Phase II Geoenvironmental Site Assessment

Site: Hinchley Road, Charlestown
Reference: 17-994-R1-1
Date: January 25



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EXECUTIVE SUMMARY

Site Address	Hinchley Road, Charlestown, Manchester, M9 7BX.
Grid Reference	E 387836, N 403142
Site Area	2.70 Ha.
Proposed Development	Miller Homes are considering the proposed acquisition and future redevelopment of land at Hinchley Road, Blackley, for low-rise residential housing with associated adopted estate roads and utility infrastructure.
Current Site Use	The site is a disused parcel of land to the west of Hinchley Road, comprising soft standing of unmaintained grasses and shrubs. Dense semi-mature and mature trees are present along the northern boundary. Sporadic semi-mature trees are present through the central, western and eastern areas of the site. Dense shrubs and vegetation are present across much of the eastern area of the site. Three circa 2m high mounds are present in the west of the site, comprising historic Made Ground fill soils. A footpath transects the site running approximately east to west. Currently public access is freely available across the site.
Site History	Available historic mapping from 1900 to present indicates the site has not undergone any historic development. A Phase 1 report, IGE Consulting Phase 1 Geo-Environmental Investigation Report – Hinchley Road, Charlestown (4070-01, February 2024), has been completed but has not been made available to E3P at this time.

ENVIRONMENTAL SETTING

Geology	Superficial Geology	Glacial Till (SAND, GRAVEL and CLAY) PEAT
	Bedrock Geology	Pennine Middle Coal Measures
	Faults	None recorded on site. Closest fault is recorded 130m south west.
Geomorphology	A review of relevant records indicates that the site has not been subject to significant anthropogenic changes, however, three large circa 2m high mounds are present in the west of the site. The mounds comprise Made Ground and given the lack of record, the origin of the soils in the mounds are unknown at this time. Given the presence of these anthropogenic soils, the site geomorphology is not considered to represent the natural landform.	
Hydrogeology	Secondary undifferentiated superficial aquifer underlain by a secondary A aquifer in the bedrock geology.	
	The site is not located within a source protection zone.	
Hydrology	No surface water features are present within 250m of the site	
	The site is located within Flood Zone 1 – area with the lowest probability of flooding.	
Utility Locations	A formal drainage survey has not been completed. A review of publicly available utility plans does not record any utility records for gas, electric, water or telecoms within the redline boundary of the site.	
Landfill Sites and Waste Sites	Two historic landfills are located within 1 km of the site. The closest off-site historic landfill is located 123m south, active between 1964 and 1974.	

Radon	The site is located within an area where 1-3% of homes are above the radon action level – radon protective measures are not required to new build properties.
Unexploded Ordnance	Moderate.
PFAS	No potential current or historical sources of PFAS have been identified on site. No further risk assessment required.
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.

E3P GROUND INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising: - 21 x mechanically excavated trial pits, - 3 x BRE 365 soakaway permeability tests, - 12 x window sample boreholes, - 4 x Cable percussive boreholes, - 3 x Rotary Boreholes; and - Construction of environmental monitoring installations.
Ground Conditions	**Made Ground – 0.0m bgl to 2.80 m bgl** Made Ground was encountered within 12 of the 40 exploratory hole locations. Made Ground was located in the northeast of the site to a maximum proven depth of 2.80 m bgl (WS108 – located on top of Made Ground mound extending to circa 0.80 m below wider site levels). Made Ground deposits were generally encountered as a reworked topsoil consisting of a dark brown very sandy clay with frequent rootlets with inclusions of sub-angular to angular brick overlying a dark brown gravelly sandy clay with gravel comprising wood, metal, glass, brick and concrete. The full extent of the Made Ground within TP102 was not confirmed due to the termination of excavation following the identification of a land drain the base of the pit, encountered at 2.20 m bgl.
	Drift – 0.10m bgl to >40 m bgl Natural drift deposits were encountered within all exploratory hole locations with the exception of TP115, to a maximum proven depth of 40.00 m bgl (RB101-RB103). Drift deposits were generally encountered as firm medium strength to stiff high strength greyish brown CLAY underlying topsoil deposits to circa 16.00 m bgl with brown slightly clayey gravelly SAND underlying the granular drift from circa 16.00 m – 40.00 m bgl. Soft clays were encountered within nine locations (SA102, SA103, TP107, TP108, TP110, TP112, TP114, TP117 and TP118) generally encountered in the north east and central areas between 1.00 and 2.00 m bgl and at thickness' <1.00 m.

	Peat deposits were encountered in 23 locations and are discussed in more detail below.
	PEAT – 0.10 – 2.80 m bgl. Peat deposits were encountered in 23 locations (of 37 total), encountered site wide. Peat deposits are generally encountered from 0.10 - 1.00, with deeper areas of peat encountered within WS106 (1.50 m bgl), CP102 (2.60 m bgl) and CP103 (2.70 m bgl). Peat was encountered as soft very low to low strength dark blackish brown silty PEAT.
	Solid – Not Encountered (>40.00 m bgl) Solid geology of the was not encountered during this phase of investigation with boreholes advanced to a maximum depth of 40.00 m bgl. Based upon BGS mapping, the site is underlain by Pennine Middle Coal Measures. Surrounding BGS boreholes indicate the top of bedrock to be present at circa 60 m bgl.
	Groundwater – 0.40–6.50m bgl Groundwater strikes were recorded within four exploratory hole locations (SA102, TP111, TP116 and CP102) at varying depths between 0.60 m – 2.00 m bgl. Strikes were generally encountered as slow ingress.

CONTAMINATED LAND ASSESSMENT

Initial Conceptual Site Model	The following potential sources of contamination have been identified: - Made Ground within the south and western mounds. - Shallow Made Ground across sporadic areas of the site. - Presence of peat – ground gas (CO2 and CH4). - Principal Aquifer within the underlying bedrock
Human Health	E3P has undertaken a Tier 2 qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable risk to the identified receptors. A total of 16 soil samples were obtained across the site. The results of this direct comparison indicates that minor exceedances of heavy metals (lead) recorded within TP101 at 1.00 m and non-volatile PAH (benzo(b)fluoranthene, benzo(a)pyrene and Dibenzo(a,h)Anthracene) recorded within TP101 at 1.00 m, TP115 at 0.60 m and WS112 at 0.80 m. Heavy metals and non-volatile PAH have a primary exposure pathway through dermal contact and soil ingestion. Where soils are to be utilised as upfill below hardstand, no viable contamination pathway will be present between future end users and heavy metal impacted soils. Where the soils are utilised as fill below areas of proposed soft standing, a clean cover system of chemical suitable sub and topsoil should be placed as a barrier to cut any contamination pathways. Following the placement of cover systems/hardstand, no viable contamination pathways will be present removing the risk to human health.

Human Health	Where Made Ground is present, the risk of previously unidentified contamination can be mitigated through the installation of a suitable cover system in proposed private gardens, landscaping and public open space to remove any potential for direct exposure to impacted soils. Where natural soils are present no cover system will be required. The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy. For all remaining samples the data does not exceed the screening criteria for residential end use with plant uptake for any determinants. Chemical analysis of the natural topsoil and drift deposits has identified these soils to be acceptable for use as subsoil within the proposed garden areas; however, further chemical validation samples may be required to meet regulatory sampling frequency. No exceedances of human health values were recorded within the two peat samples submitted.
Controlled Waters	Where leachate analysis has been undertaken, this can overstate the risk and is not be wholly representative of the site characterisation, as such, given the absence of Chromium III within groundwater samples, this is not considered to be a contaminant risk on site. Where groundwater analysis has been undertaken, exceedances of copper, nickel, and zinc has been identified within three locations across the site when compared to the EQS values. The main receptor for the site, however, is the underlying Secondary A bedrock aquifer – a such DWS are deemed appropriate given the absence of any surface water features within influencing distance. No exceedances of DWS have been recorded. Additionally, the site is underlain by a minimum of recoded thickness of c. 13 m of cohesive low permeability superficial strata, which will inhibit downward migration towards the aquifers. The rotary boreholes did not encounter bedrock at a maximum depth 40.00 m bgl, and it is assumed to be present in excess of 60.00 m bgl based on previous BGS borehole logs within the vicinity of the site. Due to the absence of a complete pollutant linkage and lack of exceedance of DWS, the site is considered to pose a low risk to controlled waters.
Ground Gas	Monitoring data to date indicates a CS2 classification, due to the CO2 levels exceeding the CS1 threshold (5% v/v) in two monitoring locations. A further 3 monitoring visits are required to complete the gas monitoring programme. Upon completion of the gas monitoring program, a ground gas addendum report with final recommendations will be produced. At this time, it is recommended precautionary allowance for CS2 protection measures are allowed for. Given the primary gas source (peat) is to be removed, post remediation and enabling monitoring is recommended.
Potable Water Infrastructure	Based upon ground conditions identified during the intrusive investigation, a PE pipeline is likely to be suitable at the proposed development.

	However, it should be noted that chemical analysis recorded heavy end hydrocarbon elevations exceeding the PE threshold within TP101 at 1.00 m bgl. TP101 was conducted upon the upfilled mound in the west of the site which does not currently represent the sites general ground conditions. Should these soils be utilised within the bulk upfill of the site, an allowance for barrier pipe should be made. A UKWIR assessment should be undertaken following enabling works to confirm the appropriate design for potable water infrastructure.

GEOTECHNICAL ASSESSMENT

Underground Obstructions & Subterranean hazards	A concrete obstruction was encountered within TP115 (south east) at 1.20 m bgl. A land drain was encountered in the north west of the site within TP102 at 2.20 m bgl (below anthropogenic mound) and TP104 at 0.40 m bgl. Based upon limited historical development recorded on site, underground obstructions are anticipated to be limited to the southeast. No shallow bedrock was encountered across the site.
Peat	Peat deposits were encountered in 21 locations (of 37 total), encountered site wide generally in the upper 1.00 m, however, have been encountered to a maximum recorded depth of 3.00 m (WS108 below raised mound). Peat is geotechnically unsuitable and poses a long-term settlement risk. Peat deposits would require removal from below proposed foundations, roads, driveways, infrastructure and all external areas. Prior to the removal of peat, all approvals must be in place with the relevant bodies to ensure compliance.
Soft Clays	Soft clays were encountered within twelve locations (SA102, SA103, TP107, TP108, TP110, TP112, TP114, TP117, TP118, WS109, CP103, and CP104) generally encountered in the north east and central areas between 1.00 and 2.00 m bgl and at thickness' <1.00 m. Soft clays have been encountered an maximum depth of 2.80 m bgl based on exploratory hole locations undertaken to date. Soft clays are unsuitable founding strata and pose a potential long term settlement risk. Plots in the vicinity of soft clays are likely to require an engineered foundation solution (piled). The design of infrastructure in these area's should take into account the presence of soft clays. Where shallow soft clays are to be cut and re-used within the earthworks balance, these soils will require moisture modification and re-engineering in line with an agreed geotechnical design. The excavation of deeper soft clays is not feasible given the volume and cut / fill balance on site. As such, plots in these areas would require an engineered (piled) foundation with drainage infrastructure piled or geosynthetic utilised to support infrastructure subject to future adoptions being approved.

Allowable Bearing Capacity	The underlying natural clay drift deposits have been evaluated and found to be generally be firm, medium strength, to stiff high strength with a net Allowable Bearing Capacities (ABC) of generally above 100 kN/m2 at an approximate depth of 1.00m bgl). However, soft CLAYs are present across the site that record shear strengths <40 Cu that are not sufficient for the proposed loadings and present a long term settlement risk, these deposits are unsuitable founding strata. Additionally, PEAT is currently present across the site that will require removal with void space backfilled to an agreed geotechnical specification. At 2.00m bgl, the ABCs are recorded to increase within the underlying stiff, medium strength to very stiff, high strength CLAYs in order of 150 - 200 kN/m2.
Foundation Options	Several foundation options should be considered for low-rise housing based on confirmed soil mechanics, cost, and construction feasibility. In this instance, it is thought that the following foundation options are likely to be suitable for low-rise housing founded where peat is removed or through the peat; however, external areas would need to have the peat removed: • Strip Foundations bearing on the firm to stiff high strength CLAY where suitable founding strata is encountered >1.20 m bgl; • Trench Fill foundations should be considered where the target bearing stratum is greater than 1.20m below the proposed level. • Piled or engineered foundations are likely to be required in areas where significant and deep peat is present (or removed), areas of deep soft clays and within tree influence. Controlled modulus columns with a soil stiffened platform are also an option but it is understood from discussions with the clients technical team that this will not be financially viable. A final assessment should be made upon receipt of final development levels and arboricultural report.
Foundations Near Trees	Foundation depths within the conjectured influence of former, existing or proposed trees will need to be deepened to ensure that structural loading bears within the underlying target founding stratum, which cannot be subject to volumetric instability associated with fluctuation in moisture content.
Heave Precautions Near Trees	Given that the underlying clay is of medium volume change potential, heave precautions will be required to be installed for the proposed development and should be incorporated within the structural and civil designs.
Building Floor Slabs	Given the presence of cohesive soils across the site that are subject to season shrinking and swelling, ground bearing floor slabs will not be suitable for the proposed development. Suspended floor slabs should be designed with a sufficient sub floor void depending on the plasticity of the clays beneath the site.
Soakaway Drainage	Three BRE 365 soakaways were conducted across the Site. During the tests the water level did not fall below the 75% effective storage depth over a period of 48 hours, the test results are not favourable for soakaway drainage.

	The Site is largely underlain by CLAY to a confirmed depth of >15.00 m bgl. Due to the presence of underlying cohesive soils and given that the water level did not drop to the required effective depths during BRE permeability testing (indicating poor drainage conditions), it is considered that soakaway drainage will is unlikely to be suitable at the subject site.
Sulphate Assessment	Results from the soil chemical analysis can assign the concrete classification of the site as DS-1, AC-1s.
Highway & Infrastructure Construction	Unsuitable materials (soft clays and peat) have been identified, where a proposed highway or infrastructure is to be constructed in these areas, peat will require removal. Where soft clays are present that are unable to be removed from beneath proposed infrastructure a specialist geotechnical design may be required to support the proposed infrastructure likely comprising geosynthetic reinforcement.
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.
Enabling Earthworks	Finalised development levels are unknown at this time; however, current proposals include a series of cut-and-fill works to prepare the development platform. As part of the earthworks design, materials should be assessed and characterised prior to re-use in constructing upfill to a geotechnical design. Peat will require delineation and removal under the supervision of a validating engineer where appropriate consent is obtained. All future earthworks should be completed in accordance with a Geotechnical Design Report (GDR) that will consider the ground model within the context of the potential for settlement induced by surcharge from earthworks, dynamic and permanent loading of the development and all known hazards.
Civil Engineering Excavations	Excavations were undertaken with standard machinery with relative ease. Further consideration is required prior to the excavation of materials due to variability in soil strength encountered during the intrusive investigation where soft clays and peat were noted. Consideration should be made for water ingress into excavations from peat deposits across the site. 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.
Waste Characterisation	Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: *Waste Classification – Guidance on the classification and assessment of waste*.

RECOMMENDATIONS

Based on the findings of the Geoenvironmental site assessment and the various conclusions drawn, the following additional works are recommended to be completed in due course:

- Foundation schedule (upon receipt of the final development levels).
- Arboricultural survey.
- Remediation and enabling works strategy.
- Geotechnical Design Report.
- Gas Protection Design Report.

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17-994-R1-004 - Site Features Plan
17-994-R1-006 - Exploratory Hole Location Plan
17-994-R1-007 - Depth of Made Ground Plan
17-994-R1-008 - Depth of Topsoil Plan
17-994-R1-011 - Conceptual Site Model
17-994-R1-013 - Depth and Thickness of Peat Plan
17-994-R1-014 - Contamination Exceedances Plan
17-994-R1-015 – Depth to Founding Strata Plan
17-994-R1-031 - Location and Depth of Soft Clays Plan

1. INTRODUCTION

1.1. BACKGROUND

Miller Homes has commissioned E3P to undertake a Phase II Geoenvironmental Site Assessment at the Land North of Hinchley Road, Charlestown, Manchester, M9 7BX.

This report is required to determine potential contaminated land liabilities, remediation requirements and geotechnical engineering works that will be required as part of the proposed site redevelopment.

1.2. PROPOSED DEVELOPMENT

E3P understands that Miller Homes are considering the proposed acquisition and future redevelopment of land at Hinchley Road, Blackley, for low-rise residential housing with associated adopted estate roads and utility infrastructure.

A snapshot of the proposed development layout is indicated in Figure 1.

Figure 1 Snapshot of Proposed Development



1.3. OBJECTIVES AND SCOPE

The objectives of the geoenvironmental investigation are as follows:

- Review historical plans, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available to complete a desk study in line with the Environment Agency (EA) document Land Contamination: Risk Management (LCRM) (updated June 2023).
- Undertake a phase of sampling and analysis to provide an overview of the environmental issues identified.
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site concerning the site's future use and off-site receptors.
- Assess the geotechnical information and provide recommendations concerning foundations, pavement construction and floor slabs; and,
- Provide recommendations regarding future works required.

1.4. SCOPE OF WORKS

The scope of work includes the elements included in Table 1.

Table 1 Scope of Works

GROUND INVESTIGATION
Design of suitable ground investigation
Window sample probeholes with the construction of environmental monitoring installations
Cable percussive boreholes
Rotary boreholes
Mechanically excavated trial pits
Soil and groundwater sampling
TESTING AND MONITORING
In-situ geotechnical testing
BRE 365 soakaway permeability tests
Chemical and geotechnical analysis
Groundwater monitoring
Ground gas monitoring

ASSESSMENT AND REPORTING

- Factual and interpretative reporting
- Contamination risk assessment and conceptual site model
- Geotechnical assessment and interpretation

1.5. LIMITATIONS

The limitations of this report are presented in APPENDIX I.

1.6. RISK CLASSIFICATION

The description of risk classification and the likely action required as set out in CIRIA C552 are included in APPENDIX III.

1.7. 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 report's contents, written approval must be sought from E3P; a charge may be levied against such consent.

2. E3P 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. 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 between the 30th and 31st of October 2024. The works are summarised in Table 2.

2.2. SCOPE OF INVESTIGATION

A summary of the fieldwork completed is included in Table 2.

Table 2 Summary of Fieldwork

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General Ground Conditions and In-Situ Permeability Testing	SA101	Mechanically Excavated Trial Pit	0.00 – 1.70	N/A
	SA102		0.00 – 1.60	N/A
	SA103		0.00 – 2.30	N/A
Ground conditions within anthropogenic mounds on site	TP101		0.00 – 2.20	N/A
	TP102		0.00 – 2.20	N/A
	TP115		0.00 – 1.20	N/A
	WS101	Window Sample	0.00 – 5.45	1.00 – 3.00
	WS102		0.00 – 5.45	1.00 – 2.00
	WS108		0.00 – 5.45	1.00 – 2.50
General Ground Conditions Including the Presence/Nature of Peat	TP103	Mechanically Excavated Trial Pit	0.00 – 1.80	N/A
	TP104		0.00 – 1.80	N/A
	TP105		0.00 – 1.90	N/A
	TP106		0.00 – 2.00	N/A
	TP107		0.00 – 1.90	N/A
	TP108		0.00 – 1.60	N/A
	TP109		0.00 – 1.40	N/A
	TP110		0.00 – 1.90	N/A
	TP111		0.00 – 2.10	N/A
	TP112		0.00 – 1.80	N/A
	TP113		0.00 – 2.10	N/A
	TP114		0.00 – 2.10	N/A
	TP116		0.00 – 1.90	N/A
	TP117		0.00 – 2.30	N/A
	TP118		0.00 – 2.10	N/A
	WS103	Window Sample	0.00 – 5.45	1.00 – 2.00
	WS104		0.00 – 4.45	2.00 – 3.50
	WS105		0.00 – 5.45	1.00 – 5.00
	WS106		0.00 – 3.45	2.00 – 3.00
	WS107		0.00 – 5.45	N/A
	WS109		0.00 – 5.45	3.00 – 5.00
	WS110		0.00 – 5.45	1.00 – 2.00
	WS111		0.00 – 5.45	1.00 – 1.50
	WS112		0.00 – 3.45	1.00 – 3.00

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
Cable Percussive Boreholes to identify deeper strata	CP101	Cable Percussive Boreholes	0.00 – 15.95	N/A
	CP102		0.00 – 15.95	N/A
	CP103		0.00 – 15.45	N/A
	CP104		0.00 – 15.45	N/A
Rotary follow-on from the Cable Percussive Boreholes to identify deeper strata and potential depth of bedrock	RB101	Rotary Boreholes	15.95 – 40.00	N/A
	RB102		15.95 – 40.00	N/A
	RB103		15.45 – 40.00	N/A

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

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. In situ permeability tests were undertaken within three locations in line with BRE365.

Cable percussive boreholes and the series of rotary follow-on boreholes were advanced to investigate the potential presence of shallow bedrock.

The sampling locations are illustrated in Drawing 17-994-005 (APPENDIX IV). The ground conditions encountered are shown on the logs, presented in APPENDIX VI.

The locations were surveyed by GPS to Ordnance Survey with an accuracy of <10mm.

Return visits were made to monitor installations for groundwater level and gas concentrations.

2.3. 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 **Error! Reference source not found.**, presented in Table 20 and discussed in Section 5.

2.4. PERMEABILITY TESTS

Three in-situ BRE 365 soakaway tests were conducted to 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 23, and the test certificates are included in APPENDIX X.

2.5. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis, summarised in Table 3.

Table 3 Summary of Laboratory Analysis

CHEMICAL ANALYSIS
• Metals • pH, total sulphate, water-soluble sulphate (2:1 extract) • Sulphide • Cyanide • Phenols • Total and speciated polycyclic aromatic hydrocarbons (PAHs) • Asbestos identification and quantification • Speciated and banded total petroleum hydrocarbons (TPHs) • Total Organic Carbon (TOC)
GEOTECHNICAL ANALYSIS
• Atterberg limits determinations • Moisture content • Particle size distribution • Dry density/Optimum moisture content 4.5 kg rammer • Single stage triaxial • Oedometer

2.6. STORAGE, PRESERVATION AND TRANSPORT OF SAMPLES

Measures taken to ensure the quality and integrity of the collected samples, from collection to receipt of the samples by the laboratory, are summarised in Table 4.

Table 4 Sample Integrity Information

SUBJECT	CHEMICAL SAMPLING	
Storage	**Soil**	**Groundwater**
	Glass jars supplied by the laboratory were used for the collection of soil samples to be analysed for VOCs. Plastic tubs were used to collect soil samples for metals analysis.	Glass vials supplied by the laboratory were used for the collection of samples to be analysed for VOCs. Samples to be analysed for lower volatility compounds were stored in laboratory-prepared glass jars.
Preservation	Soil and groundwater sample containers were filled to minimise headspace prior to sealing and stored at a low temperature within cool boxes with cooling aids to minimise the loss of volatile contaminants and reduce microbial activity during the collection of samples.	

SUBJECT	CHEMICAL SAMPLING	
	Soil	**Groundwater**
Sample Integrity	Dedicated disposable nitrile gloves were worn and changed between sample collections to prevent cross-contamination.	Groundwater samples were collected using dedicated plastic tubing, which was changed between monitoring well locations to prevent cross-contamination.
Transport	Samples were stored and shipped in dedicated sample boxes provided by the laboratory. Sample details were recorded on the laboratory chain of custody form enclosed with the samples prior to dispatch. Scheduling information for the samples was confirmed with the laboratory via email.	

Chemical analysis has been undertaken by an accredited laboratory with the testing results summarised and discussed in Section 4 and the testing certificates included in APPENDIX VII.

Geotechnical samples were collected as required per location immediately after excavation, labelled and sealed to minimise moisture loss. The geotechnical samples were collected and couriered by a dedicated courier to an accredited geotechnical testing laboratory. The testing results are summarised and discussed in Section 5 and the testing certificates included in APPENDIX VIII.

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 5.

Table 5 Summary of Strata

HOLE	DEPTH TO STRATUM (m bgl)						
	MADE GROUND	TOPSOIL	PEAT	CLAY	VERY SOFT TO SOFT CLAY	FIRM TO VERY STIFF CLAY	SAND
SA101	0.00 – 0.30	–	–	0.30 – 0.90	–	0.90 – 1.70	–
SA102	–	0.00 – 0.30	–	0.30 – 0.50	1.00 – 1.60	0.50 – 1.00	–
SA103	–	0.00 – 0.40	0.40 – 1.00	–	1.00 – 1.70	1.70 – 2.30	–
TP101	0.00 – 1.90	–	–	–	–	1.90 – 2.20	–
TP102	0.00 – 2.20	–	–	–	–	–	–
TP103	–	0.00 – 0.40	–	–	–	0.40 – 1.80	–
TP104	0.00 – 0.50	–	–	–	–	0.50 – 1.80	–
TP105	–	0.00 – 0.50	–	–	–	0.50 – 1.90	–
TP106	–	0.00 – 0.40	0.40 – 0.90	–	–	0.90 – 2.00	–
TP107	–	0.00 – 0.40	0.40 – 0.80	–	0.80 – 1.90	–	–
TP108	–	0.00 – 0.40	0.40 – 0.90	–	0.90 – 1.60	–	–
TP109	0.00 – 0.60	–	–	–	–	0.60 – 1.40	–
TP110	–	0.00 – 0.40	0.40 – 0.90	–	1.40 – 1.90	0.90 – 1.40	–
TP111	–	0.00 – 0.40	0.40 – 0.90	–	–	0.90 – 2.10	–
TP112	–	0.00 – 0.50	0.50 – 0.90	–	0.90 – 1.80	–	–
TP113	–	0.00 – 0.40	–	0.40 – 1.00	–	1.00 – 2.10	–
TP114	–	0.00 – 0.40	0.90 – 1.40	0.40 – 0.90	1.40 – 2.10	–	–
TP115	0.00 – 1.20	–	–	–	–	–	–
TP116	–	0.00 – 0.30	0.30 – 0.80	–	–	0.80 – 1.90	–
TP117	–	0.00 – 0.40	–	0.40 – 1.10	1.10 – 1.90	1.90 – 2.30	–
TP118	–	0.00 – 0.40	0.40 – 0.90	–	1.70 – 2.10	0.90 – 1.70	–
WS101	0.00 – 1.00	–	–	–	–	1.00 – 5.45	–
WS102	0.00 – 1.10	–	–	1.10 – 2.00	–	2.00 – 5.45	–
WS103	0.00 – 0.60	–	–	–	–	0.60 – 5.45	–
WS104	0.00 – 0.60	–	0.60 – 1.10	–	–	1.10 – 4.45	–
WS105	–	0.00 – 0.20	0.20 – 1.20	–	–	1.20 – 5.45	–
WS106	–	0.00 – 0.20	0.80 – 1.50	0.20 – 0.80	–	1.50 – 3.45	–
WS107	–	0.00 – 0.60	–	–	–	0.60 – 5.45	–
WS108	0.00 – 2.80	–	2.80 – 3.00	–	–	3.00 – 5.45	–
WS109	–	0.00 – 0.20	0.20 – 0.50	–	0.50 – 1.80	1.80 – 5.45	–
WS110	–	0.00 – 0.40	0.40 – 0.80	–	–	0.80 – 5.45	–
WS111	–	0.00 – 0.40	0.40 – 1.00	–	–	1.00 – 5.45	–
WS112	0.00 – 0.70	–	–	0.70 – 1.00	–	1.00 – 3.45	–
CP101	–	0.00 – 0.40	–	–	–	0.40 – 15.95	–

HOLE	DEPTH TO STRATUM (m bgl)						
	MADE GROUND	TOPSOIL	PEAT	CLAY	VERY SOFT TO SOFT CLAY	FIRM TO VERY STIFF CLAY	SAND
CP102	–	0.00 – 0.20	0.20 – 2.80	–	–	2.80 – 15.95	–
CP103	–	0.00 – 0.10	0.10 – 2.00	–	2.00 – 2.80	2.80 – 15.45	–
CP104	–	0.00 – 0.40	–	0.40 – 1.40	1.40 – 2.60	2.60 – 15.45	–
RB101	–	0.00 – 0.40	–	0.40 – 16.20	–	–	16.20 – 40.00
RB102	–	0.00 – 0.20	0.20 – 2.80	2.80 – 17.20	–	–	17.20 – 40.00
RB103	–	0.00 – 0.20	0.20 – 2.80	2.80 – 15.90	–	–	15.90 – 40.00

3.2. MADE GROUND

Made Ground deposits were encountered within 12 of the 40 exploratory hole locations, to a maximum depth of 2.80 m bgl (WS108 – located on top of Made Ground mound extending to circa 0.80 m below wider site levels), although generally did not exceed 1.00 m bgl.

