



e3p

Phase II Geoenvironmental Site Assessment
Land off Wilbraham Road, Chorlton, Manchester

Reference: 15-811-R2-5
Date: November 2022



PHASE II GEOENVIRONMENTAL SITE ASSESSMENT

Land off Wilbraham Road
Chorlton
Manchester

Prepared for:

Anwyl Homes

Report Ref: 15-811-R2-5
Date Issued: November 2022

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EXECUTIVE SUMMARY

Site Address	Land off Wilbraham Road, Chorlton, Manchester, M21 0UX	
Grid Reference	E 382643 N 394254	
Site Area	Approximately 2.22 Ha.	
Proposed Development	Full planning application proposing the erection of a residential development (Use Class C3a), with associated infrastructure, including landscaping, ecological mitigation, drainage, car parking, access from Wilbraham Road, demolition of garage to the rear of 354 Wilbraham Road and other associated works.	
Current Site Use	The application site extends to approximately 2.22 hectares (ha) and comprises an irregular shaped parcel of land within the administrative boundary of Manchester City Council (Grid Reference – E 382643 / N 394254). The application site comprises two distinct parcels of land, as described below. The part of the site identified for the proposed housing development comprises a roughly rectangular shaped parcel of land, which extends to 2 ha. 354 Wilbraham Road and its associated garage are the only existing buildings/structures within the site boundary. Access to the site is obtained from Wilbraham Road. The housing site is privately owned by GMYF and is secured on all boundaries by fencing and gates aside from 354 Wilbraham Road which is an occupied dwelling. The part of the site identified for ecological enhancement comprises 0.22 ha. The ecological enhancement area is owned by the St Margaret's Centre.	
Site History	Earliest mapping indicates the site was agricultural land with several ponds and field boundaries recorded on site. The site was subsequently developed in the 1930s to form an athletic/football ground with associated pavilion and tennis courts with trees and shrubs recorded around the periphery of the site. The tennis courts were removed in circa 1950 while the pavilion remained on site until the early 2000s. The site's last known use was as playing pitches (primarily football). However, this use ceased in 2016 (more than 5 years ago).	
Environmental Setting	Drift Geology	Glaciofluvial Sheet Deposits – SAND and GRAVEL
	Bedrock Geology	Wilmslow Sandstone Group – SANDSTONE.
	Faults	No faults are located on or within influencing distance of the site.
	Hydrogeology	The site is underlain by a secondary A superficial aquifer and a principal bedrock aquifer. The closest groundwater abstraction point is 1.60km north of the site.
	Hydrology	No surface water features are located within 250 m of the site.
	Flood Risk	Unaffected by flooding from rivers. Moderate to high potential for groundwater flooding to occur.
Utility Locations	A formal drainage survey has not been completed; however, a review of online records held by United Utilities indicates the presence of an abandoned sewer running through the southeast sector of the site.	



Utility Locations Cont.	No other drainage infrastructure is noted with the site boundary. There is likely to be private connections to the residential property off Wilbraham Road however these are not recorded on statutory service plans.
Landfill Sites and Ground Gases	There are no current or historic landfill sites located within 250 m of the site. There are several recorded infilled features including ponds and field boundaries on site and within 250m of the site which may be a source of Made Ground and organic soils and putrescible materials which could be subject to gassing and the production of hazardous ground gases. The site investigation works have identified Made Ground in the vicinity of the former ponds. It is considered that all materials associated with the ponds will be delineated and removed to allow construction of the proposed development.
Radon	Less than 1% of houses above the 'Action Level' – no special precautions required.
Coal Mining/Land Stability	The site is not located within a Coal Authority Reporting Area and is not deemed to be at risk from historic underground coal mining.
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential dwellings have been identified within influencing distance of the subject site.
Initial Conceptual Site Model	Contaminant Sources The site is potentially underlain by localised Made Ground deposits from former developments on site (pavilion and tennis courts) with the presence of infilled ponds and field boundaries recorded in localised areas. Where Made Ground and infilled features are present, there is a potential for heavy metals, PAHs, and asbestos within Made Ground soils. Infilled features with high organic content may also present a risk of hazardous ground gases. Receptors The future residential end users and construction workers are a significant receptor if any contamination is identified on site. The underlying secondary A drift aquifer and the principal bedrock aquifer are recorded as highly sensitive receptors. Pathways The potential contaminants of concern identified from the initial conceptual site model have pathways relating to direct contact and ingestion, volatilisation/indoor explosion, vapour inhalation, dust inhalation and vertical/lateral migration. The underlying drift deposits are anticipated to comprise sand underlain by low-permeability clay. Where sand deposits are recorded these will likely provide a preferential pathway for both hazardous ground gases and mobile phase contaminants within groundwater. The underlying low-permeability clay will restrict downward migration to the underlying bedrock aquifer.



E3P GROUND INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising:  14 no. mechanically excavated trial pits.  4 no. window sample boreholes.  4 no. environmental monitoring installations.
Ground Conditions	MADE GROUND – 0.00 m bgl to 1.60 m bgl Reworked topsoil comprising a dark brown clayey sand was recorded across the site to depths between 0.20 m bgl to 0.40 m bgl with gravel of brick, mudstone, glass and sandstone. Deeper Made Ground was encountered within localised areas (typically within proximity to the historic ponds and field boundaries) which comprised a dark brown gravelly sand with gravel and cobbles of brick, glass, sandstone, and ceramic and was encountered to a maximum depth of 1.60 m bgl but was typically encountered at less than 1.00 m bgl. A slight hydrocarbon/hydrogen sulphide odour was recorded within two locations (TP110 and TP111) which have been sampled and included for chemical analysis. DRIFT – 0.20 m bgl to 5.45 m bgl Drift deposits were encountered within all exploratory hole locations to depths of between 0.30 m bgl to 5.45 m bgl and typically comprised a light brownish-grey fine to medium SAND to circa 1.00 – 2.00 m bgl underlain by a firm to stiff brown silty CLAY. Soft clay was encountered within several locations between 1.00 – 3.00 m bgl. These soft clays are typically identified within proximity to the historic pond in the northeast and centre of the site and comprised some organic materials and plant debris. SOLID The solid bedrock geology was not encountered. Available BGS boreholes within the same geology circa 1.0km from the site indicate the presence of glacial till to depths in excess of 25.00 m bgl with no confirmation of depth to bedrock. GROUNDWATER – 0.80 m bgl – 3.75 m bgl Groundwater was encountered between 0.80 m bgl and 2.00 m bgl during the site investigation. Subsequent monitoring visits indicate the depth to water within boreholes between 1.15 m bgl and 3.75 m bgl.



CONTAMINATED LAND ASSESSMENT

Human Health

A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria. This assessment has identified the presence of elevated lead, arsenic, chromium (VI), mercury, naphthalene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. Levels of 2-methylnaphthalene, dibenzofuran and carbazole have been identified above the limit of detection (LOD) which have been included in the discussion below.

Non-volatile PAHs and heavy metals

The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances have been identified across a significant area of the site and are associated with the reworked topsoil and Made Ground deposits within eight locations across the site. The risk to human health can be mitigated by the installation of a chemically suitable cover system within all proposed garden areas where Made Ground soils are present.

Naphthalene

With regards to the elevated naphthalene, these present a potential volatilisation to indoor air risk. These elevated concentrations have only been identified within one location on site within TP114 at 0.40 m bgl and are therefore considered to be a localised hotspot within the Made Ground. During a process of cut-and-fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity.

Mercury

Elevated levels of mercury have been identified within three locations on site (TP103, TP109 and TP114) which may present a potential volatilisation to indoor air risk. The elevated concentrations have been identified within the Made Ground (<0.50 m bgl) and are therefore considered to be localised hotspots. Mercury speciation can be undertaken which would determine if the mercury is elemental or inorganic. If the results indicate that no elemental mercury is present, then the Generic Assessment Criteria (GAC) limit of 1.2mg/kg will no longer apply as this is based on a vapour inhalation pathway. The GAC for inorganic mercury is 40mg/kg and therefore the currently identified levels will no longer pose a risk, where this is the case further assessment and mitigation measures will not be required.

In addition to the above, levels of 2-Methylnaphthalene and Dibenzofuran were identified at levels above the laboratory limit of detection however the risk-based assessment of these has not identified the requirement for remedial action with the exception of a clean cover system.

There are no suitable sources of natural topsoil available on the site. The presence of reworked topsoil has been recorded in all exploratory hole locations. This reworked topsoil has been noted to comprise brick and is impacted by heavy metals and PAHs and is therefore unsuitable for retention on site within the 600mm cover system. Due to the likely high organic content of this material, it will be unsuitable for placement at depth and therefore is likely to require removal off site.



Human Health Contd.	A 600 mm clean cover system will be required in all gardens and landscaped areas where Made Ground remains. Excavation can cease where the natural drift deposits are identified. Where natural soils are encountered in the upper 600mm, these areas will require a 150 mm growing medium directly overlying the natural drift deposits in proposed gardens, landscaping and public open space. Further validation testing of the natural drift deposits will be required to confirm suitability for use within the upper 600mm. Chemical analysis of the natural sand and clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; however, further chemical validation samples will be required to confirm this.
Controlled Waters	The primary receptors are identified as the underlying principal aquifer (bedrock) and Secondary A aquifer (superficial). Exceedances of arsenic have been recorded in both groundwater samples and leachate samples, assumed to be within underlying perched water and localised areas of deep Made Ground associated with former ponds on site. Low-permeability clay identified across the site will likely provide some protection to the underlying principal bedrock aquifer which is classified as a high-risk receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site. It is possible that metalloid impact to the aquifer will occur through migration of perched water vertically through granular drift deposits. The site is public open space consisting of soft standing surface cover which allows for extensive infiltration of rainfall into underlying Made Ground soils. The proposed development will create some hardstanding cover across the site, thus reducing the amount of infiltration generated. This will in turn, reduce the amount of contaminants present in leachate off the site and reduce the risk further to the underlying aquifer. Deep Made Ground encountered in areas of the former pond are likely to be excavated and removed within the enabling works, thus removing the potential source and eliminating the risk. Based on the above and in the absence of a viable pollution source, the site does not pose a significant risk to controlled waters.
Ground Gas	Ground gas monitoring indicates the site can be classified as CS1/Green and ground gas protection measures are not required. Pond materials are to be removed in their entirety to ensure no long-term gas risk, and plots can be constructed without ground gas protection measures. Radon protection measures are not required in the construction of new dwellings.
Potable Water Infrastructure	An initial assessment indicates that an allowance for barrier pipe at the site will be required within the proposed development due to the anticipated importation of materials to construct road ways. This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation.



GEOTECHNICAL ASSESSMENT

Underground Obstructions	No significant underground obstructions have been encountered during the intrusive site investigation which confirms the desk-based assessment and absence of significant historical structures. During a phase of cut-and-fill enabling works to create a developable platform, any as yet unidentified below-ground obstructions will require grubbing out in their entirety to enable the construction of proposed plots.
Allowable Bearing Pressure	The underlying natural sand deposits have been assessed as being very loose to loose with a net allowable bearing pressure (ABP) in the order of 40-90 kN/m² at circa 1.00 m bgl. The underlying natural silty clay deposits have been assessed as having a net ABP in the order of 37-75 kN/m² at circa 2.00-3.00 m bgl increasing to 86-136 kN/m² at circa 3.00-5.00 m bgl.
Foundation Options	Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying firm to stiff glacial clays. Prior to the detailed design of suitable foundations solutions, a programme of localised remediation and enabling works will be required to remove any buried obstructions, unsuitable fill (infilled ponds) and cut/fill the site to provide suitable development platform levels. E3P have completed a detailed Foundation Zoning Plan (Drawing No. 15-811-019) and schedule where it is anticipated that the final foundation solution would be a combination of the following:  Trench fill to support reinforced strip foundations bearing onto firm to stiff clay (>1.50 m bgl) and in areas of tree influence.  Vibro Stone Columns to support reinforced strip foundations in areas of variable ground.  Driven piles in the area of deep Made Ground, infilled ponds, soft clays and areas of tree influence. Foundation depths should take account of the presence of existing and proposed trees, with foundations deepened locally to mitigate the potential for volumetric instability attributed to fluctuations in moisture content, in accordance with the requirements of NHBC standards.
Building Floor Slabs	Ground-bearing floor slabs are unlikely to be viable where there are significant depths of reworked Made Ground (> 600 mm) or shallow cohesive soils.
Heave Precautions	Given that the underlying clay is of predominantly medium volume change potential, heave precautions will be required to the internal face of a foundation >1.50 m in depth. If the ground floor slab is to be constructed with a beam and block floor, a minimum subfloor void of 250 mm is required within any structures located in the zone of conjectured tree influence. Heave precautions will be required to the underside of floor slabs (where there is no 250 mm void) and pile ground beams are required within the modelled influencing distance of trees.



Soakaway Drainage	The results of the BRE365 Soakaway Tests indicate the clay soils to have a poor drainage potential which would limit the use of soakaways within the proposed development.
Sulphate Assessment	Concrete classification will be DS1 AC1s.
CBR Design %	Granular soils can be re-engineered to ensure 5% within the subgrade during favourable climatic conditions. Natural clay soils will provide a CBR in the order of 3–5% during drier climatic periods. However, if water is allowed to shed onto the formation, the CBR will reduce to < 2%, which will require specialist engineering of the subgrade.
Cut/Fill	Based on the proposed levels across the site, minimal cut/fill works are anticipated in order to prepare the development platform. Cut works will be completed in the west and south of the site with fill works completed in the north, centre and east of the site.
Civil Engineering Excavations	Due to the depth and variability of the Made Ground and presence of loose sand deposits recorded in the uppermost 1.00-2.00 m bgl, it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97.
Waste Characterisation	Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: <i>Waste Classification – Guidance on the classification and assessment of waste</i> .

RECOMMENDATIONS

Based on the findings of the geoenvironmental site assessment, the following additional works are recommended to be completed in due course:

-  Further investigation of inaccessible areas associated with 358 Wilbraham Road and access track from Wilbraham Road.
-  Plot-specific foundation schedule (upon receipt of the final development levels).
-  Geotechnical earthworks strategy (infrastructure).
-  Remediation and enabling works strategy.



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DRAWING LIST

15-811-001 – Site Location Plan
15-811-002 – Proposed Development Plan
15-811-003 – Historical Features Plan
15-811-004 – Site Features Plan
15-811-005 – Exploratory Hole Location Plan
15-811-006 – Depth of Made Ground Plan
15-811-008 – Depth of Founding Strata Plan
15-811-010 – Conceptual Site Model
15-811-015 – Development Constraints Plan
15-811-018 – Contamination Exceedance Plan
15-811-019 – Foundation Zoning Plan and Schedule



1. INTRODUCTION

1.1. BACKGROUND

This Phase 2 Geoenvironmental Site Assessment has been prepared on behalf of Anwyl Homes ('the Applicant') in support of a full planning application at land off Wilbraham Road, Chorlton, Manchester ('the site').

The description of development is as follows:

"Full planning application proposing the erection of a residential development (Use Class C3a), with associated infrastructure, including landscaping, ecological mitigation, drainage, car parking, access from Wilbraham Road, demolition of garage to the rear of 354 Wilbraham Road and other associated works."

The site is owned by The Greater Manchester Trust for Recreation (working name "The Greater Manchester Youth Federation (GMYF)") and previously known as Boys' and Girls' clubs of Greater Manchester). GMYF, is a registered charity, whose origin dates to the mid 1800's.

GMYF has been operating in an extremely challenging environment owing to a long period of sustained funding cuts and the impacts of the Covid-19 pandemic. Following a strategic review, the charity is disposing of redundant land that it owns, including the application site, with the aim of reinvesting in several critical areas of the charity, such as safeguarding, governance and a new team of youth workers, to ensure that the 125 year old charity is able to support its affiliated clubs, volunteers and young people across Greater Manchester.

GMYF has selected Anwyl Homes as the preferred developer for the application site.

This report is required to determine potential contaminated land liabilities, remediation requirements and geotechnical engineering works that will be required as part a proposed low-rise residential development.

1.2. PROPOSED DEVELOPMENT

The proposed site layout is indicated in Figure 1.1.



FIGURE 1.1 PROPOSED SITE LAYOUT



1.3. OBJECTIVES

The objectives of the geoenvironmental assessment are as follows:

- Undertake a preliminary stage of sampling and analysis to provide an overview of environmental issues identified.
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors.
- Assess the geotechnical information and provide preliminary recommendations in relation to foundations, pavement construction and floor slabs.
- Provide recommendations regarding future works required.



1.4. SCOPE OF WORKS

The scope of work includes the following elements:

- 📍 Detailed review of historic information.
- 📍 Design of suitable intrusive ground investigation.
- 📍 Window sample probeholes with, and construction of, environmental monitoring installations.
- 📍 Mechanically excavated trial pits.
- 📍 In-situ geotechnical testing.
- 📍 Chemical and geotechnical laboratory analysis.
- 📍 Groundwater monitoring and sampling.
- 📍 Ground gas monitoring.
- 📍 Contamination risk assessment and conceptual site model.
- 📍 Geotechnical assessment and interpretation.
- 📍 Factual and interpretive reporting.

1.5. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.6. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.



2. GROUND INVESTIGATION

2.1. GENERAL OVERVIEW

A ground investigation has been designed based on the findings of the desk study, with exploratory holes advanced to target specific potential contaminant sources identified in the Conceptual Site Model (CSM). The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Exploratory fieldwork was completed on 30th March 2022. The works are summarised in Table 2.1.

2.2. LIMITATIONS OF THE INVESTIGATION

The access for the proposed development is located off Wilbraham Road which currently comprises a disused access track for the sports field and an area of private garden associated with the residential property (358 Wilbraham Road) to the west of the access track. Due to underground electricity cables along the access track, no exploratory locations were advanced in this area.

No access was granted to the garden of the residential property; therefore the main focus of the site investigation is within the main sports field area of the site.

2.3. SCOPE OF INVESTIGATION

TABLE 2.1 SUMMARY OF FIELDWORK

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General Ground Conditions Including the Presence/Nature of Obstructions	TP101	Mechanically Excavated Trial Pit	2.30	N/A
	TP102		2.20	
Infilled Ponds	TP103		3.50	
General Ground Conditions Including the Presence/Nature of Obstructions	TP104		2.40	
	TP105		2.40	
	TP106		2.40	
	TP107		2.40	
	TP108		2.40	
	TP109		2.60	
Infilled Ponds	TP110		2.50	
General Ground Conditions Including the Presence/Nature of Obstructions	TP111	Window Sample Probehole	2.50	2.00-5.00
	TP112		2.20	
	TP113		2.10	
	TP114		2.50	
	WS101		5.45	
Infilled Ponds	WS102		5.00	0.30-1.00



POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General Ground Conditions Including the Presence/Nature of Obstructions	WS103		5.45	1.00-4.00
	WS104		5.45	0.50-1.50

Mechanically excavated trial pits were advanced to investigate ground conditions and to retrieve environmental samples, spatially distributed to offer the maximum site coverage whilst also being advanced to target specific contaminant sources.

Window sample probeholes were advanced to undertake in-situ detailed geotechnical testing, obtain environmental samples and install groundwater and ground gas monitoring wells.

The sampling locations are illustrated in Drawing 15-811-005 (Appendix III). The ground conditions encountered are indicated on the logs, which are provided in Appendix IV.

Return visits were made to monitor installations for groundwater level and gas concentrations. In addition, selected wells were purged, and samples of groundwater recovered for chemical analysis.

2.4. IN-SITU STANDARD PENETRATION TESTING (SPT)

In-situ geotechnical testing was conducted using the standard penetration test (SPT) and, where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube. The results are shown in the probehole logs in Appendix IV and presented in Table 3.6 and discussed in Section 5.

2.5. PERMEABILITY TESTS

Three soakaway tests (SA101-SA103) tests were undertaken in order to assess the likely permeability of the underlying strata to determine the potential suitability for soakaway drainage within the proposed development. The results are presented in Table 3.9 and the test certificates are included within Appendix VIII.



2.6. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis comprising:

- ☐ Metals.
- ☐ pH, total sulphate, water-soluble sulphate (2:1 extract).
- ☐ Sulphide.
- ☐ Cyanide.
- ☐ Phenols.
- ☐ Total and speciated polycyclic aromatic hydrocarbons (PAHs).
- ☐ Semi Volatile Organic Compounds (SVOC).
- ☐ Volatile Organic Compounds (VOC).
- ☐ Asbestos identification and quantification.
- ☐ Speciated and banded total petroleum hydrocarbon (TPH).

I2 Analytical undertook the analytical work and the testing results are included in Appendix V and discussed in Section 4.

Selected samples were submitted to PSL Laboratory where the following geotechnical tests were undertaken:

- ☐ Moisture Content.
- ☐ Atterberg limits determinations.
- ☐ Particle size distribution tests.
- ☐ Single Stage Triaxial.
- ☐ One Dimensional Consolidation tests.

Laboratory analysis sheets are included in Appendix VII and are summarised in Section 3.



3. GROUND AND GROUNDWATER CONDITIONS

3.1. SUMMARY OF GROUND CONDITIONS

The ground investigation generally confirms the published geology and identifies the strata set out in Table 3.1.

TABLE 3.1 SUMMARY OF STRATA

HOLE	DEPTH TO STRATUM (m bgl)					
	MADE GROUND	SAND	SILTY CLAY	SANDY CLAY	CLAY WITH PLANT DEBRIS	SAND WITH PLANT DEBRIS
TP101	0.00–0.20	0.20–1.50	1.50–2.30	–	–	–
TP102	0.00–0.60	0.60–1.10	1.10–2.20	–	–	–
TP103	0.00–0.80	–	3.00–3.50	0.80–1.60	1.60–3.00	–
TP104	0.00–0.30	0.30–1.40	1.40–2.40	–	–	–
TP105	0.00–0.35	0.35–1.40	1.40–2.40	–	–	–
TP106	0.00–0.40	0.40–1.50	1.50–2.40	–	–	–
TP107	0.00–0.40	0.40–1.50	1.50–2.40	–	–	–
TP108	0.00–0.40	0.40–1.50	1.50–2.40	–	–	–
TP109	0.00–1.60	–	1.60–2.60	–	–	–
TP110	0.00–1.00	1.40–2.50	–	1.00–1.40	–	–
TP111	0.00–1.00	–	–	1.00–1.30	–	1.30–2.50
TP112	0.00–0.40	0.40–1.10	1.10–2.20	–	–	–
TP113	0.00–0.30	0.30–1.20	1.20–2.10	–	–	–
TP114	0.00–0.50	0.50–2.00	2.00–2.50	–	–	–
WS101	0.00–0.25	0.25–2.00	2.00–5.45	–	–	–
WS102	0.00–1.20	1.20–1.90	1.90–5.00	–	–	–
WS103	0.00–0.90	0.90–1.50	1.50–5.45	–	–	–
WS104	0.00–0.35	0.35–1.50	1.50–5.45	–	–	–

3.2. MADE GROUND

Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.20 m and 1.60 m bgl.

Reworked topsoil comprising a dark brown clayey sand was recorded across the site to depths between 0.20 m bgl to 0.40 m bgl with gravel of brick, mudstone, glass and sandstone.

Deeper Made Ground was encountered within localised areas (typically within proximity to the historic ponds and field boundaries) which comprised a dark brown gravelly sand with gravel and cobbles of brick, glass, sandstone, and ceramic and was encountered to a maximum depth of 1.60 m bgl but was typically encountered at less than 1.00 m bgl.

A Depth of Made Ground Plan is presented as Drawing 15-811-006 in Appendix III.



3.3. DRIFT DEPOSITS

Drift deposits were encountered within all exploratory hole locations to depths of between 0.30 m bgl to 5.45 m bgl and typically comprised a light brownish-grey fine to medium SAND to circa 1.00 – 2.00 m bgl underlain by a firm to stiff brown silty CLAY.

Soft clay was encountered within several locations between 1.00 – 3.00 m bgl. These soft clays are typically identified within proximity to the historic pond in the northeast and centre of the site and comprised some organic materials and plant debris.

3.4. SOLID GEOLOGY

The solid bedrock geology was not encountered.

Available BGS boreholes within the same geology circa 1.0km from the site indicate the presence of glacial till to depths in excess of 25.00 m bgl with no confirmation of depth to bedrock.

3.5. GROUNDWATER

Groundwater strikes were encountered as seepages. The depth of the seepages are shown on the exploratory hole records in Appendix IV and are summarised in Table 3.2.

TABLE 3.2 SUMMARY GROUNDWATER STRIKES

LOCATION	DEPTH TO STRIKE (m)	NOTES
TP101	0.80	Seepage
TP103	1.90	Seepage
TP104	1.30	Seepage
TP105	1.40	Seepage
TP106	1.50	Seepage
TP107	1.60	Seepage
TP109	1.60	Seepage
TP110	1.40	Seepage. Slight hydrogen sulphide odour
TP111	1.20	Seepage. Slight hydrogen sulphide odour
TP112	1.20	Seepage
TP113	1.60	Seepage
TP114	1.20	Seepage
WS101	2.00	Water Strike
WS102	2.20	Water Strike
WS103	2.00	Water Strike
WS104	1.80	Water Strike



3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the ground investigation and these are summarised in Table 3.3.

TABLE 3.3 SUMMARY VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

LOCATION	DEPTH (m)	STRATUM	NOTES
TP110	0.70	Made Ground	Slight Hydrogen Sulphide odour
TP111	1.30-2.00	Natural SAND	Slight Hydrogen Sulphide odour

3.7. SOIL CONSISTENCY

Undrained shear strength values were measured using both field hand shear vane tests and laboratory undrained triaxial tests. Results of the tests are presented in Table 3.4 and Table 3.5, which indicate the clay soils to vary between firm and very stiff with localised areas of soft clays. Strength test data is generally consistent with the field descriptions of the aforementioned soils.

TABLE 3.4 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH	SHEAR STRENGTH (kPa)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP101	1.50	73	171.55
TP101	1.80	71	166.85
TP101	2.10	74	173.90
TP102	1.10	29	68.15
TP102	1.50	73	171.55
TP102	2.20	138	324.30
TP103	3.00	74	173.90
TP104	1.40	34	79.90
TP104	1.80	96	225.60
TP104	2.30	72	169.20
TP105	1.50	59	138.65
TP105	2.00	100	235.00
TP105	2.30	115	270.25
TP106	1.60	43	101.05
TP106	2.00	103	242.05
TP106	2.40	110	258.50
TP107	1.60	72	169.20
TP107	2.00	111	260.85
TP107	2.30	102	239.70
TP108	1.50	31	72.85
TP108	2.00	75	176.25



LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP108	2.40	108	253.80
TP109	1.70	51	119.85
TP109	2.10	74	173.90
TP109	2.50	65	152.75
TP112	1.10	42	98.70
TP112	1.60	64	150.40
TP112	2.00	82	192.70
TP113	1.20	55	129.25
TP113	1.60	80	188.00
TP113	2.00	88	206.80
TP114	2.10	46	108.10

Notes

ABP Calculated using Stroud and Butler et al 1974.

