	<i>It is possible</i> that <i>harm could arise</i> to a designated receptor from an identified hazard. It is <i>likely</i> that, at worst, if any harm was realised any effects would be <i>mild</i> .
Very Low Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.

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