The Made Ground deposits generally consisted of the following sequence:

- Reworked topsoil comprising dark brown slightly sandy clay with frequent rootlets to depths of between 0.20 m and 0.50 m bgl. The topsoil was generally free from anthropogenic material with the exception of SA101 which contained gravel of brick and TP104 where a land drain was identified.
- Brown gravelly sandy clay. Gravel comprised of fine to coarse angular to subangular fragments of brick, asphalt, and concrete with gravel to cobble sized inclusions of wood, metal, glass, plastic, rubber, and leather.

Deeper Made Ground was encountered within TP101, TP102, and WS108 to a depth of between 1.90 m and 2.80 m bgl. These exploratory locations were positioned on top of the anthropogenic mounds in the west of the site.

TP115 was positioned on a smaller mound in the south of the site, bordering Hinchley Road and the car park associated with the off-site school. Made Ground deposits were encountered here to a depth of 1.20 m bgl as dark brown sandy gravelly clay with fine to coarse angular to subangular gravel of brick, concrete, and asphalt, with frequent gravel sized inclusions of wood and glass.

SA101 and TP104 contained shallow Made Ground to a maximum depth of 0.50 m bgl due to the presence of brick or a land drain in the topsoil.

The remaining exploratory locations contained Made Ground to depths ranging from 0.60 m to 1.10 m bgl associated with isolated areas with rare gravel sized fragments of brick, concrete, or asphalt.

A depth of Made Ground Plan is presented in APPENDIX IV.

3.3. SUPERFICIAL DEPOSITS

Natural drift deposits were encountered within all exploratory hole locations except for TP115, to a maximum proven depth of 40.00 m bgl (RB101-RB103).

Superficial deposits generally comprised PEAT and CLAY, varying in strength from very soft to very stiff.

SAND deposits were encountered across the site, underlying cohesive deposits from 15.90 m bgl.

3.3.1. CLAY

CLAY deposits were generally encountered as light grey slightly gravelly CLAY, with gravel consisting fine to medium subangular to subrounded of mudstone.

Organic CLAY was encountered within TP113, TP117, and WS112 at depths between 0.40 m and 1.10 m bgl, with rare inclusions of wood.

Very soft to soft CLAYs were encountered within twelve of the locations (SA102, SA103, TP107, TP108, TP110, TP112, TP114, TP117, TP118, WS109, CP103, and CP104), primarily encountered within the centre and east of the site, between 1.00 and 2.00 m bgl and at a thickness of <1.00 m.

Soft clays have been encountered at a maximum depth of 2.80 m bgl based on exploratory hole locations undertaken to date.

3.3.2. PEAT

Peat deposits have been encountered in 23 locations (of 40 total), encountered site wide generally in the upper 1.00 m. However, PEAT was encountered to a maximum recorded depth of 3.00 m within WS108 (set atop of the raised mound).

The PEAT was generally encountered within a low to moderate stage of humification, ranging from H2 to H6 on the Von Post Scale. As such, much of the original plant structure was still present, resulting in the PEAT generally containing moderate quantities of fibres, rootlets, and wood. The PEAT was described as pertaining a slight to strong organic odour based on the degree of decomposition.

3.3.3. SAND

SAND was encountered within all three deep rotary exploratory locations (RB101, RB102, and RB103) from 15.90 m bgl to a maximum proven depth of 40.00 m bgl.

The granular deposits were encountered as either brown clayey fine to medium grained SAND or brown gravelly fine to medium grained SAND with fine to medium, subangular to subrounded gravel of mudstone.

3.4. SOLID GEOLOGY

The solid bedrock geology of the Pennine Middle Coal Measures was not encountered during the ground investigation, undertaken to a maximum depth of 40.00 m bgl.

3.5. GROUNDWATER

Groundwater strikes were encountered as seepages. The depth of the seepages are shown on the exploratory hole records in APPENDIX VI and are summarised in Table 6.

Table 6 Summary of Groundwater Strikes

LOCATION	DEPTH TO STRIKE (m)	NOTES
SA102	0.80	Slow Ingress
TP111	0.80	Slow Ingress

LOCATION	DEPTH TO STRIKE (m)	NOTES
TP116	0.60	Slow Ingress
CP102	2.00	Seepage

Monitoring was undertaken using an electronic dip meter. These results are summarised in Table 14.

3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the site investigation and these are summarised in Table 7.

Table 7 Summary of Visual and Olfactory Evidence of Contamination

LOCATION	DEPTH (m)	STRATUM	NOTES
SA103	0.40 – 1.00	PEAT	Strong Organic Odour
TP102	1.90 – 2.00	Made Ground	Slight Organic Odour
TP106	0.40 – 0.90	PEAT	Strong Organic Odour
TP107	0.40 – 0.80	PEAT	Strong Organic Odour
TP108	0.40 – 0.90	PEAT	Strong Organic Odour
TP110	0.40 – 0.90	PEAT	Slight Organic Odour
TP111	0.40 – 0.90	PEAT	Slight Organic Odour
TP116	0.30 – 0.80	PEAT	Strong Organic Odour
TP118	0.40 – 0.90	PEAT	Slight Organic Odour
WS101	0.50 – 1.00	Made Ground	Slight Organic Odour
WS102	1.10 – 2.00	CLAY	Slight Organic Odour
WS105	0.20 – 1.20	PEAT	Slight Organic Odour
WS106	0.80 – 1.50	PEAT	Strong Organic Odour
WS109	0.20 – 0.50	PEAT	Slight Organic Odour
CP102	0.20 – 2.80	PEAT	Slight Organic Odour
CP103	0.10 – 2.00	PEAT	Slight Organic Odour

3.7. OBSTRUCTIONS

A concrete obstruction was encountered during the site investigation within TP115 (south east) which refused at 1.20 m bgl on a concrete slab.

A land drain was encountered in the north west of the site within TP102 at 2.20 m bgl (below anthropogenic mound) and TP104 at 0.40 m bgl.

Based upon limited historical development recorded on site, underground obstructions are anticipated to be present within the south east only.

4. TIER 2 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 2 qualitative land risk assessment with respect to human health, controlled waters and ground gas to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. SAMPLE ANALYSIS POPULATION

Table 8 summarises the chemical analysis testing scheduled.

Table 8 Summary of Testing Schedule

TYPE OF SAMPLE	NO. OF SAMPLES	DETERMINANDS
Made Ground	6	Speciated PAH
	6	pH, total metals, TOC
	6	Asbestos ID
	6	Speciated TPH
Natural Topsoil	3	Speciated PAH
	3	pH, total metals, TOC
	3	Asbestos ID
	3	Speciated TPH
Natural CLAY	4	Speciated PAH
	4	pH, total metals, TOC
	4	Asbestos ID
	4	Speciated TPH
Natural PEAT	3	Speciated PAH
	3	pH, total metals, TOC
	3	Asbestos ID
	3	Speciated TPH

4.2. HUMAN HEALTH RISK ASSESSMENT

At Tier 2 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 2 screening values are not provided by LQM, other screening values have been used and these are referenced in Table 9.

The Tier 2 screening values for residential with plant uptake have been utilised for this assessment due to the proposed development being a residential end use.

The results of the comparison have been summarised in Table 9.

Table 9 Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use (with plant uptake) 1% SOM

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
Arsenic	mg/kg	37	16	24.00	-	1	No Further Action
Cadmium	mg/kg	11	16	0.96	-	1	No Further Action
Chromium (VI)	mg/kg	6.0	16	< 0.50	-	1	No Further Action
Lead	mg/kg	200**	16	570.00	TP101 1.00 m	1	Further Action
Mercury	mg/kg	1.2	16	0.64	-	4	No Further Action
Nickel	mg/kg	130	16	47.00	-	1	No Further Action
Selenium	mg/kg	250	16	1.30	-	1	No Further Action
Copper	mg/kg	2400	16	210.00	-	1	No Further Action
Zinc	mg/kg	3700	16	280.00	-	1	No Further Action
Cyanide – Total	mg/kg	791	16	7.00	-	1	No Further Action
Phenols – Total	mg/kg	120	16	0.60	-	1	No Further Action
Asbestos	Fibres	NFD	16	NFD	-	3	No Further Action
Naphthalene	mg/kg	2.3	16	0.56	-	4	No Further Action
Acenaphthylene	mg/kg	170	16	0.38	-	2	No Further Action
Acenaphthene	mg/kg	210	16	0.51	-	1	No Further Action
Fluorene	mg/kg	170	16	0.56	-	1	No Further Action
Phenanthrene	mg/kg	95	16	4.70	-	2	No Further Action
Anthracene	mg/kg	2400	16	1.40	-	2	No Further Action
Fluoranthene	mg/kg	280	16	10.00	-	2	No Further Action
Pyrene	mg/kg	620	16	9.30	-	2	No Further Action
Benzo(a)Anthracene	mg/kg	7.2	16	4.60	-	2	No Further Action
Chrysene	mg/kg	15	16	4.90	-	2	No Further Action
Benzo(b)Fluoranthene	mg/kg	2.6	16	6.20 5.20 4.80	TP101 1.00 m WS112 0.80 m TP115 0.60 m	2	Further Action
Benzo(k)Fluoranthene	mg/kg	77	16	4.40	-	2	No Further Action
Benzo(a)Pyrene	mg/kg	2.2	16	5.10 4.90 4.10	TP101 1.00 m WS112 0.80 m TP115 0.60 m	2	Further Action
Indeno(123-cd)Pyrene	mg/kg	27	16	4.80	-	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24	16	4.10 0.71 0.52	WS112 0.80 m TP101 1.00 m TP115 0.60 m	2	Further Action
Benzo(ghi)Perylene	mg/kg	320	16	4.60	-	2	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	16	< 1.0	-	4	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	16	< 1.0	-	4	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	16	< 1.0	-	4	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	16	26.00	-	4	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	16	140.00	-	1	No Further Action
TPH C21-C35 (aromatic)*	mg/kg	1100	16	140.00	-	1	No Further Action

Notes
PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation

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

The pathway noted in the table is the primary pathway, however it may not be the only pathway of that contaminant
* The Tier 2 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 2 values for aliphatic compounds for the volatile and semi volatile fractions (C5-C12) and the Tier 2 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.
** Tier 2 GAC for lead taken from C4SL CL:AIRE

4.2.1. SUMMARY OF RESULTS

Referring to Table 9, the result of this direct comparison indicates that the concentrations of the following contaminants exceed the generic acceptance criteria (GAC) values for a residential end-use (1% SOM):

Inorganics:

- Lead (PL1).

Organics:

- Benzo(b)Fluoranthene (PL2);
- Benzo(a)Pyrene (PL2); and
- Dibenzo(a,h)Anthracene (PL2).

Asbestos was not identified in the samples submitted for analysis.

The main exposure pathways based on the Tier 2 exceedances are:

- Soil ingestion (PL1); and
- Dermal contact and ingestion (PL2).

4.2.2. DISCUSSION

All of the identified elevated concentrations have primary exposure pathways related to dermal contact (PL1) and ingestion of soils (PL2).

It is acknowledged that the assessment is based on GAC values with a conservative soil organic matter (SOM) of 1%, therefore consideration has been given to the actual SOM for the soil types and adjusting the GAC values accordingly.

When considering the actual SOM for the Made Ground and CLAY where exceedances occurred, 6% SOM is applicable. However, when reassessing the chemical analysis results using the less conservative/increased GAC values for 6% SOM, exceedances of PAH compounds remain.

Based on the above, the risk to chronic human health associated with the elevated concentrations of inorganic heavy metals and non-volatile PAH compounds can be mitigated through the installation of a suitable cover system in all proposed private gardens, landscaping and public open space to remove any potential for direct exposure to impacted soils.

The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy.

Where the exceedances of lead and non-volatile PAH compounds were encountered within the Made Ground at 1.00 m bgl and 0.60 m bgl in TP101 and TP115 respectively, it is likely associated with the bunded anthropogenic material. Delineation of the above ground anthropogenic soils is recommended.

Where the exceedances of non-volatile PAH compounds were encountered within the natural CLAY at 0.8 m bgl in WS112, the background soil chemistry for the area does not indicate elevated PAH levels locally. During enabling works further assessment should be undertaken to delineate / evaluate the soils in this area further to prove or discount any PAH source. Any subsoils proposed for use in landscaped areas will require validation testing before re-use.

4.3. 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 10.

Table 10 Controlled Waters Conceptual Model and Sensitivity Profile

DISCUSSION		SENSITIVITY RATING
Contaminant Source		
Made Ground Made Ground has been encountered within secluded areas of the site to a maximum proven depth of 2.80 m bgl. Elevated lead and non-volatile PAH concentrations have been identified within Made Ground deposits, which may leach into underlying soils and be mobilised by shallow groundwater, if present.		**Moderate**
Pathway		
Vertical Migration The site is underlain by CLAY deposits to 15.00 m bgl, which will restrict the vertical migration of contaminants. The presence of this low permeability stratum will offer protection to the underlying aquifer.		**Low**
Lateral migration Lateral migration of contaminants will be restricted due to the site being underlain by cohesive CLAY deposits. Additionally, there is no surface water receptor within 250 m of the site, further reducing the lateral migration risk.		**Low**
Receptor		
Aquifer Classification in Superficial Deposits	Secondary Undifferentiated	**Low**
Aquifer Classification in Bedrock	Secondary A	**Moderate**
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	N/A	**Low**
Distance to the Closest Groundwater Abstraction Point	None within 1 km of the site.	**Low**
Is the Site Located Within 50 m of a Surface Watercourse?	No surface water features on site or within 250m of the site boundary.	**Low**

The ICSM developed within the context of the site setting has identified the underlying Secondary A aquifer as the primary receptor, however, the likelihood of vertical migration of contamination to the aquifer is considered to be low due to the presence of low permeability cohesive drift.

The Tier 2 assessment in line with LCRM (2023) has included a comparison of leachate analysis from samples of the Made Ground and groundwater samples to drinking water standards (DWS) and environmental quality standards (EQS). These are presented in Table 11.

Water samples were obtained utilising a bailer.

Table 11 Comparison of Leachate Analysis with Tier 2 Screening Levels

DETERMINAND	UNIT	EQS [1, 2] AA	DWS [3,4]	NO. OF GROUND WATER SAMPLES	MAX CONC. IN GROUND WATER	LOCATION OF EXCEEDANCE	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
Arsenic	µg/l	50	10	3	7.60	-	1	3.90	-	No Further Action
Cadmium	µg/l	0.08-0.25	5	3	<0.11	-	1	<0.11	-	No Further Action
Chromium (VI)	µg/l	3.4	–	3	-	-	1	<20.00	-	No Further Action
Chromium (III)	µg/l	4.7	50	3	2.2	-	1	8.60	WS104 - 0.50 m	Further Action
Copper	µg/l	1	2000	3	5.6	WS101 (EQS) WS104 (EQS) WS112 (EQS)	1	20.00	WS104 - 0.50 m	Further Action
Total Cyanide	µg/l	1	50	3	<0.0050	-	1	< 0.0050	-	No Further Action
Lead	µg/l	1.2	10	3	0.85	-	1	< 0.50	-	No Further Action
Mercury	µg/l	–	1.0	3	<0.05	-	1	< 0.05	-	No Further Action
Nickel	µg/l	4	20	3	11	WS101 (EQS) WS104 (EQS) WS112 (EQS)	1	< 0.50	-	Further Action
Selenium	µg/l	–	10	3	1.5	-	1	0.89	-	No Further Action
Zinc	µg/l	10.9	–	3	27	WS101 (EQS) WS104 (EQS) WS112 (EQS)	1	< 2.50	-	Further Action
pH	6–9			3	6.7	-	1	9.9	-	No Further Action
Polycyclic Aromatic Hydrocarbons										
Naphthalene	µg/l	2	10*	3	<0.50	-	1	< 0.10	-	No Further Action

DETERMINAND	UNIT	EQS [1, 2] AA	DWS [3,4]	NO. OF GROUND WATER SAMPLES	MAX CONC. IN GROUND WATER	LOCATION OF EXCEEDANCE	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
Anthracene	µg/l	0.1	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Benzo[b]fluoranthene	µg/l	0.00017*	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Benzo[k]fluoranthene	µg/l	0.00017*	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Benzo(a)pyrene	µg/l	0.00017*	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Indeno(123-cd)pyrene	µg/l	0.00017*	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Fluoranthene	µg/l	0.0063	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Benzo(ghi)perylene	µg/l	1.7–4	10*	3	<0.50	-	1	< 0.10	-	No Further Action
Aromatic Hydrocarbons										
TPH C5-C7 (benzene)	µg/l	10	1	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C7-C8 (toluene)	µg/l	74	700	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C8-C10 (xylene)	µg/l	30	300	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C10-C12 (naphthalene)	µg/l	2	90	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C12-C16	µg/l	–	90	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C16-C35	µg/l	–	90	3	<0.10	-	1	< 0.10	-	No Further Action
Aliphatic Hydrcarbons										
TPH C5-C6	µg/l	–	1000[5]	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C6-C8	µg/l	–	1000[5]	3	<0.10	-	1	< 0.10	-	No Further Action

DETERMINAND	UNIT	EQS [1, 2] AA	DWS [3,4]	NO. OF GROUND WATER SAMPLES	MAX CONC. IN GROUND WATER	LOCATION OF EXCEEDANCE	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
TPH C8-C10	µg/l	–	300	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C10-C12	µg/l	–	300	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C12-C16	µg/l	–	300	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C16-C21	µg/l	–	300**	3	<0.10	-	1	< 0.10	-	No Further Action
TPH C21-C35	µg/l	–	300**	3	<0.10	-	1	< 0.10	-	No Further Action
Volatile Organic Compounds										
Tetrachloroethylene	µg/l	0.4	10	3	<1.00	-	N/A	-	-	No Further Action
Trichloroethylene	µg/l	10	10	3	<0.50	-	N/A	-	-	No Further Action
Trichlorobenzene	µg/l	0.4	–	3	<0.50	-	N/A	-	-	No Further Action
Trichloromethane	µg/l	2.5	–	3	<1.00	-	N/A	-	-	No Further Action
Dichloromethane	µg/l	20	200	-	-	-	N/A	-	-	N/A
Carbon Tetrachloride	µg/l	12	3	-	-	-	N/A	-	-	N/A
Vinyl Chloride	µg/l	–	0.3	3	<1.00	-	N/A	-	-	No Further Action

4.3.1. SUMMARY OF RESULTS

The direct comparison from water and leachate samples submitted to the laboratory indicated no exceedances against the DWS; which has been identified as the critical receptor for the site setting.

The leachate analysis recorded minor exceedances against the EQS values for chromium III and copper within the soils of WS104 at 0.40 m bgl.

The groundwater analysis recorded minor exceedances against the EQS values for copper, nickel, and zinc within water taken from WS101, WS104, and WS112.

4.3.2. DISCUSSION

Where leachate analysis has been undertaken, this can overstate the risk and is not be wholly representative of the site characterisation, as such, given the absence of Chromium III within groundwater samples, this is not considered to be a contaminant risk on site.

Where groundwater analysis has been undertaken, exceedances of copper, nickel, and zinc has been identified within three locations across the site when compared to the EQS values.

The main receptor for the site, however, is the underlying Secondary A bedrock aquifer – a such DWS are deemed appropriate given the absence of any surface water features within influencing distance. No exceedances of DWS have been recorded. Additionally, the site is underlain by a minimum of recoded thickness of c. 13 m of cohesive low permeability superficial strata, which will inhibit downward migration towards the aquifers.

The rotary boreholes did not encounter bedrock at a maximum depth 40.00 m bgl, and it is assumed to be present in excess of 60.00 m bgl based on previous BGS borehole logs within the vicinity of the site.

Due to the absence of a complete pollutant linkage and lack of exceedance of DWS, the site is considered to pose a low risk to controlled waters.

4.4. GROUND GAS RISK ASSESSMENT

4.4.1. RATIONALE

Hazardous ground gas qualitative risk assessment is based on a conceptual site model (CSM) similar to that used for soil and groundwater contamination sources (i.e., source pathway receptor pollutant linkages).

The risk can be assessed based on knowledge of the ground conditions and CSM and a measure of hazardous gas concentrations and gas flow at the site within monitoring standpipes.

4.4.2. SOURCES AND PATHWAYS OF GROUND GAS

Table 12 summarises the potential sources and pathways of ground gas within the context of the recorded site setting and proposed development.

Table 12 Identified Potential Sources of Ground Gas

SOURCE
Made Ground Made Ground deposits were encountered to a maximum depth of 2.80 m bgl (WS108). Slight organic odours were noted within two of the locations (TP102 between 1.90 and 2.20 m bgl and WS101 between 0.50 and 1.00 m bgl).
Superficial Strata Natural superficial deposits were encountered within the majority of exploratory hole locations with the exception of TP102 and TP115 which were terminated due to obstructions or encountering land drains. Shallow PEAT deposits were encountered within 21 of the exploratory locations site-wide to a maximum depth of 2.80 m bgl. The PEAT was noted as being within low to moderate degrees of humification, with low to moderate levels of fibres, rootlet, and wood content. Very slight to strong organic odours were noted within 13 of the locations where it was present. These deposits, therefore, pose a risk of ground gas. A peaty CLAY was noted within WS102 from 1.10 m to 2.00 m bgl which pertained a slight organic odour. The primary superficial deposit consisted of firm to very stiff low permeability CLAY with areas of commonly shallow very soft to soft CLAY. These deposits are unlikely to provide a viable pathway for gas migration when overlaying the PEAT deposits. PEAT and organic soils should be removed during enabling works, in turn removing the gas source.
Solid Strata The solid bedrock geology was not encountered during the ground investigation. The site is located within a Coal Authority reporting area but not within a development high risk area, however, the bedrock is anticipated at circa 60 m bgl with > 13 m of low permeability clays present across the site. The presence of potential deep unrecorded coal workings is a source of ground gas, however, the risk is reduced given the presence of >13 m of low permeability clays present across the site, that will inhibit the vertical migration.
Landfill Sites A historical off-site landfill was located 123 m south of the site, active between 1964 and 1974. Lateral migration of gas through deep granular SAND deposits cannot be discounted, however, given the presence of 13 m of low permeability clays present across the site, vertical migration of gas to proposed plots is unlikely.
Other Gases The site is located within an area where 1-3% of homes are above the radon action level – radon protective measures are not required to new build properties. No exceedances of volatile contaminants (naphthalene, elemental mercury or light end TPH) have been identified.

4.4.3. MONITORING FREQUENCY

The CIRIA C665 guidance on gas risk assessment includes recommendations for periods and frequencies for monitoring visits. These recommendations take into account the nature of the proposed development and the likely generation potential of the source.

The proposed development comprises private residential properties, which would be classified as a Type A development (high sensitivity) in accordance with BS8485:2015+A1:2019. However, it is considered that the likely generation potential of the identified gas sources (taking into account the likelihood of future increases in gas generation) would be best classified as low.

Therefore, within the context of the proposed residential end-use and ground gas generation potential, the gas assessment requires six visits over three months, with at least two sets of readings at low or falling atmospheric pressure.

4.4.4. 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 13.

Table 13 Site Characterisation by GSV (BS8485:2015+A1:2019)

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.

It should be noted that in the first instance, this assessment has been carried out in accordance with BS8485:2015+A1(2019).

4.4.5. MONITORING METHODOLOGY

Concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) 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 300 seconds (5 minutes) at each location, increasing to 600 seconds if elevated concentrations were identified, at which point the maximum concentration of CH_4 and CO_2, together with the lowest concentration of O_2 were recorded.

The results of the ground gas monitoring are presented in Table 14.

In addition to the raw data, the results for each 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.

4.4.6. SUMMARY OF MONITORING RESULTS

Table 14 presents of the ground gas and groundwater monitoring results to date.

Table 14 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 Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	0.1	0.1	0.0001	18.1	997	Falling	0.1	0.1	1.00 – 3.00	3.80	1.12
		04/12/2024	0.1	0.1	0.0001	1.5	0.4	0.0015	18.1	1006	Falling	0.1	0.1		3.80	0.80
		16/12/2024	0.1	0.1	0.0001	0.2	0.1	0.0002	20.7	1011	Rising	0.1	0.1		3.76	0.82
WS102	Natural Peaty CLAY	18/11/2024	0.1	0.1	0.0001	4.4	4.3	0.0044	12.4	997	Falling	0.1	0.1	1.00 – 2.00	1.68	Dry
		04/12/2024	0.1	0.1	0.0001	3.3	3.3	0.0033	17.7	1006	Falling	0.1	0.1		1.68	1.13
		16/12/2024	0.1	0.1	0.0001	4.2	4.2	0.0042	18.0	1010	Rising	0.1	0.1		1.74	1.18
WS103	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	0.7	0.6	0.0007	18.1	997	Falling	0.1	0.1	1.00 - 2.00	1.95	1.18
		04/12/2024	0.1	0.1	0.0001	1.8	0.2	0.0018	17.9	1006	Falling	0.1	0.1		1.95	1.10
		16/12/2024	0.1	0.1	0.0001	0.6	0.2	0.0006	20.7	1012	Rising	0.1	0.1		2.03	0.84
WS104	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	2.8	2.2	0.0028	15.3	997	Falling	0.1	0.1	2.00 - 3.50	3.00	1.64
		04/12/2024	0.1	0.1	0.0001	9.2	6.5	0.0092	13.9	1006	Falling	0.1	0.1		3.00	1.63
		16/12/2024	0.1	0.1	0.0001	6.3	5.8	0.0063	13.5	1013	Rising	0.1	0.1		3.00	1.60
WS105	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	4.3	1.9	0.0043	17.0	997	Falling	0.1	0.1	1.00 - 5.00	4.31	1.25
		04/12/2024	0.1	0.1	0.0001	4.9	0.3	0.0049	17.5	1005	Falling	0.1	0.1		4.31	0.52
		16/12/2024	0.1	0.1	0.0001	7.10	2.20	0.0079	19.9	1011	Rising	0.1	0.1		4.39	0.58
WS106	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	0.1	0.1	0.0001	18.3	997	Falling	0.1	0.1	2.00 - 3.00	2.00	0.97
		04/12/2024	0.1	0.1	0.0001	0.2	0.1	0.0002	17.6	1005	Falling	0.1	0.1		2.00	0.98
		16/12/2024	0.1	0.1	0.0001	0.3	0.3	0.0003	20.6	1011	Rising	0.1	0.1		2.00	1.04
WS108	Made Ground Gravelly Clay	18/11/2024	0.1	0.1	0.0001	0.9	0.9	0.0009	17.5	997	Falling	0.1	0.1	1.00 - 2.50	2.08	Dry
		04/12/2024	0.1	0.1	0.0001	7.9	7.9	0.0079	10.8	1006	Falling	0.1	0.1		2.08	1.62
		16/12/2024	0.1	0.1	0.0001	4.8	4.8	0.0048	14.10	1011	Rising	0.1	0.1		2.13	1.67
WS109	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	1.9	1.7	0.0019	15.3	997	Falling	0.1	0.1	3.00 - 5.00	4.53	2.72
		04/12/2024	0.1	0.1	0.0001	0.1	0.1	0.0001	17.1	1006	Falling	0.1	0.1		4.53	1.42
		16/12/2024	0.1	0.1	0.0001	0.3	0.1	0.0003	20.8	1011	Rising	0.1	0.1		4.59	1.14
WS110	Natural Sandy CLAY	18/11/2024	0.1	0.1	0.0001	0.1	0.1	0.0001	18.3	997	Falling	0.1	0.1	1.00 - 2.00	1.90	0.72
		04/12/2024	0.1	0.1	0.0001	0.2	0.2	0.0002	17.9	1006	Falling	0.1	0.1		1.90	0.61
		16/12/2024	0.1	0.1	0.0001	1.1	0.9	0.0011	20.3	1011	Rising	0.1	0.1		1.88	0.67
WS111	Natural Sandy Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	3.9	3.9	0.0039	15.0	997	Falling	0.1	0.1	1.00 - 1.50	0.95	0.81
		04/12/2024	0.1	0.1	0.0001	4.3	4.3	0.0043	15.2	1006	Falling	0.1	0.1		0.92	0.73
		16/12/2024	0.1	0.1	0.0001	4.9	4.9	0.0049	16.2	1011	Rising	0.1	0.1		1.08	0.81
WS112	Natural Gravelly CLAY	18/11/2024	0.1	0.1	0.0001	7.5	6.8	0.0075	10.8	997	Falling	0.1	0.1	1.00 - 3.00	2.52	1.45
		04/12/2024	0.1	0.1	0.0001	12.2	12.1	0.0122	12.0	1006	Falling	0.1	0.1		2.52	1.16
		16/12/2024	0.1	0.1	0.0001	14.0	13.2	0.0140	5.60	1011	Rising	0.1	0.1		2.65	1.31

Notes

CIRIA Characteristic Situation		Q_{hg}		
	CS1	<0.07	Typical Max CO2 <5 % Typical Max CH4 <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	

4.4.7. GROUNDWATER

The water level within several of the monitoring wells was recorded to be above the top of the response zone (flooded) on a number of occasions, as summarised in Table, thus rendering some of the monitoring data unreliable. Therefore, each time a flooded well was encountered, the well was bailed and left to re-equilibrate for the following visit.