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.6.

TABLE 3.5 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m ²)	CONSISTENCY
WS104	1.50 – 2.00	Brown sandy CLAY	38	Soft

3.8. SIDE STABILITY AND EASE OF EXCAVATION

Where a thickness of natural sand was present the sides of the exploratory trial pit excavations were extremely unstable stable during excavation, often resulting in the collapse of the trial pit. Trial pits were stable in natural clay strata.



TABLE 3.6 STANDARD/CONE PENETRATION TEST RESULTS

BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)*
WS101	1.00	SAND	9	9.07	Loose	N/A	N/A	N/A	90.733
WS101	2.00	Silty CLAY	8	7.31	N/A	Low strength	Firm	36.54	75.13
WS101	3.00	Silty CLAY	12	10.44	N/A	Medium strength	Stiff	52.18	107.28
WS101	4.00	Silty CLAY	13	10.79	N/A	Medium strength	Stiff	53.93	110.87
WS101	5.00	Silty CLAY	13	10.98	N/A	Medium strength	Stiff	54.92	112.91
WS102	1.00	SAND	4	4.03	Loose	N/A	N/A	N/A	40.32
WS102	2.00	Silty CLAY	0	0.00	N/A	Very low strength	Very soft	0.00	0.00
WS102	3.00	Silty CLAY	6	5.22	N/A	Low strength	Firm	26.09	53.64
WS102	4.00	Silty CLAY	11	9.29	N/A	Medium strength	Stiff	46.47	95.54
WS103	1.00	SAND	0	0.00	Very Loose	N/A	N/A	N/A	0.00
WS103	2.00	Silty CLAY	4	3.65	N/A	Very low strength	Soft	18.27	37.56
WS103	3.00	Silty CLAY	10	8.45	N/A	Medium strength	Stiff	42.24	86.85
WS103	4.00	Silty CLAY	11	9.57	N/A	Medium strength	Stiff	47.83	98.34
WS103	5.00	Silty CLAY	16	13.27	N/A	Medium strength	Stiff	66.37	136.46
WS104	1.00	SAND	7	7.06	Loose	N/A	N/A	N/A	70.57
WS104	2.00	Silty CLAY	7	6.39	N/A	Low strength	Firm	31.97	65.74
WS104	3.00	Silty CLAY	10	8.45	N/A	Medium strength	Stiff	42.24	86.85
WS104	4.00	Silty CLAY	10	8.70	N/A	Medium strength	Stiff	43.48	89.40
WS104	5.00	Silty CLAY	13	10.79	N/A	Medium strength	Stiff	53.93	110.87



NOTES

* The Allowable Bearing Pressure (ABP) should be considered indicative.

The interpretation of in situ mass undrained shear strength (c_u) data from SPT Blow Count (N) results and the influence of the Plasticity Index (PI) was reported in Standard Penetration Test in Insensitive Clays and Soft Rocks. Stroud (1974). The standard penetration test and the engineering properties of glacial materials subsequently. Stroud and Butler (1975) and (1989).

Allowable bearing pressure on sands. Soil Mechanics in Engineering Practice Terzaghi, K. & Peck, R.B. 1996.



3.9. CONSOLIDATION

Three undisturbed samples of Glacial Till were submitted for oedometer analysis. The results are provided in Table 3.7.

TABLE 3.7 OEDOMETER CONSOLIDATION RESULTS

LOCATION	DEPTH (m)	SAMPLE TYPE	MOISTURE CONTENT (%)	OEDOMETER CONSOLIDATION		
				PRESSURE RANGE (kPa)	M _v (m ² /MN)	C _v (m ² /year)
WS101	4.50	U	23	0-95	0.168	3.567
				95-180	0.163	1.345
				180-360	0.117	1.203
				360-720	0.077	0.921
				720-95	0.035	1.475
WS102	3.50	U	134	0-75	4.745	0.608
				75-150	1.402	0.278
				150-300	0.970	0.175
				300-600	0.501	0.139
				600-75	0.122	0.298
WS103	1.50	U	28	0-35	0.622	0.732
				35-70	0.471	0.749
				70-140	0.320	0.804
				140-280	0.203	0.808
				280-35	0.095	1.017

When considered at over-burden pressure with an additional load of 110 kPa the coefficient of volume compressibility (M_v) ranged from 0.163 m²/MN up to 1.402m²/MN. The material is considered to be medium to high compressibility.

The rate at which settlement is likely to occur is determined by the coefficient of consolidation (C_v). As shown in Table 3.7, the coefficient ranges from 0.139 m²/yr to 3.567 m²/yr. The rate at which settlement will occur is increased by the presence of localised organic materials (WS102) and it is likely that settlement will occur at a significant rate in these areas, whereas across the remainder of the site (WS101 and WS103), it is likely that settlement will occur over a period of months to years.



3.10. PARTICLE SIZE DISTRIBUTION

Particle Size Distribution Tests have been undertaken on selected samples of granular material via wet sieve to obtain information on the soil fractions. The results are included in Table 3.8. The full results can be found in Appendix VII.

TABLE 3.8 SUMMARY OF PARTICLE SIZE DISTRIBUTION TEST RESULTS

LOCATION	DEPTH (m)	SOIL FRACTION (%)			
		COBBLES	GRAVEL	SAND	SILT/CLAY
TP101	0.80 (Natural)	0	12	84	4
TP104	0.40 (Natural)	0	3	89	8
TP109	0.50 (Natural)	0	11	67	22
TP112	0.90 (Natural)	0	3	94	3
TP114	1.00 (Natural)	0	0	98	2

3.11. SOIL INFILTRATION

In-situ BRE 365 Soakaway tests were undertaken over a 48-hour period within trial pits completed as SA101-SA103.

The results are presented in Table 3.9 and the test certificates are included within Appendix VIII.

TABLE 3.9 BRE365 SOAKAWAY TESTING RESULTS

LOCATION	DEPTH (m)	MATERIAL	TEST NO.	SOIL INFILTRATION RATE (m/s)
SA101	2.00	Silty CLAY	Test No.1	N/A
SA102	1.50	Silty CLAY	Test No.1	N/A
SA103	2.40	Silty CLAY	Test No.1	N/A

Soil infiltration was taken over the wetted area from between 75% and 25% of the effective depth. All tests showed drift deposits to have very poor soakage potential as a soil infiltration rate could not be calculated due to the presence of low permeability cohesive drift deposits.

Therefore, it is considered that soakaway drainage is unlikely to be suitable for the proposed development. However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with CRE Special Digest 365 – Soakaway Design.



3.12. SOIL PLASTICITY

The Atterberg limits determinations, summarised in Table 3.10, show the clay to be of predominantly moderate plasticity with discrete areas of low plasticity clay.

TABLE 3.10 SUMMARY OF PLASTICITY INDEX TEST RESULTS

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
WS101	2.00	31	23	49	26	100	26	Medium
WS102	2.00	38	15	30	15	100	15	Low
WS103	3.00	32	26	60	34	100	34	Medium
WS104	2.00	25	23	48	25	100	25	Medium

The results of the Atterberg limits testing confirmed that the soils would be deemed to be predominantly Medium Volume Change Potential in accordance with the classification system utilised by the LABC/NHBC industry guidance with localised areas of low volume change potential.

3.13. pH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix V (summarised in Table 3.11), shows that the soils at the site meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005).

TABLE 3.11 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
TP101	0.10	0.005	5.1	DS-1 AC-1
TP101	0.80	0.0045	6.6	DS-1 AC-1
TP102	0.50	0.023	7.7	DS-1 AC-1
TP103	0.10	0.013	6.1	DS-1 AC-1
TP103	0.50	0.01	6.3	DS-1 AC-1
TP104	0.10	0.015	5.9	DS-1 AC-1
TP105	1.40	0.0057	7.3	DS-1 AC-1
TP106	0.10	0.011	5.5	DS-1 AC-1
TP106	0.80	0.0022	5.7	DS-1 AC-1
TP107	0.10	0.0051	5.6	DS-1 AC-1
TP108	0.90	0.0021	6.4	DS-1 AC-1
TP109	0.10	0.003	5.8	DS-1 AC-1
TP109	0.50	0.0048	6.2	DS-1 AC-1



LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
TP110	0.70	0.029	7.1	DS-1 AC-1
TP111	2.00	0.03	6.4	DS-1 AC-1
TP112	0.10	0.0045	5	DS-1 AC-1
TP113	0.10	0.011	5.5	DS-1 AC-1
TP114	0.40	0.012	6.7	DS-1 AC-1
WS101	0.80	0.0038	6.4	DS-1 AC-1
WS102	0.40	0.015	6.6	DS-1 AC-1
WS103	0.10	0.053	5.2	DS-1 AC-1
WS104	2.60	0.04	8.3	DS-1 AC-1



4. TIER I QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. HUMAN HEALTH RISK ASSESSMENT

At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267).

Where Tier 1 screening values are not provided by LQM, other screening values have been used and these are referenced in Table 4.1.

The results of this comparison have been summarised within Table 4.1.



TABLE 4.1 SUMMARY OF INORGANIC AND HYDROCARBON TOXICITY ASSESSMENT FOR A RESIDENTIAL END USE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Arsenic	mg/kg	37	22	64	TP110 0.70 m	1	Further Action
Cadmium	mg/kg	11	22	0.2	N/A	1	No Further Action
Chromium (VI)	mg/kg	6.0	22	27	TP107 0.10 m	1	Further Action
Lead	mg/kg	200	22	940	TP103 0.10 m TP103 0.50 m TP104 0.10 m TP110 0.70 m	1	Further Action
Mercury	mg/kg	1.2	22	2.9	TP103 0.50 m TP109 0.10 m TP109 0.50 m TP114 0.40 m	4	Further Action
Nickel	mg/kg	130	22	41	N/A	1	No Further Action
Selenium	mg/kg	250	22	1	N/A	1	No Further Action
Copper	mg/kg	2400	22	480	N/A	1	No Further Action
Zinc	mg/kg	3700	22	420	N/A	1	No Further Action
Cyanide – Total	mg/kg	791	22	7.9	N/A	1	No Further Action
Phenols – Total	mg/kg	120	22	1.3	N/A	1	No Further Action
Asbestos	Fibres	NFD	15		N/A	3	No Further Action
Naphthalene	mg/kg	2.3	22	5.2	TP114 0.40 m	4	Further Action
Acenaphthylene	mg/kg	170	22	0.53	N/A	2	No Further Action
Acenaphthene	mg/kg	210	22	8.7	N/A	1	No Further Action
Fluorene	mg/kg	170	22	5.6	N/A	1	No Further Action
Phenanthrene	mg/kg	95	22	50	N/A	2	No Further Action
Anthracene	mg/kg	2400	22	12	N/A	2	No Further Action
Fluoranthene	mg/kg	280	22	73	N/A	2	No Further Action
Pyrene	mg/kg	620	22	63	N/A	2	No Further Action
Benzo(a)Anthracene	mg/kg	7.2	22	42	TP103 0.10 m TP109 0.50 m TP110 0.70 m TP112 0.10 m TP114 0.40 m WS102 0.40 m	2	Further Action
Chrysene	mg/kg	15	22	36	TP110 0.70 m	2	Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Benzo(b)Fluoranthene	mg/kg	2.6	22	35	TP103 0.10 m TP103 0.50 m TP104 0.10 m TP109 0.10 m TP109 0.50 m TP110 0.70 m TP112 0.10 m TP114 0.40 m WS102 0.40 m	2	Further Action
Benzo(k)Fluoranthene	mg/kg	77	22	22	N/A	2	No Further Action
Benzo(a)Pyrene	mg/kg	2.2	22	37	TP103 0.10 m TP103 0.50 m TP104 0.10 m TP109 0.10 m TP109 0.50 m TP110 0.70 m TP112 0.10 m TP114 0.40 m WS102 0.40 m WS103 0.10 m	2	Further Action
Indeno(123-cd)Pyrene	mg/kg	27	22	16	N/A	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24	22	4.4	TP103 0.10 m TP103 0.50 m TP104 0.10 m TP109 0.10 m TP109 0.50 m TP110 0.70 m TP112 0.10 m TP114 0.40 m WS102 0.40 m WS103 0.10 m	2	Further Action
Benzo(ghi)Perylene	mg/kg	320	22	19	N/A	2	No Further Action
TPH C5-C6 (aliphatic)*	mg/kg	42	20	1	N/A	4	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	20	0.1	N/A	4	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	20	0.1	N/A	4	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	20	22	N/A	4	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	21	34	N/A	4	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	21	210	N/A	1	No Further Action
TPH C21-C35 (aromatic)*	mg/kg	1100	22	410	N/A	1	No Further Action
2-Methylnaphthalene	mg/kg	-	2	1.5	TP110 0.70 m	4	Further Action
Dibenzofuran	mg/kg	7.8	2	2.8	N/A	1	No Further Action
Carbazole	mg/kg	7.8	2	2.7	N/A	1	No Further Action

Notes

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation; PL5 = Vertical / Lateral Migration; PL6 = Corrosion of concrete; PL7=Tainting of water supply; PL8 = Uptake by plants

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; NFD = no fibres detected.



* The Tier 1 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. E3P has utilised the Tier 1 values for aliphatic compounds for the volatile and semi volatile fractions (C5-C12) and the Tier 1 values for aromatic compound for the non-volatile fractions (C12-C35). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.

Referring to Table 4.1, the result of this direct comparison indicates that the data exceeds the screening criteria for a residential end use for the following contaminants:

-  Arsenic
-  Chromium (VI)
-  Lead
-  Mercury
-  Naphthalene
-  Benzo(a)Anthracene
-  Chrysene
-  Benzo(a)Pyrene
-  Benzo(b)Fluoranthene.
-  Dibenzo(a,h)Anthracene.

No Asbestos was identified in any of the submitted Made Ground samples.

SVOCs were identified at levels above the LOD within localised areas of the site. No significant concentrations of VOCs were identified in the soils submitted for chemical analysis.

The laboratory analysis confirms the assessment within the initial conceptual site model that the main constituents of concern were likely to be heavy metals and PAH compounds.

In relation to these exceedances, the following can be determined:

-  The main exposure pathways based on the Tier I exceedances are:
 -  Soil ingestion.
 -  Dermal contact and ingestion.
 -  Vapour inhalation (indoor).
 -  Consumption of homegrown vegetables.
-  The exceedances for all determinants are associated with shallow Made Ground deposits (<0.7 m).



HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

All of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion of soils, inhalation of particulate, vapour inhalation and consumption of homegrown vegetables.

Heavy metals and PAHs have been identified within the Made Ground deposits and reworked topsoil across the site, likely related to small-scale upfilling and levelling of the site along with the infilling of former ponds. The majority of the identified elevated concentrations of heavy metals and PAHs have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances have been identified across a significant area of the site and are associated with the reworked topsoil and Made Ground deposits within eight locations across the site. The risk to human health can be mitigated by the installation of a chemically suitable cover system within all proposed garden areas where Made Ground soils are present

The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy; however, industry best practice (as outlined within BRE 465) will require the following minimum depths of certified clean cover:

-  Private gardens where homegrown vegetables can be cultivated – 600 mm.
-  Landscaped areas within private dwellings – 300 mm.
-  Public open space – 300 mm.

Naphthalene

With regards to the elevated naphthalene, this presents a potential volatilisation to indoor air risk. The elevated concentrations have only been identified within one location on site within TP114 at 0.40 m bgl and are therefore considered to be localised hotspots within the Made Ground. During a process of cut-and-fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity.

Mercury

Elevated levels of mercury have been identified within three locations on site (TP103, TP109 and TP114) which may present a potential volatilisation to indoor air risk. The elevated concentrations have been identified within the Made Ground (<0.50 m bgl) and are therefore considered to be localised hotspots. Mercury speciation should be undertaken which would determine if the mercury is elemental or inorganic. If the results indicate that no elemental mercury is present, then the Generic Assessment Criteria (GAC) limit of 1.2mg/kg will no longer apply as this is based on a vapour inhalation pathway. The GAC for inorganic mercury is 40mg/kg and therefore the currently identified levels will no longer pose a risk, where this is the case further assessment and mitigation measures will not be required.

2-Methylnaphthalene

This determinant is classified as a non-threshold substance, therefore even the smallest amount of exposure is considered to pose a theoretical risk to the critical receptor within the context of the developed CSM. This compound was detected within the Made Ground within one location (TP110) at a concentration of 1.5 mg/kg at 0.70 m. It is anticipated that this is considered to be a localised hotspot. Therefore, during a process of cut-and-fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity.

Dibenzofuran

The US EPA have determined a threshold value of 7.8 mg/kg. In this instance, concentrations have been recorded in the Made Ground soils within one location (TP110) at 0.70 m bgl at a concentration of 2.8 mg/kg. Based on the threshold of 7.8mg/kg, the concentrations within TP110, is not considered to be exceeding and is not deemed to present a risk to future end users.



Carbazole

Carbazole compound has been detected within shallow Made Ground (0.70 m bgl) at one location (TP110) at a concentration of 2.7mg/kg. Carbazole is a non-threshold substance, and is a white, crystalline solid. It has a characteristic odour. It is a product of incomplete combustion of organic matter and occurs in petroleum, coal, peat, crude oil and coal tar. Carbazole can also be banded with dibenzofuran due to the absence of a GAC. Based on the threshold of 7.8mg/kg, the concentrations within TP110, is not considered to be exceeding and is not deemed to present a risk to future end users.

Chemical analysis of the natural sand and clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; however, further chemical validation samples will be required to confirm this.

There are no suitable sources of natural topsoil available on the site. The presence of reworked topsoil has been recorded in all exploratory hole locations. This reworked topsoil has been noted to comprise brick and is impacted by heavy metals and PAHs and is therefore unsuitable for retention on site within the 600mm cover system. Due to the likely high organic content of this material, it will be unsuitable for placement at depth and therefore is likely to require removal off site.

A 600 mm clean cover system will be required in all gardens and landscaped areas where Made Ground remains. Excavation can cease where the natural drift deposits are identified. Where natural soils are encountered in the upper 600mm, these areas will require a 150 mm growing medium directly overlying the natural drift deposits in proposed gardens, landscaping and public open space. Further validation testing of the natural drift deposits will be required to confirm suitability for use within the upper 600mm.

4.2. CONTROLLED WATERS RISK ASSESSMENT

E3P has undertaken a controlled waters risk assessment for the site based on the consideration of the conceptual site model and the sensitive receptors which are summarised in Table 4.2.

TABLE 4.2 CONTROLLED WATERS CONCEPTUAL MODEL AND SENSITIVITY PROFILE

DISCUSSION	SENSITIVITY RATING
Contaminant Source	
Made Ground Made Ground associated with construction of the historic building in the southeast, infilled ponds and former field boundaries is a potential source of heavy metals and non-volatile PAHs. There are no significant on-site or adjacent industrial historical land-uses which would pose a risk to controlled waters.	Moderate/High
Pathway	
Vertical Migration The presence of sand drift deposits will likely facilitate the downward migration to the secondary A drift aquifer however these are typically underlain by low-permeability clay which will likely provide some protection to the underlying principal bedrock aquifer which is classified as a high-risk receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site.	Moderate/High
Lateral migration Lateral migration of contaminants is considered possible due to the presence of granular drift deposits across the site; however, CLAY deposits will provide some protection. The risk to surface water is negligible given the absence of a viable receptor within influencing distance of the site.	Moderate



Receptor		
Aquifer Classification in Superficial Drift Deposits	Secondary A aquifer	Moderate
Aquifer Classification in Bedrock	Principal aquifer	High
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not located within a groundwater source protection zone or a drinking water safeguard zone.	Low
Distance to the Closest Groundwater Abstraction Point	None identified within a 1 km radius.	Low
Is the Site Located Within 50 m of a Surface Watercourse?	The risk to surface water is negligible given the absence of a viable receptor within influencing distance of the site	Low
The ICSM developed within the context of the site setting has viable pollutant pathway, which would be the downward migration of potentially mobile phase-soluble contaminants towards the underlying principal aquifer (bedrock) and Secondary A aquifer (superficial).		

To ensure a robust appraisal of the identified risk to controlled waters, E3P has identified the sources of potential contamination that represent a risk to controlled waters from the initial CSM, we have then assessed the availability of ground investigation data in the form of analysis of the solid phase (soil) and dissolved phase within the perched groundwater or aquifer. The results of this assessment are presented in Table 4.3.

TABLE 4.3 QUALITATIVE RISK TO CONTROLLED WATERS FROM SOIL ANALYTICAL RESULTS

CONTAMINANT	ASSESSMENT RATING	DISCUSSION
BTEX > 1 mg/kg	The soil data analysis has not identified any detectable concentrations of BTEX or VOCs above 1mg/kg or TPH C5 to C6 that might otherwise be indicative of VOC impact.	None
Total VOC > 1 mg/kg		
Total SVOC > 1 mg/kg	SVOC analysis recorded concentrations above the laboratory LOD ranging between 0.53 mg/kg to 73mg/kg.	Further discussion
C5-C10 > 5 mg/kg	All concentrations are below or slightly exceeding the laboratory LOD.	None
C10-C12 > 10 mg/kg	Concentrations of C10-C12 have been recorded above 10 mg/kg within two locations and the maximum concentration was recorded in TP114 at 0.40 m bgl with a concentration 22 mg/kg.	Further discussion
C12-C16 > 50 mg/kg	All concentrations are below 50mg/kg.	None
Phenols > 2 mg/kg	All concentrations are below 2mg/kg.	None
Naphthalene > 2 mg/kg	Naphthalene has been recorded above 2 mg/kg in TP114 at 0.40 m bgl.	Further discussion
Total PAH > 10 mg/kg	Total concentrations of low-solubility PAH compounds greater than 10 mg/kg have been detected throughout the site, with a maximum concentration recorded in TP114 at 0.40 m bgl with 201 mg/kg.	Further discussion
PCB > 1 mg/kg	No potential sources of PCB have been identified	None
Heavy metals > 500 mg/kg	Concentrations of heavy metals (lead) above 500 mg/kg have been recorded in TP103 and TP110 at 0.50 m bgl and 0.70 m bgl respectively.	Further discussion

The Tier I assessment has included a comparison of leachate analysis from samples of the Made Ground and groundwater samples to drinking water standards (DWS) given the presence of a principal bedrock aquifer.

These are presented in Table 4.4.



TABLE 4.4 COMPARISON OF GROUNDWATER AND LEACHATE ANALYSIS WITH TIER 1 SCREENING LEVELS

DETERMINAND	UNIT	EQS ^{1,2,3}	DWS ^{3,4,5}	NO. OF GW SAMPLES	MAX CONC. IN GROUNDWATER	LOCATION OF EXCEEDANCE	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
		AA								
Arsenic	µg/l	50	10	2	11.6 10.1	WS101 WS103	5	66	TP111 2.0 m	Further Action
Cadmium	µg/l	0.08-0.25	5	2	<0.02	N/A	5	<0.08	N/A	No Further Action
Chromium (VI)	µg/l	3.4	–	2	<5.0	N/A	5	<0.5	N/A	No Further Action
Chromium (III)	µg/l	4.7	50	2	0.2	N/A	5	2.5	N/A	No Further Action
Copper	µg/l	1	2000	2	<0.5	N/A	5	19	N/A	No Further Action
Total Cyanide	µg/l	1	50	2	<1.0	N/A	5	<1.0	N/A	No Further Action
Lead	µg/l	1.2	10	2	<0.2	N/A	5	19	N/A	No Further Action
Mercury	µg/l	–	1.0	2	<0.05	N/A	5	<0.5	N/A	No Further Action
Nickel	µg/l	4	20	2	3.8	N/A	5	5.5	N/A	No Further Action
Selenium	µg/l	–	10	2	<0.6	N/A	5	<4.0	N/A	No Further Action
Zinc	µg/l	10.9	–	2	4.1	N/A	5	22	N/A	No Further Action
pH	6–9			2	7.1	N/A	5	7.9	N/A	No Further Action
Polycyclic Aromatic Hydrocarbons										
Naphthalene	µg/l	2	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Anthracene	µg/l	0.1	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Benzo[b]fluoranthene	µg/l	0.00017*	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Benzo[k]fluoranthene	µg/l	0.00017*	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Benzo(a)pyrene	µg/l	0.00017*	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Indeno(123-cd)pyrene	µg/l	0.00017*	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Fluoranthene	µg/l	0.0063	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action



DETERMINAND	UNIT	EQS 1, 2, 3	DWS 3,4,5	NO. OF GW SAMPLES	MAX CONC. IN GROUNDWATER	LOCATION OF EXCEEDANCE	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
		AA								
Benzo(ghi)perylene	µg/l	1.7–4	10*	2	<0.01	N/A	5	<0.01	N/A	No Further Action
Aromatic Hydrocarbon⁵										
TPH C5-C6 (benzene)	µg/l	10	1	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C6-C8 (toluene)	µg/l	74	700	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C8-C10 (ethyl benzene)	µg/l	20	300	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C10-C12 (xylene)	µg/l	30	500	2	<10	N/A	5	<10	N/A	No Further Action
TPH C10-C12 (xylene)	µg/l	30	500	2	<10	N/A	5	<10	N/A	No Further Action
TPH C12-C16	µg/l	2	90 ⁵	2	<10	N/A	5	<10	N/A	No Further Action
TPH C16-C35	µg/l	50#	90 ⁵	2	<10	N/A	5	<10	N/A	No Further Action
Aliphatic Hydrocarbon⁵										
TPH C5-C6	µg/l	–	15000	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C6-C8	µg/l	–	15000	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C8-C10	µg/l	–	300	2	<1.0	N/A	5	<1.0	N/A	No Further Action
TPH C10-C12	µg/l	–	300	2	<10	N/A	5	<10	N/A	No Further Action
TPH C12-C16	µg/l	–	300	2	<10	N/A	5	<10	N/A	No Further Action
TPH C16-C21	µg/l	–	300**	2	<10	N/A	5	<10	N/A	No Further Action
TPH C21-C35	µg/l	–	300**	2	<10	N/A	5	<10	N/A	No Further Action

Notes

Solubility <0.01µg/l

AA – Annual Average

MAC- Maximum Admissible Concentration

* Polycyclic aromatic hydrocarbons (PAH) - Benzo(a)pyrene (BaP), Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)-perylene and Indeno(1,2,3-cd)-pyrene. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water

** There are no WHO Guideline Values for aliphatic fractions C16-C21 and C21-C35, therefore the guideline value for aliphatic fractions inclusive of C8-C16 (300µg/l) has been applied.

The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations (2015)

Directive establishing a framework for Community action in the field of water policy (Water Framework Directive)

Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) - List II substances

Council Directive on the quality of water intended for human consumption (Drinking Water Directive)

WHO Guidelines for Drinking Water Quality. Third edition (2004)



4.2.1. CONTROLLED WATER RISK ASSESSMENT AND MITIGATION

This comparison indicates that the data exceeds the DWS values for the following inorganic compounds:

 Arsenic (Leachate and groundwater)

Exceedances have been recorded in both groundwater samples and leachate samples as summarised in Table 4.5.