Table 15 Flooded Monitoring Well Data

WELL	VISIT 1 18/11/2024	VISIT 2 04/12/2024	VISIT 3 16/12/2024
WS101	-	Y	Y
WS102	-	-	-
WS103	-	-	Y
WS104	Y	Y	Y
WS105	-	Y	Y
WS106	Y	Y	Y
WS108	-	-	-
WS109	Y	Y	Y
WS110	Y	Y	Y
WS111	Y	Y	Y
WS112	-	-	-

Within remaining monitoring wells, groundwater levels were observed to rise over the monitoring period, however, due to the predominantly low permeability cohesive drift stratum, it is likely that water levels are representative of surface water collecting within the standpipes and not a true representation of groundwater.

4.4.8. BAROMETRIC PRESSURE

The first visit was undertaken during a period of falling pressure, with pressure falling from 1039 m bar on the 12th November to 1001 m bar on the 19th November across the wider area. During the visit pressures were recorded as 997 m bar.

The second visit was undertaken during a period of relatively high falling pressure, with pressure falling from 1028 m bar on the 28th November to 1003 m bar on the 5th December across the wider area. During the visit pressures were recorded as 1005 - 1006 m bar.

The third visit was undertaken during a period of relatively high rising pressure, with pressure falling from 1021 m bar on the 14th December to 1027 m bar on the 16th December across the wider area. During the visit pressures were recorded as 1010 -1012 m bar.

A period of steady and low atmospheric pressure has not yet been recorded, future visits will target these atmospheric conditions where possible.

4.4.9. GAS FLOW

During all monitoring visits, flow rates were recorded to be 0.1 l/hr (limit of detection of the analyser).

4.4.10. GAS CONCENTRATIONS

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

Carbon dioxide concentrations were recorded at concentrations ranging from 0.1%–14.0 % v/v (WS112).

A further 3monitoring visits are required to complete the gas monitoring programme.

4.4.11. RADON RISK

The site is located within an area where 1-3% of homes are above the radon action level, therefore radon protection measures will not need to be incorporated into any proposed new dwellings.

4.4.12. CONCLUSION

Wells were flooded on several occasions, for the locations that were not flooded monitoring data obtained to date has recorded elevated gas readings above the Characteristic Situation 1 values and as such, a Characteristic Situation 2 (CS2) classification is likely to be required.

A further 3 monitoring visits are required to complete the gas monitoring programme. Upon completion of the gas monitoring program, a ground gas addendum report with final recommendations will be produced.

At this time, it is recommended precautionary allowance for CS2 protection measures are allowed for.

Given the gas source (PEAT) is to be removed, following enabling works post remediation gas monitoring is recommended.

4.5. 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 16 Pipeline Selection PE Threshold Concentrations

CONTAMINANT GROUP	PE -THRESHOLD (mg/kg)	CONCENTRATIONS AT CURRENT PIPELINE DEPTH (mg/kg)
Total VOC	N/A	N/A
Total BTEX And MTBE	N/A	N/A
Total SVOCs (Excluding PAH and those substances marked with an *)	N/A	N/A
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	26.00 (TP101 – 1.00 m bgl)
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	681.00 (TP101 – 1.00 m bgl)
Phenols (From SVOC Analysis)*	2	N/A
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	N/A
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?	EC10-EC16 – 19 mg/kg – TP115 0.6 m bgl.	

CONTAMINANT GROUP	PE -THRESHOLD (mg/kg)	CONCENTRATIONS AT CURRENT PIPELINE DEPTH (mg/kg)
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?	Yes – heavy end hydrocarbon impact has been identified on site, with groundwater levels generally at or above pipeline depth.	
Will soils impacted with above determinands likely be utilised elsewhere on site?	No.	
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

The elevated heavy end hydrocarbons were noted within TP101 at pipeline depth (0.75 – 1.35 m bgl), and within TP115 at a shallower depth. Both of these exploratory hole locations were conducted upon the upfilled mounds in the west/south-west of the site and are therefore not representative of the sites general ground level.

Therefore, based on the assessment of current site conditions it is likely that PE pipe will be suitable at the proposed development.

4.6. DEVELOPED CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 17 has been prepared for the site.

Table 17 Developed Conceptual Model

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
SOIL						
HUMAN HEALTH						
Made Ground/ Reworked Topsoil Heavy metals and non-volatile PAHs	Accidental ingestion and/or dermal contact with contaminated soil and/or leachate. **PL1/PL2** Inhalation of contaminated dust. **PL3**	Human Health – Site personnel Human Health – end users	Likely	Medium	Elevated heavy metals and PAHs have been identified within Made Ground and reworked Topsoil across the site. Site personnel have a greater chance of coming into contact with contaminated soils, particularly during excavation and soil recovery works. **Recommendation:** Construction works to be completed with appropriate PPE and welfare facilities. Clean cover system required for garden and landscaped areas.	Low
Made Ground VOCs, hydrocarbons, volatile PAHs	Inhalation of vapours. **PL4**	Human Health – end users	Unlikely	Low	No exceedances of hydrocarbons or volatile contaminants have been identified.	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
	Migration through permeable strata and preferential pathways.	Human Health – Off-site receptors			**Recommendation:** A watching brief should be completed during enabling works to monitor if any visual or olfactory hydrocarbon impact is identified.	
Made Ground Asbestos (Asbestos containing materials (ACM) and loose fibres)	Inhalation (of fibres). Construction works disturbing bound material and releasing fibres. **PL3**	Human Health - Site personnel, end land users, and users of adjacent sites	Unlikely	Low	Asbestos fragments and fibres have not been identified. **Recommendation:** A watching brief should be completed during enabling works to identify any visible ACM. Cover system to garden and landscaped areas will prevent exposure to future site users. Construction works completed with PPE and provision of welfare.	Low
Made Ground Sulphate from potential ash within the Made Ground.	Sulphate attack on concrete. **PL6**	Building concrete	Unlikely	Low	Soils meet classification DS-1, AC-1s. **Recommendation:** Concrete should be designed in accordance with chemical testing results.	Low
Made Ground Organic contaminants such	Ingestion of tainted water supply. **PL7**	Human Health – End Users Water pipeline	Unlikely	Low	Significant contamination has not been identified at pipeline depth (0.75–1.35 m).	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
as hydrocarbons, solvents					**Recommendation:** PE pipe is likely to be suitable following a UKWIR pipeline risk assessment.	
Made Ground Phytotoxic contaminants	Direct contact (plant uptake). **PL8**	Flora	Unlikely	Low	Contamination has been encountered which may be taken up by flora in soft landscaping. **Recommendation:** Cover system to all proposed landscaped areas.	Low
CONTROLLED WATERS						
Made Ground Heavy Metals/PAH	Leaching of contaminants from Made Ground through infiltration and percolation of rainwater. **PL5**	Underlying Principal aquifer Surface Water Courses	Unlikely	Low	Chromium III, copper, nickel, and zinc have been identified as being in exceedance the EQS screening value. However, the site is underlain by c. 13 m of cohesive low permeability superficial strata, which will inhibit downward migration toward the secondary A aquifer within the superficial SAND deposits and principal aquifer within the bedrock. Furthermore, shallow groundwater has not been recorded, therefore the	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	**MIGRATION PATHWAYS**	**RECEPTORS**				
					potential for mobilisation of contamination is reduced.	
	Contact with contaminated groundwater. **PL2**	Human Health – site personnel	Unlikely	Low	Shallow groundwater has been recorded within several wells across the monitoring period, however, groundworks will not affect groundwater levels, therefore the potential for contact with groundwater is low.	Low
GROUND GAS						
Methane and Carbon Dioxide Peat Coal Workings	Inhalation of ground gas. **PL4** Accumulation of ground gas in confined spaces (asphyxiation or explosion)	Human Health – site personnel/ end users	Low likelihood	Low	PEAT is to be removed during enabling works and as such, removes the shallow gas source. Top of bedrock is anticipated at c 60m, the presence of >13m of low permeability deposits across the site will limit the vertical migration of ground gas from any potential historical coal workings. Ground gas monitoring to date suggests CS2, however this will need to be confirmed following the completion of the gas monitoring programme.	Moderate
Radon	Inhalation of ground gas. **PL4**	Human Health – site personnel	Low likelihood	Low	The site is located within an area where 1-3% of homes	Low

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	MIGRATION PATHWAYS	RECEPTORS				
	Accumulation of ground gas in confined spaces (carcinogenic)				are above the radon action level – radon protective measures are not required to new build properties.	

Notes:
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.

LEVEL OF RISK	
Very Low	
Low	
Low/Moderate	
Moderate	
Moderate/High	
High	

5. GEOTECHNICAL ASSESSMENT

5.1. 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 18 and Table 19, respectively, which indicate the clay soils to vary between soft and very stiff. Strength test data is generally consistent with the field descriptions of the aforementioned soils.

Table 18 Summary of Hand Shear Vane Tests

LOCATION	DEPTH	SHEAR STRENGTH (KPA)	CALCULATED ALLOWABLE BEARING CAPACITY (KN/M^2)
SA101	1.00	48	112.8
SA101	1.50	45	105.75
SA102	1.00	93	218.55
SA102	1.50	32	75.2
SA103	1.20	35	82.25
SA103	1.70	61	143.35
SA103	2.20	67	157.45
TP101	2.00	70	164.5
TP102	2.00	51	119.85
TP103	0.50	42	98.7
TP103	1.00	42	98.7
TP103	1.50	67	157.45
TP104	0.60	45	105.75
TP104	1.10	51	119.85
TP104	1.60	77	180.95
TP105	0.60	51	119.85
TP105	1.10	67	157.45
TP105	1.60	99	232.65
TP106	1.00	42	98.7
TP106	1.50	54	126.9
TP106	2.00	77	180.95
TP107	1.00	32	75.2
TP107	1.50	38	89.3
TP108	1.00	13	30.55
TP108	1.50	19	44.65
TP109	0.80	77	180.95
TP109	1.30	96	225.6
TP110	1.00	83	195.05
TP110	1.50	19	44.65
TP111	1.00	77	180.95
TP111	1.50	83	195.05
TP111	2.00	106	249.1
TP112	1.00	29	68.15
TP112	1.50	45	105.75
TP113	1.00	45	105.75
TP113	1.50	58	136.3
TP113	2.00	61	143.35
TP114	1.50	32	75.2
TP114	2.00	38	89.3
TP116	1.00	45	105.75
TP116	1.50	67	157.45

LOCATION	DEPTH	SHEAR STRENGTH (KPA)	CALCULATED ALLOWABLE BEARING CAPACITY (KN/M^2)
TP117	1.50	35	82.25
TP117	2.00	77	180.95
TP118	1.00	54	126.9
TP118	1.50	77	180.95
TP118	2.00	38	89.3

Notes:
ABC Calculated using Stroud and Butler et al 1974.
*Granular content within soil tests may underestimate true shear strength.

Table 19 Summary of Undrained Shear Strength in Triaxial Compression – Laboratory Test

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m^2)	CONSISTENCY
WS110	3.50-4.00	Brown silty slightly sandy slightly gravelly CLAY. Gravel was fine	85	Stiff

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 20.

Table 20 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/m²)	ALLOWABLE BEARING CAPACITY (kN/m²)*
WS101	1.00	Slightly Gravelly CLAY	5	5.04	N/A	Low strength	Firm	25.20	51.92
WS101	2.00	Slightly Gravelly CLAY	7	6.39	N/A	Low strength	Firm	31.97	65.74
WS101	3.00	Slightly Gravelly CLAY	9	7.83	N/A	Low strength	Firm	39.13	80.46
WS101	4.00	Slightly Gravelly CLAY	13	10.98	N/A	Medium strength	Stiff	54.92	112.91
WS101	5.00	Slightly Gravelly CLAY	14	11.61	N/A	Medium strength	Stiff	58.07	119.40
WS102	1.00	Peaty CLAY	4	4.03	N/A	Low strength	Firm	20.16	41.46
WS102	2.00	Slightly Gravelly CLAY	10	9.14	N/A	Medium strength	Stiff	45.68	93.91
WS102	3.00	Slightly Gravelly CLAY	21	18.26	N/A	High strength	Very Stiff	91.31	187.74
WS102	4.00	Slightly Gravelly CLAY	21	17.74	N/A	High strength	Very Stiff	88.71	182.39
WS102	5.00	Slightly Gravelly CLAY	28	23.23	N/A	High strength	Very Stiff	116.15	238.80
WS103	1.00	Slightly Peaty CLAY	7	7.06	N/A	Low strength	Firm	35.29	72.55
WS103	2.00	Slightly Gravelly CLAY	12	10.96	N/A	Medium strength	Stiff	54.81	112.69
WS103	3.00	Slightly Gravelly CLAY	13	11.31	N/A	Medium strength	Stiff	56.53	116.22

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 CAPACITY (kN/m^2)*
WS103	4.00	Slightly Gravelly CLAY	11	9.29	N/A	Medium strength	Stiff	46.47	95.54
WS103	5.00	Slightly Gravelly CLAY	16	13.27	N/A	Medium strength	Stiff	66.37	136.46
WS104	1.00	Slightly Gravelly CLAY	4	4.03	N/A	Low strength	Firm	20.16	41.46
WS104	2.00	Slightly Gravelly CLAY	6	5.48	N/A	Low strength	Firm	27.41	56.35
WS104	3.00	Slightly Gravelly CLAY	11	9.57	N/A	Medium strength	Stiff	47.83	98.34
WS104	4.00	Slightly Gravelly CLAY	15	12.67	N/A	Medium strength	Stiff	63.36	130.28
WS105	1.00	Slightly Gravelly CLAY	4	4.03	N/A	Low strength	Firm	20.16	41.46
WS105	2.00	Slightly Gravelly CLAY	13	11.88	N/A	Medium strength	Stiff	59.38	122.09
WS105	3.00	Slightly Gravelly CLAY	12	10.44	N/A	Medium strength	Stiff	52.18	107.28
WS105	4.00	Slightly Gravelly CLAY	13	10.98	N/A	Medium strength	Stiff	54.92	112.91
WS105	5.00	Slightly Gravelly CLAY	15	12.44	N/A	Medium strength	Stiff	62.22	127.93
WS106	1.00	PEAT	5	5.04	N/A	Low strength	Firm	25.20	51.82
WS106	2.00	Slightly Gravelly CLAY	16	14.62	N/A	Medium strength	Stiff	73.08	150.26
WS106	3.00	Slightly Gravelly CLAY	50	43.48	N/A	Very high strength	Very Stiff	217.41	447.00

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 CAPACITY (kN/m^2)*
WS107	1.00	Slightly Gravelly CLAY	8	8.07	N/A	Medium strength	Stiff	40.33	82.91
WS107	2.00	Slightly Gravelly CLAY	16	14.62	N/A	Medium strength	Stiff	73.08	150.26
WS107	3.00	Slightly Gravelly CLAY	13	11.31	N/A	Medium strength	Stiff	56.53	116.22
WS107	4.00	Slightly Gravelly CLAY	12	10.14	N/A	Medium strength	Stiff	50.69	104.22
WS107	5.00	Slightly Gravelly CLAY	17	14.10	N/A	Medium strength	Stiff	70.52	144.98
WS108	3.00	Slightly Gravelly CLAY	11	9.57	N/A	Medium strength	Stiff	47.83	98.34
WS108	4.00	Slightly Gravelly CLAY	20	16.90	N/A	High strength	Very Stiff	84.49	173.70
WS108	5.00	Slightly Gravelly CLAY	19	15.76	N/A	High strength	Very Stiff	78.81	162.04
WS109	1.00	Slightly Sandy CLAY	4	4.03	N/A	Low strength	Firm	20.16	41.46
WS109	2.00	Slightly Gravelly CLAY	14	12.79	N/A	Medium strength	Stiff	63.95	131.48
WS109	3.00	Slightly Gravelly CLAY	13	11.31	N/A	Medium strength	Stiff	56.53	116.22
WS109	4.00	Slightly Gravelly CLAY	11	9.29	N/A	Medium strength	Stiff	46.47	95.54
WS109	5.00	Slightly Gravelly CLAY	17	14.10	N/A	Medium strength	Stiff	70.52	144.98
WS110	1.00	Slightly Gravelly CLAY	10	10.08	N/A	Medium strength	Stiff	50.41	103.64

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 CAPACITY (kN/m^2)*
WS110	2.00	Slightly Gravelly CLAY	21	19.18	N/A	High strength	Very Stiff	95.92	197.21
WS110	3.00	Slightly Gravelly CLAY	20	17.39	N/A	High strength	Very Stiff	86.97	178.80
WS110	4.00	Slightly Gravelly CLAY	15	12.67	N/A	Medium strength	Stiff	63.36	130.28
WS110	5.00	Slightly Gravelly CLAY	17	14.10	N/A	Medium strength	Stiff	70.52	144.98
WS111	1.00	Slightly Gravelly CLAY	5	5.04	N/A	Low strength	Firm	25.20	51.82
WS111	2.00	Slightly Gravelly CLAY	8	7.31	N/A	Low strength	Firm	36.54	75.13
WS111	3.00	Slightly Gravelly CLAY	18	15.65	N/A	High strength	Very Stiff	78.27	160.92
WS111	4.00	Slightly Gravelly CLAY	16	13.52	N/A	Medium strength	Stiff	67.59	138.96
WS111	5.00	Slightly Gravelly CLAY	17	14.10	N/A	Medium strength	Stiff	70.52	144.98
WS112	1.00	Slightly Gravelly CLAY	8	8.07	N/A	Medium strength	Stiff	40.33	82.91
WS112	2.00	Slightly Gravelly CLAY	25	22.84	N/A	High strength	Very Stiff	114.19	234.78
WS112	3.00	Slightly Gravelly CLAY	50	43.48	N/A	Very high strength	Very Stiff	217.41	447.00
CP101	1.00	Slightly Sandy CLAY	8	8.07	N/A	Medium strength	Stiff	40.33	82.91
CP101	2.00	Slightly Sandy CLAY	12	10.96	N/A	Medium strength	Stiff	54.81	112.69

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 CAPACITY (kN/m^2)*
CP101	3.00	Slightly Sandy CLAY	15	13.04	N/A	Medium strength	Stiff	65.22	134.10
CP101	4.00	Gravelly CLAY	17	14.36	N/A	Medium strength	Stiff	71.81	147.65
CP101	5.00	CLAY	22	18.25	N/A	High strength	Very Stiff	91.26	187.63
CP101	6.50	CLAY	21	17.14	N/A	High strength	Very Stiff	85.72	176.24
CP101	8.00	CLAY	23	18.62	N/A	High strength	Very Stiff	93.09	191.39
CP101	9.50	CLAY	28	22.57	N/A	High strength	Very Stiff	112.83	231.98
CP101	12.50	CLAY	27	19.73	N/A	High strength	Very Stiff	98.63	202.79
CP101	14.00	CLAY	33	22.86	N/A	High strength	Very Stiff	114.30	235.00
CP101	15.50	CLAY	33	21.74	N/A	High strength	Very Stiff	108.68	223.45
CP102	1.00	Silty PEAT	4	4.03	N/A	Low strength	Firm	20.16	41.46
CP102	2.00	Silty PEAT	4	3.65	N/A	Very low strength	Soft	18.27	37.56
CP102	3.00	Slightly Sandy CLAY	10	8.70	N/A	Medium strength	Stiff	43.48	89.40
CP102	4.00	Slightly Sandy CLAY	10	8.45	N/A	Medium strength	Stiff	42.24	86.85
CP102	5.00	Slightly Sandy CLAY	15	12.44	N/A	Medium strength	Stiff	62.22	127.93
CP102	6.50	Slightly Sandy CLAY	19	15.51	N/A	High strength	Very Stiff	77.56	159.46
CP102	8.00	Gravelly CLAY	21	17.00	N/A	High strength	Very Stiff	84.99	174.75
CP102	11.00	Gravelly CLAY	26	20.11	N/A	High strength	Very Stiff	100.54	206.70
CP102	12.50	Gravelly CLAY	27	19.73	N/A	High strength	Very Stiff	98.63	202.79
CP102	15.50	Gravelly CLAY	36	23.71	N/A	High strength	Very Stiff	118.56	243.76
CP103	1.00	Silty PEAT	2	2.02	N/A	Very low strength	Soft	10.08	20.73

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/m²)	ALLOWABLE BEARING CAPACITY (kN/m²)*
CP103	2.00	Peaty CLAY	3	2.74	N/A	Very low strength	Soft	13.70	28.17
CP103	3.00	Gravelly CLAY	18	15.65	N/A	High strength	Very Stiff	78.27	160.92
CP103	4.00	Gravelly CLAY	20	16.90	N/A	High strength	Very Stiff	84.49	173.70
CP103	5.00	Gravelly CLAY	17	14.10	N/A	Medium strength	Stiff	70.52	144.98
CP103	8.00	Gravelly CLAY	21	17.00	N/A	High strength	Very Stiff	84.99	174.75
CP103	9.50	Gravelly CLAY	23	18.54	N/A	High strength	Very Stiff	92.68	190.56
CP103	12.50	Gravelly CLAY	25	18.27	N/A	High strength	Very Stiff	91.33	187.77
CP103	14.00	Gravelly CLAY	24	16.63	N/A	High strength	Very Stiff	83.13	170.91
CP103	15.00	Gravelly CLAY	28	18.75	N/A	High strength	Very Stiff	93.75	192.75
CP104	1.00	Peaty CLAY	3	3.02	N/A	Very low strength	Soft	15.12	31.09
CP104	2.00	Sandy CLAY	3	3.02	N/A	Very low strength	Soft	15.12	31.09
CP104	3.00	Gravelly CLAY	4	3.65	N/A	Very low strength	Soft	18.27	37.56
CP104	4.00	Gravelly CLAY	14	12.18	N/A	Medium strength	Stiff	60.88	125.16
CP104	5.00	Gravelly CLAY	16	13.52	N/A	Medium strength	Stiff	67.59	138.96
CP104	6.50	Gravelly CLAY	16	13.27	N/A	Medium strength	Stiff	66.37	136.46
CP104	8.00	Gravelly CLAY	16	13.06	N/A	Medium strength	Stiff	65.31	134.28
CP104	9.50	Gravelly CLAY	18	14.57	N/A	Medium strength	Stiff	72.85	149.78
CP104	12.50	Gravelly CLAY	22	17.73	N/A	High strength	Very Stiff	88.65	182.27

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 CAPACITY (kN/m^2)*
CP104	14.00	Gravelly CLAY	19	13.88	N/A	Medium strength	Stiff	69.41	142.70
CP104	15.00	Gravelly CLAY	23	15.93	N/A	High strength	Very Stiff	79.66	163.79

Notes
* The Allowable Bearing Capacity (ABC) should be considered indicative.
The interpretation of in situ mass undrained shear strength (cu) 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 capacity on sands. Soil Mechanics in Engineering Practice Terzaghi, K. & Peck, R.B. 1996.

5.2. SIDE STABILITY AND EASE OF EXCAVATION

The sides of the exploratory trial pit excavations appeared to be generally stable during excavation.

Saturated PEAT has been encountered at shallow depths across the majority of the site, where encountered water ingress into excavations is likely to occur.

The presence of peat and soft clays meant that in certain areas excavation was completed with relative ease.

A concrete obstruction was encountered in the southeast of the site that will require grubbing out and removal. Smaller land drains were encountered in the north west that were excavated with relative ease.

5.3. CONSOLIDATION

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

Table 21 Oedometer Consolidation Results

LOCATION	DEPTH (M)	SAMPLE TYPE	MOISTURE CONTENT (%)	OEDOMETER CONSOLIDATION		
				PRESSURE RANGE (kPa)	Mv (m^2/MN)	Cv (m^2/year)
CP103	6.50-6.95	U100	14.9	0–135	0.33	1.21
				135–270	0.10	1.31
				270–540	0.07	1.67
				540–1080	0.04	1.78
				1080–135	0.01	

When considered at over-burden pressure with an additional load of 1080 kPa the coefficient of volume compressibility (Mv) ranged from 0.01 m^2/MN up to 0.33 m^2/MN. The material is considered to be low to medium compressibility.

The rate at which settlement is likely to occur is determined by the coefficient of consolidation (Cv). As shown in Table 21, the coefficient ranges from 1.21 m^2/yr to 1.78 m^2/yr. The rate at which settlement will occur is increased by the presence of sand and silt within the Glacial Till and it is likely that settlement will occur over a period of months to years.

5.4. PARTICLE SIZE DISTRIBUTION

Particle Size Distribution (PSD) tests have been undertaken on selected samples of granular material via wet sieve to obtain information on the soil fractions. The results are summarised in Table . The full results can be found in APPENDIX VIII.

Table 22 Summary of Particle Size Distribution Test Results

LOCATION	DEPTH (m)	SOIL FRACTION (%)				MCHW 600 CLASSIFICATION
		COBBLES	GRAVEL	SAND	SILT/CLAY	
TP101	0.80	9	36	20	36	2C
TP104	1.40	0	1	4	95	2A/2B
TP113	1.80	0	2	5	93	2A/2B

5.5. MAXIMUM DRY DENSITY/OPTIMUM MOISTURE CONTENT RELATIONSHIP

Maximum dry density/optimum moisture content relationship analysis has been conducted on soils using via compaction tests utilising a 4.5 kg rammer. The results of the tests have been summarised in Table 15. The full test results can be found in APPENDIX VIII.

Table 15 Summary of Dry Density and Moisture Content

LOCATION	LABORATORY DESCRIPTION	TOP DEPTH (m)	METHOD OF COMPACTION	INITIAL MOISTURE CONTENT (%)	OPTIMUM MOISTURE CONTENT (%)	MATERIAL RETAINED ON 37.5 mm SIEVE (%)	MAX DRY DENSITY (mg/m³)	MATERIAL RETAINED ON 20.0 mm TEST SIEVE (%)
TP104	Brown silty slightly sandy slightly gravelly CLAY	1.40	4.5 kg	26.5	19	0	1.74	1
TP113	Brown silty slightly sandy slightly gravelly CLAY	1.80	4.5 kg	28.8	19	0	1.75	0

The compaction tests have indicated that the soils in TP104 and TP113 as being wet of the optimum. It should be noted that if this material is excavated for use in a cut/fill operation careful consideration should be taken in the stabilisation of this material.

Engineering of this type of material will need to be completed during dry weather periods only.

5.6. SOIL INFILTRATION

In-situ BRE 365 Soakaway tests were undertaken over a 24 hour period within trial pits completed as SA101-SA103.

The results are presented in Table 24, test certificates are included within APPENDIX VIII.

Table 16 Soil Infiltration Results

LOCATION	DEPTH (M)	MATERIAL	TEST NO.	SOIL INFILTRATION RATE (M/S)
SA101	0.20 – 1.70	Firm Greyish Brown CLAY	1	N/A
SA102	0.50 – 1.60	Stiff Light Grey CLAY	1	N/A
SA103	0.50 – 2.30	Soft Light Grey Slightly Sandy CLAY	1	N/A

The test did not reach 25% or 75% effective storage depth and therefore an infiltration rate could not be calculated.

All tests showed the cohesive deposits to have poor soakage potential, with SA102 remaining at a depth to water of 0.50 m bgl throughout the entire 24 hour testing period.

Therefore, it is unfeasible for soakaway drainage to be used for the proposed development.

5.7. SOIL PLASTICITY

E3P apply engineering judgement where PI results are spread over a range of classifications. Consideration is given to the average values for each particular soil type (differentiate between residual soil and alluvium), the number of results in each class and the actual values.

Results are summarised in Table 25, the full test results can be found in APPENDIX VIII.

Table 17 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
WS102	2.00	23.9	21	45	24	98	23.52	Medium
WS107	2.00	20.7	19	43	24	99	23.76	Medium
WS110	1.00	22.0	16	25	9	97	8.73	Low

The results indicate the soils to be of low and medium volume change potential in accordance with the classification system utilised by the LABC/NHBC industry guidance.

When considering tree influence and foundations, medium volume change potential clay should be assumed site-wide as the worst case.

5.8. PH AND SULPHATE

Samples were submitted to Chemtest laboratory for pH and soluble sulphate content analysis. Results are summarised in Table 18. Full results can be found in APPENDIX VII.