TABLE 4.5 SUMMARY OF ELEVATED CONTAMINANTS IN GROUNDWATER

CONTAMINANT	TP111 2.00 M BGL (µg/l)	WS101 (µg/l)	WS103 (µg/l)
Arsenic	66 (leachate)	11.6	10.1

4.2.2. DISCUSSION OF CONTROLLED WATERS RISK ASSESSMENT

Earliest mapping indicates the site was agricultural land with several ponds and field boundaries recorded on site. These ponds were subsequently infilled, and deep Made Ground has been identified within these locations which may have subsequently leached down into the underlying ground and subsequently contaminated groundwater both within Made Ground and natural drift deposits.

The site is generally underlain by a mixed natural geology, typically comprising a fine to medium SAND to circa 1.00 – 2.00 m bgl underlain by a firm to stiff brown silty CLAY. Bedrock was not encountered within this investigation, however the BGS records the site to be underlain by the Wilmslow Sandstone Formation at depths in excess of 7.00 bgl.

The primary receptor identified on the site is the underlying principal aquifer, alongside the Secondary A aquifer noted within the superficial deposits. Low-permeability clay identified across the site will likely provide some protection to the underlying principal bedrock aquifer which is classified as a sensitive receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site. However, impacted groundwater has the potential to migrate vertically towards the noted aquifers, which are therefore deemed to be at a moderate risk to onsite contamination.

Exceedances of Arsenic have been identified within the soils, leachates and groundwater samples. Where leachate analysis has been undertaken, this can overstate the risk and is not wholly representative of the site characterisation. Results from groundwater testing have noted minor exceedances of Arsenic when compared to the Drinking Water Standards (DWS).

As the site is currently open, public space, with little hardstanding surface cover, rainfall is not being intercepted and subsequently infiltrates freely into the underlying Made Ground, potentially mobilising the identified contaminants. The proposed development will create some hardstanding cover across the site, thus reducing the amount of infiltration generated. This will in turn, reduce the amount of contaminants present in leachate off the site and reduce the risk further to the underlying aquifer.

Given that the majority of the site is underlain by significant depths (>5.00mbgl) of low permeability clay, the leaching of contaminants will be significantly reduced as the Made Ground will be contained beneath the impermeable surface covering, with the exception of garden areas, and above the natural clay aquitard.



The results of the data review and Tier 1 qualitative risk assessment has allowed E3P to draw the following conclusions in respect to the risk to controlled waters:

- The primary receptors are identified as the underlying principal aquifer (bedrock) and Secondary A aquifer (superficial).
- Exceedances of arsenic have been recorded in both groundwater samples and leachate samples, assumed to be within underlying perched water and localised areas of deep Made Ground associated with former ponds on site.
- Low-permeability clay identified across the site will likely provide some protection to the underlying principal bedrock aquifer which is classified as a high-risk receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site.
- It is possible that metalloid impact to the aquifer will occur through migration of perched water vertically through granular drift deposits.
- The site is public open space consisting of soft standing surface cover which allows for extensive infiltration of rainfall into underlying Made Ground soils. The proposed development will create some hardstanding cover across the site, thus reducing the amount of infiltration generated. This will in turn, reduce the amount of contaminants present in leachate off the site and reduce the risk further to the underlying aquifer.
- Deep Made Ground encountered in areas of the former pond are likely to be excavated and removed within the enabling works, thus removing the source and eliminating the risk.

Based on the above and in the absence of a viable pollution source, the site does not pose a significant risk to controlled waters.

4.3. GROUND GAS RISK ASSESSMENT METHODOLOGY

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in:

CIRIA Report 665 – Assessing risks posed by hazardous ground gases to buildings (2007)

BS8485:2015+A1:2019 – Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation (CS) and the proposed development based on building type.

Therefore, in accordance with BS8485, based on the measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) shall be derived for each monitoring point, from which the site characteristic hazardous gas flow rate (Q_{hgs}), and then the Characteristic Situation (CS) can be determined.



The following equation should be utilised:

$$Q_{hg} = q \left(\frac{C_{hg}}{100} \right)$$

Where:

q is the measured flow rate (in litres per hour) of combined gases from the monitoring standpipe
 C_{hg} is the measured hazardous gas concentration (in percentage volume/volume).

The subsequent derived gas screening value (GSV) should be the maximum Q_{hg} (flow rate x concentration as a percentage volume) for all the monitoring events.

A 'worst case check' may be carried out using the maximum recorded flow in any hole with the maximum concentration in any hole to present the plausible worst -case conditions. Adoption of the worst case Q_{hg} requires thorough justification and reference to the CSM.

The final derived GSV can then be used to characterise the site as summarised in Table 4.6.

TABLE 4.6 SITE CHARACTERISATION BY GSV (BS8485:2015)

CS	HAZARD POTENTIAL	GSV (l/hr) FOR METHANE AND CARBON DIOXIDE	ADDITIONAL FACTORS
CS1	Very Low	< 0.07	Typically, <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	< 0.70	Typical measured flow rate <70 l/h (otherwise consider an increase to CS3)
CS3	Moderate	< 3.5	N/A
CS4	Moderate to High	< 15	N/A
CS5	High	< 70	N/A
CS6	Very High	> 70	N/A

Notes

1. The CS is equivalent to the characteristic GSV in CIRIA C665.
2. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter should be considered.
3. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, multiplied by the concentration in the air stream of the particular gas being considered.
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

4.4. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂), oxygen (O₂) and hydrogen sulphide were measured using a calibrated infrared gas analyser (GFM435) with gas flow rates measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 500 seconds at each location, at which point the maximum concentration of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded.

The results of the ground gas monitoring are presented in Table 4.7.



In addition to the raw data, the results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015. Based on the initial peak measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) have been derived for each monitoring point, from which an individual Characteristic Situation (CS) can ultimately be determined.



TABLE 4.7 SUMMARY OF GROUND GAS MONITORING RESULTS

WELL	STRATA	DATE	CH ₄ PEAK (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ Q _{hg} (l/hr)	CO ₂ PEAK (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ Q _{hg} (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	PEAK FLOW (l/hr)	STEADY FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS101	Natural CLAY Drift	05/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1005	Steady	0.1	0.1	2.00-5.00	4.20	3.75
		25/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1012	Rising	0.1	0.1		4.37	3.53
		16/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1007	Rising	0.1	0.1		4.37	3.24
		31/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1006	Steady	0.1	0.1		4.39	3.31
		20/06/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.0	1014	Rising	0.1	0.1		4.40	3.60
		20/07/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1008	Rising	0.1	0.1		4.37	3.87
		15/08/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	997	Rising	0.1	0.1		4.35	3.92
		21/09/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.5	1020	Falling	0.1	0.1		4.35	4.05
		07/10/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.1	1008	Falling	0.1	0.1		4.35	3.40
WS102	Made Ground	05/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1005	Steady	0.1	0.1	0.30-1.00	1.20	Dry
		25/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1012	Rising	0.1	0.1		1.33	Dry
		16/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.9	1007	Rising	0.1	0.1		1.33	Dry
		31/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1005	Steady	0.1	0.1		1.33	Dry
		20/06/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.9	1014	Rising	0.1	0.1		1.33	Dry
		20/07/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1008	Rising	0.1	0.1		1.33	Dry
		15/08/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	997	Rising	0.1	0.1		1.33	Dry
		21/09/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.5	1020	Falling	0.1	0.1		1.35	Dry
		07/10/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.1	1007	Falling	0.1	0.1		1.35	Dry
WS103	Natural CLAY Drift	05/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.0	1006	Steady	0.1	0.1	1.00-4.00	3.20	2.80
		25/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1012	Rising	0.1	0.1		3.34	1.35
		16/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1008	Rising	0.1	0.1		3.34	1.13
		31/05/2022	0.1	0.1	0.0048	0.1	0.1	0.0048	18.7	1006	Steady	4.8	0.1		3.34	1.15
		20/06/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.0	1014	Rising	0.1	0.1		3.34	1.20



WELL	STRATA	DATE	CH ₄ PEAK (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ Q _{hg} (l/hr)	CO ₂ PEAK (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ Q _{hg} (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	PEAK FLOW (l/hr)	STEADY FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS103	Natural CLAY Drift	20/07/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1009	Rising	0.1	0.1	1.00-4.00	3.33	1.30
		15/08/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	997	Rising	0.1	0.1		3.33	1.37
		21/09/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.5	1021	Falling	0.1	0.1		3.35	1.70
		07/10/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.1	1008	Falling	0.1	0.1		3.35	1.30
WS104	Natural SAND Drift	05/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1006	Steady	0.1	0.1	0.50-1.50	1.35	1.15
		25/04/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1013	Rising	0.1	0.1		1.45	1.15
		16/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.8	1008	Rising	0.1	0.1		1.45	1.25
		31/05/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.6	1006	Steady	0.1	0.1		1.45	1.26
		20/06/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.0	1015	Rising	0.1	0.1		1.45	1.32
		20/07/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	1008	Rising	0.1	0.1		1.45	1.40
		15/08/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.7	998	Rising	0.1	0.1		1.45	1.42
		21/09/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	20.5	1021	Falling	0.1	0.1		1.45	Dry
		07/10/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	18.1	1009	Falling	0.1	0.1		1.45	1.38

Notes

CIRIA Characteristic Situation		Q _{hg}			
	CS1	<0.07	Typical Max CO ₂ <5 % Typical Max CH ₄ <1 %	Values in BOLD exceed CS1 Thresholds	
	CS2	<0.7	Flow rate not to exceed 70 l/hr otherwise consider increase to CS3	Values in BLUE denote water above level of response zone (flooded)	
	CS3	<3.5			
	CS4	<15	Quantitative Risk Assessment required to evaluate scope of protective measures		



4.5. SUMMARY OF MONITORING RESULTS

4.5.1. GROUNDWATER

Groundwater was recorded to be above the response zone within WS101 during all visits apart from the first monitoring visits. Where the response zone is deemed to be 'flooded' the data can be unreliable. During these visits, the water was bailed and the well left to re-equilibrate for around 30 minutes prior to monitoring. The depth to water recorded in Table 4.7 is following the well being left to re-equilibrate.

No other wells were noted to be flooded above the response zone and required bailing.

WS102 was noted to be dry on all occasions, with groundwater levels within WS103 and WS104 to rise, fall and then rise again during the monitoring period.

Due to the predominantly low permeability cohesive drift stratum, it is likely that water levels are representative of surface water collecting within the standpipes or perched water, and not a true representation of groundwater.

4.5.2. BAROMETRIC PRESSURE

The monitoring undertaken has been completed under both high and low atmospheric pressures between 997 mb and 1021 mb.

Monitoring has been completed at steady, rising and falling atmospheric pressures.

4.5.3. GAS FLOW

Throughout the monitoring period, steady flow rates were recorded to be 0.1 l/hr (limit of detection of the analyser).

Within WS103 on the 31st May 2022, a peak flow rate of 4.8 l/hr was recorded which fell to 0.1 l/hr after 30 seconds and remained at this level throughout the monitoring.

4.5.4. GAS CONCENTRATIONS

The maximum methane value recorded within the monitoring wells was 0.1% v/v (limit of detection of the analyser).

The maximum carbon dioxide value recorded within the monitoring wells was 0.1% v/v (limit of detection of the analyser).

4.6. CONCLUSION

The determined Characteristic Situation for each standpipe for each visit is presented in Table 4.8. This indicates that based on the peak flow rates all monitoring visits classify the site as Characteristic Situation (CS)1 – Very Low Gas Risk.



TABLE 4.8 GAS RISK PROFILE AND LOCATION

WELL	DATE	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH ₄ (%V/V)	MAX CH ₄ Q _{hg} (l/hr)	MAX CO ₂ (%V/V)	MAX CO ₂ Q _{hg} (l/hr)	CHARACTERISTIC SITUATION	NHBC TRAFFIC LIGHT
WS101	05/04/2022	3.75	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	25/04/2022	3.53	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	16/05/2022	3.24	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	31/05/2022	3.31	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/06/2022	3.60	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/07/2022	3.87	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	15/08/2022	3.92	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	21/09/2022	4.05	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	07/10/2022	3.40	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS102	05/04/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	25/04/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	16/05/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	31/05/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/06/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/07/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	15/08/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	21/09/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	07/10/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS103	05/04/2022	2.80	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	25/04/2022	1.35	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	16/05/2022	1.13	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	31/05/2022	1.15	4.8	0.1	0.0048	0.1	0.0048	CS1	Green
	20/06/2022	1.20	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/07/2022	1.30	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	15/08/2022	1.37	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	21/09/2022	1.70	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	07/10/2022	1.30	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS104	05/04/2022	1.15	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	25/04/2022	1.15	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	16/05/2022	1.25	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	31/05/2022	1.26	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/06/2022	1.32	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	20/07/2022	1.40	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	15/08/2022	1.42	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	21/09/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	07/10/2022	1.38	0.1	0.1	0.0001	0.1	0.0001	CS1	Green



E3P has assessed the previous variables and come to the following conclusions:

- 📍 Ground gas monitoring suggests that the site can be classified as CS1 / Green, and it is considered that gas protection measures will not be required.
- 📍 The site is predominantly glacial till of SANDS and CLAY at depths of 0.20m bgl to 3.50 m bgl.
- 📍 Made Ground has been encountered across the site, with deeper deposits within localised areas in southern half of the site and in the northeast associated with former infilling.
- 📍 Former ponds are present on site, and Made Ground has been encountered within these areas. Analysis of Made Ground materials in TP110 and WS102 within two of the locations of the former ponds have identified total organic carbon at 4.2% and 4% respectively. It is understood at this time that the pond materials will be removed in their entirety and therefore the ground gas risk removed.
- 📍 Radon protection measures are not required in the construction of new dwellings.

It is recommended that the full ground gas assessment is agreed with the local authority prior to their adoption on site.

4.6.1. NHBC

The NHBC Traffic Light guidance can still be used where the development proposals are based on the 'typical house' used in the modelling for the traffic light classification system.

A typical house is defined as a house (up to three storeys) with <100 m² footprint and minimum 150 mm depth clear ventilated void achieving sub-slab ventilation of one complete air exchange per day.

NHBC expectations for verification to satisfy the Traffic Light gas regime classifications are as detailed in Table 4.9.



TABLE 4.9 TYPICAL NHBC EXPECTATION AND VERIFICATION REQUIREMENTS

GAS REGIME	MINIMUM GAS PROTECTION EXPECTATIONS	VERIFICATION OR INFORMATION REQUIREMENTS
Green	N/A – but need to comply with BR211 radon requirements, where applicable	
Amber 1	Ventilation – subfloor venting to achieve at least one air exchange per day (minimum 150 mm void height; 1500 mm² /m air vent opening or 500 mm² /m² floor area spaced at not more than 2 m centres on at least two opposing sides). Membrane – must be suitable for purpose. Membrane installation/design - to achieve complete integrity across entire building footprint. Penetrations and joints sealed.	Construction drawings – showing position of membrane; sealing details and ventilation points to be provided. Membrane specification – technical data sheet(s) for gas membrane (including gas permeability data) to be provided. Installation – photographic evidence of installed membrane may be requested.
Amber 2	Ventilation – subfloor venting to achieve at least one air exchange per day. Membrane – must be suitable for purpose (criterion detailed in BS8485 clause 7.2.4). Membrane installation and design to achieve complete integrity across entire building footprint. Penetrations and joints sealed. Installer – installers must be experienced and appropriately trained and/or qualified.	Construction drawings showing position of membrane, sealing details and ventilation points to be provided. Membrane specification – technical data sheet(s) for gas membrane (including gas permeability data) to be provided. Installation – third-party verification report with supporting evidence to be included (i.e. photographic evidence and certificates of conformity, observations relating to sealing, location of ventilators and standards of installation). Integrity testing – may be requested; testing plan to be agreed in advance.
Red	Standard residential housing is not generally acceptable without further ground gas risk assessment and/or possible remedial mitigation measures to reduce or remove the source of the ground gases.	



4.7. POTABLE WATER SUPPLY

This section provides a summary of the site investigation data with reference to the selection of potable water supply pipework. The assessment is made with reference to the UK Water Industry Research (UKWIR) publication "Guidance on the selection of Water Supply Pipes to be used in Brownfield Sites"

TABLE 4.10 PIPELINE SELECTION PE THRESHOLD CONCENTRATIONS

Contaminant Group	PE-threshold (mg/kg)	Concentrations at <u>Current</u> pipeline depth (mg/kg)
Total VOC	0.5	N/A
Total BTEX And MTBE	0.1	N/A
Total SVOCs (Excluding PAH and those substances marked with an *)	2	N/A
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	<4.0
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	24.5
Phenols (From SVOC Analysis)*	2	N/A
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	NA
Ethers*	0.5	NA
Nitrobenzene*	0.5	NA
Ketones*	0.5	NA
Aldehydes*	0.5	NA
Amines	Fail	NA
Other Consideration		
Are there any exceedances of the PE threshold outside of the pipeline depth?	Yes – elevated TPH above PE threshold has been identified within shallow Made Ground soils between 0.10 m bgl and 0.50 m bgl. It is considered likely that these soils will be removed during a process of remediation and enabling works.	
Is free product present in soil and groundwater?	None	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater levels?	No – hydrocarbon impact has not been identified at depth greater than proposed pipeline depth.	
Will soils impacted with above determinands likely be utilised elsewhere on site?	Currently unknown – impacted soils may be placed in areas of low sensitivity i.e. within gardens which would not impact proposed pipeline locations.	
Will soils be imported to site as part of any future earth works	Currently unknown, however it is unlikely soils will be required to be imported to site.	

Notes - Pipe line depth normally between 0.75m–1.35m



Based on the assessment of current site conditions it is likely that barrier pipe will be required at the proposed development. Site conditions following remediation and enabling works will vary considerably and therefore a UKWIR assessment should be undertaken upon completion of the enabling works to confirm pipeline requirements.

At this stage, it is recommended that an allowance should be made for barrier pipe.



4.8. CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 4.11 has been prepared for the site.

TABLE 4.11 CONCEPTUAL MODEL

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1 PL2	Heavy Metals, non-volatile PAH (Made Ground)	Dermal contact. Dermal contact and ingestion.	Future site users. Off-site receptors.	Likely	High	LOW
Discussion: Elevated concentrations of heavy metals (Lead and Arsenic) and non-volatile PAHs have been identified throughout Made Ground deposits between depths of 0.10m and 0.70 m bgl, however these are predominantly within shallow reworked topsoil. These elevated levels have a dermal contact and ingestion pathway to future site users and construction workers when coming into direct contact with impacted soils. Recommendation: In order to remove the pathway of direct contact for future site users, a suitable clean cover system to garden and landscaped areas will prevent exposure. The majority of the identified exceedances are within a reworked topsoil material and is therefore unsuitable for retention on site within the 600mm cover system. Due to the likely high organic content of this material, it will be unsuitable for placement at depth and therefore is likely to require removal off site. A 600 mm clean cover system will be required in all gardens and landscaped areas where Made Ground remains. Excavation can cease where the natural drift deposits are identified. Where natural soils are encountered in the upper 600mm, these areas will require a 150 mm growing medium directly overlying the natural drift deposits in proposed gardens, landscaping and public open space. Further validation testing of the natural drift deposits will be required to confirm suitability for use within the upper 600mm. Construction works should be completed with PPE and provision of welfare to ensure exposure and direct contact with impacted materials is at a minimum.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL3	ACM in Made Ground	Inhalation of dust.	Future site users. Off-site land users.	Low Likelihood	Moderate	LOW
Assessment: No Asbestos was identified in any of the submitted Made Ground samples, however, due to historic developments on site during the period of time where asbestos was readily used within construction materials, the presence of asbestos fibres within Made Ground and or any demolition material cannot be completely discounted. Recommendation: If identified, ACM and or asbestos soils will require placement in accordance with the asbestos CSM. Construction works completed with PPE and provision of welfare.						
PL4	Volatile / Semi Volatile Contaminants such as hydrocarbons (Made Ground)	Inhalation of vapours. Migration through permeable strata and preferential pathways.	Future site users. Off-site receptors.	Likely	Moderate	LOW
Assessment: Elevated concentrations of volatile contaminants including Mercury, Naphthalene and 2-Methylnaphthalene have been identified across the site within shallow Made Ground between the depths of 0.10 m bgl and 0.70 m bgl. Recommendation: During a process of cut/fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity. In regard to the mercury, further testing should be completed to confirm the type of mercury present and whether it presents a vapour risk. Should it be identified as elemental mercury at a level above the tier 1 threshold, a hotspot removal should be undertaken. Construction works completed with PPE and provision of welfare.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL5	Methane, carbon dioxide (Made Ground)	Inhalation of gas. Migration through permeable strata and preferential pathways. Explosion in confined spaces.	Future site users. Buildings. Off-site land users.	Low likelihood	Moderate	LOW
Assessment: Ground gas monitoring has characterised the site as CS1. Radon protection measures are not required in the construction of new dwellings. Recommendation: Pond materials to be removed in their entirety to ensure no long-term gas risk, and plots to be constructed without ground gas protection measures.						
PL6	Mobile contaminants such as metals, PAHs, volatile compounds (Made Ground)	Surface runoff. Migration through permeable strata and preferential pathways. Perched waters migration.	Groundwater (Principal aquifer).	Likely	Moderate	LOW
Assessment: The primary receptor identified on the site is the underlying principal aquifer, alongside the Secondary A aquifer noted within the superficial deposits. Low-permeability clay identified across the site will likely provide some protection to the underlying principal bedrock aquifer which is classified as a sensitive receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site. However, impacted groundwater has the potential to migrate vertically towards the noted aquifers, which are therefore deemed to be at a moderate risk to onsite contamination.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
Exceedances of Arsenic have been identified within the soils, leachates and groundwater samples. Where leachate analysis has been undertaken, this can overstate the risk and is not wholly representative of the site characterisation. Results from groundwater testing have noted minor exceedances of Arsenic when compared to the Drinking Water Standards (DWS). Recommendation: The remediation works for the site may include the removal of localised deep Made Ground and organic deposits where infilled features are present. This may remove the source of the source of the exceedances, however it is recommended that further sampling of groundwater is undertaken prior to, during and following remediation works.						
PL7	Sulphate (potential ash within Made Ground)	Sulphate attack on concrete.	Building structure.	Likely	Moderate/Low	LOW
Assessment: No elevated sulphate or pH has been recorded across the site which chemical analysis confirming soils conform to concrete classification DS-1, AC-1s. Recommendation: Concrete should be designed in accordance with DS-1, AC-1s.						
PL8	Organic contaminants such as hydrocarbons, solvents (Made Ground)	Ingestion of tainted water supply.	Future site users. Water pipes.	Low Likelihood	Moderate/Low	LOW
Assessment: Elevated TPH has been recorded at pipeline depth within localised Made Ground above the PE threshold. Further exceedances above PE threshold have been identified at depths shallower than pipeline depth. Recommendation: Based on the assessment of current site conditions, it is likely that barrier pipe will be required. This will need to be confirmed with a UKWIR risk assessment post remediation.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL9	Phytotoxic contaminants (Made Ground)	Direct Contact (plant uptake).	Flora.	Likely	Low	LOW
Assessment: Contamination has been encountered within Made Ground across the site which may be taken up by flora in soft landscaping.						
Recommendation: Installation of a clean cover system within gardens and any areas of soft landscaping to prevent plant uptake of contaminants.						

Main exposure pathways:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation; PL5 = Vertical / Lateral Migration; PL6 = Corrosion of concrete; PL7=Tainting of water supply; PL8 = Uptake by plants;



5. GEOTECHNICAL ASSESSMENT

5.1. PROPOSED DEVELOPMENT

The proposals comprise the erection of a residential development (Use Class C3a), with associated infrastructure, including landscaping, ecological mitigation, drainage, car parking, access from Wilbraham Road, demolition of garage to the rear of 354 Wilbraham Road and other associated works.

5.2. SUMMARY OF GROUND CONDITIONS

MADE GROUND

Made Ground deposits were encountered within all exploratory hole locations to depths of between 0.20 m and 1.60 m bgl.

Reworked topsoil comprising a dark brown clayey sand was recorded across the site to depths between 0.20 m bgl to 0.40 m bgl with gravel of brick, mudstone, glass and sandstone.

Deeper Made Ground was encountered within localised areas (typically within proximity to the historic ponds and field boundaries) which comprised a dark brown gravelly sand with gravel and cobbles of brick, glass, sandstone, and ceramic and was encountered to a maximum depth of 1.60 m bgl but was typically encountered at less than 1.00 m bgl.

A Depth of Made Ground Plan is presented as Drawing 15-811-006 in Appendix III.

DRIFT DEPOSITS

Drift deposits were encountered within all exploratory hole locations to depths of between 0.30 m bgl to 5.45 m bgl and typically comprised a light brownish-grey fine to medium SAND to circa 1.00 – 2.00 m bgl underlain by a firm to stiff brown silty CLAY.

Soft clay was encountered within several locations between 1.00 – 3.00 m bgl. These soft clays are typically identified within proximity to the historic pond in the northeast and centre of the site and comprised some organic materials and plant debris.

SOLID GEOLOGY

The solid bedrock geology was not encountered.

Available BGS boreholes within the same geology circa 1.0km from the site indicate the presence of glacial till to depths in excess of 25.00 m bgl with no confirmation of depth to bedrock.

GROUNDWATER

Groundwater strikes have been encountered across the site at depths of between 0.80 m bgl and 2.20 m bgl.



5.3. SITE PREPARATION

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the *Manual of Contract Documents for Highway Works (MCHW)*. This should include the following:

- ☐ Deep Made Ground of unsuitably grading has been identified which will require removal in its entirety and the resulting void backfilled with suitably engineered fill.
- ☐ Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill.
- ☐ Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill.
- ☐ Buried structures may be present where former buildings have been identified. These should be excavated from below the proposed development footprint with the resulting void backfilled.

5.4. FOUNDATION CONDITIONS AND ASSESSMENT OF POTENTIAL BEARING CAPACITIES

In due consideration of the identified ground conditions, in-situ and laboratory geotechnical testing, E3P has undertaken an assessment of the net safe allowable bearing pressure (ABP) within the underlying natural stratum to assist in the detailed design of foundations and infrastructure and determine the target founding stratum. The results of this assessment are summarised in Table 5.1.

TABLE 5.1 SUMMARY OF ABP

GRANULAR SOILS			
Description	Depth (Range m bgl)	Relative Density	Allowable Bearing Pressure (kN/m ²)
Loose SAND	1.00 – 1.45	Loose	0 – 90.73
COHESIVE SOILS			
Description	Depth (range m bgl)	Undrained Shear Strength (Cu) (kN/m ²)	Allowable Bearing Pressure (kN/m ²)
Very soft Silty CLAY (2 locations, WS102 and WS103)	2.00 – 3.45	0 – 26.09	0 – 53.64
Firm to Stiff Silty CLAY	2.00 – 2.45	31.97 – 36.54	65.74 – 75.13
	3.00 – 3.45	43.48 – 52.18	89.40 – 107.28
	4.00 – 4.45	42.24 – 54.92	86.86 – 112.91
	5.00 – 5.45	53.93 – 66.37	110.87 – 136.46



Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying firm to stiff glacial clays.

Prior to the detailed design of suitable foundations solutions, a programme of remediation and enabling works will be required to remove any buried obstructions, unsuitable fill (infilled ponds) and cut/fill the site to provide suitable development platform levels.

E3P have completed a detailed Foundation Zoning Plan (Drawing No. 15-811-019) for the subject site based on current levels and development layout. This has confirmed that following enabling works the most cost-effective option for the majority of the site would be to re-engineer the underlying Made Ground, loose sand and clay soils using vibro stone columns (VSCs) to support a shallow strip or spread foundation. Confirmation of ground conditions in vicinity of the former ponds will be required to confirm allowance of VSC. Isolated areas will require plots to be constructed using mass trench fill foundations and driven piled foundations in areas of tree influence and former ponds. If the soft clays are to be removed as part of the remediation and enabling works, the subsequent void will require upfilling with a suitably engineered fill to specification in order to render the area suitable for VSC.

To determine if VSC is viable at the subject site, E3P has completed a Ground Improvement Design Risk Matrix that is summarised in Table 5.2.

TABLE 5.2 GROUND IMPROVEMENT DESIGN RISK MATRIX

RISK ITEM	COMMENT	PASS/FAIL
Soft clays with an undrained shear strength less than 30 kN/m²	CLAY soils are generally firm to stiff with $C_u > 40$ kN. Isolated areas of softer clay soils were encountered with $C_u > 30$ kN/m ² ; however, it is considered that these will either be piled, or soft material excavated to remove the organic deposits.	PASS – on completion of enabling works
Ground with peat layers close to foundation level or the base of the stone column, or where intermediate layers of peat are thicker than 200 mm, either as a single layer or the sum of the thicknesses of individual layers throughout the length of the stone column	Peat has not been encountered on site. Soft silty clays have been identified within infilled ponds. It is considered that these will be piled or soft material excavated to remove the organic deposits.	PASS – on completion of enabling works
Voided filled ground, e.g. old water tanks, pottery, glass bottles, concrete rubble or brick fill of unsuitable grading	Made Ground encountered within the infilled ponds comprises loose fill material with ceramic and glass bottles which will require removal and processing to render the site suitable for VSC.	PASS – on completion of enabling works
Loose or non-engineered fill not previously subject to rising or fluctuating water levels saturation	None identified.	PASS



RISK ITEM	COMMENT	PASS/FAIL
Filled ground still settling or expected to settle under its own weight or due to the effects of surcharging/upfilling where there is a high organic content or where decay is continuing	None identified	PASS
Fill, containing degradable material where organic material forms more than 15% of fill by volume	None identified.	PASS
Clays with a plasticity index greater than 40%	None identified.	PASS
Highly sensitive soils liable to collapse or remoulding	None identified.	PASS
Cohesive soils with trees in influencing distance	Plots where tree influence has been modelled and will either be subject to a piled or mass trench-fill solution.	PASS
Overall Risk Rating and Suitability for Vibratory Ground Improvement		PASS

Foundation depths should take account of the presence of existing and proposed trees, with foundations deepened locally to mitigate the potential for volumetric instability attributed to fluctuations in moisture content, in accordance with the requirements of NHBC standards.

It is recommended that at working drawing stage a foundation schedule is prepared for the development, taking account of the physical change of natural clay soils and the current/proposed locations of trees.

At this time, it is not possible to accurately define the foundation types due to the absence of a detailed tree survey and final development levels; however, based on our extensive experience of similar sites, we would anticipate that the final foundation solution would be a combination of the following:

-  Trench fill to support reinforced strip foundations bearing onto firm to stiff clay (>1.50 m bgl) and in areas of tree influence.
-  Vibro Stone Columns to support reinforced strip foundations in areas of variable ground.
-  Driven piles in the area of deep Made Ground, infilled ponds, soft clays and areas of tree influence.

A summary of anticipated foundations is presented in Table 5.3.



TABLE 5.3 ANTICIPATED FOUNDATIONS

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
TP101	1.95	0.80	Firm CLAY	Yes	Mass Trench	DS-1 AC-1s
TP102	1.95	-	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP103	>2.50	1.90	TBC	-	Engineered	DS-1 AC-1s
TP104	2.25	1.30	Stiff CLAY	-	Mass Trench	DS-1 AC-1s
TP105	1.85	1.40	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP106	2.45	1.50	Stiff CLAY	Yes	Mass Trench	DS-1 AC-1s
TP107	1.95	1.60	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP108	2.45	-	Stiff CLAY	-	Mass Trench	DS-1 AC-1s
TP109	2.15	1.60	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP110	>2.50	1.40	TBC	-	Engineered	DS-1 AC-1s
TP111	>2.50	1.20	TBC	-	Engineered	DS-1 AC-1s
TP112	2.05	1.20	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP113	1.65	1.60	Firm CLAY	-	Mass Trench	DS-1 AC-1s
TP114	>2.50	1.20	TBC	-	Engineered	DS-1 AC-1s
WS101	2.45	2.00	Firm CLAY	-	Mass Trench	DS-1 AC-1s
WS102	>2.50	2.20	TBC	-	Engineered	DS-1 AC-1s
WS103	>2.50	2.00	TBC	-	Engineered	DS-1 AC-1s
WS104	2.45	1.80	Firm CLAY	Yes	Mass Trench	DS-1 AC-1s

5.5. GROUND FLOOR SLABS

Current building control regulations require that where infilled ground is present to depths in excess of 600 mm, or where the substratum is variable in terms of the structure and settlement potential, or where clay soils are present within the influence of existing or proposed trees, a suspended floor slab is required.

In this instance, it is considered that for the majority of substructures, the underlying stratum is granular in nature and ground floor bearing slabs would be viable. Ground floor bearing slabs would not be viable in areas where there is an excess of 600 mm of infill and, as such, a suspended floor slab will be required.

Where a cast in-situ suspended slab is utilised with no subfloor void, appropriate compressible material (heave precautions) will be required in the construction of the substructure.



5.6. HEAVE PRECAUTIONS

The site has been proven to be underlain by clay soils, which are susceptible to volumetric instability due to fluctuations in moisture content, particularly within influencing distance of trees as per the NHBC/LABC conjectured zones of influence.

As the clay is deemed to be predominantly moderate plasticity, heave precautions are required to the internal face of the external load-bearing walls (outside or within tree influence).

If a ground beam is to be constructed within the zone of tree influence, heave precautions are required to the underside of this and edge beams.

If the ground floor slab is to be constructed with a beam and block floor, a minimum subfloor void of 250 mm is required within any structures located in the zone of conjectured tree influence.

If the ground floor slab is constructed with a cast in-situ suspended floor slab, then heave precautions that can tolerate 100 mm of clay swelling are required within any part of the floor slab to be located within the zone of influence of a tree.

A summary of heave precautions is presented in Table 5.4.

TABLE 5.4 SUMMARY OF HEAVE PRECAUTIONS

		MINIMUM VOID DIMENSION FOR FOUNDATIONS, GROUND BEAMS AND SUSPENDED IN-SITU CONCRETE GROUND FLOORS		MINIMUM VOID DIMENSIONS UNDER PRECAST CONCRETE AND SUSPENDED TIMBER FLOORS
Plasticity Index of Soil	Required Foundation Depth (m)	Thickness of Void Former Against Side of Foundation or Ground Beam (mm)	Thickness of Void Former on Underside of Edge Beam and Floor Slab (mm)	Void Dimension (mm)
High Plasticity (> 40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	35	150	300
	1.5–2.0	25	75	
Moderate Plasticity (20–40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	25	100	250
	1.5–2.0	25	50	
Low Plasticity (< 20)	2.0–2.5	N/A	50	200
	> 2.0	No Special Precautions		



5.7. HIGHWAYS CONSTRUCTION

A programme of remediation and enabling works will be required to remediate the proposed road subgrade in accordance with the requirements of the Manual of Contract Documents for Highway Works Volume 1 Specification for Highway Works (Series 600-Earthworks) for a method compaction.

It is considered that the material can be re-engineered using method compaction to achieve a CBR in excess of 5% if works are completed in favourable climatic conditions.

5.8. DRAINAGE

The site is predominantly underlain by low-permeability gravelly CLAY deposits. Therefore, the use of soakaway drainage will be limited, therefore it is not recommended that soakaways are utilised for disposal of surface water runoff.

The results of the BRE365 Soakaway Tests indicate the clay soils to have a poor drainage potential which would preclude the use of soakaways within the proposed development.

5.9. CONCRETE DURABILITY

Based upon the results of the chemical analysis it is considered that subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE *Special Digest 1* (2005).

5.10. EXCAVATIONS

Trial pits appeared unstable within the granular natural and Made Ground soils which resulted in side wall collapse within several locations. Where Made Ground exceeded 1.00 m bgl, trial pits were significantly more unstable. The clay stratum appeared relatively stable and was excavated with ease.

Site observations indicated that excavations should be feasible in the near surface with normal plant. It is anticipated that any obstructions, if encountered, will be grubbed out during the reduced-level dig for the substructure works.

Due to the depth and variability of the granular and Made Ground soils, and likelihood of trench collapse, it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97.

If local pumping of groundwater is required during the advancement of excavations for the proposed foundations, then consideration should be given to the potential for dewatering gravels in the surrounding areas that may cause structural damage to building substructures in close proximity to the site.



TABLE 5.5 CIVIL ENGINEERING EXCAVATION RISK MATRIX

RISK ITEM	PRESENT	COMMENT
Running Sands	No	No running sand has been identified.
Minor Water Ingress	No	No significant water ingress was recorded during the site investigation. Minor water ingress will require localised dewatering/sump pumping during the construction of site drainage infrastructure.
Shallow Bedrock	No	Shallow bedrock has not been identified on site.

5.11. CONSTRUCTION ACTIVITY AND INSPECTION

The following activities and inspections should be incorporated into the site works:

- Due to the variability of the soils at the site, it is recommended that sufficient allowance is made for the inspection of formations and sub-formations to foundations and pavement construction.
- Excavations where access is required should be subject to a risk assessment from a competent person and, where appropriate, mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 should be utilised.
- It is considered that dewatering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.
- Where access to confined spaces is required, appropriate mitigation measures should be addressed within the construction stage health and safety plan. Particular account should be taken of the gas results.
- The presence of potential contamination and mitigation measures should be addressed as part of the construction stage health and safety plan and should include measures to design out the risks, reduce their impact and, finally, to include the use of personnel protective equipment (PPE).



5.12. GEOTECHNICAL RISK REGISTER

POTENTIAL CONSTRAINT	ABNORMAL	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Remediation of contaminated soils		On site	TBC	Elevated levels of heavy metals, PAHs and VOCs have been identified within Made Ground to a proven depth of 0.70 m bgl. Material deemed to have a potential vapour risk may require hotspot removal, resulting the requirement to backfill the resulting void. Should significant backfill be needed deeper or specialist foundations may be required in those areas.
Bedrock		N/A	N/A	N/A
Obstructions		TBC	-	No significant obstructions have been identified during the intrusive investigation. If encountered, all obstructions will require grubbing out in their entirety and the resulting void backfilled with suitably engineered fill.
Artificially levelled and filled platforms		TBC	-	Localised infilled ponds have been identified with fill material of unsuitable geotechnical grading. These materials will require removal and backfilled with re-engineered material, or a piled foundation solution will be required.
Retaining walls		N/A	N/A	N/A
Trench collapse		All	100	Loose granular sand and localised Made Ground present beneath the site has been noted to result in side wall collapse of trial pit excavations. Excavations where access is required should be subject to a risk assessment from a competent person and, where appropriate, mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 should be utilised.
Mature trees		Periphery	35	Arboriculture survey required to determine areas of potential tree influence. The site is predominantly grass cover however several mature and semi mature trees are present around the periphery, in particular along the southern boundary of the site.



POTENTIAL CONSTRAINT	ABNORMAL	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Volume-change potential clay		On site	80	The site is proven to be underlain by cohesive soils at depths in excess of 1.00 m bgl. Geotechnical analysis has indicated the clay soils to be of medium volume change potential and therefore heave precautions will be required as discussed in section 5.6.
Peat/Compressible Deposits		On-site	15	Localised areas of the site have identified silty clay deposits with some organic plant materials indicative of slightly organic glacial till. Compressibility testing indicates that the silty clay have been assessed as medium to high compressibility.
Running sands		N/A	N/A	Data searches indicate low risk.
Ground dissolution		N/A	N/A	Data searches indicate no hazard.
Concrete design		On-site	All	Concrete designed in accordance with DS-1, AC-1s.
Low-permeability ground		On site	70	Soakaway testing indicated that the underlying cohesive deposits have a poor drainage potential which ultimately precludes the use of soakaway drainage within the proposed development.
Services/sensitive structures		South	5	Underground services are recorded in the south of the site – there are no services deemed to be highly sensitive.
Abnormal foundation solutions		TBC	TBC	The presence of deep Made Ground, soft clays and cohesive deposits within areas of tree influence, an abnormal foundation (driven pile) solution may be required.
Areas not investigated		South	5	Investigation works could not be undertaken in the south of the site due to use of the area for access to the adjacent property and the presence of underground services.
Surface water features		N/A	N/A	None recorded on site
Current ponds to be filled		N/A	N/A	None recorded on site



POTENTIAL CONSTRAINT	ABNORMAL	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Historically infilled pond		On-site	20	Localised infilled ponds have been identified with fill material of unsuitable geotechnical grading and soft clays (<30 kN/m ²). These materials will require removal and backfilled with re-engineered material. The presence of soft clays with a Cu <30 kN/m ² will preclude the use of VSC.
Soft Clays and Loose Sand		TBC	75	Where loose sands or soft clays have been identified at drainage pipe invert level, a reinforced pipe bedding may be required to stabilise drainage runs.



5.13. FURTHER WORKS

Based on the findings of the intrusive site investigation, the following additional works are recommended to be completed in due course:

-  Further investigation of inaccessible areas associated with 358 Wilbraham Road and access track from Wilbraham Road.
-  Plot-specific foundation schedule (upon receipt of the final development levels).
-  Geotechnical earthworks strategy (infrastructure).
-  Remediation and enabling works strategy.



6. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONTAMINATED LAND ASSESSMENT

Human Health	A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria. This assessment has identified the presence of elevated lead, arsenic, chromium (VI), mercury, naphthalene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. Levels of 2-methylnaphthalene, dibenzofuran and carbazole have been identified above the limit of detection (LOD) which have been included in the discussion below. Non-volatile PAHs and heavy metals The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances are associated with the reworked topsoil and Made Ground deposits within eight locations across the site. The risk to human health can be mitigated by the installation of a chemically suitable cover system within all proposed garden areas where Made Ground soils are present. Naphthalene With regards to the elevated naphthalene, these present a potential volatilisation to indoor air risk. These elevated concentrations have only been identified within one location on site within TP114 at 0.40 m bgl and are therefore considered to be a localised hotspot within the Made Ground. During a process of cut-and-fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity. Mercury Elevated levels of mercury have been identified within three locations on site (TP103, TP109 and TP114) which may present a potential volatilisation to indoor air risk. The elevated concentrations have been identified within the Made Ground (<0.50 m bgl) and are therefore considered to be localised hotspots. Mercury speciation can be undertaken which would determine if the mercury is elemental or inorganic. If the results indicate that no elemental mercury is present, then the Generic Assessment Criteria (GAC) limit of 1.2mg/kg will no longer apply as this is based on a vapour inhalation pathway. The GAC for inorganic mercury is 40mg/kg and therefore the currently identified levels will no longer pose a risk, where this is the case further assessment and mitigation measures will not be required. In addition to the above, levels of 2-Methylnaphthalene and Dibenzofuran were identified at levels above the laboratory limit of detection however the risk-based assessment of these has not identified the requirement for remedial action with the exception of a clean cover system.
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Human Health Contd.	There are no suitable sources of natural topsoil available on the site. The presence of reworked topsoil has been recorded in all exploratory hole locations. This reworked topsoil has been noted to comprise brick and is impacted by heavy metals and PAHs and is therefore unsuitable for retention on site within the 600mm cover system. Due to the likely high organic content of this material, it will be unsuitable for placement at depth and therefore is likely to require removal off site. A 600 mm clean cover system will be required in all gardens and landscaped areas where Made Ground remains. Excavation can cease where the natural drift deposits are identified. Where natural soils are encountered in the upper 600mm, these areas will require a 150 mm growing medium directly overlying the natural drift deposits in proposed gardens, landscaping and public open space. Further validation testing of the natural drift deposits will be required to confirm suitability for use within the upper 600mm. Chemical analysis of the natural sand and clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; however, further chemical validation samples will be required to confirm this.
Controlled Waters	The primary receptors are identified as the underlying principal aquifer (bedrock) and Secondary A aquifer (superficial). Exceedances of arsenic have been recorded in both groundwater samples and leachate samples, assumed to be within underlying perched water and localised areas of deep Made Ground associated with former ponds on site. Low-permeability clay identified across the site will likely provide some protection to the underlying principal bedrock aquifer which is classified as a high-risk receptor. The sensitivity of the aquifer is reduced given there are no active potable groundwater abstractions within 1.60km of the site. It is possible that metalloid impact to the aquifer will occur through migration of perched water vertically through granular drift deposits. The site is public open space consisting of soft standing surface cover which allows for extensive infiltration of rainfall into underlying Made Ground soils. The proposed development will create some hardstanding cover across the site, thus reducing the amount of infiltration generated. This will in turn, reduce the amount of contaminants present in leachate off the site and reduce the risk further to the underlying aquifer. Deep Made Ground encountered in areas of the former pond are likely to be excavated and removed within the enabling works, thus removing the source and eliminating the risk. Based on the above and in the absence of a viable pollution source, the site does not pose a significant risk to controlled waters.



Ground Gas	Ground gas monitoring indicates the site can be classified as CS1/Green and ground gas protection measures are not required. Pond materials are to be removed in their entirety to ensure no long-term gas risk, and plots can be constructed without ground gas protection measures. Radon protection measures are not required in the construction of new dwellings.
Potable Water	An initial assessment indicates that barrier pipe will be required within the proposed development. This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation.

6.2. GEOTECHNICAL ASSESSMENT

No significant underground obstructions have been encountered during the intrusive site investigation which confirms the desk-based assessment and absence of significant historical structures.

During a phase of cut-and-fill enabling works to create a developable platform, if identified, all below-ground obstructions will require grubbing out in their entirety to enable the construction of proposed plots.

The underlying natural sand deposits have been assessed as being very loose to loose with a net allowable bearing pressure (ABP) in the order of 40-90 kN/m² at circa 1.00 m bgl.

The underlying natural silty clay deposits have been assessed as having a net ABP in the order of 37-75 kN/m² at circa 2.00-3.00 m bgl increasing to 86-136 kN/m² at circa 3.00-5.00 m bgl.

E3P have completed a detailed Foundation Zoning Plan (Drawing No. 15-811-019) and schedule where it is anticipated that the final foundation solution would be a combination of the following:

- Trench fill to support reinforced strip foundations bearing onto firm to stiff clay (>1.50 m bgl) and in areas of tree influence.
- Vibro Stone Columns to support reinforced strip foundations in areas of variable ground.
- Driven piles in the area of deep Made Ground, infilled ponds, soft clays and areas of tree influence.

Foundation depths should take account of the presence of existing and proposed trees, with foundations deepened locally to mitigate the potential for volumetric instability attributed to fluctuations in moisture content, in accordance with the requirements of NHBC standards.

END OF REPORT



APPENDIX I LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme



Land off Wilbraham Road, Chorlton, Manchester

Phase II Geoenvironmental Site Assessment

November 2022

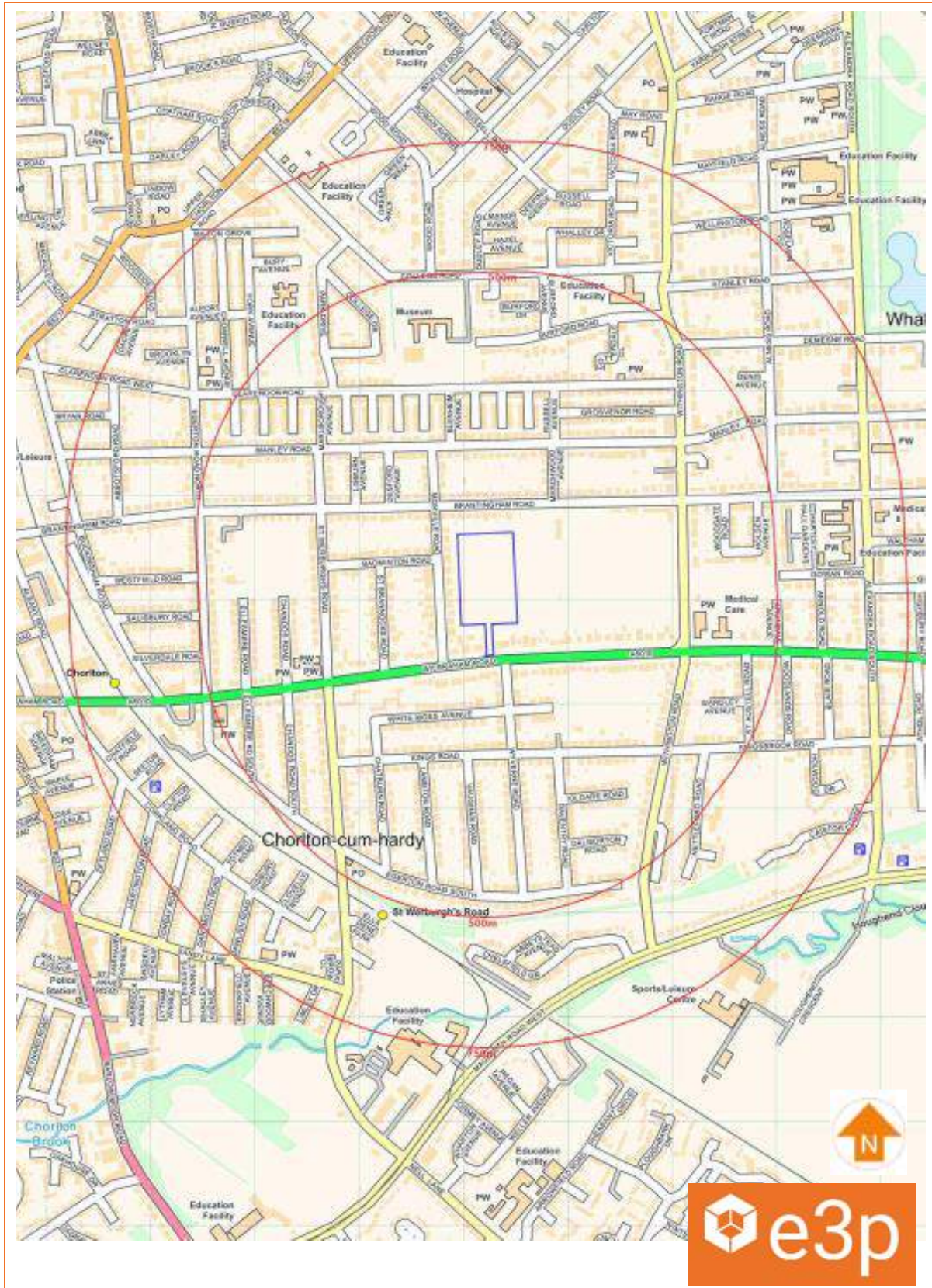
MIBK	Methyl isobutyl ketone	WTE	Water table elevation
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection

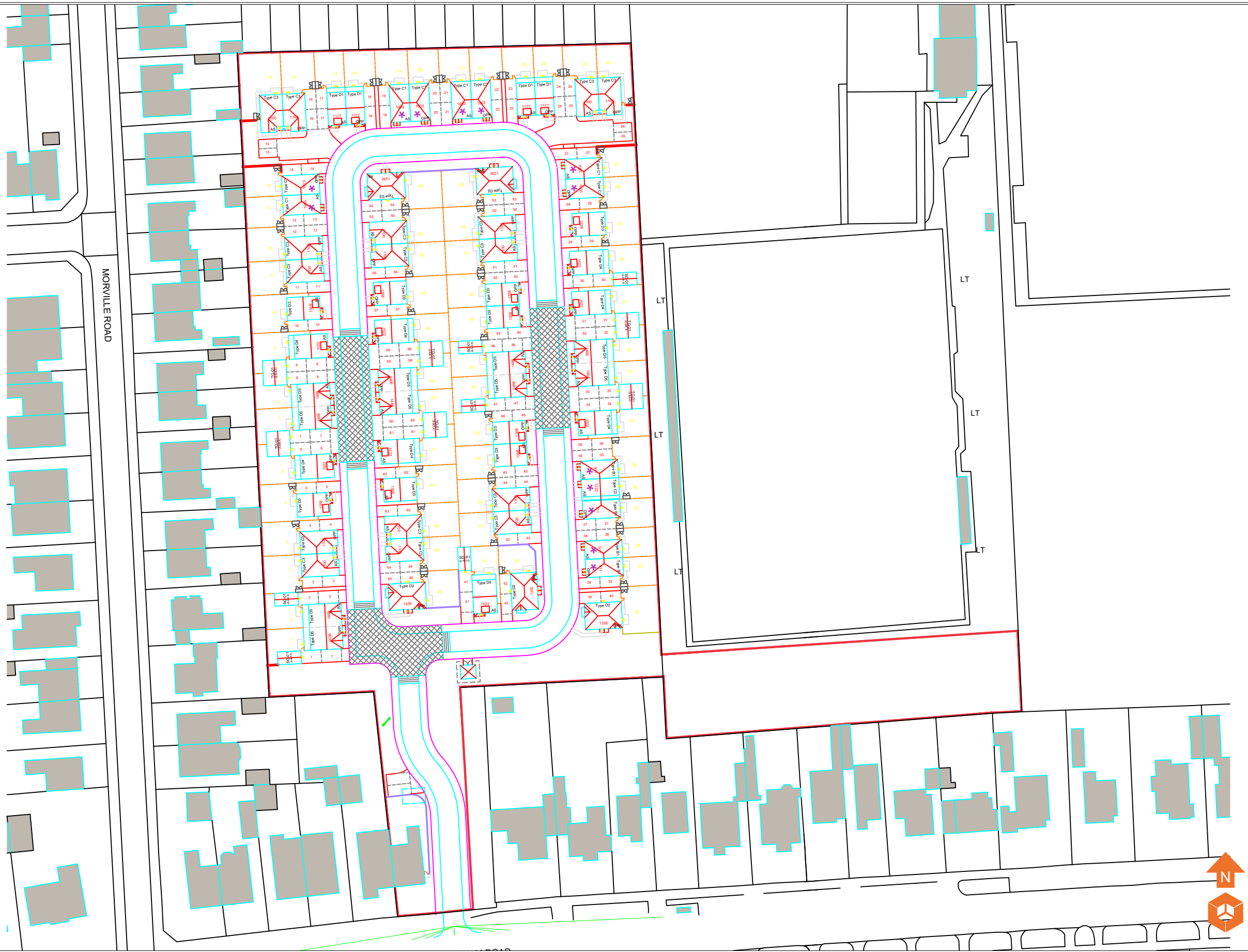


APPENDIX III

DRAWINGS

DRAWING 15-811-001 – SITE LOCATION PLAN





Notes:				
P1	REVC	24.11.2022	HM	BH
P1	REVB	03.10.2022	CB	BH
P1	REVA	31.03.2022	CB	BH
Phase	Issue	Date	Drawn	Checked