Table 18 Summary of pH and Sulphate Data

LOCATION	STRATA	DEPTH (m)	SO_4 IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
SA101	Made Ground	0.20	<0.010	5.7	DS-1, AC-1s
SA103	Topsoil	0.20	<0.010	7.2	DS-1, AC-1s
TP101	Made Ground	1.00	0.11	7.7	DS-1, AC-1s
TP102	Made Ground	0.80	0.057	7.6	DS-1, AC-1s
TP103	Topsoil	0.20	<0.010	5.0	DS-1, AC-1s
TP105	CLAY	0.60	<0.010	5.9	DS-1, AC-1s
TP109	Made Ground	0.50	<0.010	6.7	DS-1, AC-1s
TP111	PEAT	0.50	0.022	5.6	DS-1, AC-1s
TP113	Topsoil	0.20	<0.010	5.3	DS-1, AC-1s
TP115	Made Ground	0.60	<0.010	7.3	DS-1, AC-1s
TP116	PEAT	0.50	0.022	5.8	DS-1, AC-1s
WS101	CLAY	1.20	<0.010	6.6	DS-1, AC-1s
WS104	CLAY	1.20	<0.010	5.7	DS-1, AC-1s
WS105	PEAT	1.10	<0.010	6.1	DS-1, AC-1s

LOCATION	STRATA	DEPTH (m)	SO_4 IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
WS108	Made Ground	2.80	0.11	6.4	DS-1, AC-1s
WS112	CLAY	0.80	0.042	6.7	DS-1, AC-1s

Results indicate the Made Ground and natural strata meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005).

5.8.1. HIGHWAYS AND CONCRETE

MCHW Series 600 provides a criterion of 1500 mg/l for water-soluble sulphate within 500 mm of any concrete structure. A second criterion of 300 mg/l is given with respect to soils within 500 mm of steel structures. Sulphate testing summarised in Table 27 does not record any exceedances of either MCHW Series 600 criterion.

5.9. GROUNDWATER

Table 19 Summary of Groundwater Strikes

LOCATION	DEPTH (m bgl)	DESCRIPTION OF STRIKE	STRATA	EVIDENCE OF CONTAMINATION
Site Investigation Waterstrike Information				
SA102	0.80	Slow Ingress	CLAY	No
TP111	0.80	Slow Ingress	PEAT	No
TP116	0.60	Slow Ingress	PEAT	No
CP102	2.00	Slow Ingress	PEAT	No
Location	**Depth Range (m bgl)**	**Period of monitoring**	**Weather conditions during monitoring**	**Comments**
Groundwater Monitoring Summary from Installations				
WS101	0.80 – 1.12	November 2024 – December 2024	Overcast / Rain	Wells set within low permeability deposits. It is likely that water levels are representative of surface water collecting within the standpipes and not a true representation of groundwater.
WS102	1.13 - >2.00			
WS103	0.84 – 1.18			
WS104	1.60 – 1.64			
WS105	0.52 – 1.25			
WS106	0.97 – 1.04			
WS108	1.62 - >2.50			
WS109	1.14 – 2.72			
WS110	0.61 – 0.72			
WS111	0.73 – 0.81			
WS112	1.16 – 1.45			

Water strikes encountered during the site investigation were associated with PEAT and CLAY superficial deposits between 0.60–2.00 m bgl.

Groundwater was recorded at between 0.52 m - >2.50 m bgl during the first three return monitoring visits. However, given the visits were undertaken during the wetter winter months, and the presence of low permeability deposits surrounding the monitoring response zones, this is likely to be surface water collecting within the installed wells as opposed to true groundwater.

5.9.1. INFLUENCING FUNCTIONAL WATERBODIES

Long-term monitoring of groundwater has not been conducted as a part of this investigation and interpreted levels are approximate and may be dependent on seasonal variation. It should be noted that seasonal variation is likely to result in potentially significant changes in groundwater levels beneath the site.

The water table can have significant effects on the foundation of a building, including:

- **Soil settlement**: Changes in the water table can cause soil to expand or contract, which can result in foundation settlement or movement. This can lead to cracks in the foundation, walls, or floors of a building.
- **Soil erosion**: High water tables can cause soil erosion, which can lead to the loss of soil support beneath the foundation. This can result in foundation settling or movement, which can be dangerous for the stability of the structure.
- **Hydrostatic pressure**: When the water table rises, the water exerts hydrostatic pressure on the foundation. This can cause foundation walls to crack or bow, which can compromise the structural integrity of the building.
- **Moisture infiltration**: High water tables can result in moisture infiltration into the foundation and surrounding soil. This can lead to mold growth, decay, and deterioration of building materials.
- **Drainage problems**: Poor drainage around a building can cause water to pool around the foundation, increasing the likelihood of soil erosion and hydrostatic pressure. This can lead to foundation settling or movement and can also cause flooding in the basement or crawl space.

It is important to consider the effects of the water table on the foundation when designing and constructing a building. Proper drainage and foundation waterproofing can help to mitigate the effects of the water table on the foundation and improve the longevity and stability of the structure.

5.10. SITE PREPARATION

Our assessment has been based on the fact that the site will 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:

- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill.

- Removal of the Made Ground upfilled mounds where the majority of chemical exceedances are present.

- Removal of the PEAT across the site. However, given that peat deposits, which can be classified as raised lowland bog, are present on site to depths greater than 0.45m, in the UK, this qualifies as deep peat. Deep peat capable of restoration is identified in the Places for Everyone Planning Inspectors' Report as an irreplaceable habitat. If consulted by the LAP, Natural England may potentially object to the extraction and removal of these peat deposits, which could create challenges during the planning process. Given the above, the removal of peat may not be feasible.

5.11. 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 safe allowable bearing capacity (ABC) 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 20.

Table 20 Summary of ABC

COHESIVE SOILS			
Description	**Depth (range m bgl)**	**Undrained Shear Strength (Cu) (kN/m^2)**	**Allowable Bearing Capacity (kN/m^2)**
Soft Silty PEAT	1.00–2.00	10–18	21–37
Soft Peaty CLAY	1.00–2.00	14–15	28–31
Soft Sandy CLAY	2.00	18	38
Firm PEAT	1.00	20–25	41–52
Firm Peaty CLAY	1.00	20–35	41–72
Firm Slightly Gravelly CLAY	1.00–3.00	25-39	52-80
Firm Slightly Sandy CLAY	1.00	20	41
Stiff to Very Stiff Slightly Sandy CLAY	1.00–5.00	40–65	83–134
Stiff to Very Stiff CLAY	5.00–15.50	86–114	176–235
Stiff to Very Stiff Slightly Gravelly CLAY	1.00–5.00	40–83	217–447

The above ABC data demonstrates that within the cohesive soils, the suitable founding strata is the stiff to very stiff CLAY with an ABC in the order of 83 – 447 kN/m^2 at depths of between 1.00 – 5.00 m bgl.

Soft clays were encountered within twelve locations (SA102, SA103, TP107, TP108, TP110, TP112, TP114, TP117, TP118, WS109, CP103, and CP104) generally encountered in the north east and central areas between 1.00 and 2.00 m bgl and at thickness' <1.00 m. The depth and location of soft clays is shown on E3P drawing 17-994-031, provided in APPENDIX IV. Where softer clays are present discus between 1.00 – 2.00 m bgl, deeper foundations will be required.

Peat deposits were encountered in 21 locations (of 37 total), encountered site wide generally in the upper 1.00 m, however, have been encountered to a maximum recorded depth of 3.00 m (WS108 below raised mound). The depth and location of soft clays is shown on E3P drawing 17-994-013, provided in

APPENDIX IV. Where peat is encountered between 1.00 – 2.00 m bgl, deeper foundations will be required. Where peat is present in proposed external areas (inclusive of driveways, garden and landscaping areas), peat will require excavation.

The depth to founding strata from current site levels is provided on E3P Drawing 17-994-015 in APPENDIX IV.

5.12. FOUNDATIONS OPTIONS APPRAISAL

Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe allowable bearing capacity, the following recommendations have been developed for the site of the potential foundation solutions that may be adopted for future residential development.

Peat and soft clays are unsuitable founding strata, foundations should pass through the peat or where peat has been removed, bearing on the underlying target founding stratum. In this instance, the suitable target founding stratum has been identified as the underlying stiff to very stiff CLAY with allowable bearing capacity of >100 kN/m^2 at >1.00 m bgl.

Following this assessment, the following foundations may be suitable for the proposed development:

- Traditional strip foundations where suitable founding strata is <1.20 m bgl.
- Trench Fill foundations should be considered where the target bearing stratum is greater than 1.20m below the proposed level to circa 2.50 m bgl.
- Piled or engineered foundations are likely to be required in areas where the target founding strata is encountered >2.50 m bgl, including areas where deep peat is present (or removed), areas of soft deep soft clays and within tree influence. A final assessment should be made upon receipt of final development levels and arboricultural report.

Controlled modulus columns with a soil stiffened platform are also an option but it is understood from discussions with the clients technical team that this will not be financially viable.

Vibro stone column (VSC) foundations are unlikely to be suitable due to the presence of PEAT, soft CLAYS and cohesive soils across the site. However, it is advisable to consult with geotechnical engineers and foundation specialists who can assess the specific ground conditions and design an appropriate Vibro Stone Column system to meet the project's requirements. They will consider factors such as soil composition, depth, and spacing of the stone columns to ensure effective ground improvement and proper load distribution, soft clays and peats will require removal for VSC foundations to be suitable.

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.

5.13. 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 for the proposed residential development that a suspended floor slab will be required.

In clay soils, allowance should be made in the design for heave. This must incorporate either a clear void of a specified minimum depth under the suspended floor, or a proprietary compressible material/void former below the underside of the floor construction.

5.14. SETTLEMENT

The site has been appraised through desk-based information and site investigation data in order to inform geotechnical risk where possible. Table 29 below has been formulated to determine if settlement risks are required to be further appraised. Where any item is determined to be appraised a settlement appraisal for the site should be prepared upon receipt of development levels and layout.

Table 219 Summary of Geotechnical Information for Settlement

RISK	COMMENT	ASSESSMENT
Site is located in an area deemed to be at Risk from Ground Dissolution from desk based information	The site is a low-risk area of ground dissolution based on BGS data searches.	No Further Assessment
Site is in an area where geology is reported as having a compressible risk from desk based information	Peat deposits and soft CLAY soils have been identified on-site, generally in the upper 2.00 m.	**Further Assessment**
Do historical maps indicate relic excavation features such as opencast or ponds that have been infilled.	None identified.	No Further Assessment
Has the site been proven to be underlain by anthropogenic materials to an unknown specification?	Yes, Made Ground deposits have been encountered from 0.00–2.80 m bgl (below mound), although generally did not exceed 1.00 m bgl.	**Further Assessment**
Have Oedometers and/or ground conditions reported compressible stratum on site?	Odometers have been undertaken and record a low-moderate compressibility.	No Further Assessment
Have High walls been identified on site that could result in differential settlement?	None Identified.	No Further Assessment
Has any evidence been observed on site indicating settlement (non structural assessment)	An oval shallow depression is present at the centre of the site.	**Further Assessment**
Is voided ground present beneath the site?	None Identified.	No Further Assessment
Is the site in an area where a mobile groundwater regieme is present in influencing distance of foundations and infrastructure?	None Identified.	No Further Assessment
Will the site be subject to changes in site levels that may induce heave or settlement?	Site levels are unknown at this time. Significant level changes are not anticipated.	**Further Assessment**

Current ground conditions indicate a moderate-high overall risk from settlement. Should significant depths of PEAT or soft CLAY be encountered, further assessment (or piled foundations) will be required.

Site levels are unknown at this time. Final levels should consider the settlement risk associated with surcharge associated with increased level changes.

5.15. 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 conjectures zones of influence.

The clay has been determined as being of medium volume change potential. Table shows where heave precautions are required for a trench fill, pier and beam and pile and beam foundation types which are in the zone of influence of trees which are to remain or be removed.

Table 30 Position of Heave Precautions

SITUATION	TRENCH FILL	PIER AND BEAM	PILE AND BEAM
External trench fill and pier foundations. Unless NHBC is satisfied that the soil is not desiccated compressible material should be provided to the:	Inside faces of external wall foundations deeper than 1.5 m, based on the appropriate tree height.	All faces of pier foundations deeper than 1.5 m, based on the appropriate tree height.	N/A
External ground beams. Unless NHBC is satisfied that the soil is not desiccated, compressible material or void formers should be provided to the:	N/A	Inside faces	Inside faces
Internal trench fill foundations and ground beams. Compressible material required:	No	No	No
External and internal ground beams. Compressible material, void former or void should be provided to the underside of:	N/A	All	All
Heave precautions required for proposed trees where the soil is not desiccated:	No	No	No

Note: Information taken from NHBC Standards 2024, Chapter 4.2, Table 8 – Position of heave precautions

A summary of heave precautions is presented in 31.

Table 31 Summary of Heave Precautions

VOLUME CHANGE POTENTIAL	VOID DIMENSION AGAINST SIDE OF FOUNDATION AND GROUND BEAM	VOID DIMENSION UNDERGROUND BEAMS, AND SUSPENDED IN-SITU CONCRETE GROUND FLOOR	VOID DIMENSION UNDER SUSPENDED PRECAST CONCRETE AND TIMBER FLOORS(1)
High	35 mm	150 mm	300 mm
Medium	25 mm	100 mm	250 mm
Low	0 mm	50 mm	200 mm

In addition to the requirements of the 'Drainage' section, drainage near trees should incorporate additional provisions. Where there is a volume change potential within the ground, the provisions include:

- Increased falls to cater for any ground movement.
- Deeper and wider backfill of granular material.
- A drainage system that is capable of movement should heave and shrinkage occur.
- Drainage pipes should not be encased in concrete.
- Additional clearance is required where drains pass through the structure of a building to allow for additional movement.

5.16. 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.

Bulk earthworks to construct highways to the underside of capping. Enabling works contractor will need to do CBRs to determine the capping layer.

5.17. DRAINAGE

Where loose or soft materials are identified at drainage invert levels, there will need to be consideration for the use of reinforced pipe bedding.

Shrinkage and heave of clay soils can affect pipelines. To protect against the effects of heave, drainage should be designed:

- To take account of potential ground movement as identified in Table 29, including where pipes and services pass through substructure walls or foundations.
- With gradients which may need to be steeper.
- To use alternative means of catering for the movement when sufficient falls cannot be provided, for example, by deepening the excavation and laying pipework on a granular bedding of suitable thickness to reduce the extent of potential movement.

Table 32 Potential Ground Movement for Drainage

VOLUME CHANGE POTENTIAL	HIGH	MEDIUM	LOW
Potential ground movement	150 mm	100 mm	50 mm

5.18. EXCAVATIONS

Trial pits were generally stable in both granular Made Ground and natural strata; as such, it is considered that near-surface excavations will be feasible.

Site observations indicated that excavations should be feasible in the near-surface with normal plants; however, obstructions are likely to be present in the near-surface in the south east, including former foundations and former floor slabs. It is anticipated that any obstructions will be grubbed out during the reduced-level dig for the substructure works.

However, due to the depth and variability of the CLAY soils and the likelihood of trench collapse where PEAT and soft CLAY is encountered, it is considered that all excavations are supported or battered back in accordance with the 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 the surrounding areas that may cause structural damage to building substructures in close proximity to the site.

Table 22 Civil Engineering Excavation Risk Matrix

RISK ITEM	PRESENT	COMMENT
Running Sands	No	No running sand has been identified.
Minor Water Ingress	No	Significant water ingress is not anticipated. However, ingress of water into foundation excavation will potentially flood foundation excavations, and require pumping.
Shallow Bedrock	No	Shallow bedrock has not been identified on-site.

5.19. 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.
- Made Ground soils within the mounds located in the west and south of the site should be delineated and sub sampled prior to use in the earthworks.
- Peat will require delineation, excavation and removal from site. This should be undertaken under the supervision of a remediation engineer.
- 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 the 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).

5.20. DEVELOPED GEOTECHNICAL RISK REGISTER

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON-SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Remediation of contaminated soils	All	25	Where the exceedances of lead and non-volatile PAH compounds were encountered within the Made Ground at 1.00 m bgl and 0.60 m bgl in TP101 and TP115 respectively, it is likely associated with the bunded anthropogenic material. Delineation of the above ground anthropogenic soils is recommended. Where the exceedances of non-volatile PAH compounds were encountered within the natural CLAY at 0.8 m bgl in WS112, the background soil chemistry for the area does not indicate elevated PAH levels locally. During enabling works further assessment should be undertaken to delineate / evaluate the soils in this area further to prove or discount any PAH source. Any subsoils proposed for use in landscaped areas will require validation testing before re-use.
Obstructions	South East	15	One obstruction was encountered during the site investigation within TP115 (south east) which refused at 1.20 m bgl on a concrete slab. Based upon limited historical development recorded on site, underground obstructions are anticipated to be present within the south east only.
Artificially levelled and filled platforms	West and South	50	A review of relevant records indicates that the site has not been subject to significant anthropogenic changes, however, three large circa 2m high mounds are present in the west of the site. The mounds comprise Made Ground and given the lack of record the origin of the soils in the mounds are unknown at this time. Given the presence of these anthropogenic soils, the site geomorphology is not considered to represent the natural landform.
Trench collapse	Site Wide	100	Due to the depth and variability of the CLAY soils and the likelihood of trench collapse where PEAT and soft CLAY is encountered, it is considered that all excavations are supported or battered back in accordance with the guidance contained in CIRIA R97.
Drainage Invert levels	Site Wide	100	Natural CLAY soils have been found to be variable between soft and stiff. Where soft materials are identified at drainage invert levels, there will need to be consideration for the use of reinforced pipe bedding.

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON-SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Mature trees	North and Boundaries	20	An arboriculture survey is required to determine areas of potential tree influence.
Volume change potential clay	All	100	Atterberg results indicate the soils to be of low and medium volume change potential in accordance with the classification system utilised by the LABC/NHBC industry guidance. When considering tree influence and foundations, medium volume change potential clay should be assumed site wide as the worst case.
Running sands	N/A	N/A	None encountered. Data searches indicate low risk.
Ground dissolution	N/A	N/A	Data searches indicate no hazard.
Concrete design	All	100	Concrete classification is DS-1, AC-1s.
Low-permeability ground	All	100	Soakaways are unlikely to be effective in areas where low permeability cohesive deposits are present or where areas of potentially contaminated soil and groundwater are present.
Abnormal foundation solutions	All	100	Abnormal foundations (piled foundations) may be required in areas of deep Made Ground, soft CLAYs and PEAT and/or tree influence.
PEAT	All	75	PEAT has been encountered across the site, generally in the upper 2.00 m bgl. PEAT is geotechnically unstable and will require delineation, excavation and removal. In areas of deep peat plots are likely to require a piled foundation.
Enabling Earthworks	All	100	All proposed earthworks will need to be designed by a suitably qualified geotechnical engineer in accordance with NHBC Chapter 4.6. The earthworks design will incorporate a Geotechnical Specification for Earthworks that will define protocols to ensure no unacceptable future risk.

5.21. FURTHER WORKS

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

- Foundation schedule (upon receipt of the final development levels).
- Arboricultural survey.
- Remediation and enabling works strategy.
- Geotechnical Design Report
- Gas Protection Design Repot

END OF REPORT

APPENDIX I
LIMITATIONS



GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P “Terms of Business” or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.

2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.

3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.

4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEOENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

5. Coverage: This section covers reports with the following titles or combination of titles: Phase 1; Desktop Study; Geoenvironmental Assessment; Development Appraisal; Preliminary Environmental Risk Assessment; Constraints Report; Due Diligence Report; Geotechnical Development Review; Environmental Statement; Environmental Chapter; Baseline Environmental Assessment; Project Scope Summary Report (PSSR), Program Environmental Impact Report (PEIR), Geotechnical Development Risk Register; Agricultural Land Assessment; Mineral Safeguarding Assessment; Desk Top Coal Mining Risk Assessment; Hydrogeological Appraisal; Construction Environmental Management Plan; and Site Water Management Plan.

6. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.

7. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.

8. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.

9. 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 does not constitute or replace full and proper surveys completed by suitably qualified and experienced specialists in these fields.

10. E3P does not warrant work/data undertaken/provided by others.

INTRUSIVE INVESTIGATION REPORTS

11. Coverage: The following report titles (or combination) may cover this category of work: Geoenvironmental Site Investigation; Geotechnical Assessment; GIR (Ground Investigation Reports); Preliminary Environmental And Geotechnical Risk Assessment; Preliminary Summary; Coal Mining Risk Assessment, Ground Gas Addendum; and, Geotechnical Risk Register.

12. The investigation has been undertaken to provide information concerning either:

    I. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or

    II. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.

13. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.

14. Unless otherwise specified in the scope of works, any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

15. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.

16. For geotechnical investigations, the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.

17. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.

18. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

19. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, E3P has used reasonable skill and care to extrapolate conditions between these points based on assumptions to develop our interpretation and conclusions.

20. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation and at the time of the investigation.

21. Conditions can change between investigation points both spatially and over time and these interpretations should therefore be considered indicative. The assessment of extreme weather events and their impact on ground conditions is not within the scope of E3P's work.

22. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated with the risk assessment process have been outlined within the body or associated appendix of the report.

23. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

24. Where soil contamination concentrations recorded as part of this investigation are used for commentary on the potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed and the waste classification and any subsequent disposal option agreed upon with licenced subcontractors and/or the relevant regulators.

25. The results of the asbestos testing are factually reported and interpretation is given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and/or trace loose asbestos fibres within the soil matrix at the site.

26. If costs have been included in relation to additional site works, and/or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

27. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.

28. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIATION AND ENABLING WORK STRATEGY REPORTS

29. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected based on the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.

30. The outputs of the Detailed Quantitative Risk Assessments are based upon the manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.

31. Before adoption on-site, assessment criteria will need to be discussed and agreed upon with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatoy Authority engagement are not within the control of E3P. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

32. E3P does not accept liability for any subcontract work that has not been completed in strict accordance with an approved E3P Remediation and Enabling Works Strategy.

GEOTECHNICAL DESIGN REPORT (GDR)

33. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS AND BUILD PHASE MITIGATION)

34. These reports are factual and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of earthworks or remedial works.

35. The data is presented and will be compared with assessment criteria.

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
MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million
km	Kilometres	**mg/m^3**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl 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/m^2**	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
RISK CLASSIFICATION



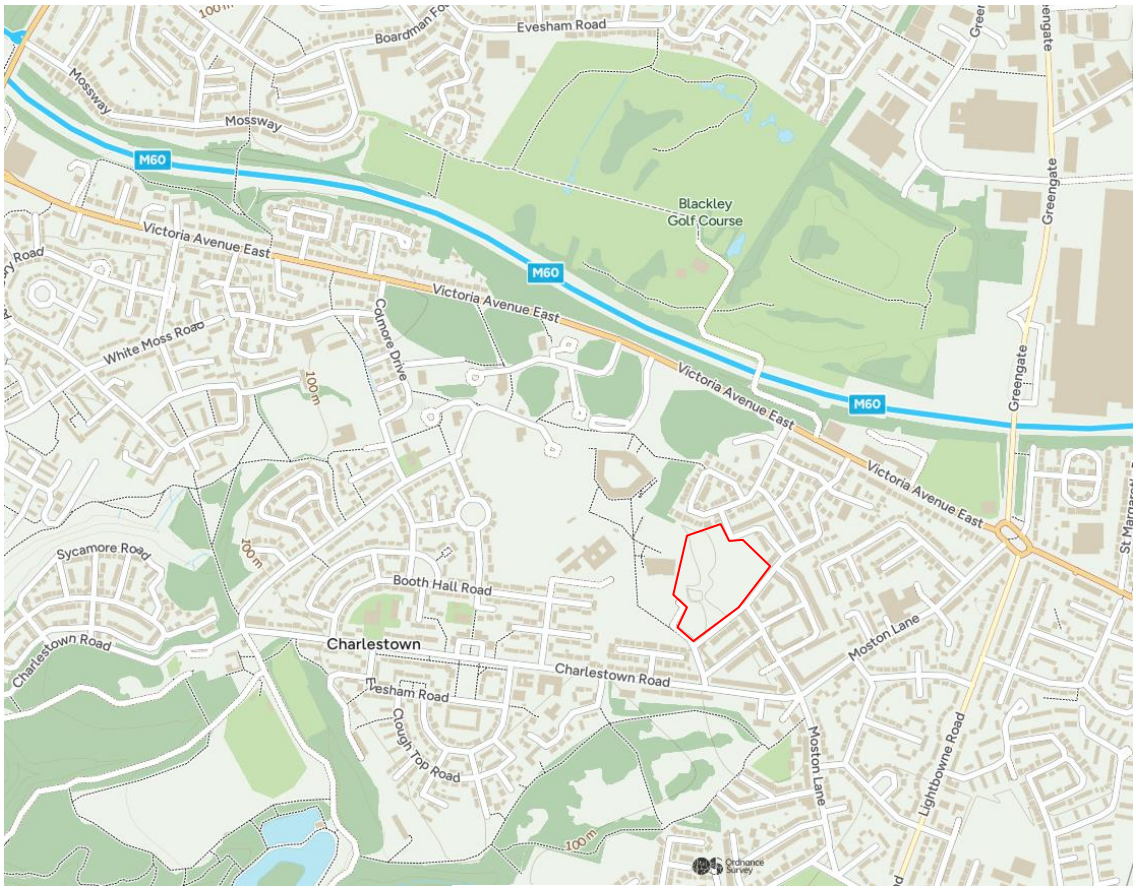
Risk Classification

RISK	DEFINITION
Low	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property.
Low Moderate	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property with regard to the proposed use. However, minor issues may require further consideration in the event of future redevelopment of the Site.
Moderate	Some potential contaminated land liabilities/geotechnical constraints are likely to affect the property as a result of historical and/or current activities. The risks identified are unlikely to pose an immediate significant issue but the purchaser/developer may wish to make further enquiries of the vendor or undertake further environmental improvements. Redevelopment of the Site will likely require further site investigation.
Moderate High	Some potentially significant contaminated land liabilities/geotechnical constraints have been identified at the property that requires further assessment, including intrusive ground investigations.
High	Significant potential contaminated land liabilities/geotechnical constraints have been identified at the property. Further assessment including intrusive ground investigation will be required to determine the level of risk and associated liability.