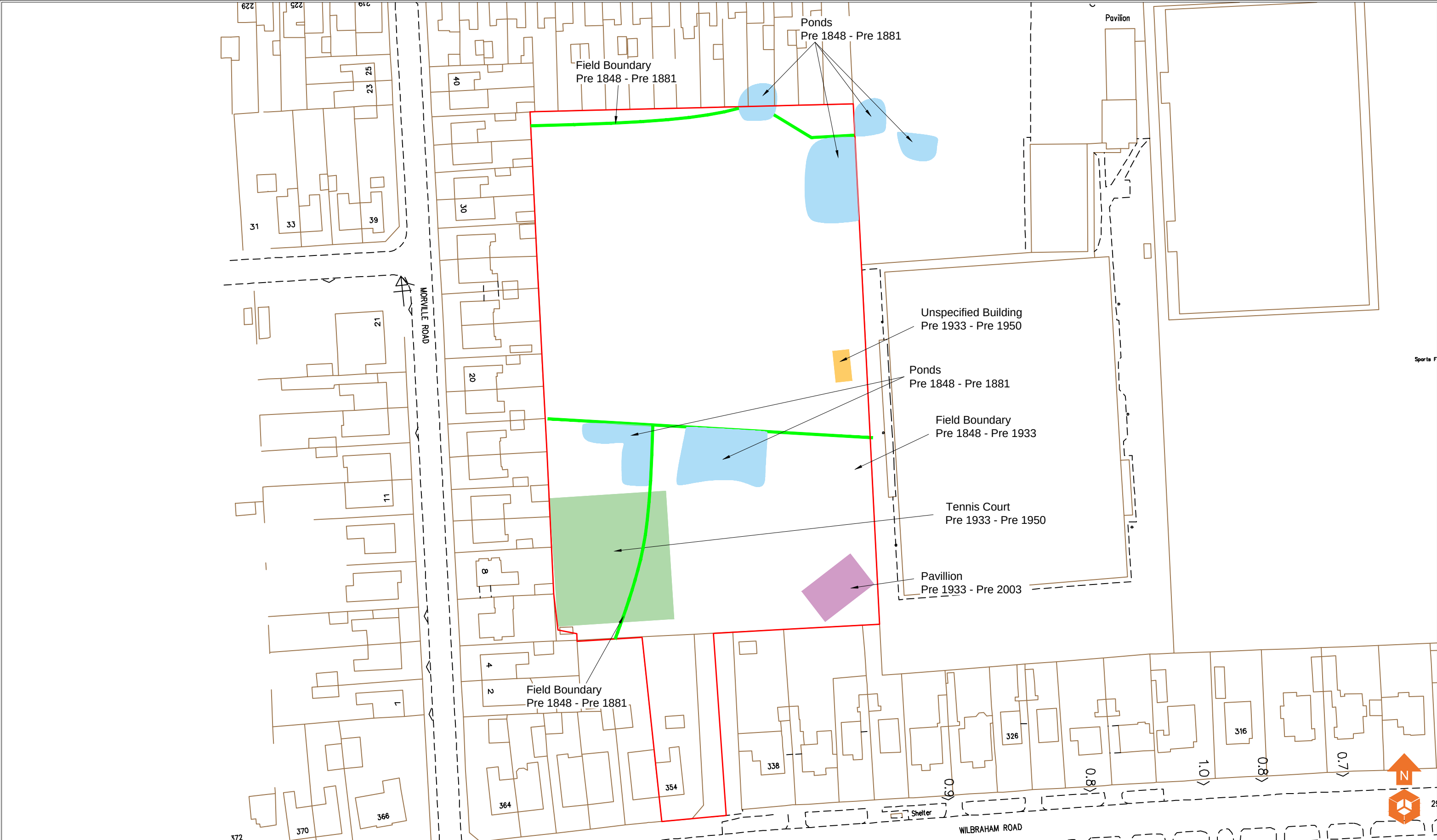
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Anwyl Homes
Job Title:
Land off Wilbraham Road, Chorlton

Job No:
15-811
Drawing No:
002
Date:
24.11.2022
Scale:
NTS
Drawing Title:
Proposed Development Plan



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Historical Features Former Ponds Former Field Boundary Former Pavillion Former Tennis Court Former Unspecified Building
--

Notes:

Client:

Anwyl Homes

Job No:

15-811

Date:

31.03.2022

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Site Features Field - Rough Grass Access Gate Hedgerows Hardstanding Mature and Semi Mature Trees Pallisade Fence	Notes:	Client: Anwyl Homes	Job No: 15-811	Date: 31.03.2022	e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk
		Job Title: Land off Wilbraham Road, Chorlton	Drawing No: 004	Scale: NTS	The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1	REVA	31.03.2022	CB	BH	
Phase	Issue	Date	Drawn	Checked	



Location Symbols WS101(MW) Approximate Window Sample Probehole Location with Install TP101 Approximate Trial Pit Location SA101 Approximate Soakaway Test Location	Notes:					Client: Anwyl Homes	Job No: 15-811	Date: 04.11.2022	e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
							Drawing No: 005	Scale: NTS		
						Job Title: Land off Wilbraham Road, Chorlton	Drawing Title: Exploratory Hole Location Plan			The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1 REVA 08.06.2022 EB ND Phase Issue Date Drawn Checked										

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Location Symbols

- Approximate Window Sample Probehole Location with Install
- Approximate Trial Pit Location
- Approximate Soakaway Test Location

Shallow Spread Footings

- Depth to Founding Strata 0.00 - 1.24m
- Depth to Founding Strata 1.25 - 1.49m

Mass Trench Fill Footings

- Depth to Founding Strata 1.50 - 1.74m
- Depth to Founding Strata 1.75 - 1.99m
- Depth to Founding Strata 2.00 - 2.24m

Engineered Footings

- Depth to Founding Strata 2.25 - 2.49m
- Depth to Founding Strata >2.50m

Notes:

P1	REVB	23.05.2022	CB	ND
P1	REVA	08.04.2022	HM	ND
Phase	Issue	Date	Drawn	Checked

Client:

Anwyl Homes

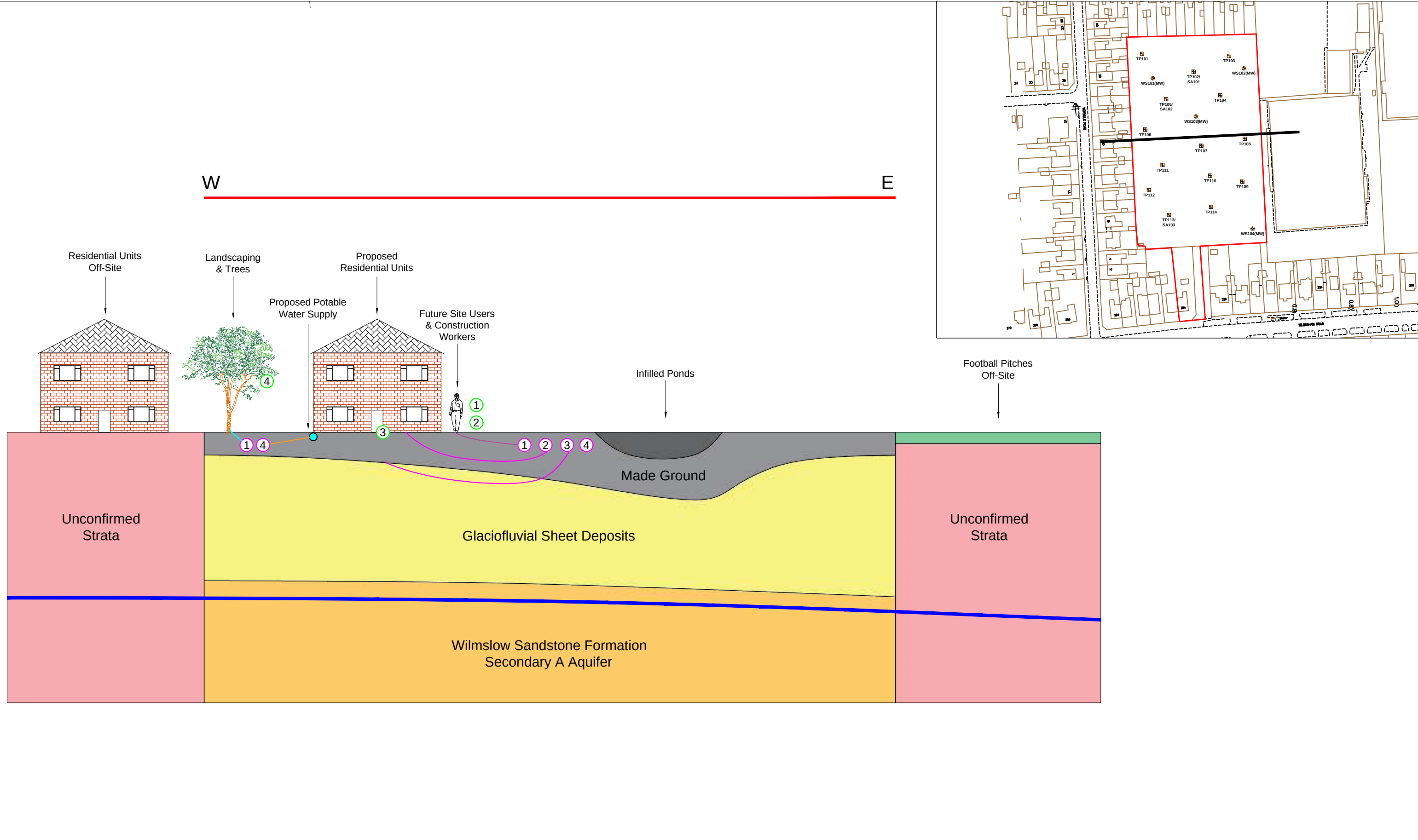
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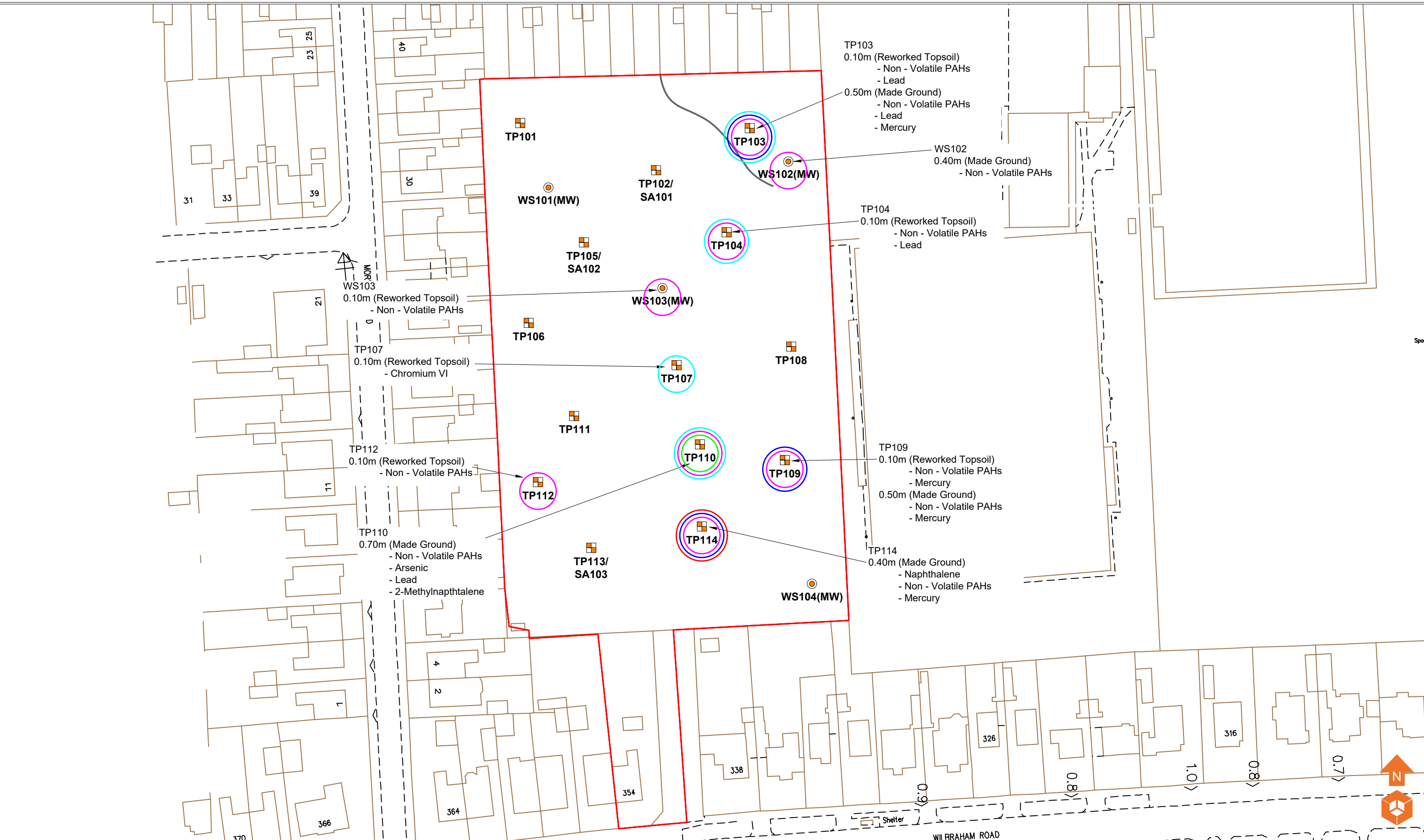
Job No:	15-811	Date:	23.05.2022
Drawing No:	008	Scale:	NTS
Drawing Title:		Depth to Founding Strata Plan	

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Geology Key Made Ground Glaciofluvial Sheet Deposits Wilmslow Sandstone Formation - Secondary A Aquifer Unconfirmed Strata Groundwater	Sources 1 Heavy Metals and PAH (Made Ground) 2 Volatile Contaminants (Made Ground) 3 Ground Gases (Made Ground) 4 TPH (Made Ground)
---	--



Location Symbols

- Approximate Window Sample Probehole Location with Install
- Approximate Trial Pit Location
- Approximate Soakaway Test Location

Contamination Exceedances

- 2-methylnapthalene
- Naphthalene
- Non-volatile PAHs
- Non-volatile Heavy Metals
- Mercury

Notes:

P1	REV B	04.11.2022	OW	BH
P1	REVA	11.04.2022	LM	ND
Phase	Issue	Date	Drawn	Checked

Client:

Anwyl Homes

Job Title:

Land off Wilbraham Road, Chorlton

Job No:

15-811

Drawing No:

018

Date:

04.11.2022

Scale:

NTS

Environmental Engineering Partnership Ltd
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Summary of Heave Precaution Requirements				
Volume Change Potential	Required Foundation Depth (m)	Minimum Void Dimensions for Foundations, Ground Beams & Suspended In-Situ Concrete Ground Floors		Minimum Void Dimensions Under Pre-Cast Concrete & Suspended Timber Floors
		Thickness of Void Former Against Side of Foundation of Ground Beam (mm)	Thickness of Void Former or Underside of Edge Beam & Floor Slab (mm)	Void Dimension (mm)
Low Volume Change Potential (<20%)	>2.00	No Special Precautions		200
	2.00-2.50	-	50	
Medium Volume Change Potential (20-40%)	1.50-2.00	25	50	250
	2.00-2.50	25	100	
High Volume Change Potential (>40%)	>2.50	Engineer Design		Engineer Design
	1.50-2.00	25	75	300
	2.00-2.50	35	150	
	>2.50	Engineer Design		Engineer Design

Minimum Width of Strip Footings								
Type of Ground (Including Engineered Fill)	Condition of Ground	Total Load of Load-Bearing Walling more than (kN/linear metre)						
		20	30	40	50	60	70	
		Minimum Width of Strip Foundation (mm)						
Gravel	Sand	Medium Dense to Dense	250	300	400	500	600	650
Clay	Sandy Clay	Stiff	250	300	400	500	600	650
Clay	Sandy Clay	Firm	300	350	450	600	750	850

Items Considered	
Bearing Capacity	E3P Phase II Geoenvironmental Site Assessment - Ref: 15-811-R2-1 June 2022
Trees	Tyler Grange Arboricultural Report - Ref: 14807_P01
Historical	E3P Phase II Geoenvironmental Site Assessment - Ref: 15-811-R2-1 June 2022
Groundwater Table	E3P Phase II Geoenvironmental Site Assessment - Ref: 15-811-R2-1 June 2022
FFL	01 - Engineering Appraisal - P3
Client Layout	AH158 - Chorlton - PL01 Planning Layout Rev E
Contamination	E3P Phase II Geoenvironmental Site Assessment - Ref: 15-811-R2-1 June 2022
Remediation	TBC
Volume Change Potential	Medium
Root Protection Areas	Tyler Grange Arboricultural Report - Ref: 14807_P01
Is the Site Affected by Shallow Mining?	No
Are Mine Entries Present on or Within Influencing Distance of the Site?	No

Residual Risks			
Foreseeable Risks That Cannot be Avoided	Applicable (Y/N)	Action to Reduce Risk	Justification for Design Decision
Deep Excavations	Y	Identify locations on drawing and depths on schedule	Lesser risk than other alternatives
Trench Collapse	Y	Risk highlighted on drawing	Lesser risk than other alternatives
Use of Working Platform for Pile/Vibro Operations	Y	Compliance with working platform directive required	Pile/Vibro foundation less risky than other alternatives

Approximate extent of marshlands

Approximate Location of Historic Ponds

Football Ground

Ground Conditions in Vicinity of Pond to be Confirmed by Further Investigation to Allow for VSC.

Anticipated Foundation Types

TS	Traditional Strip Foundations Minimum depth 900mm below proposed Final Finished Level Maximum safe bearing pressure limited to 100kN/m2
MT	Mass Trench Fill Foundations Minimum depth 1200mm below proposed Final Finished Level Maximum safe bearing pressure limited to 100kN/m2
V	Vibro Stone Column Compaction In accordance with NBSIC Chapter 4.2
P	Piled Foundations Where the proposed foundation depth exceeds 2.50m a piled foundation option rather than a trench fill / deep reinforced clay foundations may be adopted. Columns or tie beams supported by ground beams.
R	Raft Foundations Maximum safe bearing pressure limited to 50kN/m2 on approved engineered greater Rf. Raft foundations to be designed by a structural engineer in accordance with Chapter 4.3 of BSIC 2019. Raft foundations are considered suitable to mitigate against potential influence of clay heave / subsidence in accordance with Section 4.2, sub-section 2(b).
TB	Traditional Strip / Trench Block Foundations Traditional strip / trench block foundations are considered suitable with built up or trench block and subsequent backfill to development level.
Colours on Plot Corners to be Used When Referring to Foundation Schedule. (Shading Final Levels & Levels)	

Depth to Target Founding Strata

Footings 0.75 - 0.90m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 0.90 - 1.25m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 1.25 - 1.50m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 1.50 - 1.75m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 1.75 - 2.00m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 2.00 - 2.25m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Footings 2.25 - 2.50m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2
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Engineered Foundation Solutions

Footings >2.50m Deep From Final Finished Level In accordance with NBSIC Chapter 4.2	Vibro From Final Finished Level In accordance with NBSIC Chapter 4.2	Medium Volume Change Potential Clay Heave precautions required to underside of cast in-situ floor slab (with no sub-floor void) within corrected zone of tree influence. Heave precautions not required to foundation.
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Structural Design Risk Management

Abnormal residual risks associated with the design outcomes on the drawing:
Infilled Pond, Further Ground Investigation to confirm extent of reduced strength material
Reduced Strength Clay Confirmatory Ground Investigation to confirm CU > 30kPa

Tree Influence (Retained / Removed)

0.90 - 1.25m	1.25 - 1.50m	1.50 - 1.75m	1.75 - 2.00m	2.00 - 2.25m	2.25 - 2.50m	>2.50m
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Notes:

P1	REVD	23.11.2022	HM	BH
P1	REVC	14.10.2022	LM	BH
P1	REVB	13.10.2022	CB	BH
P1	REVA	05.10.2022	CB	BH
Phase	Issue	Date	Drawn	Checked

Client:

Anwyl Homes

Job Title:

Harry Dalton Fields, Chorlton

Job No:

15-811

Drawing No:

019

Date:

23.11.2022

Scale:

NTS

Drawing Title:

Foundation Zoning Plan



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APPENDIX IV

E3P EXPLORATORY HOLE

LOGS

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382603.00 - 394319.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

Scale
1:30

Client: Anwyl Homes

Depth
2.30

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 0.80	0.10	ES		0.20			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium subrounded of mudstone and brick Light brown fine to medium SAND.	
				0.50			Greyish brown fine to medium SAND	1
	0.80 0.80	B ES						
	1.50	HVP	73	1.50			Firm medium strength greyish brown slightly silty CLAY	2
	1.80	HVP	71					
	2.10	HVP	74	2.30			End of Pit at 2.30m	3
								4

Trial Pit Photographs



Trial Pit 101



Trial Pit 101 Spoil

Remarks: 1. Complete. 2. Water seepage at 0.8 m bgl.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382641.00 - 394307.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

Scale
1:30

Client: Anwyl Homes

Depth
2.20

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					MADE GROUND: Dark brown slightly clayey fine to medium sand with rootlets (Topsoil).	
	0.50	ES		0.40 0.60			MADE GROUND: Greyish brown slightly gravelly fine to medium sand. Gravel is fine to medium sub angular to sub rounded of sandstone and brick. Greyish brown slightly silty fine to medium SAND.	
	1.10	HVP	29	1.10			Soft low strength greyish brown slightly silty CLAY (Becoming firm medium strength at circa 1.50mbgl and stiff high strength at circa 2.20m bgl)	1
	1.50	HVP	73					2
	2.20	HVP	138	2.20			End of Pit at 2.20m	3
								4

Trial Pit Photographs



Trial Pit 102



Trial Pit 102 Spoil

Remarks: 1. Complete. 2. Soakaway test completed.

Stability: Stable

Project Name:	Land off Wilbraham Road	Project No.	15811	Co-ords: 382680.00 - 394321.00	Level:	Date	30/03/2022
Location:	Chorlton	Dimensions (m):	2.00	Scale	1:30	Logged	J.Beer
Client:	Anwyl Homes	Depth	3.50	0.70			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone, glass and brick. (Topsoil).	
	0.50	ES		0.40			MADE GROUND: Dark brown slightly gravelly clayey fine to medium sand. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick.	
				0.80			Yellowish greyish brown very sandy CLAY.	1
				1.60			Brown CLAY with plant debris (Very soft).	2
	3.00	HVP	74	3.00			Firm medium strength greyish brown slightly silty CLAY	3
				3.50			End of Pit at 3.50m	4

Trial Pit Photographs



Trial Pit 103



Trial Pit 103 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.90m bgl as seepage. 3. Unable to obtain hand shear vane from 1.60m to 3.00m bgl due to soft nature

Stability: Stable

Project Name:	Land off Wilbraham Road	Project No.	15811	Co-ords: 382670.00 - 394289.00	Level:	Date	30/03/2022
Location:	Chorlton	Dimensions (m):	2.00	Scale	1:30	Logged	J.Beer
Client:	Anwyl Homes	Depth	2.40	0.70			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.30	0.10	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone, glass and brick. (Topsoil). Greyish light brown mottled dark brown slightly clayey fine to medium SAND.	
	0.50	B		0.80			Greyish brown fine to medium SAND.	1
	1.40	HVP	34	1.40			Soft low strength greyish brown slightly silty CLAY. (Becoming stiff high strength at circa 1.80m bgl and firm medium strength at circa 2.30m bgl).	2
	1.80	HVP	96					
	2.30	HVP	72	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 104



Trial Pit 104 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.30m bgl as seepage.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382626.00 - 394285.00
Level:

Date
30/03/2022

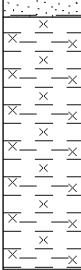
Location: Chorlton

Dimensions (m): 2.00
Depth 2.40

Scale
1:30

Logged
J.Beer

Client: Anwyl Homes

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.40	0.10	ES		0.35			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone, glass and brick. (Topsoil).	
							Grey mottled brown slightly clayey fine to medium SAND.	1
	1.40	ES		1.40			Firm medium strength greyish brown slightly silty CLAY (Becoming stiff high strength at circa 2.00m bgl).	2
	1.50	HVP	59					
	2.00	HVP	100					
	2.30	HVP	115	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 105



Trial Pit 105 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.40m bgl as seepage.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382599.00 - 394252.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

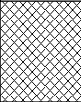
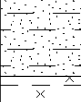
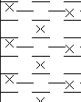
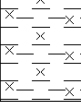
Scale
1:30

Client: Anwyl Homes

Depth
2.40

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.50	0.10	ES		0.40			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
							Brown fine to medium SAND.	
	0.80	ES		0.90			Brownish grey slightly clayey fine to medium SAND.	1
	1.60	HVP	43	1.50			Firm medium strength greyish brown slightly silty CLAY (Becoming stiff high strength at circa 2.00m bgl)	
	2.00	HVP	103					2
	2.40	HVP	110	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 106



Trial Pit 106 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.50m bgl as seepage.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382657.00 - 394245.00
Level:

Date
30/03/2022

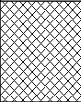
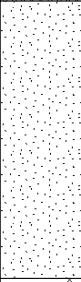
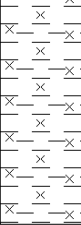
Location: Chorlton

Dimensions (m): 2.00
Depth 2.40

Scale
1:30

Logged
J.Beer

Client: Anwyl Homes

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.60	0.10	ES		0.40			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
							Brownish grey fine to medium SAND.	1
	1.00	B						
	1.60	HVP	72	1.50			Firm medium strength greyish brown slightly silty CLAY. (Becoming stiff high strength at circ 2.00m bgl).	2
	2.00	HVP	111					
	2.30	HVP	102	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 107



Trial Pit 107 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.60m bgl as seepage.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382685.00 - 394253.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

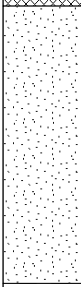
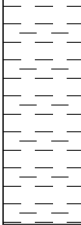
Scale
1:30

Client: Anwyl Homes

Depth
2.40

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.40			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
	0.90	ES					Brownish grey fine to medium SAND.	1
	1.50	HVP	31	1.50			Soft low strength greyish brown CLAY. (Becoming stiff high strength at circa 2.00m bgl).	2
	2.00	HVP	75					
	2.40	HVP	108	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 108



Trial Pit 108 Spoil

Remarks: 1. Complete.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382682.00 - 394218.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

Scale
1:30

Client: Anwyl Homes

Depth
2.60

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.60	0.10	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
	0.50	B		0.60			MADE GROUND: Dark brown slightly gravelly slightly clayey fine to medium sand. Gravel is fine to medium sub angular to sub rounded of mudstone, brick and ceramic.	
	0.50	ES					MADE GROUND: Dark brown slightly gravelly sandy clay. Gravel is fine to medium sub angular to sub rounded of mudstone and brick.	
	1.70	HVP	51	1.60			Firm medium strength greyish brown slightly silty CLAY.	1
	2.10	HVP	74					2
	2.50	HVP	65	2.60			End of Pit at 2.60m	3
								4

Trial Pit Photographs



Trial Pit 109



Trial Pit 109 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.6 m bgl.