APPENDIX IV
DRAWINGS



DRAWING 17-994-001 – Site Location Plan





N

P1	REVA	14.01.2025	TG	MD	MD	
Phase	Issue	Date	Drawn	Checked	PM	

Notes:

Client: Miler Homes LTD

Job No: 17-994

Date: 14.01.2025

Drawing No: 002

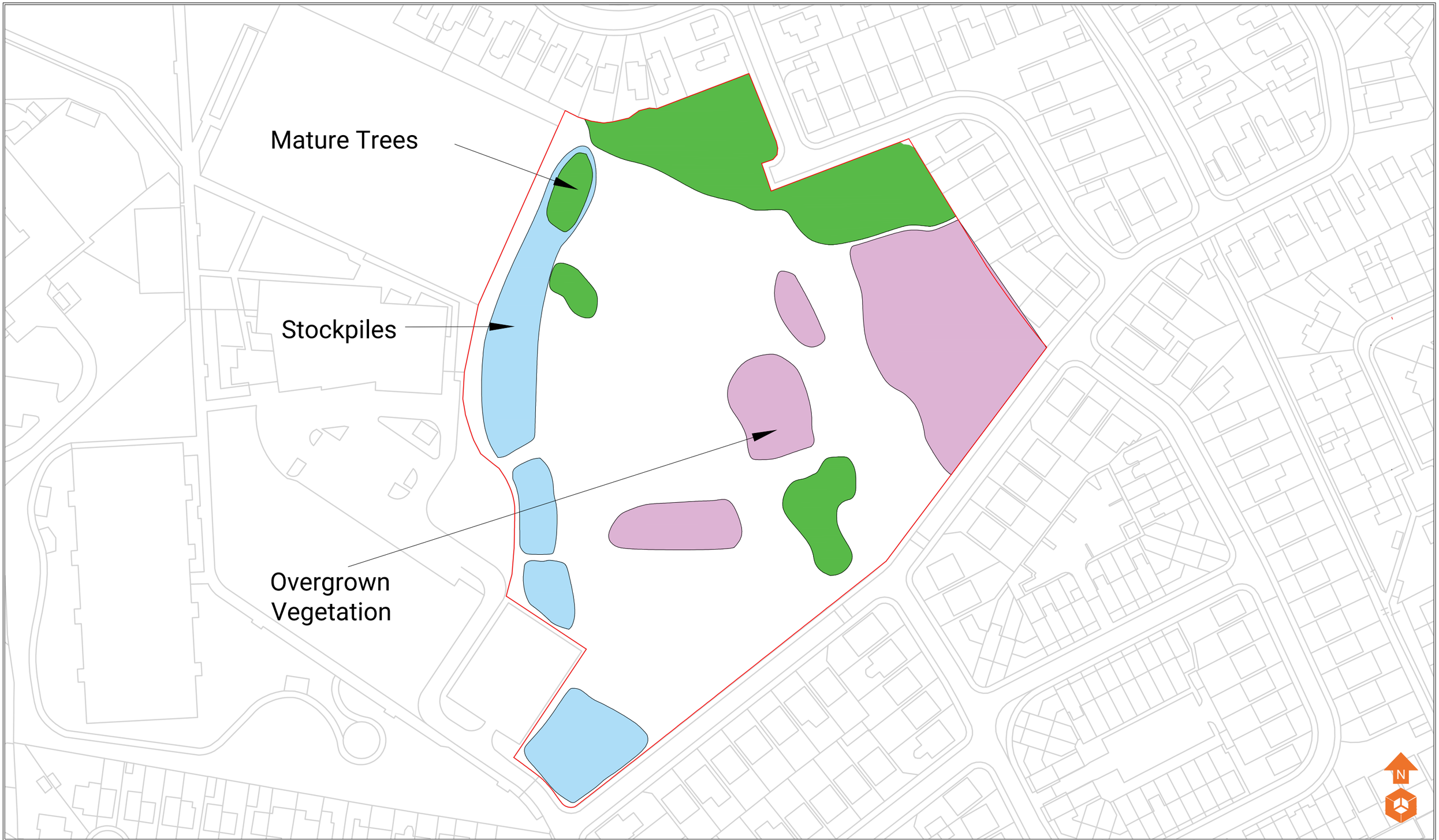
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Proposed Development Plan

Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
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Site Features

- Stockpiles
- Mature Trees
- Overgrown Vegetation

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	05.11.2024	TG	LC	LC

Client: Miller Homes LTD

Job No: 17-994

Date: 05.11.2024

Drawing No: 004

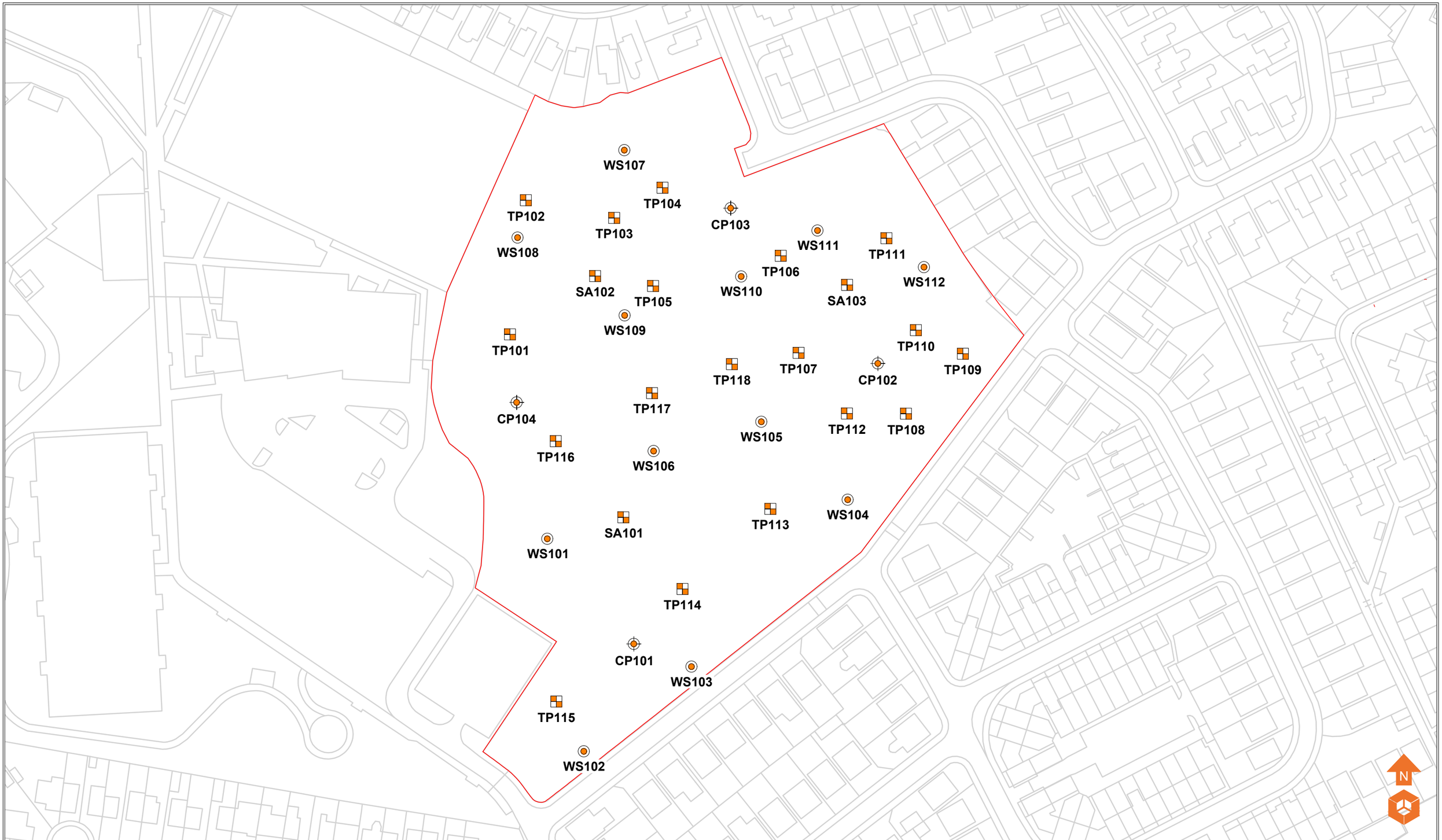
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Site Features Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Notes:

P1	REVA	05.11.2024	TG	LC	LC
Phase	Issue	Date	Drawn	Checked	PM

Client: Miller Homes LTD

Job No: 17-994

Date: 05.11.2024

Drawing No: 006

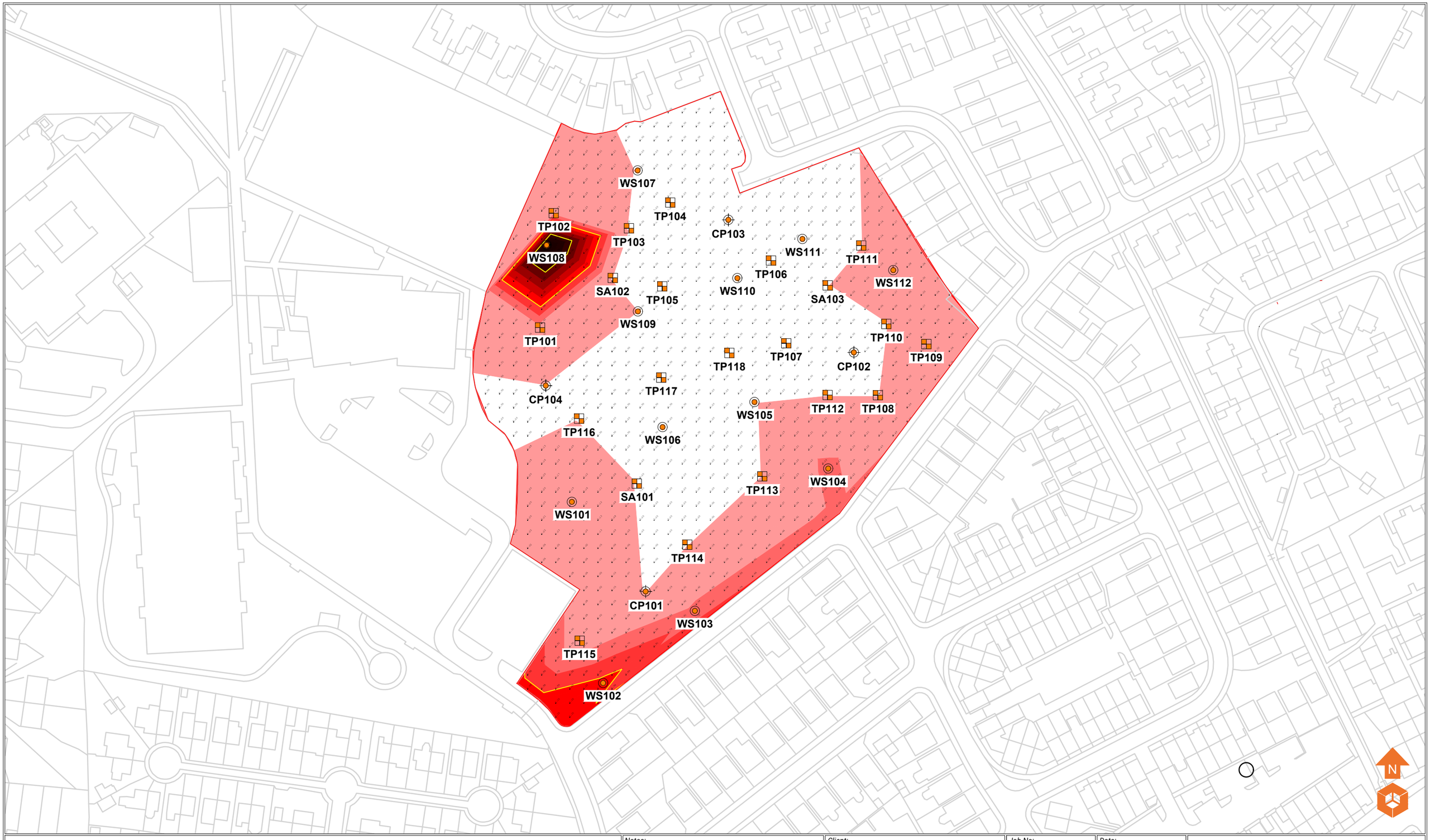
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Exploratory Hole Location Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Made Ground Depth (m)

- Depth of Made Ground 0.01 - 0.24m
- Depth of Made Ground 0.25 - 0.49m
- Depth of Made Ground 0.50 - 0.74m
- Depth of Made Ground 0.75 - 0.99m
- Depth of Made Ground 1.00 - 1.24m
- Depth of Made Ground 1.25 - 1.49m
- Depth of Made Ground 1.50 - 1.74m
- Depth of Made Ground 1.75 - 1.99m
- Depth of Made Ground >2.00m

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVB	18.11.2024	OW	LC	MD
P1	REVA	14.11.2024	OW	MD	MD

Client: Miller Homes LTD

Job No: 17-994

Date: 18.11.2024

Drawing No: 007

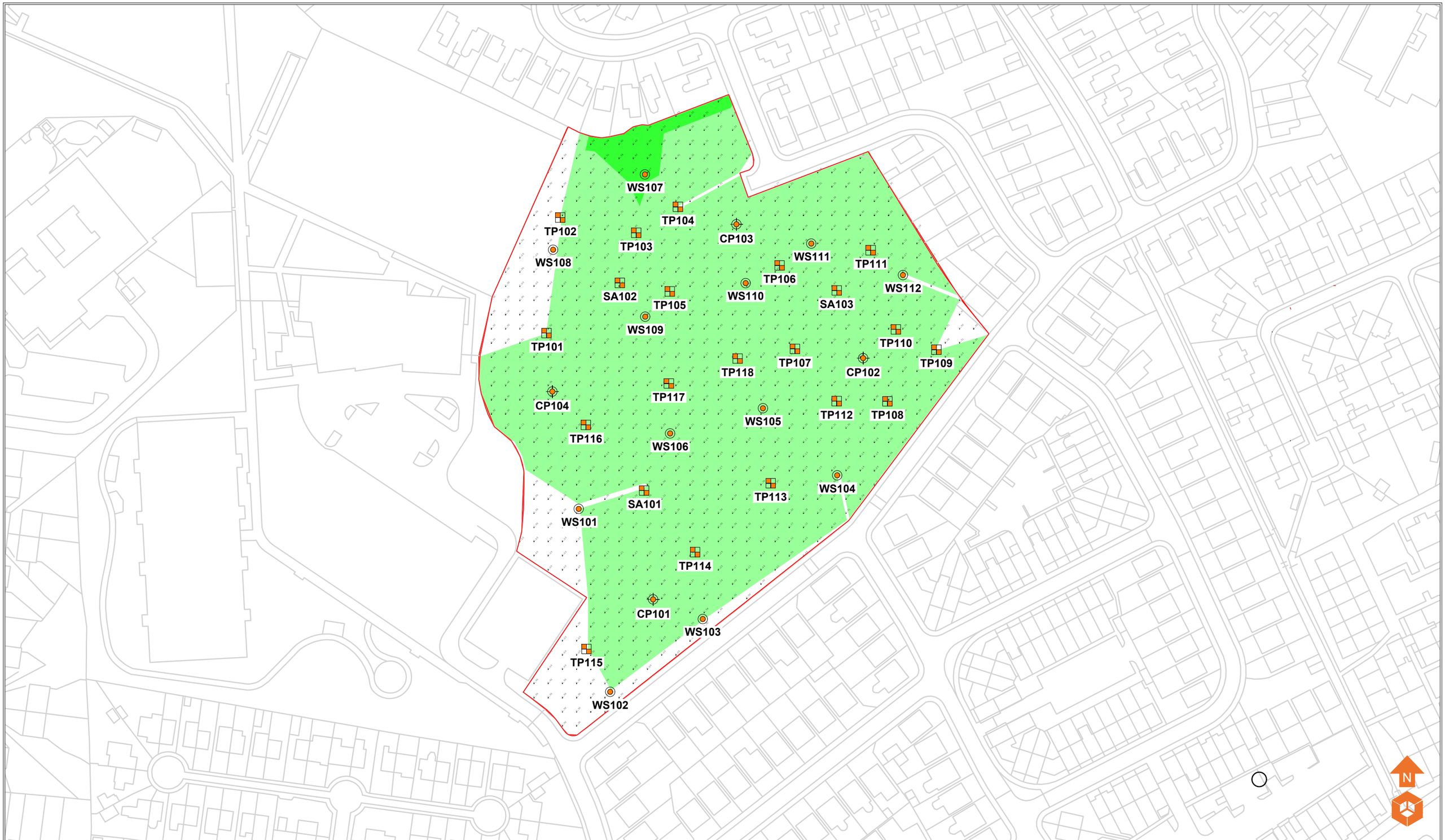
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Depth of Made Ground Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Topsoil Depth (m)

- Depth of Topsoil 0.00 - 0.24m
- Depth of Topsoil 0.25 - 0.49m
- Depth of Topsoil < 0.50m

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVB	18.11.2024	OW	LC	MD
P1	REVA	14.11.2024	OW	MD	MD

Client: Miller Homes LTD

Job No: 17-994

Date: 18.11.2024

Drawing No: 008

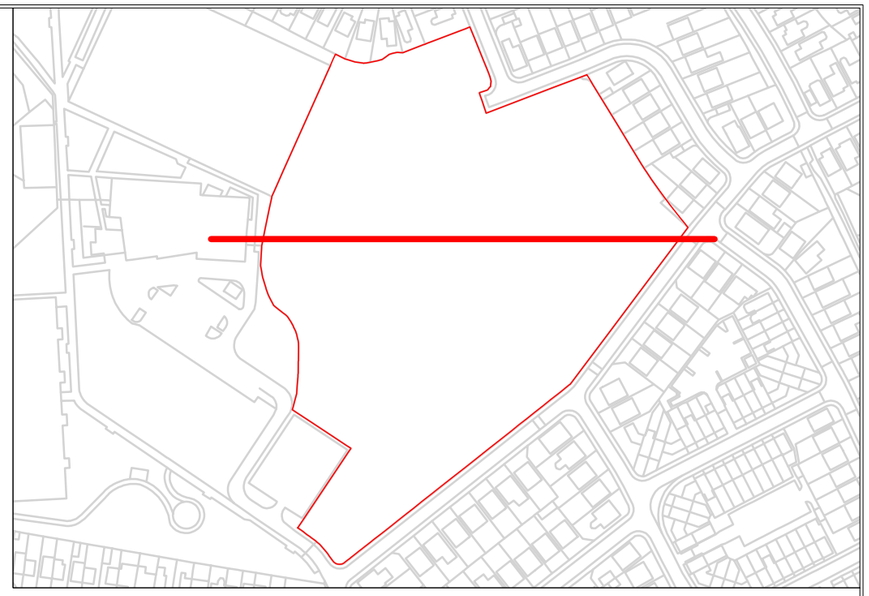
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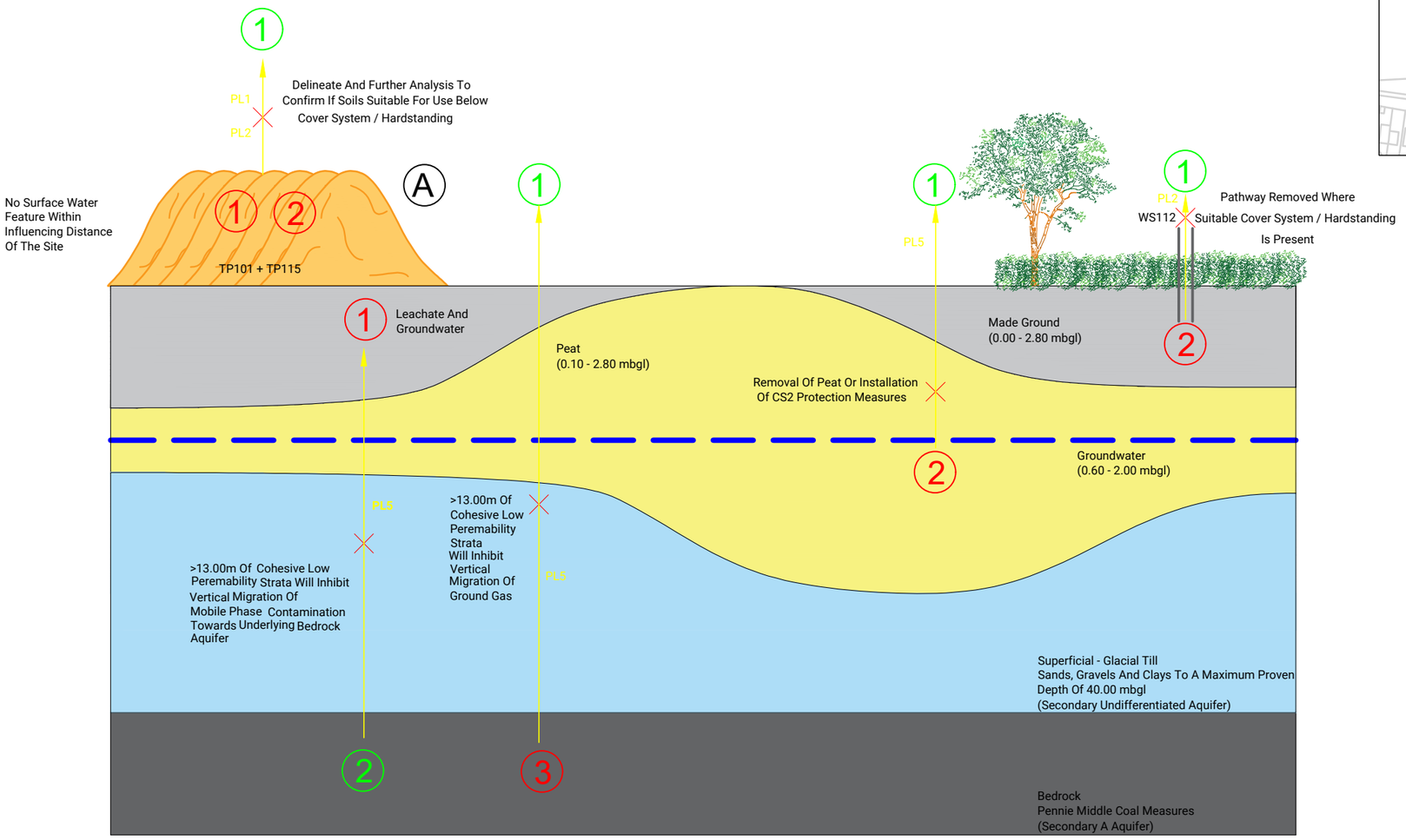
Job Title: Hinchley Road, Charlestown

Drawing Title: Depth of Topsoil Plan

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Geology Key

- Made Ground
- Peat
- Sand, Gravels & Clays (Secondary Undifferentiated Aquifer)
- Bedrock (Secondary A Aquifer)
- Groundwater

Sources

1. Heavy Metals
2. PAH's (Benzo(b)Fluorathene, Benzo(a)pyrene, Dibenzo(a,h)Antharene)
3. Ground Gas ($CO^{'}$, $CH^{'}$)

Pathways

- PL1 Soil Ingestion
- PL2 Dermal Contact / Ingestion
- PL5 Vapour / Gas Inhalation
- PL5 Vertical / Lateral Migration
- Pathway Cut

Receptors

1. End Users
2. Underlying Secondary A Aquifer

Site Features

- Made Ground Mounds
- B Dense Vegetation And Mature Trees

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	14.01.2025	TG	MD	MD

Client: Miler Homes LTD

Job No: 17-994

Date: 14.01.2025

Drawing No: 011

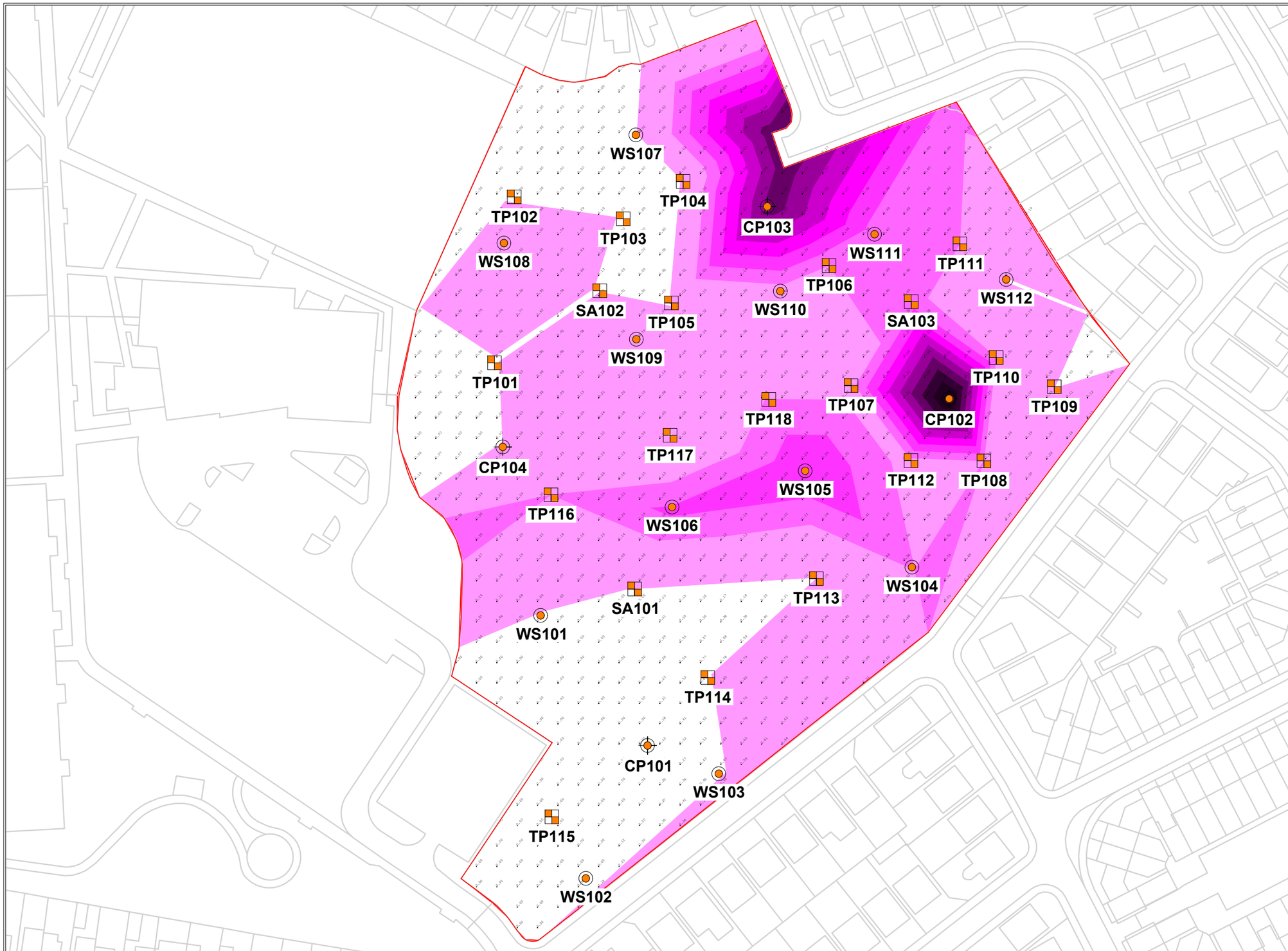
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Conceptual Site Model

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Depth and Thickness of Peat				
Location	Depth to Top of Peat (mBGL)	Depth to Base of Peat (mBGL)	Thickness of Peat (m)	Termination Depth (mBGL)
CP101	-	-	-	15.95
CP102	0.20	2.80	2.60	15.95
CP103	0.10	2.80	2.70	15.45
CP104	-	-	-	15.45
SA101	-	-	-	1.70
SA102	-	-	-	1.60
SA103	0.40	1.00	0.60	2.30
TP101	-	-	-	2.20
TP102	-	-	-	2.20
TP103	-	-	-	1.80
TP104	-	-	-	1.80
TP105	-	-	-	1.90
TP106	0.40	0.90	0.50	2.00
TP107	0.40	0.80	0.40	1.90
TP108	0.40	0.90	0.50	1.60
TP109	-	--		1.40
TP110	0.40	0.90	0.50	1.90
TP111	0.40	0.90	0.50	2.10
TP112	0.50	0.90	0.40	1.80
TP113	0.40	0.80	0.40	2.10
TP114	-	-	-	2.10
TP115	-	-	-	1.20
TP116	0.30	0.80	0.50	1.90
TP117	0.40	1.10	0.70	2.30
TP118	0.40	0.90	0.50	2.10
WS101	-	-	-	5.45
WS102	1.10	2.00	0.90	5.45
WS103	0.60	1.30	0.70	5.45
WS104	0.60	1.10	0.50	4.45
WS105	0.20	0.90	0.70	5.45
WS106	0.20	1.50	1.30	3.40
WS107	-	-	-	5.45
WS108	2.80	3.00	0.20	5.45
WS109	0.20	0.50	0.30	5.45
WS110	0.40	0.80	0.40	5.45
WS111	0.40	1.00	0.60	5.45
WS112	0.70	1.00	0.30	3.42

Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Peat Thickness (m)

- Thickness of Peat 0.00 - 0.24m
- Thickness of Peat 0.25 - 0.49m
- Thickness of Peat 0.50 - 0.74m
- Thickness of Peat 0.75 - 0.99m
- Thickness of Peat >1.00m
- 0.80 Recorded Depth to Top of Peat (mBGL)

Notes:

Approximate Volume of Peat - 11,046m³
Approximate Volume of Peat Including 30% Bulking Factor - 14,360m³

Client: Miller Homes LTD

Job No: 17-994

Date: 18.11.2024

Drawing No: 013

Scale: NTS

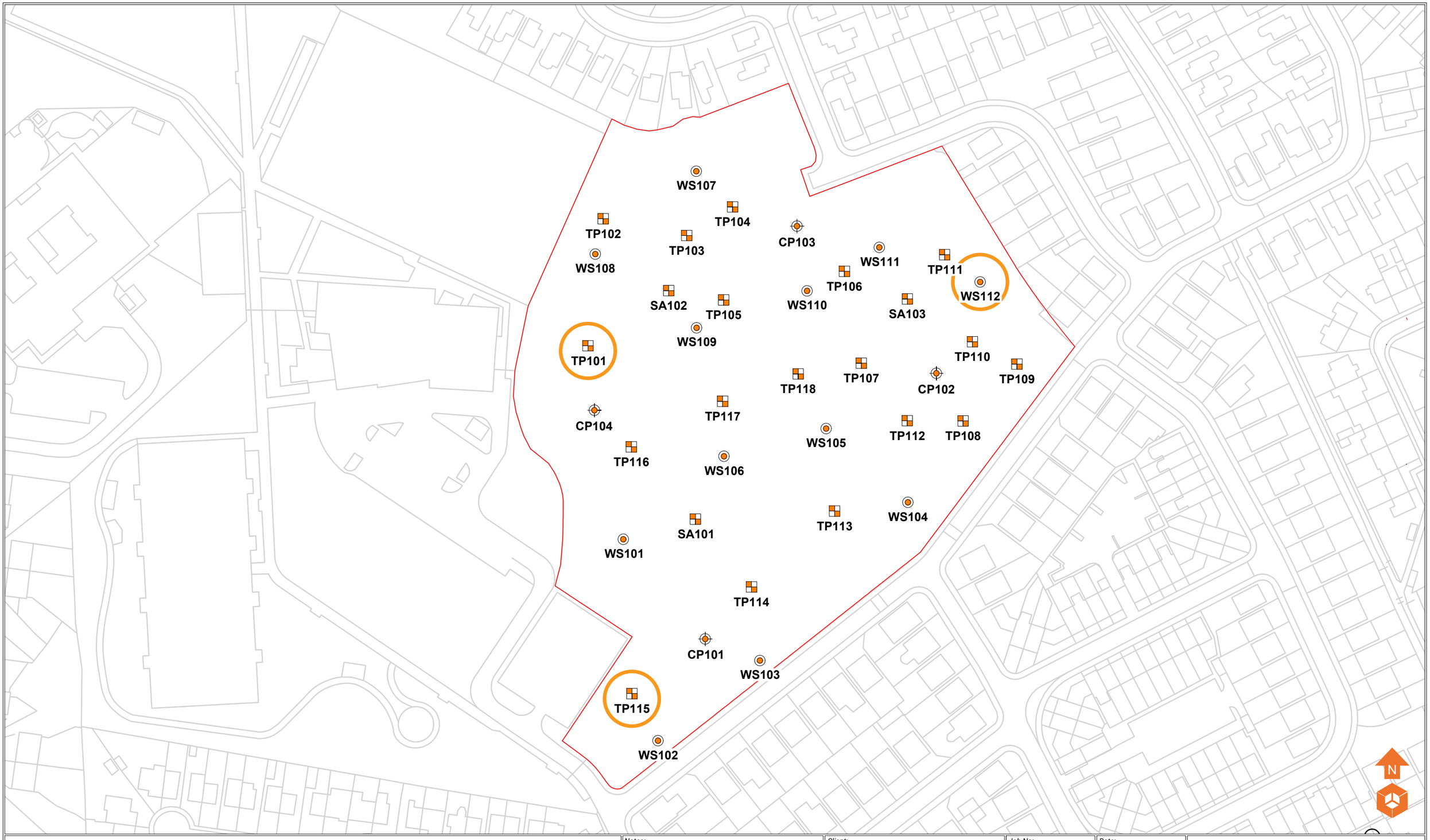
Phase	Issue	Date	Drawn	Checked	PM
P1	REVB	18.11.2024	OW	LC	MD
P1	REVA	02.03.2020	RW	MD	MD