Stability: Stable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382653.00 - 394222.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00

Scale
1:30

Client: Anwyl Homes

Depth
2.50

0.70

Logged
J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.40	0.10	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
	0.70 0.80	ES B		1.00			MADE GROUND: Dark brown slightly clayey gravelly fine to medium sand with cobbles. Gravel is fine to coarse angular to sub rounded of mudstone, sandstone, glass, brick and ceramic. Cobbles are sub angular of brick.	1
				1.40			Dark brown sandy CLAY. (Soft clay)	
				2.50			Greyish brown fine to medium SAND.	2
							End of Pit at 2.50m	3
								4

Trial Pit Photographs



Trial Pit 110



Trial Pit 110 Spoil

Remarks: 1. Terminated at 2.50m bgl due to instability. 2. Water strike encountered at 1.4 m bgl as seepage. 3. Slight hydrogen sulphide odour at 0.7 m bgl.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382613.00 - 394233.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00
Depth 2.50

Scale
1:30

Logged
J.Beer

Client: Anwyl Homes

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.20	2.00	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
				1.00			MADE GROUND: Dark brown slightly clayey gravelly fine to medium sand with rare cobbles. Gravel is fine to coarse angular to sub rounded of mudstone, sandstone, brick, ceramic and glass. Cobbles are sub angular of brick.	1
				1.30			Dark brown sandy CLAY. (Very soft)	
				2.50			Greyish brown slightly clayey fine to medium sand with plant debris. (Slight hydrogen sulphide odour).	2
							End of Pit at 2.50m	3
								4

Trial Pit Photographs



Trial Pit 111



Trial Pit 111 Spoil

Remarks: 1. Terminated due to instability. 2. Water strike encountered at 1.20m bgl as seepage. 3. Slight hydrogen sulphide odour at 1.30m-2.00m bgl.

Stability: Unstable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382604.00 - 394211.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00
Depth 2.20

Scale
1:30

Logged
J.Beer

Client: Anwyl Homes

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.20	0.10	ES		0.40			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
				0.80			Light brown fine to medium SAND.	
	1.10	HVP	42	1.10			Brownish grey fine to medium SAND.	1
	1.60	HVP	64				Firm medium strength greyish brown slightly silty CLAY. (Becoming stiff high strength at circa 2.00m bgl).	
	2.00	HVP	82	2.20				2
							End of Pit at 2.20m	3
								4

Trial Pit Photographs



Trial Pit 112 Spoil



Trial Pit 112 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.2 m bgl as seepage. 3. Soakaway test completed

Stability: Stable

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382623.00 - 394190.00
Level:

Date
30/03/2022

Location: Chorlton

Dimensions (m): 2.00
Depth 2.10

Scale
1:30

Logged
J.Beer

Client: Anwyl Homes

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.60	0.10	ES					MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil). Reddish brown fine to medium SAND.	
				0.30				
				0.50			Light brown fine to medium SAND.	
				0.80			Grey fine to medium SAND.	1
	1.20	HVP	55	1.20			Firm medium strength greyish brown slightly silty CLAY. (Becoming stiff high strength at circa 1.60m bgl).	
	1.60	HVP	80					
	2.00	HVP	88					2
				2.10			End of Pit at 2.10m	
								3
								4

Trial Pit Photographs



Trial Pit 113



Trial Pit 113 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.20m bgl as seepage.

Stability: Stable

Project Name: Land off Wilbraham Road	Project No. 15811	Co-ords: 382652.00 - 394195.00 Level:	Date 30/03/2022
Location: Chorlton	Client: Anwyl Homes	Dimensions (m): 2.00 Depth 2.50	Scale 1:30 Logged J.Beer

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.20	0.40	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
				0.50			MADE GROUND: Dark brown slightly clayey gravelly fine to medium sand. Gravel is fine to coarse angular to sub rounded of mudstone, sandstone, brick, glass and tar. Brown fine to medium SAND.	
	1.00	B		1.20			Grey fine to medium SAND.	1
	2.10	HVP	46	2.00			Firm medium strength greyish brown slightly silty CLAY.	2
				2.50			End of Pit at 2.50m	3
								4

Trial Pit Photographs



Trial Pit 114



Trial Pit 114 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 1.20m bgl. 3. Soakaway test completed

Stability: Unstable

Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382613.00 - 394299.00

Hole Type
WS

Location: Chorlton

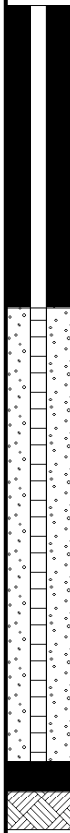
Level:

Scale
1:50

Client: Anwyl Homes

Dates: 30/03/2022 -

Logged By
J.Beer

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25			0.25			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
		0.40			0.40			Greyish brown slightly gravelly fine to medium SAND. Gravel is fine sub rounded of mudstone and sandstone.	1
		0.80	ES	N=9 (2,2/2,2,2,3)				Loose brownish grey fine to medium SAND.	
		1.00							
		2.00	D	N=8 (1,1/1,2,2,3)	2.00			Firm low strength greyish brown slightly silty CLAY. Becoming stiff medium strength from 3.00 m bgl.	2
		2.00							
		3.00	D	N=12 (1,2/3,3,3,3)					3
		3.00							
		4.00	D	N=13 (2,2/3,2,4,4)					4
		4.00							
		4.50 - 5.00	U						
		5.00	D	N=13 (2,2/3,2,3,5)					5
		5.00							
					5.45			End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks

1. Complete. 2. Water strike encountered at 2.00 m bgl. 3. Monitoring well installed. (Response zone 2.00-5.00 m bgl)

Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382691.00 - 394302.00

Hole Type
WS

Location: Chorlton

Level:

Scale
1:50

Client: Anwyl Homes

Dates: 30/03/2022 -

Logged By
J.Beer

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.30			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	1
		1.00		N=4 (1,0/1,0,1,2)	1.20			MADE GROUND: Dark brown slightly gravelly clayey fine to medium sand. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick.	
		2.00			1.90			Loose brownish grey slightly clayey fine to medium SAND.	
		2.00	D	N=0 (0,0/0,0,0,0)				Firm low strength greyish brown slightly silty CLAY. Becoming stiff medium strength from 4.00 m bgl. (Poor recovery 2.00-2.90 m bgl).	2
		3.00		N=6 (1,1/0,2,2,2)					3
		3.50 - 4.00	U						4
		4.00	D	N=11 (2,2/2,3,3,3)					4
		4.00							5
					5.00				5
								End of borehole at 5.00 m	5
									6
									7
									8
									9
									10

Remarks

1. Terminated at 5.00 m bgl due to hole collapse. 2. Hole collapse to 3.00 m bgl. 3. Water strike at 2.20 m bgl. 4. Monitoring well installed. (Response zone 0.30-1.00 m bgl).

Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382651.00 - 394263.00

Hole Type
WS

Location: Chorlton

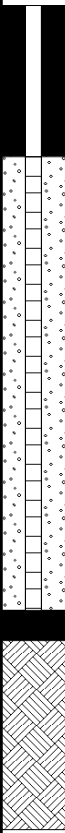
Level:

Scale
1:50

Client: Anwyl Homes

Dates: 30/03/2022 -

Logged By
J.Beer

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.25 0.40			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
		1.00		N=0 (0,0/0,0,0,0)	0.90			MADE GROUND: Dark brown slightly gravelly slightly clayey fine to medium sand. Gravel is fine to medium angular to sub rounded of mudstone, sandstone, brick and ceramic.	1
		1.50 - 2.00	U		1.50			MADE GROUND: Brown slightly clayey sandy gravel. Gravel is fine to coarse sub angular to sub rounded of mudstone, sandstone and brick.	
		2.00		N=4 (0,0/0,1,1,2)				Loose brownish grey fine to medium SAND.	2
		3.00 3.00	D	N=11 (2,2/3,3,2,3)				Soft very low strength greyish brown slightly silty CLAY. Becoming stiff medium strength from 3.00 m bgl.	3
		4.00 4.00	D	N=10 (2,2/2,2,3,3)					4
		5.00 5.00	D	N=16 (2,3/4,4,4,4)					5
					5.45				6
									7
									8
									9
									10

Remarks

1. Complete. 2. Water strike at 2.00 m bgl. 3. Monitoring well installed. (Response zone 1.00-4.00 m bgl).

Borehole Log

Borehole No.

WS104

Sheet 1 of 1

Project Name: Land off Wilbraham Road

Project No.
15811

Co-ords: 382696.00 - 394182.00

Hole Type
WS

Location: Chorlton

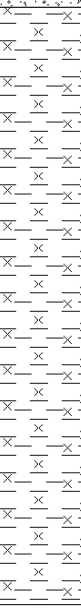
Level:

Scale
1:50

Client: Anwyl Homes

Dates: 30/03/2022 -

Logged By
J.Beer

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.35			0.35			MADE GROUND: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is fine to medium sub angular to sub rounded of mudstone, sandstone and brick. (Topsoil).	
		1.00		N=7 (0,0/1,2,2,2)				Loose brownish grey slightly gravelly fine to medium SAND. Gravel is fine sub rounded of mudstone and sandstone.	1
		1.50 - 2.00	U		1.50			Firm low strength greyish brown slightly silty CLAY. Becoming stiff medium strength from 3.00 m bgl.	2
		2.00	D	N=7 (1,1/1,2,2,2)					
		2.00							
		2.60	ES						
		3.00	D	N=10 (2,2/2,3,2,3)					3
		3.00							
		4.00	D	N=10 (2,2/2,2,3,3)					4
		4.00							
		5.00		N=13 (2,1/2,3,4,4)					5
					5.45			End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks

1. Complete. 2. Water strike at 1.80 m bgl. 3. Monitoring well installed. (Response zone 0.50-1.50 m bgl).

APPENDIX V

CHEMICAL TESTING

RESULTS



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Analytical Report Number : 22-59035-2

Replaces Analytical Report Number: 22-59035-1, issue no. 2
Client references/information amended.

Project / Site name:	Land off Wilbraham Road, Chorlton, Manchester	Samples received on:	17/05/2022
Your job number:	15 8 11	Samples instructed on/ Analysis started on:	17/05/2022
Your order number:	001140	Analysis completed by:	24/05/2022
Report Issue Number:	2	Report issued on:	04/11/2022
Samples Analysed:	2 water samples		


Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



Analytical Report Number: 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001140

Lab Sample Number	2279732	2279733
Sample Reference	WS101	WS103
Sample Number	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied
Date Sampled	16/05/2022	16/05/2022
Time Taken	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection
		Accreditation Status

General Inorganics

pH	pH Units	N/A	ISO 17025	7.1	7.1
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	9.71	8.41

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	< 1.0	1.1
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Heavy Metals / Metalloids

Calcium (dissolved)	mg/l	0.012	ISO 17025	75	89
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0

Arsenic (dissolved)	µg/l	0.15	ISO 17025	10.1	11.6
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	430	430
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.8	2.7
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.1	3.8

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_ID_TOTAL_MS	µg/l	10	ISO 17025	< 10	< 10
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TPH-CWG - Aliphatic >C5 - C6 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) HS+EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10

TPH-CWG - Aromatic >C5 - C7 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10



Analytical Report Number: 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001140

Lab Sample Number				2279732	2279733
Sample Reference				WS101	WS103
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				16/05/2022	16/05/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0



Analytical Report Number: 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001140

Lab Sample Number				2279732	2279733
Sample Reference				WS101	WS103
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				16/05/2022	16/05/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01



Analytical Report Number: 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001140

Lab Sample Number				2279732	2279733
Sample Reference				WS101	WS103
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				16/05/2022	16/05/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
3&4-Methylphenol	µg/l	0.1	NONE	< 0.10	< 0.10

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector



Analytical Report Number : 22-59035

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
GC	Gas Chromatography				
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))				
CU	Clean-up - e.g. by Florisil®, silica gel				
1D	GC - Single coil/column gas chromatography				
2D	GC-GC - Double coil/column gas chromatography				
Total	Aliphatics & Aromatics				
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
_	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				



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Analytical Report Number : 22-49240-2

Replaces Analytical Report Number: 22-49240-1, issue no. 2
Client references/information amended.

Project / Site name:	Land off Wilbraham Road, Chorlton, Manchester	Samples received on:	31/03/2022
Your job number:	15 811	Samples instructed on/ Analysis started on:	31/03/2022
Your order number:	001139	Analysis completed by:	08/04/2022
Report Issue Number:	2	Report issued on:	04/11/2022
Samples Analysed:	5 leachate samples - 22 soil samples		


Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224147	2224148	2224149	2224150	2224151
Sample Reference	TP101	TP101	TP102	TP103	TP103
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10	0.80	0.50	0.10	0.50
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.6	15
Total mass of sample received	kg	0.001	NONE	0.4	0.4

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	5.1	6.6	7.7	6.1	6.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	520	87	140	700	490
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.005	0.0045	0.023	0.013	0.01
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	10	9	47	26	20
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	5	4.5	23.3	12.8	10
Sulphide	mg/kg	1	MCERTS	5.1	1.4	1.1	2.8	3
Total Sulphur	mg/kg	50	MCERTS	320	52	59	390	320
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3.4	0.3	0.5	4.1	3.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	1	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.8	0.81
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.8	0.44
Phenanthrene	mg/kg	0.05	MCERTS	0.97	< 0.05	< 0.05	20	4
Anthracene	mg/kg	0.05	MCERTS	0.2	< 0.05	< 0.05	3.4	0.8
Fluoranthene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	27	6.7
Pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	26	6.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.9	< 0.05	< 0.05	14	3.5
Chrysene	mg/kg	0.05	MCERTS	0.88	< 0.05	< 0.05	12	3.3
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.89	< 0.05	< 0.05	14	3.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.53	< 0.05	< 0.05	4.1	1.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.94	< 0.05	< 0.05	13	3.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.43	< 0.05	< 0.05	5.2	1.6
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.6	0.41
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.52	< 0.05	< 0.05	6.4	1.9

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	9.65	< 0.80	< 0.80	150	38.4
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.9	1.4	3.2	23	19
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6	4.6	8.8	18	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	13	10	63	79
Lead (aqua regia extractable)	mg/kg	1	MCERTS	54	5	9.1	200	940
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.7	2.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	5.7	7.4	14	19	17

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224147	2224148	2224149	2224150	2224151
Sample Reference				TP101	TP101	TP102	TP103	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.80	0.50	0.10	0.50
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	20	15	31	95	130

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_ID_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_ID_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_ID_AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_ID_AL	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_ID_AL	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_ID_AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_ID_AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_ID_AL	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS_ID_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_ID_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_ID_AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_ID_AR	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_ID_AR	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_ID_AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_ID_AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_ID_AR	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	4.7	< 4.0	< 4.0	19	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	7.3	< 1.0	< 1.0	49	18
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	26	< 1.0	< 1.0	87	32
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	MCERTS	38	< 10	< 10	150	50

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224147	2224148	2224149	2224150	2224151
Sample Reference				TP101	TP101	TP102	TP103	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.80	0.50	0.10	0.50
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-

SVOCs

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224147	2224148	2224149	2224150	2224151
Sample Reference				TP101	TP101	TP102	TP103	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.80	0.50	0.10	0.50
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224152	2224153	2224154	2224155	2224156
Sample Reference				TP104	TP105	TP106	TP106	TP107
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.40	0.10	0.80	0.10
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	16	12	9.4	13
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.4	0.8	0.4

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	5.9	7.3	5.5	5.7	5.6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	570	98	560	150	550
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.015	0.0057	0.011	0.0022	0.0051
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	29	11	21	4.4	10
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	14.7	5.7	10.5	2.2	5.1
Sulphide	mg/kg	1	MCERTS	4.7	3.5	1.9	1.1	1.5
Total Sulphur	mg/kg	50	MCERTS	400	290	350	96	460
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3.8	1.1	3.7	1	5.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.37	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.27	< 0.05	0.33
Fluorene	mg/kg	0.05	MCERTS	0.93	< 0.05	< 0.05	< 0.05	0.18
Phenanthrene	mg/kg	0.05	MCERTS	7	1.1	2	0.58	1.8
Anthracene	mg/kg	0.05	MCERTS	1.1	0.25	0.39	< 0.05	0.37
Fluoranthene	mg/kg	0.05	MCERTS	6.9	1.2	3.3	0.47	3.1
Pyrene	mg/kg	0.05	MCERTS	6.4	1.2	3.4	0.49	3.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.1	0.54	2.1	0.3	1.9
Chrysene	mg/kg	0.05	MCERTS	3.1	0.59	1.7	0.24	1.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.8	0.47	1.8	< 0.05	1.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	0.17	1.1	< 0.05	0.77
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3	0.49	2	< 0.05	1.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2	< 0.05	0.84	< 0.05	0.82
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.36	< 0.05	0.21	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.5	< 0.05	1	< 0.05	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	40.6	5.91	20	2.08	18.8
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	3.5	14	2.1	13
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 4.0	< 4.0	< 4.0	< 4.0	27
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	26	14	4.8	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	48	25	37	13	40
Lead (aqua regia extractable)	mg/kg	1	MCERTS	240	14	100	16	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3	0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	32	13	5.4	11

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224152	2224153	2224154	2224155	2224156
Sample Reference	TP104	TP105	TP106	TP106	TP107
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10	1.40	0.10	0.80	0.10
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	58

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH CU 1D AL	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH CU 1D AL	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH CU+HS 1D AL	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH CU 1D AR	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH CU 1D AR	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH CU+HS 1D AR	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6) HS 1D TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH CU 1D TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH CU 1D TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	4.2	< 4.0	< 4.0
TPH (C16 - C21) EH CU 1D TOTAL	mg/kg	1	MCERTS	20	< 1.0	11	8.5	12
TPH (C21 - C35) EH CU 1D TOTAL	mg/kg	1	MCERTS	44	< 1.0	26	16	28
TPH (C35 - C40) EH CU 1D TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C40 EH CU+HS 1D TOTAL	mg/kg	10	MCERTS	64	< 10	41	25	39

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224152	2224153	2224154	2224155	2224156
Sample Reference				TP104	TP105	TP106	TP106	TP107
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.40	0.10	0.80	0.10
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-

SVOCs

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224152	2224153	2224154	2224155	2224156
Sample Reference				TP104	TP105	TP106	TP106	TP107
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.40	0.10	0.80	0.10
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224157	2224158	2224159	2224160	2224161
Sample Reference				TP108	TP109	TP109	TP110	TP111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	0.10	0.50	0.70	2.00
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	10	13	25	17
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.8	0.8	0.8

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.4	5.8	6.2	7.1	6.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	7.9	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	75	670	430	1300	180
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.0021	0.003	0.0048	0.029	0.03
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	4.3	6	9.6	58	60
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	2.1	3	4.8	28.8	29.9
Sulphide	mg/kg	1	MCERTS	< 1.0	2.1	3.2	3.6	20
Total Sulphur	mg/kg	50	MCERTS	56	430	310	1100	1800
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.5	3.2	3.5	4.2	1.6

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.41	1.6	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.51	2.4	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.3	1.5	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	3.6	13	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.74	3.2	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	6.8	18	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	6.5	19	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	3.9	9.6	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	3.1	8.2	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.9	6.3	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.6	4.3	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	3.9	6.1	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.7	3.6	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.48	0.94	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	2.1	3.8	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	39.5	102	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1.5	15	21	64	4.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5	31	17	29	7.4
Copper (aqua regia extractable)	mg/kg	1	MCERTS	10	55	150	480	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.8	140	180	670	23
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	2.9	1.9	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.6	13	18	41	8.6

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224157	2224158	2224159	2224160	2224161
Sample Reference	TP108	TP109	TP109	TP110	TP111
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.90	0.10	0.50	0.70	2.00
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	17	76
				110	420
				20	

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH CU 1D AL	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH CU 1D AL	mg/kg	2	MCERTS	-	-	-	8.5	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	25	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	100	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) EH CU+HS 1D AL	mg/kg	10	MCERTS	-	-	-	130	< 10

TPH-CWG - Aromatic >EC5 - EC7 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH CU 1D AR	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH CU 1D AR	mg/kg	2	MCERTS	-	-	-	34	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	210	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	410	19
TPH-CWG - Aromatic (EC5 - EC35) EH CU+HS 1D AR	mg/kg	10	MCERTS	-	-	-	650	27

TPH (C5 - C6) HS 1D TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	-
TPH (C6 - C8) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	-
TPH (C8 - C10) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	-
TPH (C10 - C12) EH CU 1D TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	4.9	-	-
TPH (C12 - C16) EH CU 1D TOTAL	mg/kg	4	MCERTS	< 4.0	5.5	12	-	-
TPH (C16 - C21) EH CU 1D TOTAL	mg/kg	1	MCERTS	< 1.0	18	35	-	-
TPH (C21 - C35) EH CU 1D TOTAL	mg/kg	1	MCERTS	< 1.0	38	59	-	-
TPH (C35 - C40) EH CU 1D TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	-	-
TPH Total C5 - C40 EH CU+HS 1D TOTAL	mg/kg	10	MCERTS	< 10	62	110	-	-

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224157	2224158	2224159	2224160	2224161
Sample Reference				TP108	TP109	TP109	TP110	TP111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	0.10	0.50	0.70	2.00
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0

SVOCs

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224157	2224158	2224159	2224160	2224161
Sample Reference				TP108	TP109	TP109	TP110	TP111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	0.10	0.50	0.70	2.00
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	1.4	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	1.5	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	0.53	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	8.7	0.43
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	2.8	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	-	-	-	5.6	0.25
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	50	2.3
Anthracene	mg/kg	0.05	MCERTS	-	-	-	12	0.51
Carbazole	mg/kg	0.3	MCERTS	-	-	-	2.7	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	73	2.9
Pyrene	mg/kg	0.05	MCERTS	-	-	-	63	2.5
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	42	1.2
Chrysene	mg/kg	0.05	MCERTS	-	-	-	36	1.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	35	0.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	22	0.59
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	37	0.89
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	16	0.41
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	4.4	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	19	0.48

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224162	2224163	2224164	2224165	2224166
Sample Reference	TP112	TP113	TP114	WS101	WS102
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10	0.10	0.40	0.80	0.40
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	12
Total mass of sample received	kg	0.001	NONE	0.4	0.4

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	GF1	GF1	GF1	N/A	GF1

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	5	5.5	6.7	6.4	6.6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	630	880	420	55	570
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.0045	0.011	0.012	0.0038	0.015
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	8.9	21	25	7.6	31
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	4.5	10.5	12.3	3.8	15.4
Sulphide	mg/kg	1	MCERTS	8.5	3	6.7	1	2
Total Sulphur	mg/kg	50	MCERTS	420	740	460	< 50	420
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.5	4.8	3	0.3	4

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	1.1	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.57	< 0.05	5.2	< 0.05	0.92
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1.7	< 0.05	6.8	< 0.05	2.3
Fluorene	mg/kg	0.05	MCERTS	1.1	< 0.05	5.4	< 0.05	1.5
Phenanthrene	mg/kg	0.05	MCERTS	13	1.1	32	< 0.05	13
Anthracene	mg/kg	0.05	MCERTS	2.8	< 0.05	10	< 0.05	2.3
Fluoranthene	mg/kg	0.05	MCERTS	16	1.6	32	< 0.05	16
Pyrene	mg/kg	0.05	MCERTS	15	1.5	28	< 0.05	14
Benzo(a)anthracene	mg/kg	0.05	MCERTS	8.1	0.96	18	< 0.05	8
Chrysene	mg/kg	0.05	MCERTS	6.8	0.75	12	< 0.05	6.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	7.2	0.78	15	< 0.05	7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.7	0.63	6.6	< 0.05	3.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	7.6	0.96	13	< 0.05	6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.5	0.41	6	< 0.05	2.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.91	< 0.05	1.8	< 0.05	0.78
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.9	0.57	7.6	< 0.05	3.5

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	92.2	9.32	201	< 0.80	88.8
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	14	30	1.4	20
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	32	28	5.4	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	53	32	370	11	62
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	120	170	3.6	150
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.7	0.4	2.5	< 0.3	0.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	13	37	8.1	22

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224162	2224163	2224164	2224165	2224166
Sample Reference				TP112	TP113	TP114	WS101	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.40	0.80	0.40
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	50	57	77	18	81

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS 1D AL	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH CU 1D AL	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH CU 1D AL	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH CU 1D AL	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH CU+HS 1D AL	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS 1D AR	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH CU 1D AR	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH CU 1D AR	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH CU 1D AR	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH CU+HS 1D AR	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6) HS 1D TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS 1D TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH CU 1D TOTAL	mg/kg	2	MCERTS	19	< 2.0	22	< 2.0	7
TPH (C12 - C16) EH CU 1D TOTAL	mg/kg	4	MCERTS	33	< 4.0	24	< 4.0	12
TPH (C16 - C21) EH CU 1D TOTAL	mg/kg	1	MCERTS	75	9.9	76	< 1.0	26
TPH (C21 - C35) EH CU 1D TOTAL	mg/kg	1	MCERTS	150	23	96	< 1.0	58
TPH (C35 - C40) EH CU 1D TOTAL	mg/kg	10	MCERTS	52	< 10	< 10	< 10	< 10
TPH Total C5 - C40 EH CU+HS 1D TOTAL	mg/kg	10	MCERTS	320	33	220	< 10	100

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224162	2224163	2224164	2224165	2224166
Sample Reference				TP112	TP113	TP114	WS101	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.40	0.80	0.40
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-

SVOCs

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224162	2224163	2224164	2224165	2224166
Sample Reference				TP112	TP113	TP114	WS101	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.40	0.80	0.40
Date Sampled				30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224167	2224168
Sample Reference				WS103	WS104
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	2.60
Date Sampled				30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	22	12
Total mass of sample received	kg	0.001	NONE	0.4	0.4

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	5.2	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	780	220
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.053	0.04
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	110	80
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	52.7	40
Sulphide	mg/kg	1	MCERTS	1	44
Total Sulphur	mg/kg	50	MCERTS	470	740
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.9	1.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	1.3	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.4	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.25	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.4	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.46	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	3.6	< 0.05
Pyrene	mg/kg	0.05	MCERTS	3.4	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.3	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.6	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.2	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.4	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.2	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.94	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.3	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.5	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	7.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	38	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	51	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	150	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	38

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224167	2224168
Sample Reference	WS103	WS104
Sample Number	None Supplied	None Supplied
Depth (m)	0.10	2.60
Date Sampled	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection
Selenium (aqua regia extractable)	mg/kg	1
Zinc (aqua regia extractable)	mg/kg	1
		MCERTS
		< 1.0
		76
		63

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-
Toluene	µg/kg	1	MCERTS	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-
o-xylene	µg/kg	1	MCERTS	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	-	-

TPH (C5 - C6) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0
TPH (C6 - C8) HS_1D_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C8 - C10) HS_1D_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	7.3	< 4.0
TPH (C16 - C21) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	25	< 1.0
TPH (C21 - C35) EH_CU_1D_TOTAL	mg/kg	1	MCERTS	49	< 1.0
TPH (C35 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10	< 10
TPH Total C5 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	MCERTS	81	< 10

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-
Chloroethane	µg/kg	1	NONE	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224167	2224168
Sample Reference				WS103	WS104
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	2.60
Date Sampled				30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-
Benzene	µg/kg	1	MCERTS	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-
Toluene	µg/kg	1	MCERTS	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-
Styrene	µg/kg	1	MCERTS	-	-
Tribromomethane	µg/kg	1	NONE	-	-
o-Xylene	µg/kg	1	MCERTS	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-

SVOCs

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

Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number				2224167	2224168
Sample Reference				WS103	WS104
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	2.60
Date Sampled				30/03/2022	30/03/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224169	2224170	2224171	2224172	2224173
Sample Reference	TP103	TP106	TP109	TP110	TP111
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	0.80	0.50	0.70	2.00
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7	6.9	7	7.9	7.3
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	3	3.3	2.9	2.7	3
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	1.8	< 1.0	66
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	2.5	1.4	2.1	1.2	1.3
Copper (dissolved)	µg/l	0.7	ISO 17025	19	7.9	19	15	14
Lead (dissolved)	µg/l	1	ISO 17025	19	4.4	14	6.9	4
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	4.4	5.1	6	4.3	5.5
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	4.8	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	22	7.8	16	10	6.4

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10



Analytical Report Number: 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Your Order No: 001139

Lab Sample Number	2224169	2224170	2224171	2224172	2224173
Sample Reference	TP103	TP106	TP109	TP110	TP111
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	0.80	0.50	0.70	2.00
Date Sampled	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status		

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_ID_TOTAL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
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TPH-CWG - Aliphatic >C5 - C6 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) HS+EH_ID_AL_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >C5 - C7 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_ID_AR_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-49240
Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2224147	TP101	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224148	TP101	None Supplied	0.8	Brown sandy gravel.
2224149	TP102	None Supplied	0.5	Brown clay and sand with gravel.
2224150	TP103	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224151	TP103	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
2224152	TP104	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2224153	TP105	None Supplied	1.4	Brown clay.
2224154	TP106	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224155	TP106	None Supplied	0.8	Brown loam and sand with gravel and vegetation.
2224156	TP107	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224157	TP108	None Supplied	0.9	Brown sand with gravel.
2224158	TP109	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2224159	TP109	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
2224160	TP110	None Supplied	0.7	Brown loam and clay with gravel and vegetation.
2224161	TP111	None Supplied	2	Brown clay and sand with gravel and vegetation.
2224162	TP112	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224163	TP113	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
2224164	TP114	None Supplied	0.4	Brown loam and sand with gravel and vegetation.
2224165	WS101	None Supplied	0.8	Brown sand with gravel.
2224166	WS102	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2224167	WS103	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2224168	WS104	None Supplied	2.6	Brown clay.