Job Title: Hinchley Road, Charlestown

Drawing Title: Depth and Thickness of Peat Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Contamination Exceedances

- Heavy Metal And PAH Exceedance

Notes:

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	14.01.2025	TG	MD	MD

Client: Miler Homes LTD

Job No: 17-994

Date: 14.01.2025

Drawing No: 014

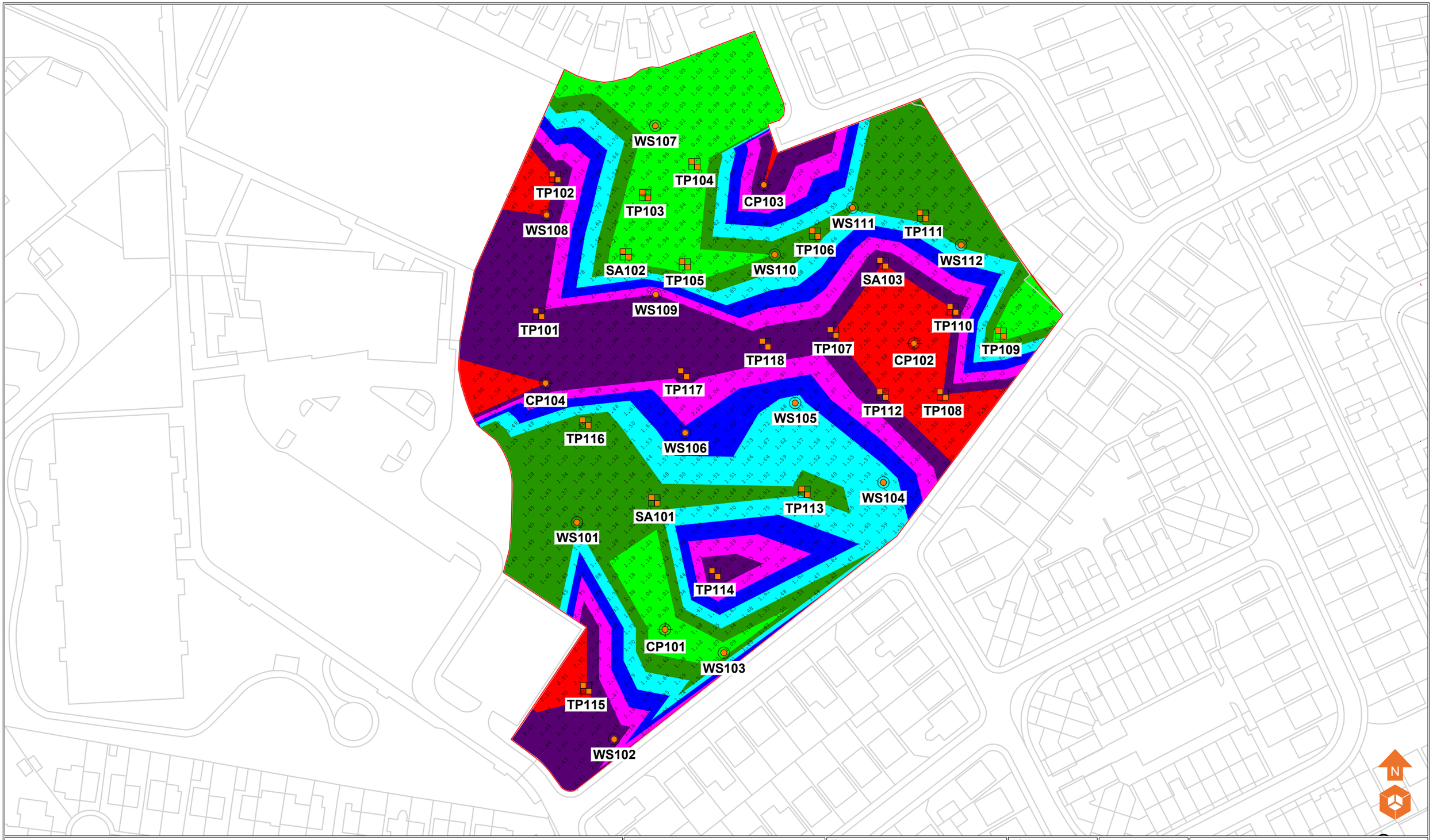
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Contamination Exceedances Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

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:

Depth to Founding Strata does not Consider Anthropogenic Influence or Trees and is an Indicative Assessment

Phase	Issue	Date	Drawn	Checked	PM
P1	REVA	14.01.2025	TG	MD	MD

Client: Miler Homes LTD

Job No: 17-994

Date: 14.01.2025

Drawing No: 015

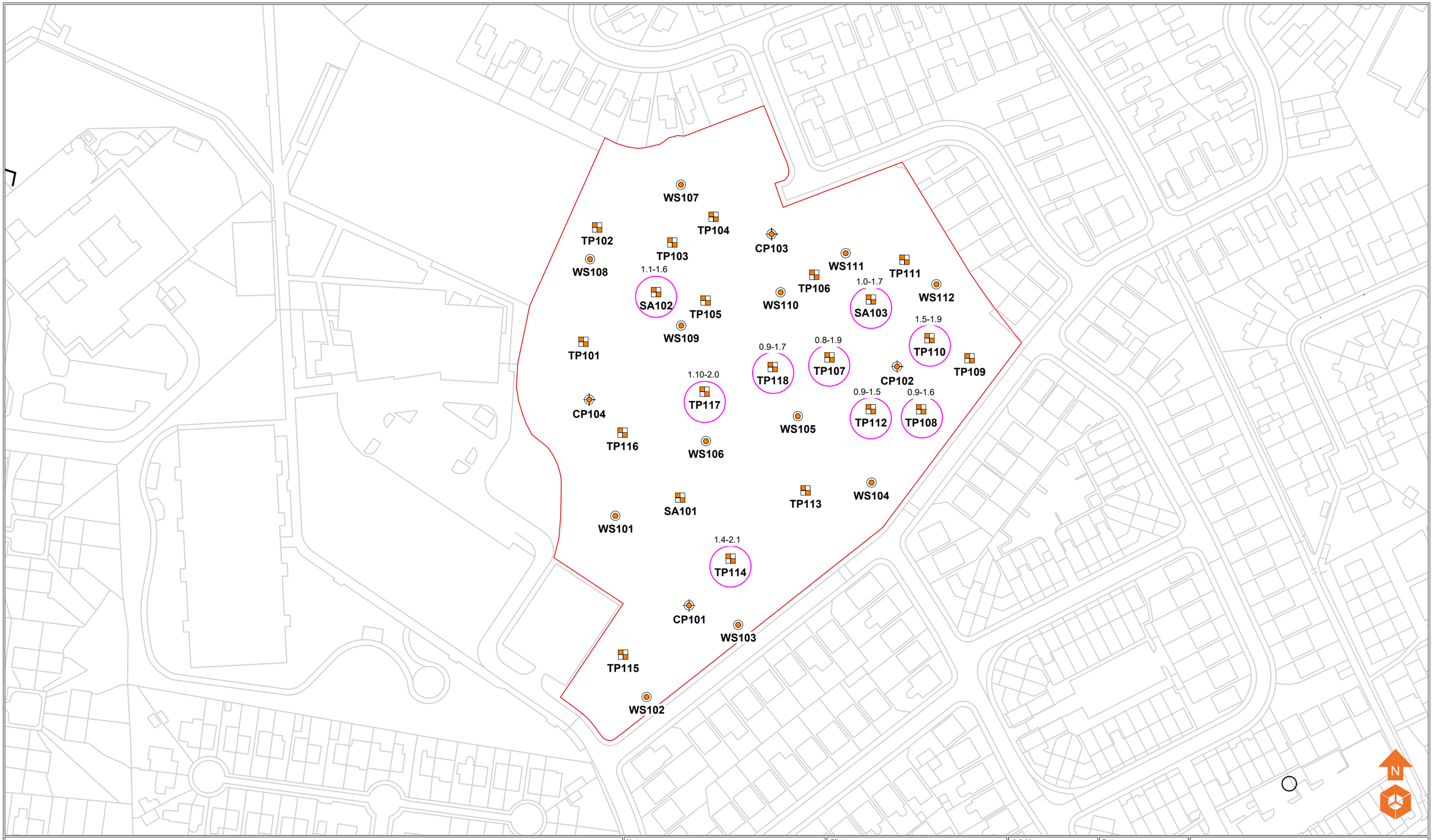
Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Depth To Founding Strata Plan

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Location Symbols

- Approximate Window Sample Probehole Location - E3P Location October 2024
- Approximate Cable Percussive Borehole Location - E3P Location October 2024
- Approximate Soakaway Test Location - E3P Location October 2024
- Approximate Trial Pit Location - E3P Location October 2024

Soft Clay

- Location and Depth of Soft Clay

Notes:

P1	REVA	14.11.2024	OW	MD	MD
Phase	Issue	Date	Drawn	Checked	PM

Client: Miller Homes LTD

Job No: 17-994

Date: 14.11.2024

Drawing No: 031

Scale: NTS

Job Title: Hinchley Road, Charlestown

Drawing Title: Location and Depth of Soft Clays Plan

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APPENDIX V
PHOTOGRAPHS



PLATE 1 LOOKING NORTHWEST ACROSS SITE



PLATE 2 LOOKING SOUTHWEST ACROSS SITE



PLATE 3 LOOKING SOUTH ACROSS SITE



PLATE 4 LOOKING SOUTHEAST ACROSS SITE



PLATE 5 WS101 ARISINGS (LEFT) AND WS102 ARISINGS (RIGHT)





PLATE 6 WS103 ARISINGS (LEFT) AND WS104 ARISINGS (RIGHT)





PLATE 7 WS105 ARISINGS (LEFT) AND WS106 ARISINGS (RIGHT)





PLATE 8 WS107 ARISINGS (LEFT) AND WS108 ARISINGS (RIGHT)





PLATE 9 WS109 ARISINGS (LEFT) AND WS110 ARISINGS (RIGHT)





PLATE 10 WS111 ARISINGS (LEFT) AND WS112 ARISINGS (RIGHT)





APPENDIX VI
EXPLORATORY HOLE LOGS



Borehole Log

Borehole No. **CP101**

Sheet 1 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387800.00 - 403057.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 28/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		1.00 1.00 - 1.45	D	N=8 (1,2/2,2,2,2)				Stiff medium to high strength brownish grey slightly silty slightly sandy CLAY.
		2.00 2.00 2.00 - 2.45	B D	N=12 (2,2/3,3,3,3)				
		3.00 3.00 - 3.45	D	N=15 (2,3/3,4,4,4)				
					3.50			Very stiff very high strength brown slightly silty gravelly CLAY. Gravel is fine to coarse subangular to rounded of mudstone.
		4.00 4.00 - 4.45	D	N=17 (3,3/4,4,4,5)				
					4.50			Very stiff very high strength brown CLAY.
		5.00 5.00 5.00 - 5.45	B D	N=22 (3,4/5,5,6,6)				
		6.50 6.50 - 6.95	D	N=21 (3,4/4,5,6,6)				
		8.00 8.00 - 8.45	D	N=23 (3,3/4,5,6,8)				
		9.50 9.50 - 9.95	D	N=28 (3,4/6,7,7,8)				
								Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

1. Complete. 2. What 3 Words: reason.energetic.then

Borehole Log

Borehole No. **CP101**
Sheet 2 of 2

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387800.00 - 403057.00	Hole Type CP
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	28/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00 - 11.45	U					
		12.50 12.50 - 12.95	D	N=27 (4,4/5,6,7,9)				
		14.00 14.00 - 14.45	D	N=33 (4,4/7,8,8,10)				
		15.50 15.50 - 15.95	D	N=33 (4,4/6,8,10,9)				
					15.95			End of borehole at 15.95 m

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Remarks
1. Complete. 2. What 3 Words: reason.energetic.then

Borehole Log

Borehole No. **CP102**

Sheet 1 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387876.00 - 403143.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 29/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		1.00	B					Soft very low to low dark blackish brown silty PEAT. (Slight organic odour).
		1.00		N=4 (1,0/1,1,1,1)				
		1.00 - 1.45	D					
	▼	2.00		N=4 (1,1/0,1,1,2)				
		2.00 - 2.45	D					
					2.80			Stiff medium to high strength light grey slightly silty slightly sandy CLAY.
		3.00	B					
		3.00		N=10 (1,2/2,2,3,3)				
		3.00 - 3.45	D					
		4.00		N=10 (2,2/2,3,3,2)				
		4.00 - 4.45	D					
		5.00		N=15 (2,3/3,4,4,4)				
		5.00 - 5.45	D					
					6.00			Very stiff high to very high strength brown slightly silty gravelly CLAY. Gravel is fine to coarse subangular to rounded of mudstone.
		6.50		N=19 (3,4/4,5,5,5)				
		6.50 - 6.95	D					
		8.00	B					
		8.00		N=21 (3,4/4,5,6,6)				
		8.00 - 8.45	D					
		9.50 - 9.95	U					

Continued on next sheet

Remarks

1. Complete. 2. What 3 Words: bind.scenes.hardly

Borehole Log

Borehole No. **CP102**

Sheet 2 of 2

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387876.00 - 403143.00	Hole Type CP
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client:	Miller Homes		Dates: 29/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00 11.00 - 11.45	D	N=26 (3,5/5,6,7,8)				
		12.50 12.50 - 12.95	D	N=27 (3,4/6,6,7,8)				
		14.00 - 14.45	U					
		15.00 - 15.45	D					
		15.50		N=36 (4,5/8,9,9,10)				
					15.95			End of borehole at 15.95 m

11 12 13 14 15 16 17 18 19 20

Remarks
1. Complete. 2. What 3 Words: bind.scenes.hardly

Borehole Log

Borehole No. **CP103**

Sheet 1 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387829.00 - 403191.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		1.00	B					Very soft very low strength dark blackish brown silty PEAT. (Slight organic odour).
		1.00		N=2 (0,1/0,1,0,1)				
		1.00 - 1.45	D					
		2.00	B		2.00			Soft very low to low strength light grey slightly silty slightly sandy peaty CLAY.
		2.00		N=3 (1,0/1,1,0,1)				
		2.00 - 2.45	D					
					2.80			Very stiff high to very high strength brown slightly silty gravelly CLAY. Gravel is fine to coarse subangular to rounded of mudstone.
		3.00		N=18 (3,4/4,4,5,5)				
		3.00 - 3.45	D					
		4.00		N=20 (3,4/4,5,5,6)				
		4.00 - 4.45	D					
		5.00		N=17 (3,4/4,4,4,5)				
		5.00 - 5.45	B					
		5.00 - 5.45	D					
		6.50 - 6.95	U					
		8.00		N=21 (3,4/5,5,5,6)				
		8.00 - 8.45	D					
		9.50		N=23 (3,4/5,5,6,7)				
		9.50 - 9.95	D					

Continued on next sheet

Remarks

1. Complete. 2. What 3 Words: rewarding.ridge.herds

Borehole Log

Borehole No. **CP103**

Sheet 2 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387829.00 - 403191.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00 - 11.45	U					
		12.50 12.50 - 12.95	D	N=25 (3,4/5,6,7,7)				
		14.00 14.00 - 14.45	D	N=24 (4,4/5,5,6,8)				
		15.00 15.00 - 15.45	D	N=28 (4,5/5,5,9,9)				
					15.45			End of borehole at 15.45 m

11 12 13 14 15 16 17 18 19 20

Remarks
1. Complete. 2. What 3 Words: rewarding.ridge.herds

Borehole Log

Borehole No. **CP104**

Sheet 1 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387763.00 - 403131.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		1.00 1.00 - 1.45	D	N=3 (1,0/1,1,0,1)				Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
					1.40			Dark brown slightly sandy peaty CLAY.
		2.00 2.00 2.00 - 2.45	B D	N=4 (1,0/1,1,1,1)	1.40			Soft low strength light grey slightly silty sandy CLAY.
					2.60			Stiff to very stiff high strength brown slightly silty gravelly CLAY. Gravel is fine to coarse subangular to rounded of mudstone.
		3.00 3.00 - 3.45	D	N=14 (2,3/3,3,4,4)				
		4.00 4.00 - 4.45	D	N=16 (2,3/4,4,4,4)				
		5.00 5.00 5.00 - 5.45	B D	N=16 (2,3/3,4,4,5)				
		6.50 6.50 - 6.95	D	N=16 (2,3/4,4,4,4)				
		8.00 8.00 - 8.45	D	N=18 (3,4/4,4,5,5)				
		9.50 9.50 - 9.95	D	N=22 (3,4/4,5,6,7)				
					9.80			Very stiff high to very high strength brown slightly
								Continued on next sheet

Remarks

1. Complete. 2. What 3 Words: backs.loans.civil

Borehole Log

Borehole No. **CP104**
Sheet 2 of 2

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387763.00 - 403131.00	Hole Type CP
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		11.00 - 11.45	U					silty gravelly CLAY. Gravel is fine to coarse subangular to rounded of mudstone.
		12.50 12.50 - 12.95	D	N=19 (3,4/4,5,5,5)				
		14.00 14.00 - 14.45	D	N=23 (3,4/4,5,6,8)				
		15.00 15.00 - 15.45	D	N=26 (4,4/4,5,8,9)				
					15.45			End of borehole at 15.45 m

11 12 13 14 15 16 17 18 19 20

Remarks
1. Complete. 2. What 3 Words: backs.loans.civil

Borehole Log

Borehole No. **RB101**

Sheet 1 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387800E - 403057N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	28/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
								Brown slightly sandy CLAY.

Remarks

1. Complete. 2. What 3 Words: reason.energetic.then 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB101**

Sheet 2 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387800E - 403057N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	28/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown slightly sandy CLAY.
					16.20			Brown clayey SAND.
					18.90			Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone.

11 12 13 14 15 16 17 18 19 20

Remarks

1. Complete. 2. What 3 Words: reason.energetic.then 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB101**

Sheet 3 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387800E - 403057N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	28/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone.

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Remarks

1. Complete. 2. What 3 Words: reason.energetic.then 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB101**

Sheet 4 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387800E - 403057N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	28/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone.
					40.00			End of Borehole at 40.00m

31 32 33 34 35 36 37 38 39 40

Remarks

1. Complete. 2. What 3 Words: reason.energetic.then 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB102**

Sheet 1 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387876E - 403143N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client:	Miller Homes		Dates: 29/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
								Blackish brown silty PEAT.
					2.80			Brown slightly sandy gravelly cobbly CLAY. Gravel is medium to coarse subrounded to rounded mudstone and sandstone. Cobbles of subangular sandstone.

1 2 3 4 5 6 7 8 9 10

Remarks

1. Complete. 2. What 3 Words: bind.scenes.hardly 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB102**

Sheet 2 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387876E - 403143N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	29/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown slightly sandy gravelly cobbly CLAY. Gravel is medium to coarse subrounded to rounded mudstone and sandstone. Cobbles of subangular sandstone.
					17.20			Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.

11 12 13 14 15 16 17 18 19 20

Remarks

1. Complete. 2. What 3 Words: bind.scenes.hardly 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB102**

Sheet 3 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387876E - 403143N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	29/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.

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Remarks

1. Complete. 2. What 3 Words: bind.scenes.hardly 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB102**

Sheet 4 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387876E - 403143N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	29/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.
					40.00			End of Borehole at 40.00m

31 32 33 34 35 36 37 38 39 40

Remarks

1. Complete. 2. What 3 Words: bind.scenes.hardly 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB103**

Sheet 1 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387829E - 403191N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client:	Miller Homes		Dates: 30/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
								Blackish brown silty PEAT.
					2.80			Brown slightly sandy gravelly cobbly CLAY. Gravel is medium to coarse subrounded to rounded mudstone and sandstone. Cobbles of subangular sandstone.

1 2 3 4 5 6 7 8 9 10

Remarks

1. Complete. 2. What 3 Words: rewarding.ridge.herds 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB103**

Sheet 2 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387829E - 403191N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	30/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown slightly sandy gravelly cobbly CLAY. Gravel is medium to coarse subrounded to rounded mudstone and sandstone. Cobbles of subangular sandstone.
					15.90			Brown slightly clayey gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.

11 12 13 14 15 16 17 18 19 20

Remarks

1. Complete. 2. What 3 Words: rewarding.ridge.herds 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB103**

Sheet 3 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387829E - 403191N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	30/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown slightly clayey gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.

21
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Remarks

1. Complete. 2. What 3 Words: rewarding.ridge.herds 3. Rotary borehole backfilled with bentonite to top of bedrock.

Borehole Log

Borehole No. **RB103**

Sheet 4 of 4

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords:	387829E - 403191N	Hole Type BH
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:		Scale 1:50
Client:	Miller Homes		Dates:	30/10/2024	Logged By L. CALLISS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Brown slightly clayey gravelly SAND. Gravel is fine to medium subangular to subrounded of mudstone. Gravel is occasional in bands.
					40.00			End of Borehole at 40.00m

31 32 33 34 35 36 37 38 39 40

Remarks

1. Complete. 2. What 3 Words: rewarding.ridge.herds 3. Rotary borehole backfilled with bentonite to top of bedrock.

Trial Pit Log

TrialPit No SA101 Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387796.10 - 403095.55 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.10 x 0.60 Depth 1.70	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30			MADE GROUND. Dark brown slightly sandy slightly gravelly clay with frequent rootlets. Gravel is fine to course subangular brick. (Reworked topsoil).
							Dark brown slightly sandy CLAY.
	1.00	HVP	48	0.90			Firm medium strength greyish brown CLAY.
	1.20	ES					
	1.50	HVP	45				
				1.70			End of Pit at 1.70m

1 2 3 4

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Soakaway testing undertaken.

Stability: STABLE

Trial Pit Log

TrialPit No: SA102
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387787.26 - 403170.99 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 2.80 × 0.60 Depth 1.60	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40	ES		0.30			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				0.50			Dark brown silghtly sandy CLAY with rare inclusions of wood.
▼ 0.80	1.00	HVP	93				Stiff high strength light grey CLAY. (Becoming soft at 1.00 m bgl).
	1.40	ES					
	1.50	HVP	32				
				1.60			End of Pit at 1.60m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Soakaway testing undertaken.

Stability: STABLE

Trial Pit Log

TrialPit No: SA103
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387865.00 - 403167.94 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 2.90 × 0.70 Depth 2.30	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				1.00			Brown clayey PEAT. (Strong organic odour).
	1.20 1.20	ES HVP	35				Soft low strength light grey slightly sandy CLAY. (Becoming firm medium strength at 1.7 m bgl).
	1.70	HVP	61				
	2.20	HVP	67	2.30			End of Pit at 2.30m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Soakaway testing undertaken. 3. Peat H3, F1, R2, W3.

Stability: STABLE

Trial Pit Log

			TrialPit No TP101 Sheet 1 of 1
Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387760.99 - 403152.98 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.60 x 0.70 Depth 2.20	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			MADE GROUND. Dark brown slighlty sandy clay with frequent rootlets. (Reworked topsoil).
	0.80	B					MADE GROUND. Dark brown gravelly sandy clay. Gravel is fine to coarse angular to subangular brick, concrete, asphalt. Cobbles of angular to subangular brick and concrete. Gravel to cobble sized inclusions of plastic, leather, glass and rubber.
	1.00	ES					
	2.00	ES		1.90			Firm medium strength greyish brown slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of sandstone, mudstone and coal.
	2.00	HVP	70	2.20			End of Pit at 2.20m

1 2 3 4

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

			TrialPit No TP102 Sheet 1 of 1
Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387766.41 - 403194.56 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.20 x 0.70 Depth 2.20	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			MADE GROUND. Dark brown slightly sandy CLAY with frequent rootlets. (Reworked topsoil).
	0.80	ES					MADE GROUND. Dark brown slightly gravelly sandy clay. Gravel is fine to coarse angular to subangular brick, concrete, plastic. Gravel sized inclusions of wood, metal and glass. Rare cobbles of angular brick and concrete.
	2.00 2.00 2.00	B ES HVP	51	1.90 2.20			MADE GROUND. Firm greyish brown slightly gravelly slightly peaty clay. Gravel is fine to medium subangular to rounded of mudstone, sandstone and coal with rare inclusions of wood and roots. (Slight organic odour). End of Pit at 2.20m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Pit terminated due to land drain located 2.2 m bgl.

Stability: STABLE

Trial Pit Log

TrialPit No: TP103
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387793.64 - 403188.41 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 1.80	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.40			Dark brown slightl sandy CLAY with frequent rootlets. (Topsoil).
	0.50	HVP	42				Firm medium strength greyish brown CLAY.
	0.80	ES					
	1.00	HVP	42				
	1.50	HVP	67	1.80			End of Pit at 1.80m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP104
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387808.36 - 403197.70 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.20 x 0.70 Depth 1.80	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.50			MADE GROUND. Dark brown slightly sandy clay with frequent rootlets. (Reworked topsoil).
	0.60	HVP	45				Firm medium strength greyish brown CLAY. (Becoming stiff medium strength at 1.6 m bgl).
	1.10	HVP	51				
	1.20	ES					
	1.40	B					
	1.60	HVP	77	1.80			End of Pit at 1.80m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Land drain located at 0.4 m bgl.

Stability: STABLE

Trial Pit Log

TrialPit No: TP105
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387805.41 - 403167.97 Level:	Date 30/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 1.90	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30	ES		0.50			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
	0.60 0.60	ES HVP	51				Firm medium strength greyish brown CLAY. (Becoming stiff medium to high strength from 1.6 m bgl).
	1.10	HVP	67				
	1.60	HVP	99				
				1.90			End of Pit at 1.90m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP106
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387844.62 - 403176.42 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 2.00	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				0.90			Blackish brown PEAT. (Strong organic odour).
	1.00	HVP	42				Firm medium strength light grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded or mudstone and coal. (Becoming stiff medium to high strength at 2.0 m bgl).
	1.20	ES					
	1.50	HVP	54				
	2.00	HVP	77	2.00			End of Pit at 2.00m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Peat H6, F2, R2, W1.

Stability: STABLE

Trial Pit Log

TrialPit No: TP107
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387850.14 - 403146.94 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 1.90	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30	ES		0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
							Blackish brown PEAT. Strong organic odour.
	0.90	ES		0.80			Soft low strength light greyish brown slightly sandy CLAY.
	1.00	HVP	32	1.00			Soft low strength light grey slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
	1.50	B					
	1.50	HVP	38				
				1.90			End of Pit at 1.90m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Peat H6, F2, R3, W1.

Stability: STABLE

Trial Pit Log

TrialPit No: TP108
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387883.23 - 403128.55 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.80 x 0.70 Depth 1.60	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				0.90			Blackish brown PEAT. (Strong organic odour)
	1.00 1.00	ES HVP	13				Very soft extremely low strength light grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
	1.50	HVP	19	1.60			End of Pit at 1.60m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP109
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387901.33 - 403146.64 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.50 x 0.70 Depth 1.40	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			MADE GROUND. Dark brown slightly sandy CLAY with frequent rootlets. (Reworked topsoil).
	0.50	ES		0.60			MADE GROUND. Greyish brown slightly gravelly clay. Gravel is fine to coarse angular to subrounded concrete, brick and wood.
	0.80 0.80	ES HVP	77				Stiff high strength light brown CLAY
	1.30	HVP	96	1.40			End of Pit at 1.40m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP110
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387886.45 - 403152.22 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 1.90	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				0.90			Blackish brown PEAT. (Slight organic odour)
	1.00 1.00	ES HVP	83	1.40			Stiff high strength greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
	1.50	HVP	19	1.90			Very soft extremely low strength greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
							End of Pit at 1.90m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP111
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387878.66 - 403182.47 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 2.10	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
	0.50	ES					Blackish brown slightly clayey PEAT. (Very slight organic odour).
0.80 ▼				0.90			
	1.00	HVP	77	1.10			Stiff high strength light greyish brown slightly sandy CLAY.
	1.50	HVP	83				Stiff high strength light grey slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
	2.00	HVP	106	2.10			End of Pit at 2.10m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP112
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387865.36 - 403128.65 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.30 x 0.70 Depth 1.80	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30	ES		0.50			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
	1.00 1.00	ES HVP	29	0.90			Blackish brown PEAT.
	1.50	HVP	45	1.80			Very soft to soft low strength light grey slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone with rare inclusions of wood and roots.
							End of Pit at 1.80m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Peat H4, R2, F1, W2.

Stability: STABLE

Trial Pit Log

			TrialPit No TP113 Sheet 1 of 1
Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387841.64 - 403098.67 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.50 x 0.70 Depth 2.10	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				0.80			Brown sandy organic CLAY with frequent rootlets.
	0.90	ES					Light greyish brown slightly sandy CLAY
	1.00	HVP	45	1.00			Firm medium strength light grey CLAY. (Becoming firm at 1.5 m bgl).
	1.50	HVP	58				
	1.80	B					
	2.00	HVP	61	2.10			End of Pit at 2.10m

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Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

TrialPit No: TP114
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387814.11 - 403074.02 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.20 x 0.70 Depth 2.10	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
	0.60	ES		0.90			Dark brown slightly sandy CLAY.
	1.50	HVP	32	1.40			Blackish brown PEAT.
	2.00	HVP	38	2.10			Soft low strength light grey CLAY.
							End of Pit at 2.10m

Trial Pit Photographs



TP114 Arisings

Remarks: 1. Complete. 2. Peat H6, F1, R2, W1.

Stability: STABLE

Trial Pit Log

TrialPit No: TP115
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387775.01 - 403038.77 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.10 x 0.60 Depth 1.20	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			MADE GROUND. Dark brown slightly sandy clay with frequent rootlets. (Reworked topsoil).
	0.60	ES		1.20			MADE GROUND. Dark brown slightly sandy gravelly clay. Gravel is fine to coarse angular to subangular brick, concrete and asphalt. Occasional cobble of angular brick and concrete. Frequent inclusions of gravel sized wood and glass.
							End of Pit at 1.20m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Refusal at 1.2 m bgl on concrete slab.

Stability: STABLE

Trial Pit Log

TrialPit No: TP116
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387775.22 - 403119.08 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.10 x 0.70 Depth 1.90	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
0.60	0.50	ES					Blackish brown PEAT. (Strong organic odour)
	1.00 1.00	ES HVP	45	0.80			Firm medium strength light grey CLAY.
	1.50	HVP	67				
				1.90			End of Pit at 1.90m

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Peat H3, F2, R2, W3.

Stability: STABLE

Trial Pit Log

TrialPit No: TP117
Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387805.55 - 403134.79 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.40 x 0.70 Depth 2.30	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
				1.10			Dark brown slightly sandy organic CLAY with rare inclusions of roots.
	1.30	ES					Soft low strength light grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
	1.50	HVP	35				
	2.00	HVP	77	1.90			Stiff medium to high strength light grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
				2.30			End of Pit at 2.30m

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4

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete.

Stability: STABLE

Trial Pit Log

			TrialPit No TP118 Sheet 1 of 1
Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387829.04 - 403143.89 Level:	Date 31/10/2024
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Dimensions (m): 3.10 x 0.70 Depth 2.10	Scale 1:30
Client: Miller Homes			Logged L. CALLISS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.30	ES		0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
							Blackish brown PEAT. (Slight organic odour)
	1.00	HVP	54	0.90			Firm to stiff medium to high strength light grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
	1.30	ES					
	1.50	HVP	77				
	2.00	HVP	38	1.70			Soft low strength light grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded of mudstone and coal.
				2.10			End of Pit at 2.10m

1 2 3 4

Trial Pit Photographs



Multiple



Multiple

Remarks: 1. Complete. 2. Peat H2, F2, R3, W3.

Stability: STABLE

Borehole Log

Borehole No. **WS101**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387772.27 - 403086.24	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND. Dark brown slighlty sandy clay with frequent rootlets. (Reworked topsoil).
		0.50	ES		0.50			MADE GROUND. Brown clayey sandy gravel. Gravel is fine to course angular to subangular brick, asphalt and concrete.
		1.00		N=5 (1,1/1,1,1,2)	1.00			MADE GROUND. Blackish brown slighlty peaty gravelly clay. Gravel is fine to course angular to subangular brick. Peat is rare inclusions of wood and roots. (Slight organic odour).
		1.00 - 1.45	D					
		1.20	ES					
		2.00		N=7 (1,1/1,2,2,2)				Firm to stiff medium to high strength brown mottled grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
		2.00 - 2.45	D					
		3.00		N=9 (2,2/2,2,2,3)				
		3.00 - 3.45	D					
		4.00		N=13 (2,2/3,3,3,4)				
		4.00 - 4.45	D					
		5.00		N=14 (2,2/3,3,3,5)				
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 3.00 m bgl.

Borehole Log

Borehole No. **WS102**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387783.74 - 403024.02	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES		0.20			MADE GROUND. Dark brown slightly sandy clay with frequent rootlets. (Reworked topsoil).
		1.00 1.00 - 1.45	D	N=4 (2,1/1,1,1,1)	0.90 1.10			MADE GROUND. Brown slightly sandy slightly gravelly clay. Gravel is fine to medium subangular to subrounded sandstone, brick, concrete and asphalt.
		1.40	ES					MADE GROUND. Black sandy GRAVEL. Gravel is fine to course angular to subangular asphalt and brick.
		2.00 2.00 - 2.45	D	N=10 (1,2/2,2,2,4)	2.00			Black sandy peaty CLAY. (Slight organic odour).
		3.00 3.00 - 3.45	D	N=21 (2,3/4,5,5,7)				Stiff to very stiff high strength brown mottled grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded mudstone and coal.
		4.00		N=21 (4,4/5,5,5,6)				
		5.00 5.00 - 5.45	D	N=28 (4,5/6,6,8,8)				
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 2.00 m bgl.

Borehole Log

Borehole No. **WS103**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387814.89 - 403049.28	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND. Dark brown slighlty sandy CLAY with frequent rootlets. (Reworked topsoil).
		0.50	ES		0.60			MADE GROUND. Greyish brown slightly gravelly clay. Gravel is fine to coarse angular to subangular asphalt and brick.
		0.80	ES					Firm medium strength blackish brown slightly sandy slightly peaty CLAY. Rare peat inclusions of intact roots and wood.
		1.00		N=7 (1,1/1,2,2,2)				
		1.00 - 1.45	D		1.30			Stiff high strength greyish brown slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
		2.00		N=12 (1,2/2,3,3,4)				
		2.00 - 2.45	D					
		3.00		N=13 (3,3/3,3,3,4)				
		3.00 - 3.45	D					
		4.00		N=11 (2,2/2,3,3,3)				
		4.00 - 4.45	D					
		5.00		N=16 (3,3/3,4,4,5)				
		5.00 - 5.45	D					
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 2.00 m bgl.

Borehole Log

Borehole No. **WS104**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387864.58 - 403099.70	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES		0.20			MADE GROUND. Dark brown slighlty sandy CLAY with frequent rootlets. (Reworked topsoil).
					0.30			MADE GROUND. Black sandy gravel. Gravel is fragments of asphalt and brick.
					0.60			MADE GROUND. Brown sandy gravel. Gravel is fragments of brick, concrete and asphalt.
		1.00		N=4 (1,1/1,1,1,1)				Soft low strength blackish brown PEAT.
		1.00 - 1.45	D		1.10			Firm to stiff medium to high strength grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of sandstone, mudstone and coal.
		1.20	ES					
		2.00		N=6 (1,1/1,2,2,1)				
		2.00 - 2.45	D					
		3.00		N=11 (2,2/2,3,3,3)				
		3.00 - 3.45	D					
		4.00		N=15 (2,3/3,3,4,5)				
		4.00 - 4.45	D					
					4.45			End of borehole at 4.45 m

Remarks

1. Hole collapsed. 2. Wet sand at 3 m bgl. 3. Monitoring well installed. 4. Monitoring zone between 2.00 - 3.50 m bgl. 5. Peat H5, R2, F2, W1.

Borehole Log

Borehole No. **WS105**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387837.48 - 403121.31	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		0.70	ES					Soft low strength blackinsh brown PEAT. (Slight organic odour).
		1.00 1.10	ES	N=4 (1,1/1,1,1,1)	1.20			Stiff high strength grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
		2.00 2.00 - 2.45	D	N=13 (2,2/2,3,4,4)				
		3.00 3.00 - 3.45	D	N=12 (2,2/3,3,3,3)				
		4.00 4.00 - 4.45	D	N=13 (2,2/3,3,3,4)				
		5.00 5.00 - 5.45	D	N=15 (3,3/3,3,4,5)				
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 5.00 m bgl. 4. Peat H3, R1, F1, W3.

Borehole Log

Borehole No. **WS106**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387804.01 - 403114.43	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 30/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES		0.20			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		1.00 1.00 - 1.45	D	N=5 (1,1/1,1,1,2)	0.80			Dark brown sandy slightly peaty CLAY with frequent rootlets and rare inclusions of cobble sized wood.
		1.60	ES		1.50			Firm low strength blackish brown PEAT. (Strong organic odour).
		2.00 2.00 - 2.45	D	N=16 (2,3/3,3,3,7)				Stiff high strength light grey slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
		3.00		50 (7,12/50 for 250mm)				
					3.45			End of borehole at 3.40 m

Remarks

1. Drilled to 3.00 m with no recovery from 2.00 - 3.00 m bgl. 2. Refusal on a cobble at 3.00 m. 3. Peat H6, F2, R1, W2.

Borehole Log

Borehole No. **WS107**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387795.96 - 403202.82	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.60			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		0.80	ES					Stiff high strength light brown slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
		1.00		N=8 (1,2/2,2,2,2)				
		2.00		N=16 (2,3/3,4,4,5)				
		2.00 - 2.45	D					
		3.00		N=13 (2,2/3,3,3,4)				
		3.00 - 3.45	D					
		4.00		N=12 (2,2/2,3,3,4)				
		5.00		N=17 (3,3/4,4,5,4)				
		5.00 - 5.45	D		5.45			End of borehole at 5.45 m

Remarks
1. Complete.

Borehole Log

Borehole No. **WS108**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387761.93 - 403178.58	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND. Dark brown slightly sandy clay with frequent rootlets. (Reworked topsoil).
		0.80	ES					MADE GROUND.Dark brown gravelly clay. Gravel is fine to medium subangular to subrounded of sandstone, brick, asphalt, concrete and slag.
		1.00		N=8 (1,3/3,2,2,1)				
		1.00 - 1.45	D					
		2.00		N=8 (2,1/1,2,2,3)				
		2.00 - 2.45	D					
					2.60			MADE GROUND. Black sandy gravel. Gravel is fine to medium subrounded slag.
		2.80	ES		2.80			Blackish brown PEAT.
		3.00		N=11 (2,3/3,2,2,4)	3.00			Stiff high strength light brown slightly gravelly CLAY. Gravel is fine to medium subrounded of mudstone.
		3.00 - 3.45	D					
		3.20	ES					
		4.00		N=20 (3,3/3,4,6,7)				
		4.00 - 4.45	D					
		5.00		N=19 (3,3/3,5,5,6)				
		5.00 - 5.45	D					
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 2.50 m bgl. 4. Peat H6, F2, R1, W1.

Borehole Log

Borehole No. **WS109**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387795.11 - 403153.62	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.20			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
					0.50			Blackish brown PEAT. (Slight organic odour)
		1.00		N=4 (1,1/1,1,1,1)				Soft low strength greyish brown slightly sandy CLAY.
		1.00 - 1.45	D					
		1.30	ES					
		2.00		N=14 (1,2/2,3,4,5)	1.80			Stiff high strength light brown slightly gravelly CLAY. Gravel is fine to medium subangular to rounded of mudstone and coal.
		2.00 - 2.45	D					
		3.00		N=13 (2,2/3,3,4,3)				
		3.00 - 3.45	D					
		4.00		N=11 (2,2/2,2,3,4)				
		4.00 - 4.45	D					
		5.00		N=17 (2,3/3,4,5,5)				
		5.00 - 5.45	D					
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 3.00 - 5.00 m bgl.

Borehole Log

Borehole No. **WS110**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387832.14 - 403166.11	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
					0.80			Blackish brown PEAT.
		1.00 1.00 - 1.45	 D	N=10 (1,2/3,3,2,2)				Stiff high strength greyish brown slightly gravelly CLAY. Gravel is fine to medium subrounded to subrounded of mudstone sandstone and coal.
		1.60	ES					
		2.00 2.00 - 2.45	 D	N=21 (2,3/3,4,6,8)				
		3.00 3.00 - 3.45 3.00 - 4.00	 D U	N=20 (3,3/3,5,6,6)				
		4.00 4.00 - 4.45	 D	N=15 (2,2/3,3,4,5)				
		5.00 5.00 - 5.45	 D	N=17 (2,3/4,4,4,5)				
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 2.00 m bgl. 4. Peat H4, R2, F1, W2.

Borehole Log

Borehole No. **WS111**

Sheet 1 of 1

Project Name: Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387855.45 - 403180.06	Hole Type WS
Location: Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client: Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).
		0.80	ES					Blackish brown PEAT.
		1.00		N=5 (1,1/1,1,2,1)	1.00			
		1.00 - 1.45	D					Stiff high strength light grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
		1.80	ES					
		2.00		N=8 (1,1/2,2,2,2)				
		2.00 - 2.45	D					
		3.00		N=18 (2,3/3,4,5,6)				
		3.00 - 3.45	D					
		4.00		N=16 (2,3/3,3,5,5)				
		4.00 - 4.45	D					
		5.00		N=17 (3,3/3,4,5,5)				
					5.45			End of borehole at 5.45 m

Remarks

1. Complete. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 1.50 m bgl. 4. Peat H3, F2, R2, W3.

Borehole Log

Borehole No. **WS112**

Sheet 1 of 1

Project Name:	Hinchley Road, Charlestown	Project No. 17994	Co-ords: 387890.38 - 403167.74	Hole Type WS
Location:	Land off Hinchley Road, Charlestown, Manchester, M9 7BX		Level:	Scale 1:50
Client:	Miller Homes		Dates: 31/10/2024 -	Logged By L. CALLISS

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND. Dark brown slightly sandy CLAY with frequent rootlets. (Reworked topsoil).
		0.80	ES		0.70			MADE GROUND. Dark brown gravelly clay. Gravel is fine to coarse angular to subangular asphalt, brick and coal.
		1.00		N=8 (1,1/2,2,2,2)	1.00			Light brown organic CLAY. Organic rootlet inclusions.
		1.00 - 1.45	D					Firm to stiff medium to high strength light greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
		1.20	ES					
					1.80			Stiff high strength light brown slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
		2.00		N=25 (2,4/5,6,6,8)				
		2.00 - 2.45	D					
		3.00		50 (8,12/50 for 265mm)				
		3.00 - 3.45	D					
					3.45			End of borehole at 3.42 m

Remarks

1. Refusal at 3.00 m bgl. 2. Monitoring well installed. 3. Monitoring zone between 1.00 - 3.00 m bgl.

APPENDIX VII
CHEMICAL TESTING RESULTS



Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	24-36191-1
Initial Date of Issue:	14-Nov-2024
Re-Issue Details:	
Client	E3P
Client Address:	Taylor Road Trafford Park Urmston Manchester M41 7JQ
Contact(s):	lcalliss@e3p.co.uk; mdee@e3p.co.uk
Project	Hinchley Rd

Quotation No.:	Q23-31421	**Date Received:**	07-Nov-2024
Order No.:	009941	**Date Instructed:**	07-Nov-2024
No. of Samples:	17		
Turnaround (Wkdays):	5	**Results Due:**	13-Nov-2024
Date Approved:	14-Nov-2024		

Approved By:

[redacted]

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Leachate

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891349
				Client Sample ID.:		WS104
				Sample Location:		MG
				Sample Type:		SOIL
				Top Depth (m):		0.5
				Date Sampled:		30-Oct-2024
				Time Sampled:		12:00
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
pH at 20C	U	1010	2:1		4.0	9.9
Cyanide (Total) Low-Level	N	1300	2:1	mg/l	0.0050	< 0.0050
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	3.9
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11
Chromium (Dissolved)	U	1455	2:1	µg/l	0.50	8.6
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	20
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	0.89
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	< 5.0
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	< 10
Benzene	U	1760	2:1	µg/l	1.0	< 1.0
Toluene	U	1760	2:1	µg/l	1.0	< 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	< 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	< 1.0
Naphthalene	U	1800	2:1	µg/l	0.10	< 0.10

Results - Leachate

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891349
				Client Sample ID.:		WS104
				Sample Location:		MG
				Sample Type:		SOIL
				Top Depth (m):		0.5
				Date Sampled:		30-Oct-2024
				Time Sampled:		12:00
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**	
Acenaphthylene	U	1800	2:1	µg/l	0.10	< 0.10
Acenaphthene	U	1800	2:1	µg/l	0.10	< 0.10
Fluorene	U	1800	2:1	µg/l	0.10	< 0.10
Phenanthrene	U	1800	2:1	µg/l	0.10	< 0.10
Anthracene	U	1800	2:1	µg/l	0.10	< 0.10
Fluoranthene	U	1800	2:1	µg/l	0.10	< 0.10
Pyrene	U	1800	2:1	µg/l	0.10	< 0.10
Benzo[a]anthracene	U	1800	2:1	µg/l	0.10	< 0.10
Chrysene	U	1800	2:1	µg/l	0.10	< 0.10
Benzo[b]fluoranthene	U	1800	2:1	µg/l	0.10	< 0.10
Benzo[k]fluoranthene	U	1800	2:1	µg/l	0.10	< 0.10
Benzo[a]pyrene	U	1800	2:1	µg/l	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	2:1	µg/l	0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	2:1	µg/l	0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	2:1	µg/l	0.10	< 0.10
Total Of 16 PAH's	U	1800	2:1	µg/l	2.0	< 2.0
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030

Results - Soil

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891336	1891337	1891338	1891339	1891340	1891341	1891342	1891343
				Client Sample ID.:		WS112	SA103	SA101	TP101	TP102	TP103	TP105	TP109
				Sample Location:		CLAY	TS	MG	MG	MG	TS	CLAY	MG
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.8	0.2	0.2	1	0.8	0.2	0.6	0.5
				Date Sampled:		31-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	31-Oct-2024
				Time Sampled:		12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type		U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	37	55	29	19	26	30	17	18
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Roots	Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones	Roots	Stones
Soil Texture		N	2040		N/A	Clay	Loam	Loam	Loam	Loam	Loam	Clay	Loam
pH at 20C		M	2010		4.0	6.7	7.2	5.7	7.7	7.6	5.0	5.9	6.7
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.042	< 0.010	< 0.010	0.11	0.057	< 0.010	< 0.010	< 0.010
Total Sulphur		U	2175	%	0.010	0.040	0.12	0.10	0.11	0.080	0.080	0.030	0.020
Cyanide (Total)		M	2300	mg/kg	0.50	0.60	0.60	7.0	0.50	< 0.50	0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	3.0	2.7	4.0	3.6	2.3	2.8	2.6	2.6
Sulphate (Total)		U	2430	%	0.010	0.095	0.53	0.15	0.16	0.14	0.12	0.070	0.12
Arsenic		M	2455	mg/kg	0.5	1.9	17	19	24	14	16	8.9	6.0
Cadmium		M	2455	mg/kg	0.10	< 0.10	0.41	0.23	0.96	0.28	0.23	< 0.10	0.35
Chromium		M	2455	mg/kg	0.5	5.5	13	18	25	24	18	35	16
Copper		M	2455	mg/kg	0.50	5.5	47	44	210	44	40	30	18
Mercury		M	2455	mg/kg	0.05	< 0.05	0.25	0.22	0.64	0.15	0.19	< 0.05	0.09
Nickel		M	2455	mg/kg	0.50	3.1	18	20	27	25	24	35	14
Lead		M	2455	mg/kg	0.50	9.1	93	92	570	81	89	21	34
Selenium		M	2455	mg/kg	0.25	< 0.25	1.3	1.1	1.1	0.91	1.0	1.2	0.53
Zinc		M	2455	mg/kg	0.50	19	82	69	280	77	76	130	43
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	13	36	17	10	8.3	11	1.5	5.1
Total Organic Carbon		M	2625	%	0.20	7.4	21	9.9	6.0	4.8	6.4	0.87	3.0
TPH >C6-C8	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	8.2	26	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	40	140	16	< 1.0	< 1.0	< 1.0
TPH >C21-C25	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	38	140	18	< 1.0	< 1.0	< 1.0
TPH >C25-C35	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	170	350	82	< 1.0	< 1.0	< 1.0
TPH >C35-C40	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	43	51	18	< 1.0	< 1.0	< 1.0
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	< 10	< 10	300	700	140	< 10	< 10	< 10
Naphthalene		M	2800	mg/kg	0.10	0.11	0.30	0.19	0.56	< 0.10	0.40	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.38	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891336	1891337	1891338	1891339	1891340	1891341	1891342	1891343
				Client Sample ID.:		WS112	SA103	SA101	TP101	TP102	TP103	TP105	TP109
				Sample Location:		CLAY	TS	MG	MG	MG	TS	CLAY	MG
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.8	0.2	0.2	1	0.8	0.2	0.6	0.5
				Date Sampled:		31-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	31-Oct-2024
				Time Sampled:		12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.50	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	0.22	< 0.10	< 0.10	0.56	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	0.75	1.8	0.63	4.7	0.79	0.72	< 0.10	0.20
Anthracene		M	2800	mg/kg	0.10	0.75	0.29	0.12	1.2	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	3.8	2.1	1.4	9.9	1.7	1.1	0.31	0.58
Pyrene		M	2800	mg/kg	0.10	3.9	2.0	1.2	9.3	1.5	1.0	0.32	0.59
Benzo[a]anthracene		M	2800	mg/kg	0.10	4.6	0.68	0.62	4.6	0.61	0.42	< 0.10	0.32
Chrysene		M	2800	mg/kg	0.10	4.4	0.75	0.77	4.9	0.62	0.52	< 0.10	0.34
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	5.2	0.88	0.93	6.2	1.1	0.64	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	4.4	0.30	0.31	2.1	0.37	0.20	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	4.9	0.74	0.68	5.1	0.75	0.45	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	4.8	0.46	0.58	3.4	0.53	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	4.1	< 0.10	< 0.10	0.71	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	4.6	0.50	0.53	3.1	0.54	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	47	11	8.0	57	8.5	5.5	< 2.0	2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10	0.35	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891344	1891345	1891346	1891347	1891348	1891350	1891351	1891352
				Client Sample ID.:		TP111	TP113	TP115	TP116	WS101	WS104	WS105	WS108
				Sample Location:		PEAT	TS	MG	PEAT	CLAY	CLAY	CLAY	MG
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.5	0.2	0.6	0.5	1.2	1.2	1.1	2.8
				Date Sampled:		31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	31-Oct-2024
				Time Sampled:		12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type		U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	75	58	20	62	20	21	18	26
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones, Roots and Wood	Roots	Stones and Roots	Stones	Stones	None	None	Stones
Soil Texture		N	2040		N/A	Loam	Loam	Loam	Loam	Clay	Clay	Clay	Clay
pH at 20C		M	2010		4.0	5.6	5.3	7.3	5.8	6.6	5.7	6.1	6.4
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.022	< 0.010	< 0.010	0.022	< 0.010	< 0.010	< 0.010	0.11
Total Sulphur		U	2175	%	0.010	0.12	0.16	0.030	0.14	0.020	0.020	0.010	0.19
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	2.7	2.3	2.8	3.1	2.4	2.5	3.1	16
Sulphate (Total)		U	2430	%	0.010	0.33	0.28	0.12	0.56	0.084	0.046	0.044	0.42
Arsenic		M	2455	mg/kg	0.5	1.5	7.5	8.2	7.6	5.8	3.0	5.4	16
Cadmium		M	2455	mg/kg	0.10	< 0.10	0.15	0.18	0.16	< 0.10	< 0.10	< 0.10	0.12
Chromium		M	2455	mg/kg	0.5	2.2	7.2	18	8.9	35	22	36	21
Copper		M	2455	mg/kg	0.50	6.7	20	47	35	28	16	30	44
Mercury		M	2455	mg/kg	0.05	< 0.05	0.12	0.10	0.11	< 0.05	< 0.05	0.06	0.15
Nickel		M	2455	mg/kg	0.50	3.1	8.9	19	15	40	15	47	24
Lead		M	2455	mg/kg	0.50	5.1	38	45	46	17	12	16	110
Selenium		M	2455	mg/kg	0.25	0.30	0.63	0.70	0.69	1.0	0.66	1.2	1.0
Zinc		M	2455	mg/kg	0.50	13	37	58	44	62	29	69	42
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	31	45	6.3	26	1.8	0.84	1.3	17
Total Organic Carbon		M	2625	%	0.20	18	26	3.7	15	1.0	0.49	0.73	9.6
TPH >C6-C8	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	110	< 1.0	15	< 1.0	< 1.0	16
TPH >C21-C25	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	72	< 1.0	17	< 1.0	< 1.0	26
TPH >C25-C35	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	190	< 1.0	51	< 1.0	< 1.0	150
TPH >C35-C40	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	58	< 1.0	5.9	< 1.0	< 1.0	47
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	< 10	< 10	460	< 10	88	< 10	< 10	240
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.26	< 0.10	< 0.10	< 0.10	< 0.10	0.19
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: Hinchley Rd

Client: E3P				**Chemtest Job No.:**		24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191	24-36191
Quotation No.: Q23-31421				**Chemtest Sample ID.:**		1891344	1891345	1891346	1891347	1891348	1891350	1891351	1891352
				Client Sample ID.:		TP111	TP113	TP115	TP116	WS101	WS104	WS105	WS108
				Sample Location:		PEAT	TS	MG	PEAT	CLAY	CLAY	CLAY	MG
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.5	0.2	0.6	0.5	1.2	1.2	1.1	2.8
				Date Sampled:		31-Oct-2024	31-Oct-2024	31-Oct-2024	31-Oct-2024	30-Oct-2024	30-Oct-2024	30-Oct-2024	31-Oct-2024
				Time Sampled:		12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.51	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.40	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	< 0.10	0.20	4.7	0.34	0.57	< 0.10	< 0.10	0.64
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	1.4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	< 0.10	0.52	10	0.74	0.72	< 0.10	< 0.10	1.3
Pyrene		M	2800	mg/kg	0.10	< 0.10	0.45	8.3	0.70	0.61	< 0.10	< 0.10	1.1
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	3.9	0.42	< 0.10	< 0.10	< 0.10	0.56
Chrysene		M	2800	mg/kg	0.10	< 0.10	< 0.10	3.8	0.39	< 0.10	< 0.10	< 0.10	0.65
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	4.8	0.61	< 0.10	< 0.10	< 0.10	0.94
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	1.8	0.19	< 0.10	< 0.10	< 0.10	0.35
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	4.1	0.37	< 0.10	< 0.10	< 0.10	0.71
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	2.6	< 0.10	< 0.10	< 0.10	< 0.10	0.53
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	0.52	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	< 0.10	2.6	< 0.10	< 0.10	< 0.10	< 0.10	0.58
Total Of 16 PAH's		N	2800	mg/kg	2.0	< 2.0	< 2.0	50	3.8	< 2.0	< 2.0	< 2.0	7.6
Total Phenols		M	2920	mg/kg	0.10	0.52	0.60	0.11	0.21	< 0.10	< 0.10	< 0.10	0.19

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.	
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	RE PW PL SW DW FW
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection	
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.	
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection	
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.	
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

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Final Report

Report No.:	24-38028-1
Initial Date of Issue:	26-Nov-2024
Re-Issue Details:	
Client	E3P
Client Address:	Taylor Road Trafford Park Urmston Manchester M41 7JQ
Contact(s):	lcalliss@e3p.co.uk; mdee@e3p.co.uk
Project	Hinchley Rd - Waters

Quotation No.:		**Date Received:**	20-Nov-2024
Order No.:	010062	**Date Instructed:**	20-Nov-2024
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	26-Nov-2024
Date Approved:	26-Nov-2024		

Approved By:

[redacted]