Analytical Report Number : 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 300C. Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
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Analytical Report Number : 22-49240

Project / Site name: Land off Wilbraham Road, Chorlton, Manchester

Water matrix abbreviations:

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

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

APPENDIX VI

ORIGIN OF TIER I GENERIC ASSESSMENT CRITERIA

CONSTITUENT	ORIGIN OF RISK ASSESSMENT VALUE
Arsenic	2014 LQM/CIEH S4ULs
Cadmium	2014 LQM/CIEH S4ULs
Chromium	2014 LQM/CIEH S4ULs
Lead	2014 LQM/CIEH S4ULs
Mercury	2014 LQM/CIEH S4ULs – methylmercury
Nickel	2014 LQM/CIEH S4ULs
Selenium	2014 LQM/CIEH S4ULs
Copper	2014 LQM/CIEH S4ULs
Zinc	2014 LQM/CIEH S4ULs
Cyanide – Total	2014 LQM/CIEH S4ULs
Phenols – Total	2014 LQM/CIEH S4ULs
Naphthalene	General assessment criteria (GAC) developed by CIEH/LQM Suitable 4 Use Levels with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM.
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene	
Chrysene	
Benzo(b/k)Fluoranthene ⁽ⁱⁱⁱ⁾	
Benzo(a)Pyrene	
Indeno(123-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(ghi)Perylene	
TPH C₅-C₆ (aliphatic)	
TPH C₆-C₈ (aliphatic)	
TPH C₈-C₁₀ (aliphatic)	
TPH C₁₀-C₁₂ (aliphatic)	
TPH C₁₂-C₁₆ (aromatic)	
TPH C₁₆-C₂₁ (aromatic)	
TPH C₂₁-C₃₅ (aromatic)	



APPENDIX VII

GEOTECHNICAL TESTING

RESULTS



LABORATORY REPORT



4043

Contract Number: PSL22/2598

Report Date: 03 November 2022

Client's Reference: 15-811

Client Name: E3P
Taylor Road
Urmston
Manchester
M41 7JQ

For the attention of: Jonny Beer

Contract Title: Land off Wilbraham Road, Chorlton, Manchester

Date Received: 8/4/2022
Date Commenced: 8/4/2022
Date Completed: 13/5/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


T Watkins
(Senior Technician)

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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP101		B	0.80		Brown gravelly slightly clayey SAND.
TP104		B	0.40		Brown slightly gravelly clayey SAND.
TP109		B	0.50		Brown TOPSOIL.
TP112		B	0.90		Brown mottled grey slightly gravelly slightly silty SAND.
TP114		B	1.00		Brown SAND.
WS101		D	2.00		Brown sandy CLAY.
WS101		U	4.50	5.00	Brown slightly gravelly sandy CLAY
WS102		D	2.00		Brown very sandy CLAY.
WS102		U	3.50	4.00	Brown slightly sandy peaty CLAY.
WS103		D	3.00		Brown slightly sandy CLAY.
WS103		U	1.50	2.00	Brown slightly sandy CLAY.
WS104		D	2.00		Brown sandy CLAY.
WS104		U	1.50	2.00	Soft brown sandy CLAY.



4043

PSL

Professional Soils Laboratory

Land off Wilbraham Road, Chorlton, Manchester

Contract No:

PSL22/2598

Client Ref:

15-811

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

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



4043

PSL
Professional Soils Laboratory

Land off Wilbraham Road, Chorlton, Manchester

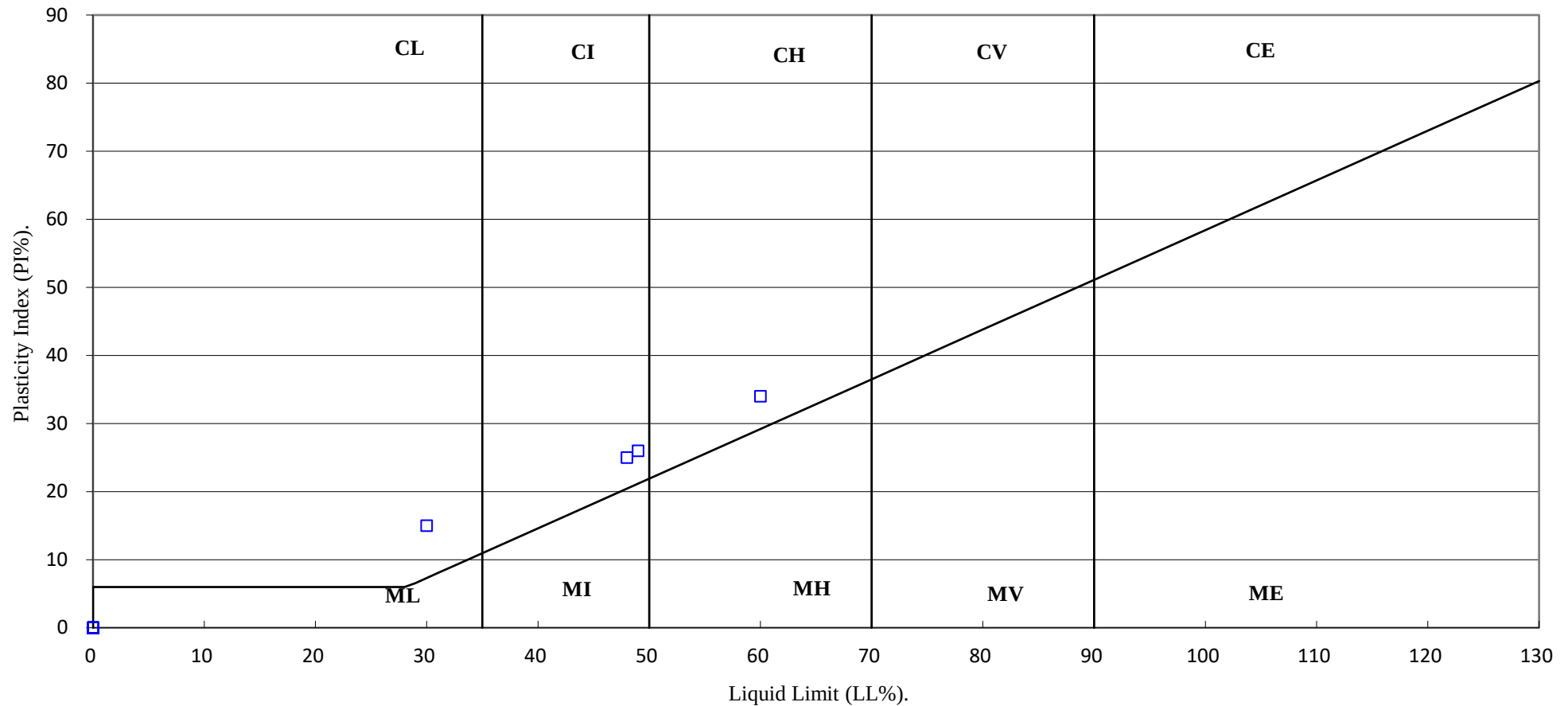
Contract No:

PSL22/2598

Client Ref:

15-811

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Land off Wilbraham Road, Chorlton, Manchester

Contract No:

PSL22/2598

Client Ref:

15-811

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

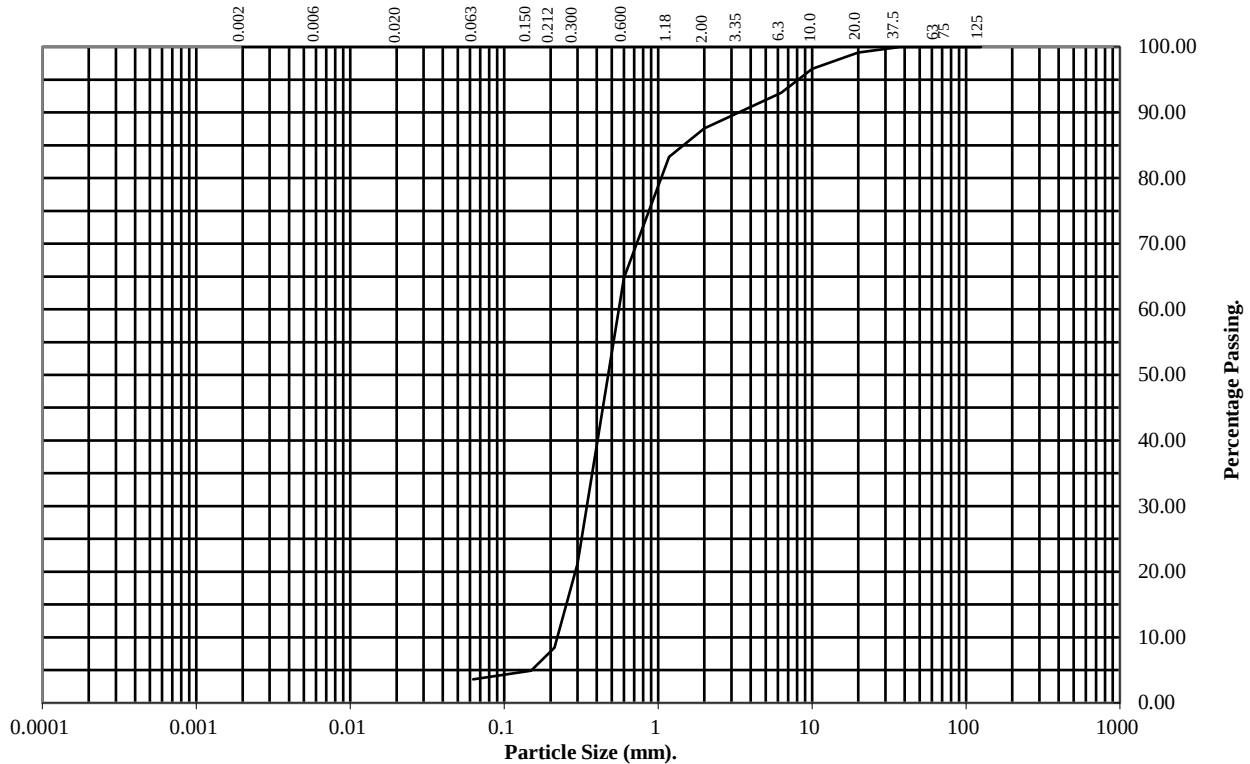
Hole Number: TP101

Top Depth (m): 0.80

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	97
6.3	93
3.35	90
2	88
1.18	83
0.6	65
0.3	21
0.212	8
0.15	5
0.063	4

Soil Fraction	Total Percentage
Cobbles	0
Gravel	12
Sand	84
Silt/Clay	4

Remarks:

See Summary of Soil Descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:
PSL22/2598
Client Ref:
15-811

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

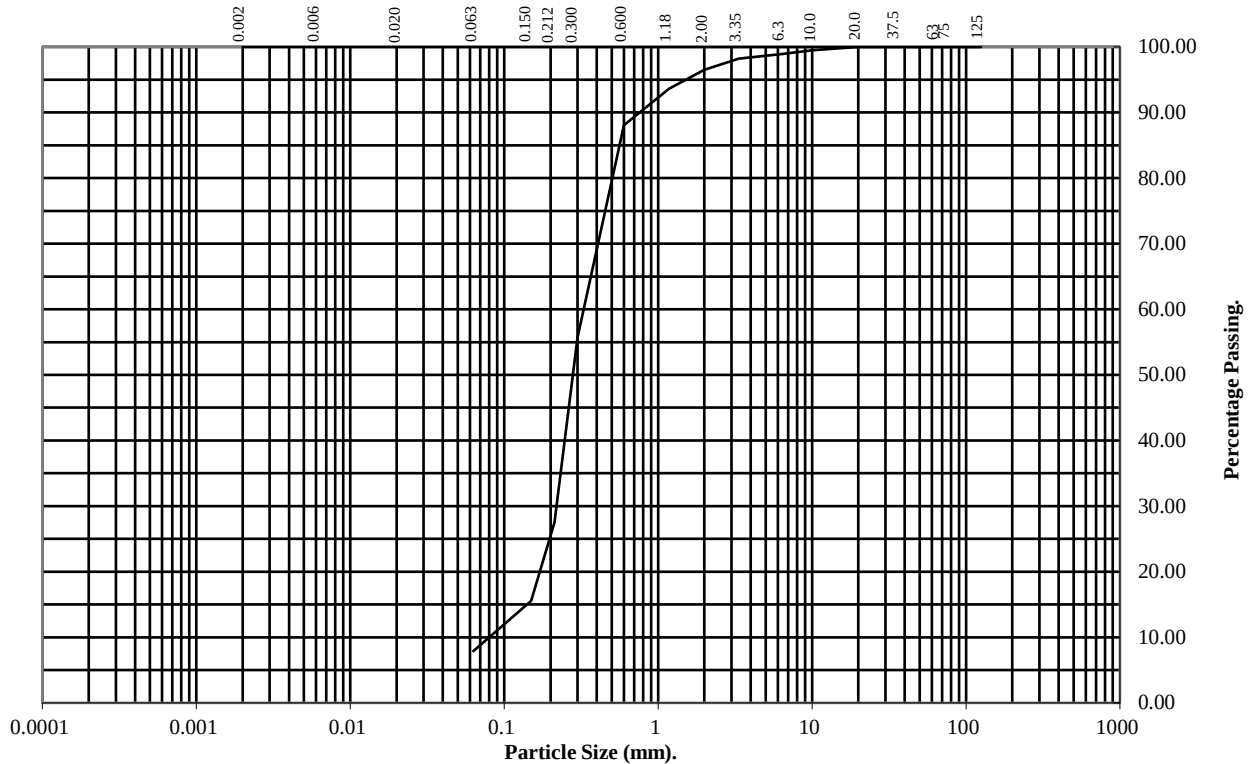
Hole Number: TP104

Top Depth (m): 0.40

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	99
3.35	98
2	97
1.18	94
0.6	88
0.3	56
0.212	27
0.15	16
0.063	8

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	89
Silt/Clay	8

Remarks:

See Summary of Soil Descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:
PSL22/2598
Client Ref:
15-811

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

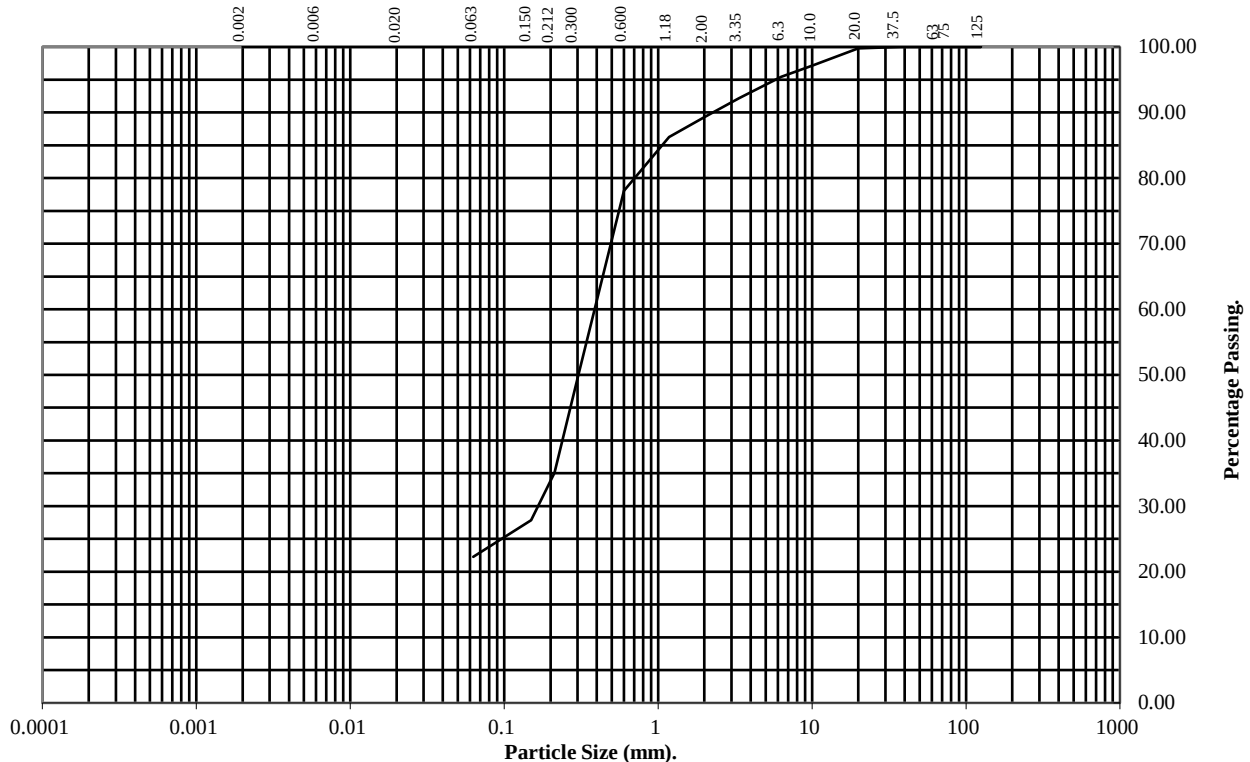
Hole Number: TP109

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	97
6.3	95
3.35	92
2	89
1.18	86
0.6	78
0.3	49
0.212	35
0.15	28
0.063	22

Soil Fraction	Total Percentage
Cobbles	0
Gravel	11
Sand	67
Silt/Clay	22

Remarks:

See Summary of Soil Descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:
PSL22/2598
Client Ref:
15-811

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

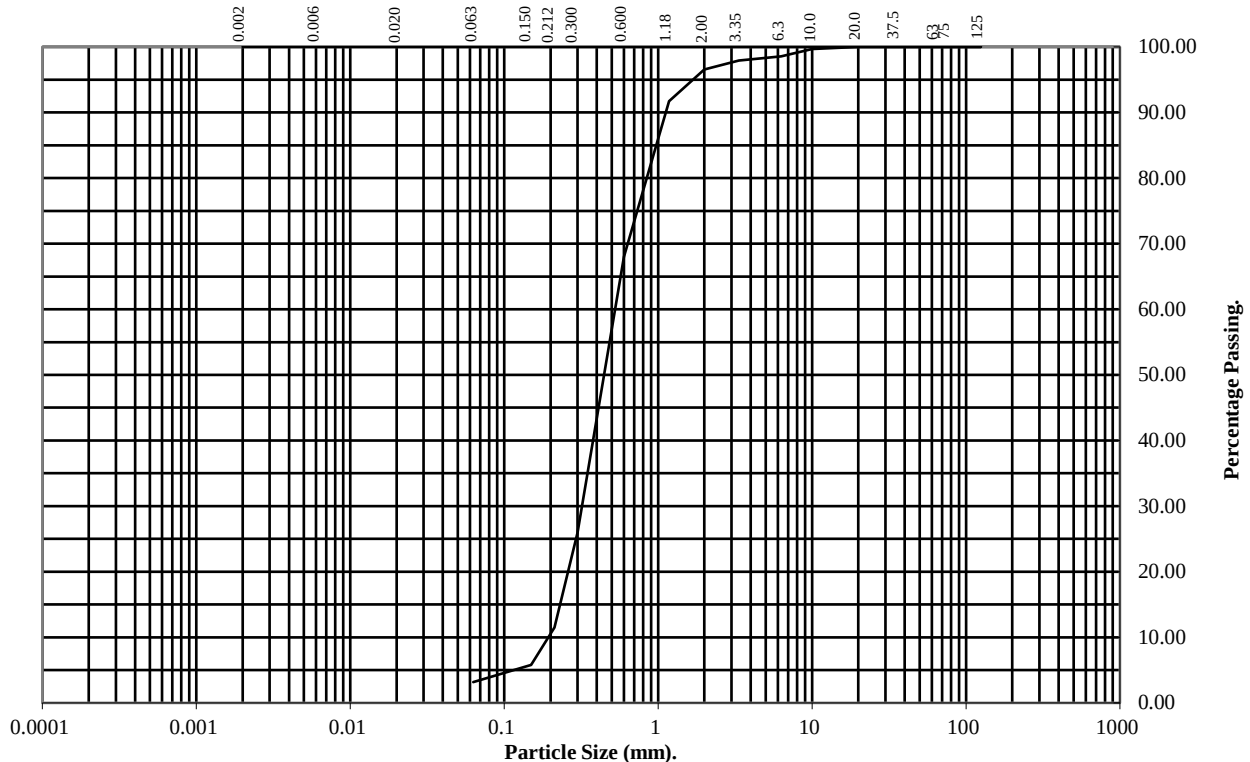
Hole Number: TP112

Top Depth (m): 0.90

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	98
2	97
1.18	92
0.6	68
0.3	26
0.212	11
0.15	6
0.063	3

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	94
Silt/Clay	3

Remarks:

See Summary of Soil Descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:
PSL22/2598
Client Ref:
15-811

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

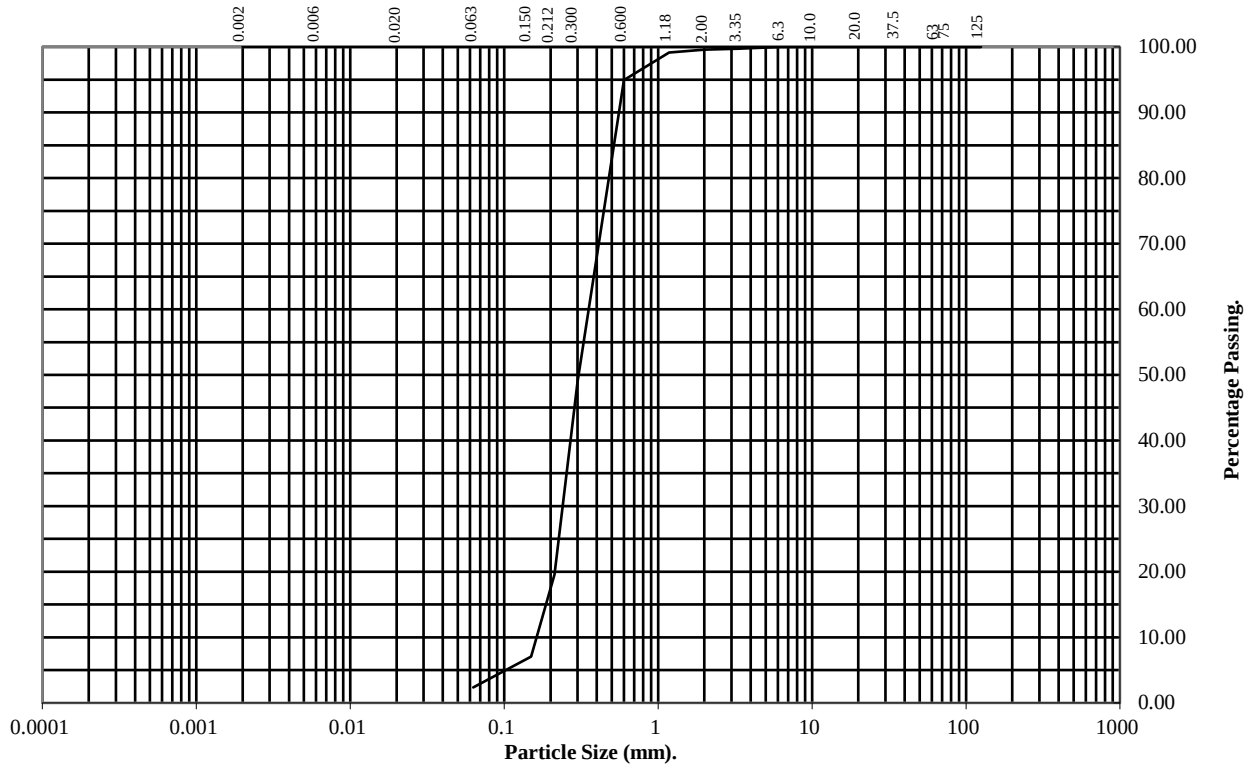
Hole Number: TP114

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	95
0.3	49
0.212	20
0.15	7
0.063	2

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	98
Silt/Clay	2

Remarks:

See Summary of Soil Descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:
PSL22/2598
Client Ref:
15-811

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

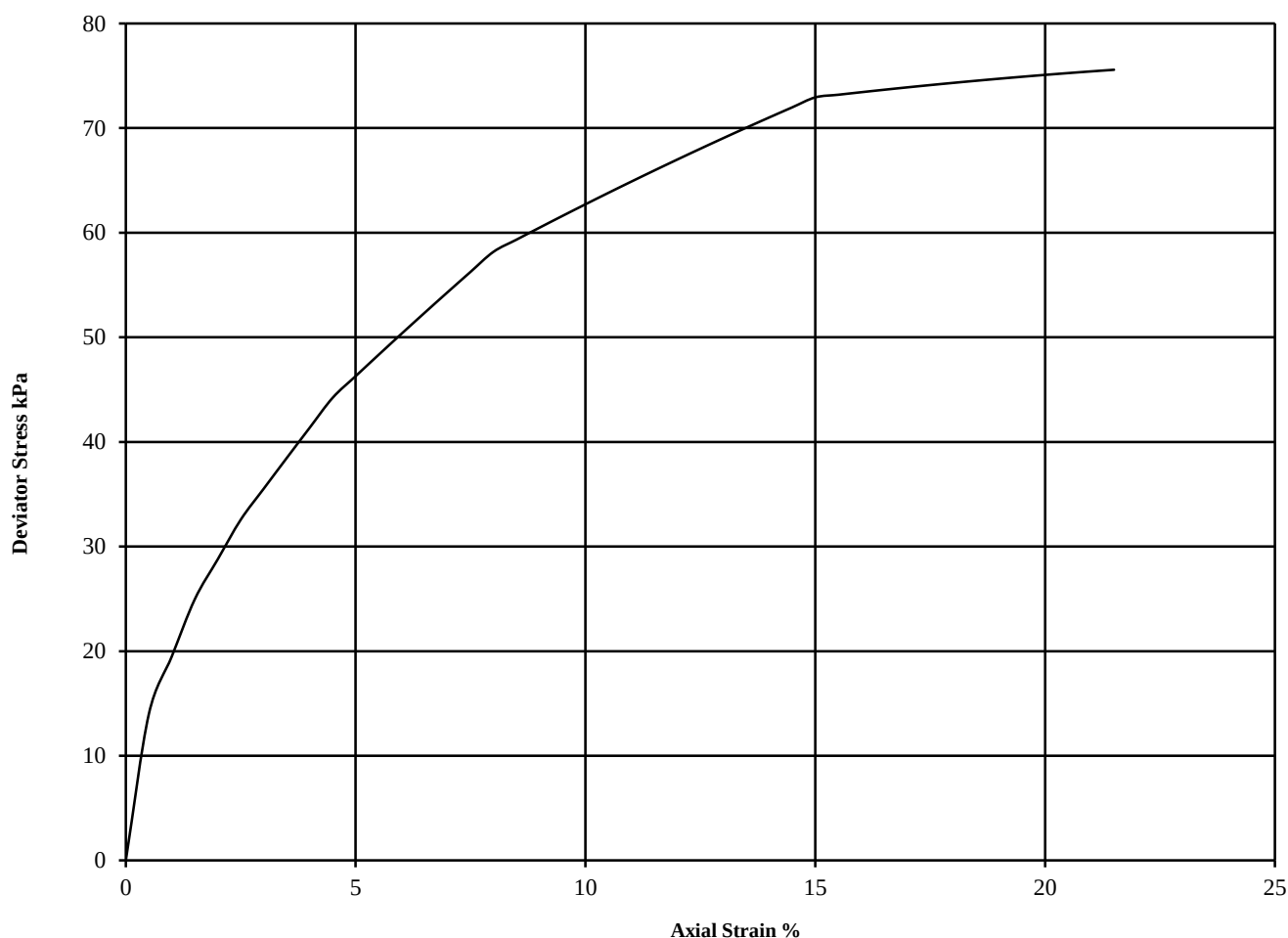
Hole Number: WS104

Top Depth (m): 1.50

Sample Number:

Base Depth (m): 2.00

Sample Type U



Diameter (mm):		80		Height (mm):		160	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure		Undisturbed Sample
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$				Sample taken from top of tube
										Rate of strain = 2 %/min
										Latex Membrane used 0.2 mm thick,
										Correction applied 0.41
1	27	2.01	1.58	35	76	38	21.5	Plastic		See summary of soil descriptions



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:

PSL22/2598

Client Ref:

15-811

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS101

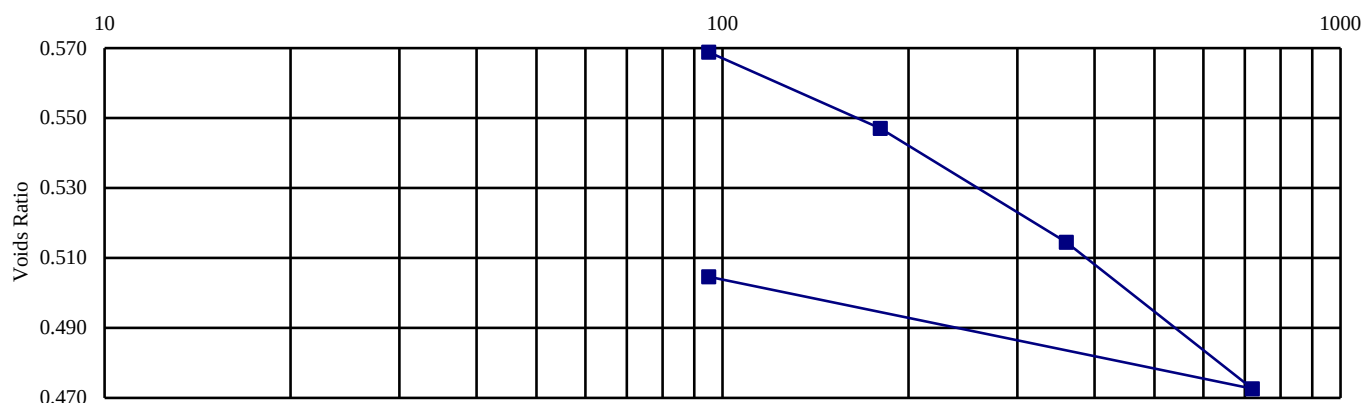
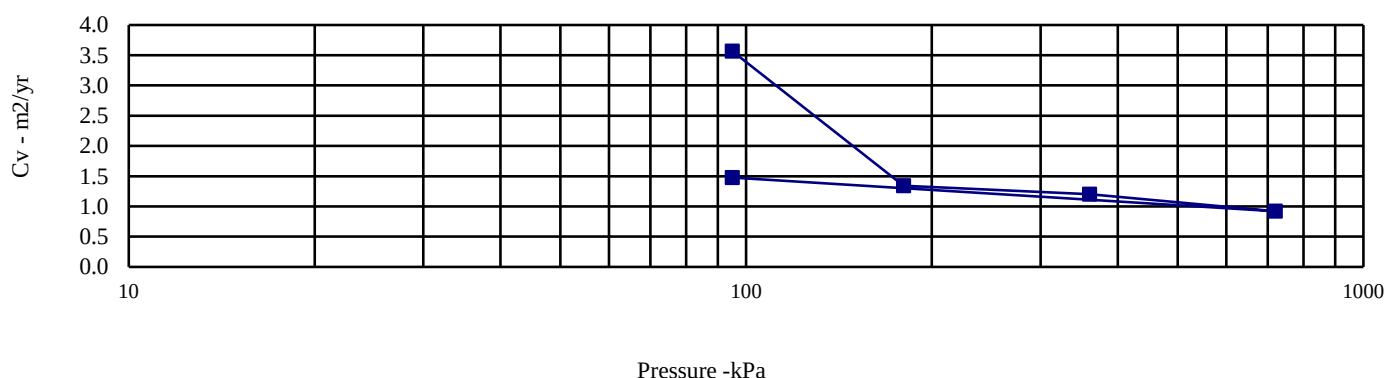
Top Depth (m): 4.50

Sample Number:

Base Depth (m) : 5.00

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	23	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.04	0	95	0.168	3.567	Method used to	
Dry Density (Mg/m3):	1.66	95	180	0.163	1.345	determine CV:	T90
Voids Ratio:	0.594	180	360	0.117	1.203	Nominal temperature	
Degree of saturation:	101.6	360	720	0.077	0.921	during test ' C:	20
Height (mm):	20.07	720	95	0.035	1.475	Remarks:	
Diameter (mm)	50.08					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:

PSL22/2598

Client Ref:

15-811

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS102

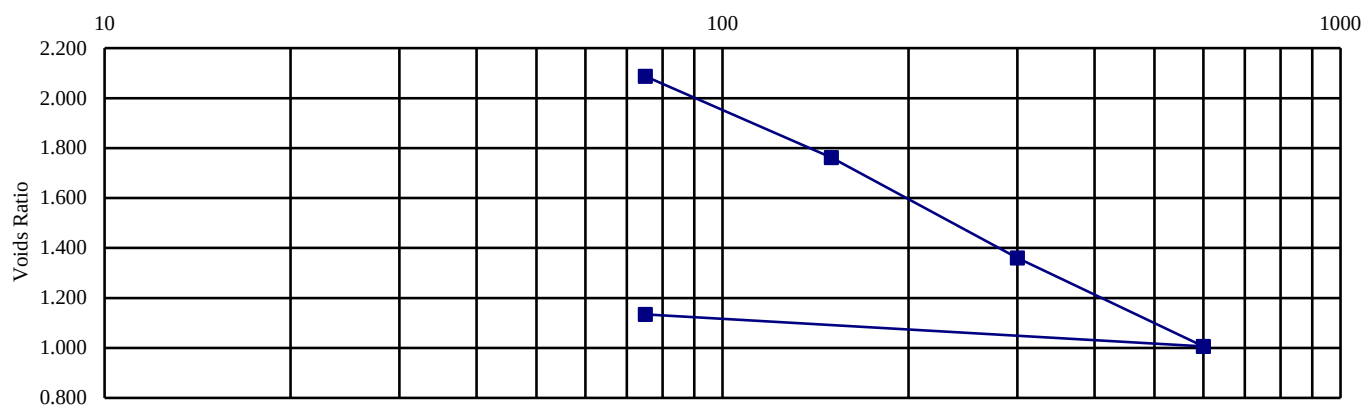
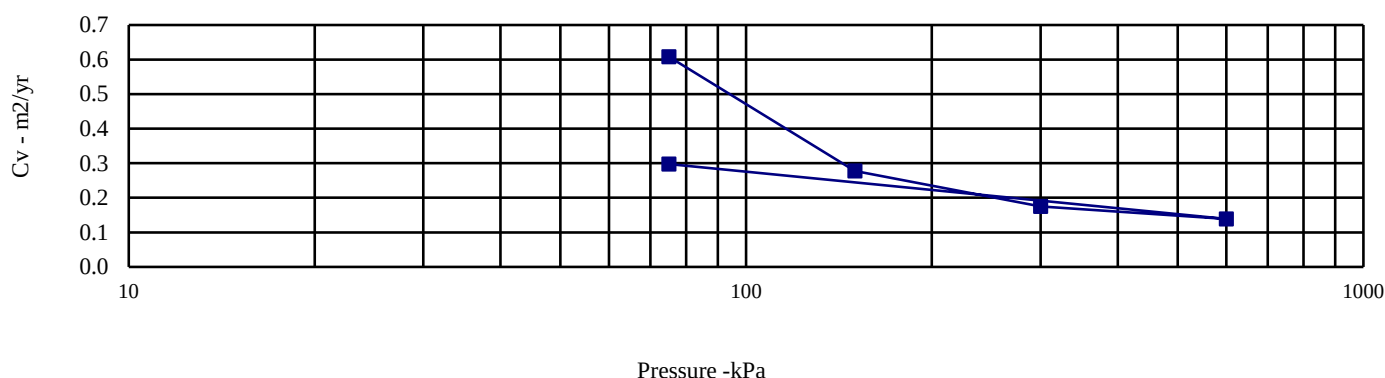
Top Depth (m): 3.50

Sample Number:

Base Depth (m) : 4.00

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	134	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.29	0	75	4.745	0.608	Method used to	
Dry Density (Mg/m3):	0.55	75	150	1.402	0.278	determine CV:	T90
Voids Ratio:	3.793	150	300	0.970	0.175	Nominal temperature	
Degree of saturation:	93.5	300	600	0.501	0.139	during test ' C:	20
Height (mm):	20.07	600	75	0.122	0.298	Remarks:	See summary of soil descriptions
Diameter (mm)	75.08						
Particle Density (Mg/m3):	2.65						
Assumed							



Land off Wilbraham Road, Chorlton,
Manchester

Contract No:

PSL22/2598

Client Ref:

15-811

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS103

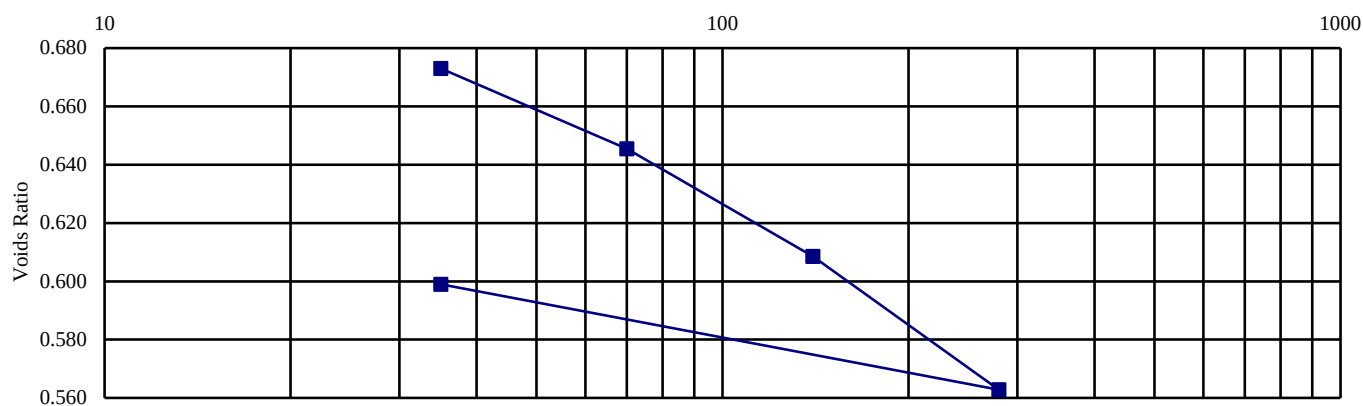
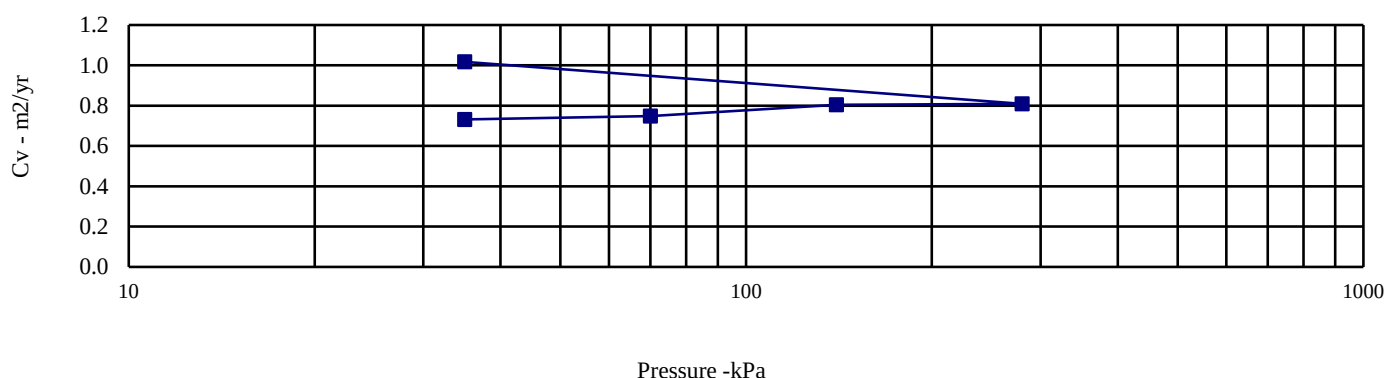
Top Depth (m): 1.50

Sample Number:

Base Depth (m) : 2.00

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	28	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.98	0	35	0.622	0.732	Method used to	
Dry Density (Mg/m3):	1.55	35	70	0.471	0.749	determine CV:	T90
Voids Ratio:	0.710	70	140	0.320	0.804	Nominal temperature	
Degree of saturation:	104.4	140	280	0.203	0.808	during test ' C:	20
Height (mm):	20.11	280	35	0.095	1.017	Remarks:	
Diameter (mm)	75.09					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



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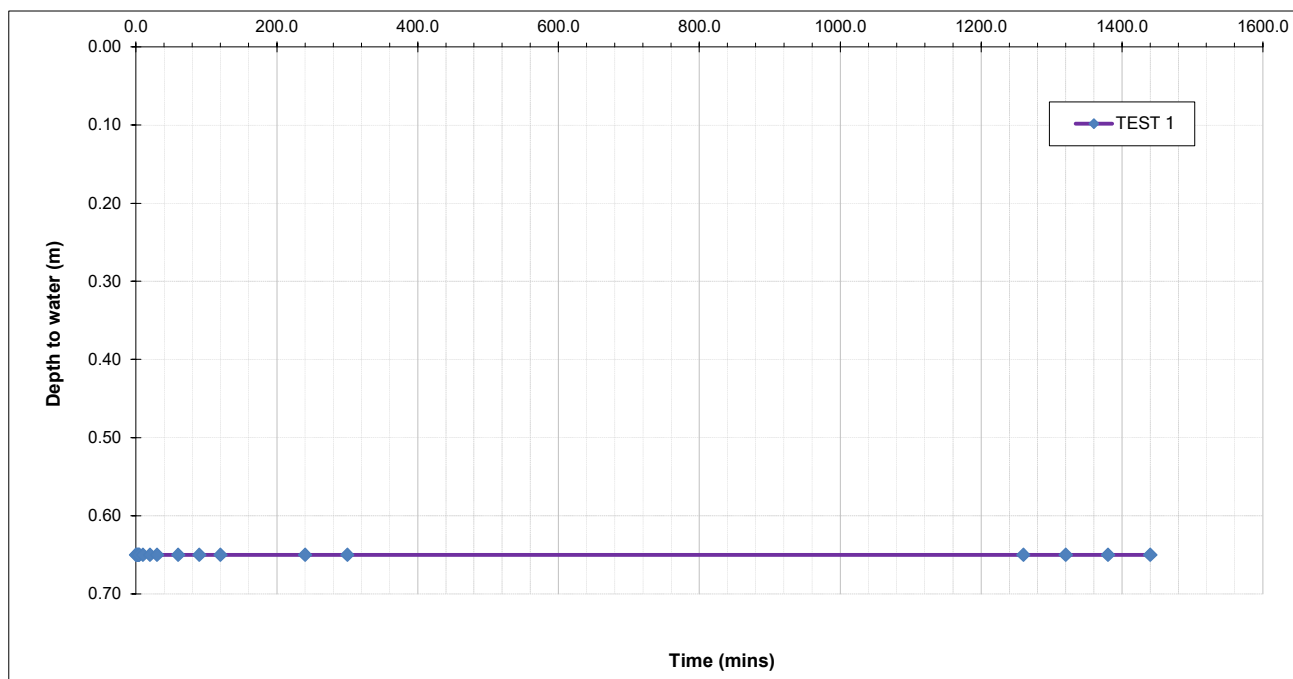
APPENDIX VIII

BRE365 SOAKAWAY TEST

CERTIFICATES

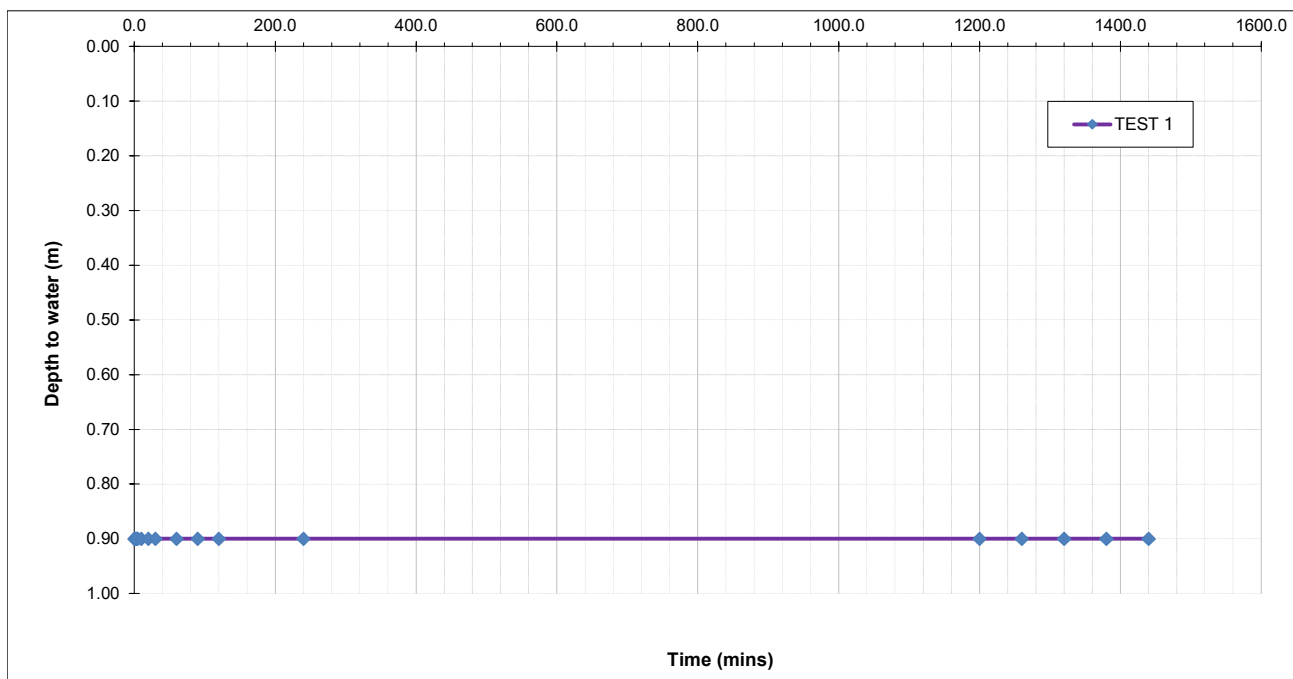
		Site: Land off Wilbraham Road Job Number: 15-811 Date of Test: 30/03/2022		Trial Pit Number: TP102/SA101 Length: 2.10 m Width: 0.55 m Depth: 2.10 m Groundwater Level: - m	
Remarks - Only one test was undertaken due to the depth of water remaining above the 25% effective storage depth.	TEST 1 10.38		TEST 2		TEST 3
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min) Depth to Water (m)
	0	0.65			
	1	0.65			
	2	0.65			
	3	0.65			
	4	0.65			
	5	0.65			
	10	0.65			
	20	0.65			
	30	0.65			
	60	0.65			
	90	0.65			
	120	0.65			
	240	0.65			
	300	0.65			
	1260	0.65			
	1320	0.65			
1380	0.65				
1440	0.65				
Effective Storage Depth	m	1.45			
75% Effective Storage Depth	m	1.09			
(i.e. depth below GL)	m	1.01			
25% Effective Storage Depth	m	0.36			
(i.e. depth below GL)	m	1.74			
Effective Storage Depth 75%-25%	m	0.73			
Time to fall to 75% effective depth	mins	N/A			
Time to fall to 25% effective depth	mins	N/A			
V (75%-25%)	m3	0.84			
a (50%)	m2	5.00			
t (75%-25%)	mins	N/A			
SOIL INFILTRATION RATE	m/s	N/A			

DESIGN SOIL INFILTRATION RATE, f	N/A
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		Site: Land off Wilbraham Road Job Number: 15-811 Date of Test: 30/03/2022		Trial Pit Number: TP105/SA102 Length: 2.10 m Width: 0.50 m Depth: 2.50 m Groundwater Level: m		
Remarks - Only one test was undertaken due to the depth of water remaining above the 25% effective storage depth.	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0	0.90				
	1	0.90				
	2	0.90				
	3	0.90				
	4	0.90				
	5	0.90				
	10	0.90				
	20	0.90				
	30	0.90				
	60	0.90				
	90	0.90				
	120	0.90				
	240	0.90				
	1200	0.90				
	1260	0.90				
1320	0.90					
1380	0.90					
1440	0.90					
Effective Storage Depth	m	1.60				
75% Effective Storage Depth	m	1.20				
(i.e. depth below GL)	m	1.30				
25% Effective Storage Depth	m	0.40				
(i.e. depth below GL)	m	2.10				
Effective Storage Depth 75%-25%	m	0.80				
Time to fall to 75% effective depth	mins	N/A				
Time to fall to 25% effective depth	mins	N/A				
V (75%-25%)	m3	0.84				
a (50%)	m2	5.21				
t (75%-25%)	mins	N/A				
SOIL INFILTRATION RATE	m/s	N/A				

DESIGN SOIL INFILTRATION RATE, f	N/A
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		Site: Land off Wilbraham Road Job Number: 15-811 Date of Test: 30/03/2022		Trial Pit Number: TP113/SA103 Length: 2.20 m Width: 0.60 m Depth: 2.10 m Groundwater Level: m	
Remarks - Only one test was undertaken due to the depth of water remaining above the 25% effective storage depth.	TEST 1 4.01		TEST 2		TEST 3
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min) Depth to Water (m)
	0	0.90			
	1	0.90			
	2	0.90			
	3	0.90			
	4	0.90			
	5	0.90			
	10	0.90			
	20	0.90			
	30	0.91			
	960	1.04			
	1020	1.05			
	1080	1.05			
	1140	1.06			
	1200	1.06			
	1260	1.07			
	1320	1.07			
1380	1.08				
1440	1.08				
Effective Storage Depth	m	1.20			
75% Effective Storage Depth	m	0.90			
(i.e. depth below GL)	m	1.20			
25% Effective Storage Depth	m	0.30			
(i.e. depth below GL)	m	1.80			
Effective Storage Depth 75%-25%	m	0.60			
Time to fall to 75% effective depth	mins	N/A			
Time to fall to 25% effective depth	mins	N/A			
V (75%-25%)	m3	0.79			
a (50%)	m2	4.68			
t (75%-25%)	mins	N/A			
SOIL INFILTRATION RATE	m/s	N/A			

DESIGN SOIL INFILTRATION RATE, f	N/A
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