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Water

Project: Hinchley Rd - Waters

Client: E3P			**Chemtest Job No.:**			24-38028	24-38028	24-38028
Quotation No.:			**Chemtest Sample ID.:**			1898097	1898098	1898099
			Client Sample ID.:			WS101	WS104	WS112
			Sample Type:			WATER	WATER	WATER
			Sample Sub Type:					
			Date Sampled:			18-Nov-2024	18-Nov-2024	18-Nov-2024
			Time Sampled:			12:00	12:00	12:00
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
pH at 20C		U	1010		4.0	6.7	5.7	6.3
Suspended Solids At 105C		U	1030	mg/l	5.0	1900	12000	5600
Cyanide (Total)		U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium (Dissolved)		U	1455	mg/l	2.00	72	38	27
Arsenic (Dissolved)		U	1455	µg/l	0.20	1.4	7.6	0.93
Cadmium (Dissolved)		U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)		U	1455	µg/l	0.50	1.4	2.2	< 0.50
Copper (Dissolved)		U	1455	µg/l	0.50	2.3	2.8	5.8
Mercury (Dissolved)		U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Manganese (Dissolved)		U	1455	µg/l	0.50	600	420	370
Nickel (Dissolved)		U	1455	µg/l	0.50	11	6.3	11
Lead (Dissolved)		U	1455	µg/l	0.50	< 0.50	0.85	< 0.50
Selenium (Dissolved)		U	1455	µg/l	0.50	0.53	1.5	< 0.50
Zinc (Dissolved)		U	1455	µg/l	2.5	13	12	27
Dissolved Organic Carbon		U	1610	mg/l	2.0	37	46	12
Aliphatic TPH >C5-C6	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	EH_2D_AL_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	EH_2D_AL_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	EH_2D_AR_#1	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	EH_2D_AR_#1	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	EH_2D_Total_#1	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane		U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0

Results - Water

Project: Hinchley Rd - Waters

Client: E3P				**Chemtest Job No.:**		24-38028	24-38028	24-38028
Quotation No.:				**Chemtest Sample ID.:**		1898097	1898098	1898099
				Client Sample ID.:		WS101	WS104	WS112
				Sample Type:		WATER	WATER	WATER
				Sample Sub Type:				
				Date Sampled:		18-Nov-2024	18-Nov-2024	18-Nov-2024
				Time Sampled:		12:00	12:00	12:00
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
Trichlorofluoromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane		U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane		U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane		U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
Toluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene		N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane		U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane		U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane		U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane		N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

Results - Water

Project: Hinchley Rd - Waters

Client: E3P				**Chemtest Job No.:**		24-38028	24-38028	24-38028
Quotation No.:				**Chemtest Sample ID.:**		1898097	1898098	1898099
				Client Sample ID.:		WS101	WS104	WS112
				Sample Type:		WATER	WATER	WATER
				Sample Sub Type:				
				Date Sampled:		18-Nov-2024	18-Nov-2024	18-Nov-2024
				Time Sampled:		12:00	12:00	12:00
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
1,2,4-Trimethylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane		U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene		U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene		U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether		N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Isophorone		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Naphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Water

Project: Hinchley Rd - Waters

Client: E3P				**Chemtest Job No.:**		24-38028	24-38028	24-38028
Quotation No.:				**Chemtest Sample ID.:**		1898097	1898098	1898099
				Client Sample ID.:		WS101	WS104	WS112
				Sample Type:		WATER	WATER	WATER
				Sample Sub Type:				
				Date Sampled:		18-Nov-2024	18-Nov-2024	18-Nov-2024
				Time Sampled:		12:00	12:00	12:00
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**			
2-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Acenaphthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Carbazole		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[b]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[k]fluoranthene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[a]pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzo[g,h,i]perylene		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol		N	1790	µg/l	0.50	< 0.50	< 0.50	< 0.50
Total Phenols		U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	RE PW TE TS PL DW GW
1030	Total Suspended Solids	Total suspended solids	Filtration of a mixed sample through a standard glass fibre filter and determination of the mass of residue retained dried at 105°C.	SW
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.	GW
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	RE PW PL SW DW GW
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation	PL SW GW
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection	
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.	PL GW
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection	
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.	PL GW

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
Uncertainty of measurement for the determinands tested are available upon request .
None of the results in this report have been recovery corrected.
All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.
All Asbestos testing is performed at the indicated laboratory .
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.
All water samples will be retained for 14 days from the date of receipt.
Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX VIII
GEOTECHNICAL TESTING RESULTS



MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client e3p

Address Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Contract Hinchley Road,
Charlestown

Job Number MRN 24005/329
Date of Issue 16 December 2024

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

5 The results included within the report are representative of the samples submitted for analysis.

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

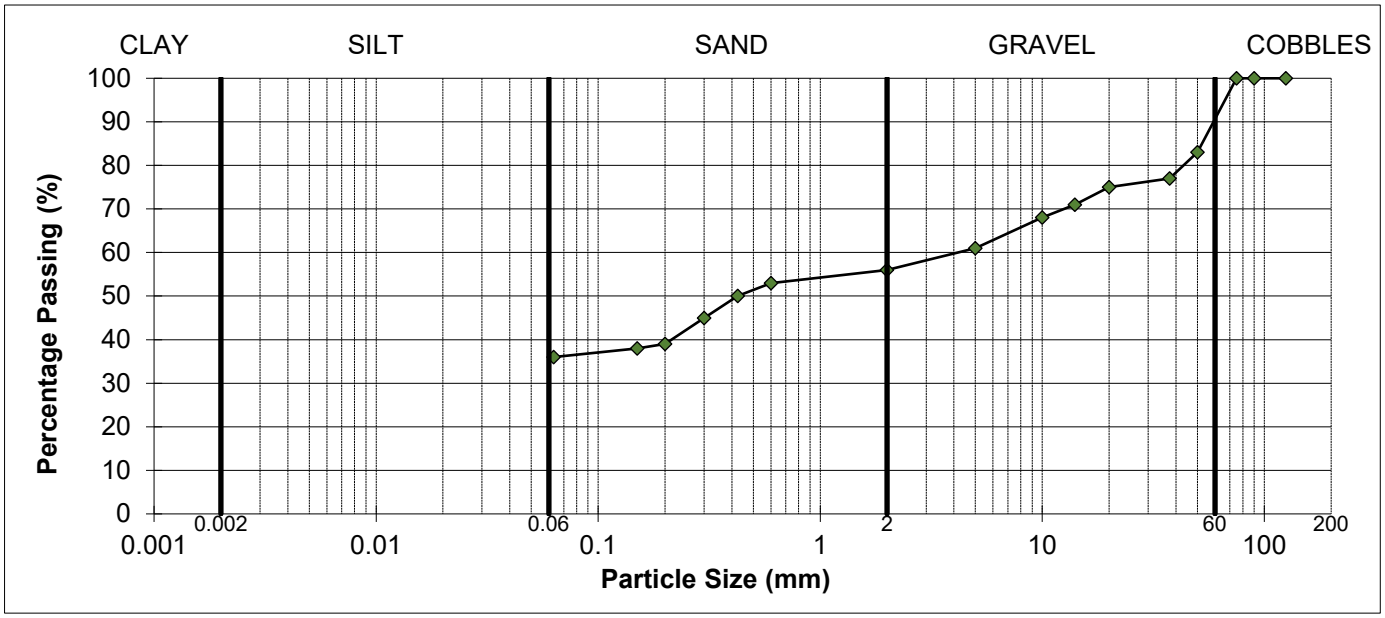
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	TP101 0.8m	DATE SAMPLED	30-Oct-24
LAB SAMPLE No	604201	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	MADE GROUND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	61	
90	100		2	56	15-80
75	100		0.6	53	
50	83		0.425	50	
37.5	77		0.3	45	
20	75		0.2	39	
14	71		0.15	38	
10	68		0.063	36	15-80



SOIL FRACTIONS			
COBBLES	9%	SAND	20%
GRAVEL	36%	SILT / CLAY	36%

As received water content	23.9%

REMARKS

Sample complies with the advised grading specification for a 2C material (SHW, Feb 2017)

SIGNED [redacted]

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory) DATE 16-Dec-24

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

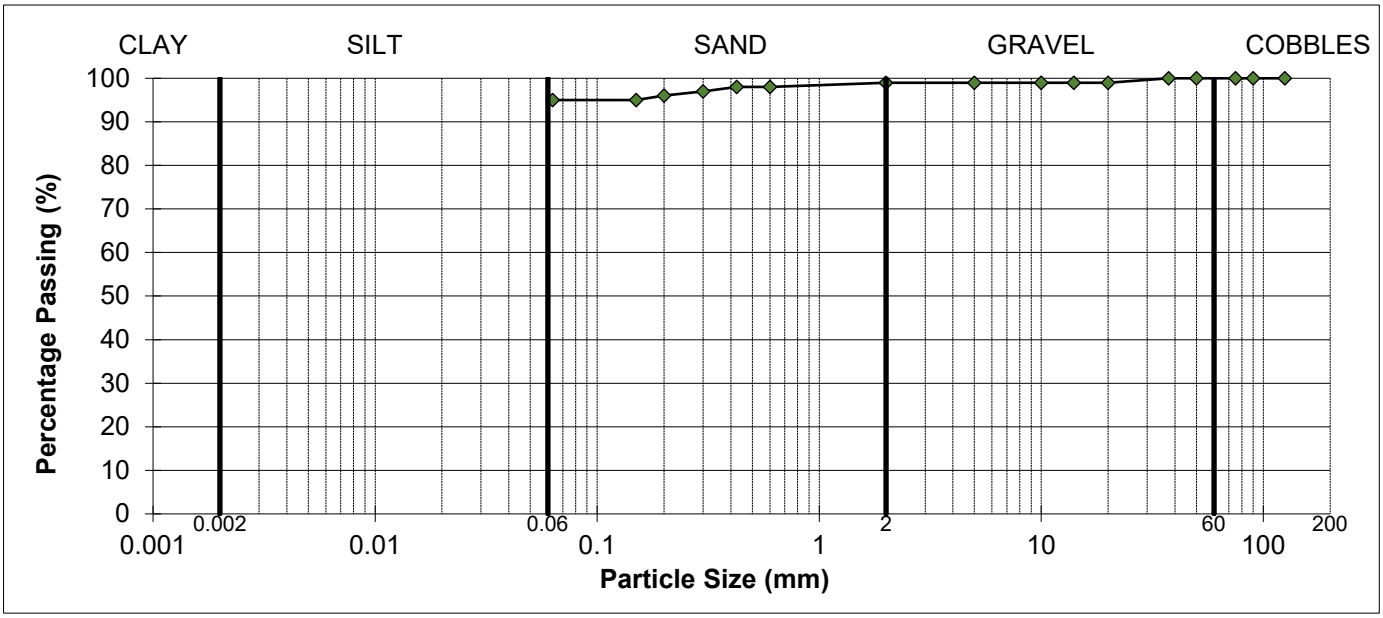
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	TP104 1.4m	DATE SAMPLED	30-Oct-24
LAB SAMPLE No	604202	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	99	
90	100		2	99	80-100
75	100		0.6	98	
50	100		0.425	98	
37.5	100		0.3	97	
20	99		0.2	96	
14	99		0.15	95	
10	99		0.063	95	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	4%
GRAVEL	1%	SILT / CLAY	95%

As received water content	26.5%

REMARKS

Sample complies with the advised grading specification for a 2A/2B material (SHW, Feb 2017)

SIGNED [redacted]

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory) DATE 16-Dec-24

M U R R A Y R I X
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

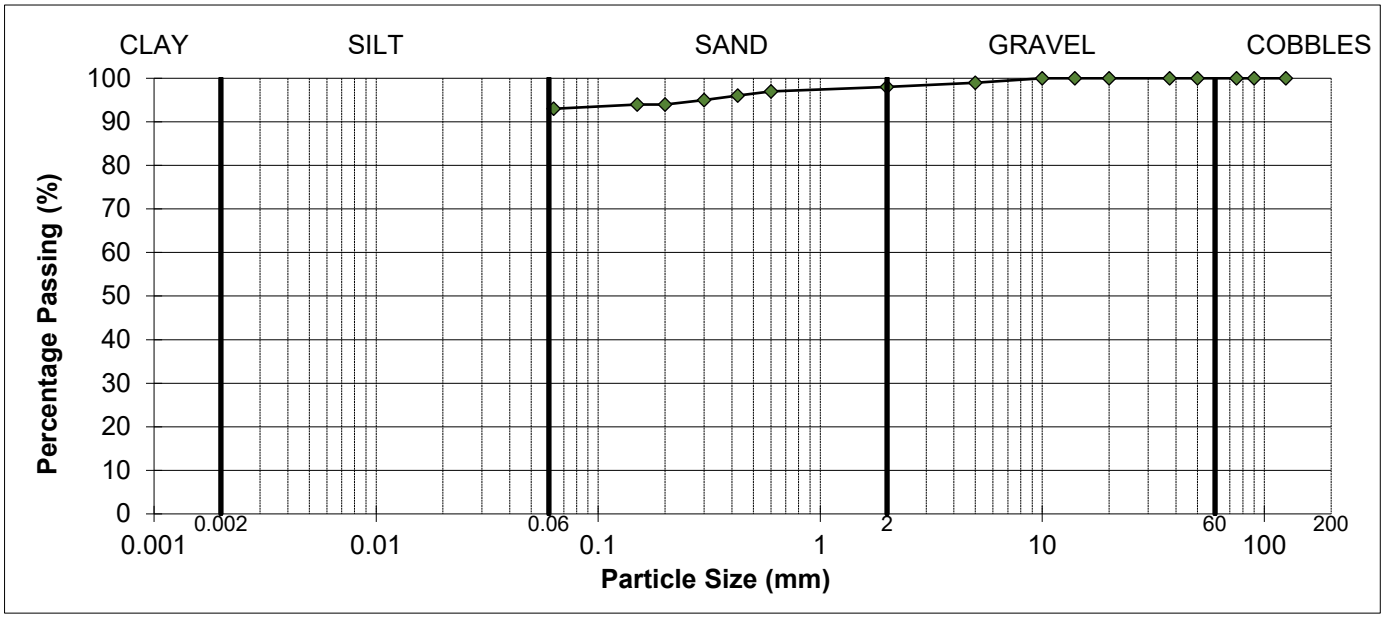
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	TP113 1.8m	DATE SAMPLED	31-Oct-24
LAB SAMPLE No	604203	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	5	99	
90	100		2	98	80-100
75	100		0.6	97	
50	100		0.425	96	
37.5	100		0.3	95	
20	100		0.2	94	
14	100		0.15	94	
10	100		0.063	93	15-100



SOIL FRACTIONS			
COBBLES	0%	SAND	5%
GRAVEL	2%	SILT / CLAY	93%

As received water content	28.8%

REMARKS
Sample complies with the advised grading specification for a 2A/2B material (SHW, Feb 2017)

SIGNED [redacted]

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory) DATE 16-Dec-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

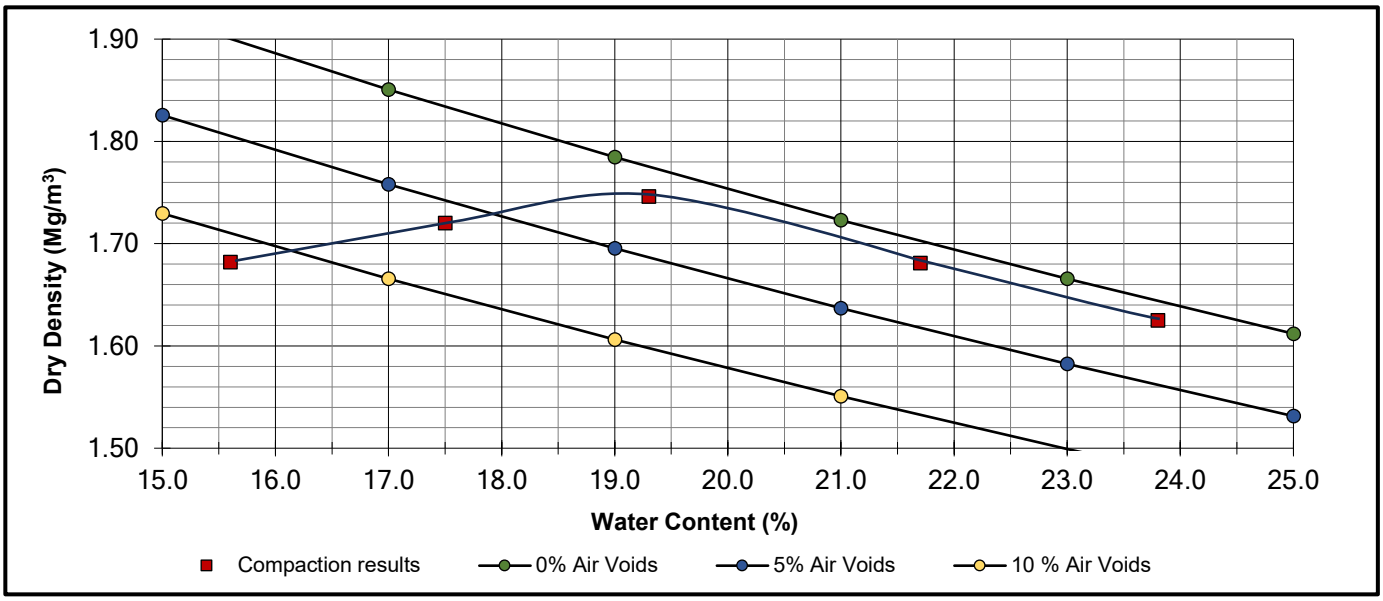
CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	TP104 1.4m	DATE SAMPLED	30-Oct-24
SAMPLE NUMBER	604202	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 2
RETAINED 20mm	1 %	PARTICLE DENSITY	2.70 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	15.6	1.682
2	17.5	1.720
3	19.3	1.746
4	21.7	1.681
5	23.8	1.625



OPTIMUM WATER CONTENT	**19**	(%)
MAXIMUM DRY DENSITY	**1.74**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) SIGNED [redacted] DATE 16-Dec-24
(Director / Head of Laboratory)

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

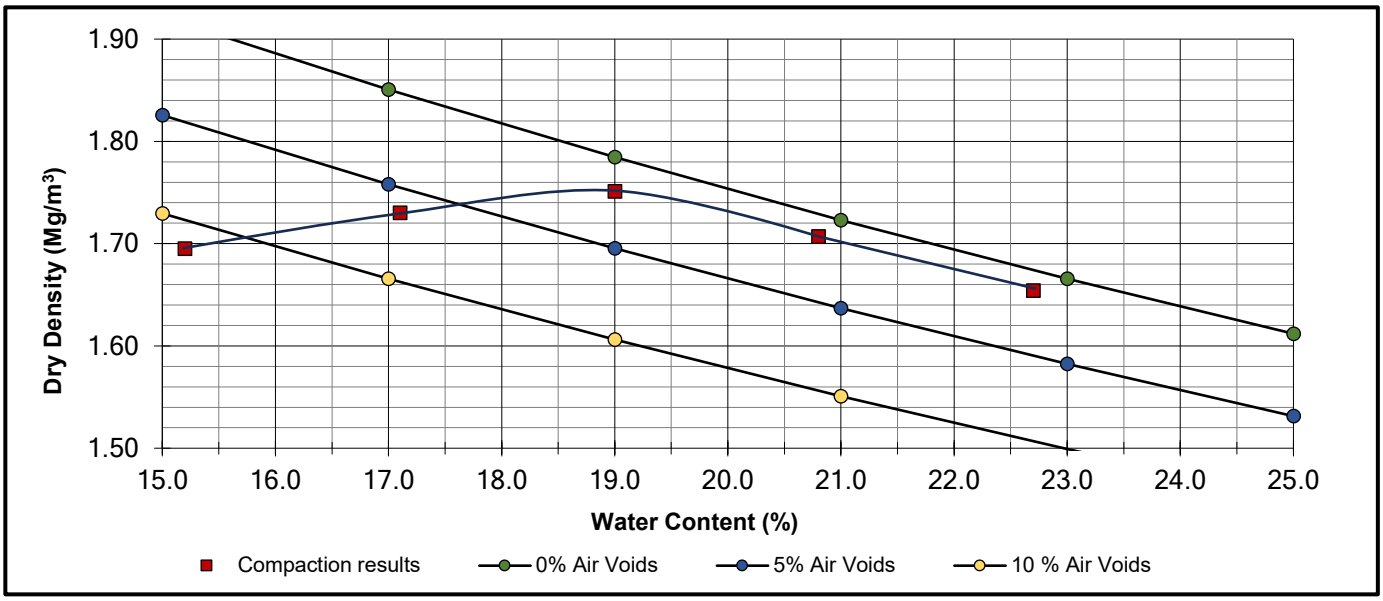
CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	TP113 1.8m	DATE SAMPLED	31-Oct-24
SAMPLE NUMBER	604203	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.70 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	15.2	1.695
2	17.1	1.730
3	19.0	1.751
4	20.8	1.707
5	22.7	1.654



OPTIMUM WATER CONTENT	**19**	(%)
MAXIMUM DRY DENSITY	**1.75**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) SIGNED [redacted] DATE 16-Dec-24
(Director / Head of Laboratory)

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

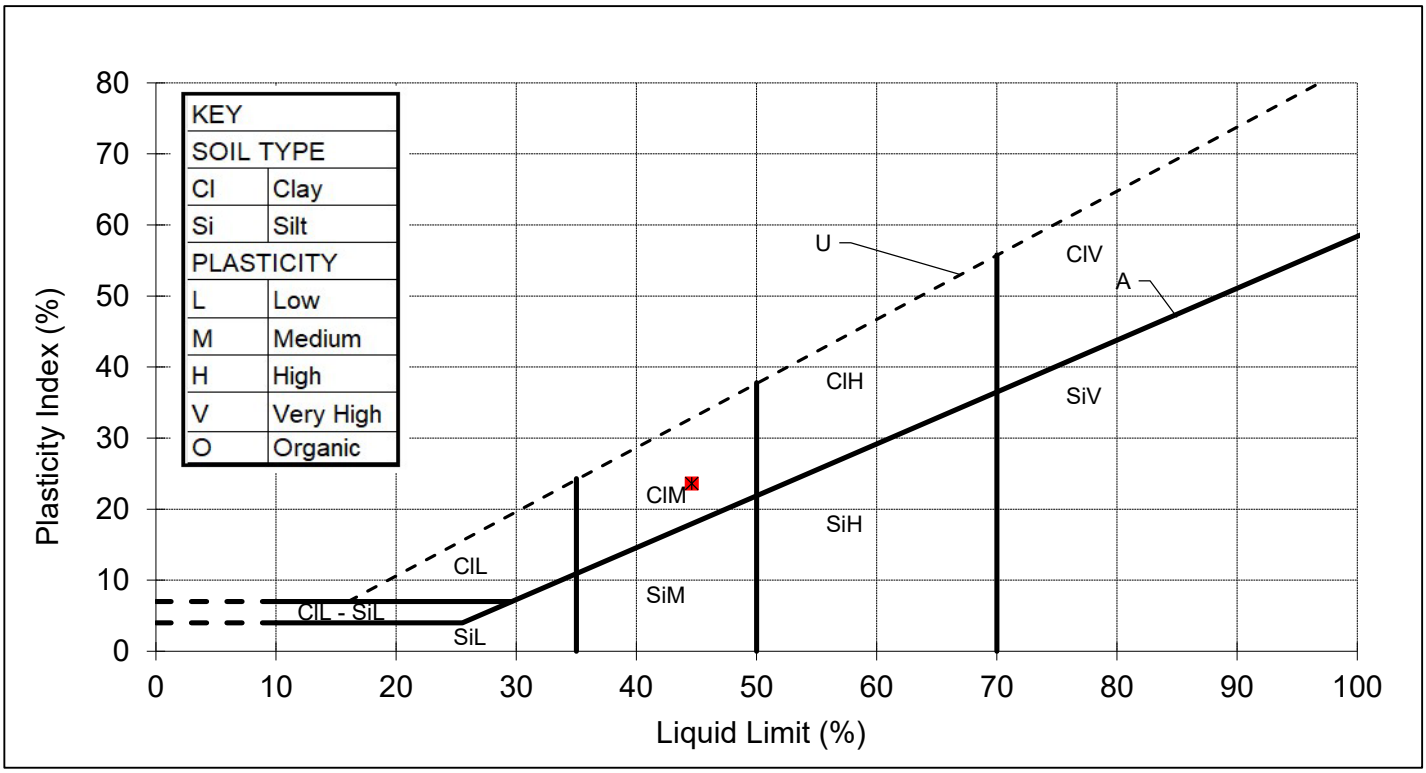
CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	WS102 2-2.45m	DATE SAMPLED	30-Oct-24
SAMPLE No.	604204	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Dark brown silty slightly sandy slightly gravelly CLAY. Gravel was fine.		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	24.8	47.3	0.950	
Determination 2 (avg)	24.5	46.6		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
23.9	45	21	24	98



REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory) DATE 16-Dec-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

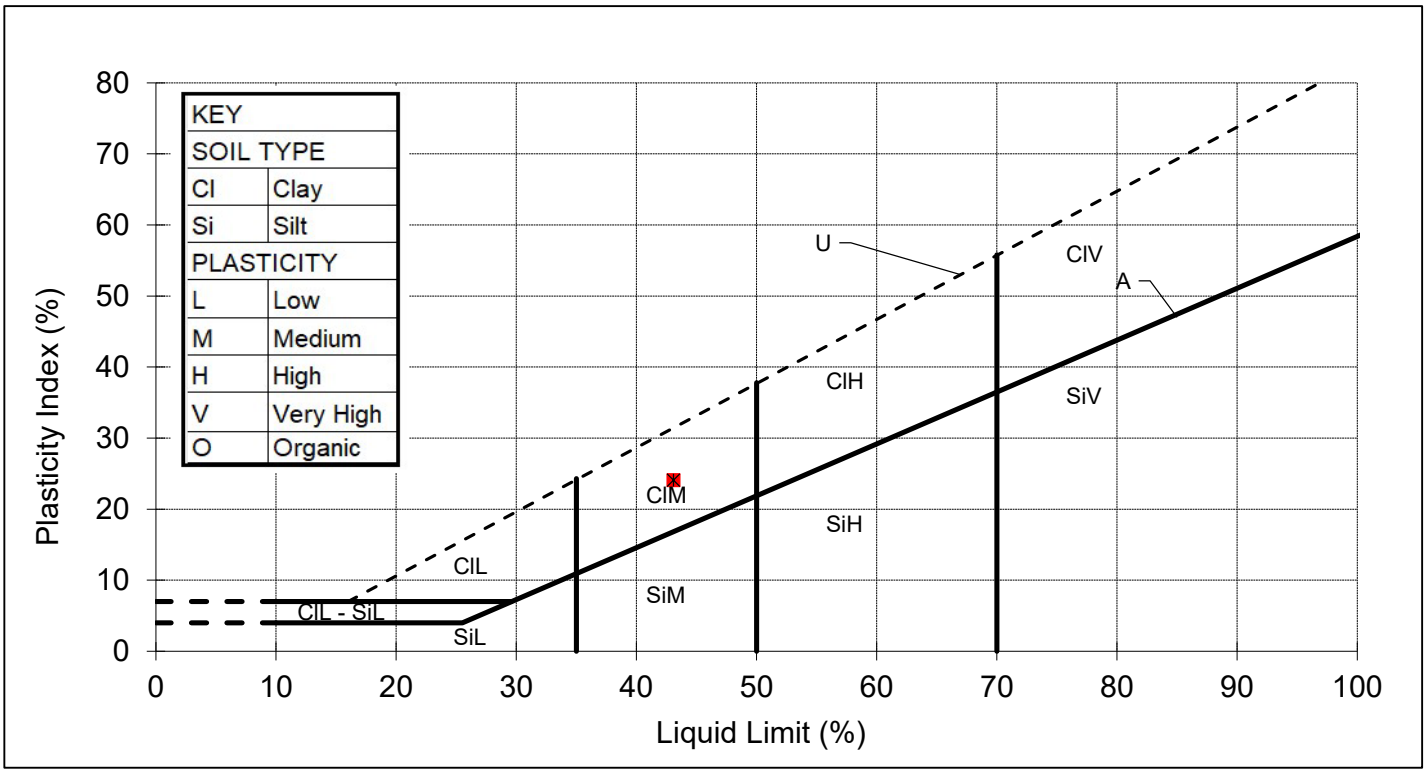
CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	WS107 2-2.45m	DATE SAMPLED	31-Oct-24
SAMPLE No.	604205	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Dark brown silty slightly sandy slightly gravelly CLAY. Gravel was fine.		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	23.5	45.2	0.954	
Determination 2 (avg)	23.4	45.1		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20.7	43	19	24	99



REMARKS

SIGNED [redacted]

NAME (Hons) DATE 16-Dec-24

(Director / Head of Laboratory)

MURRAY RIX

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

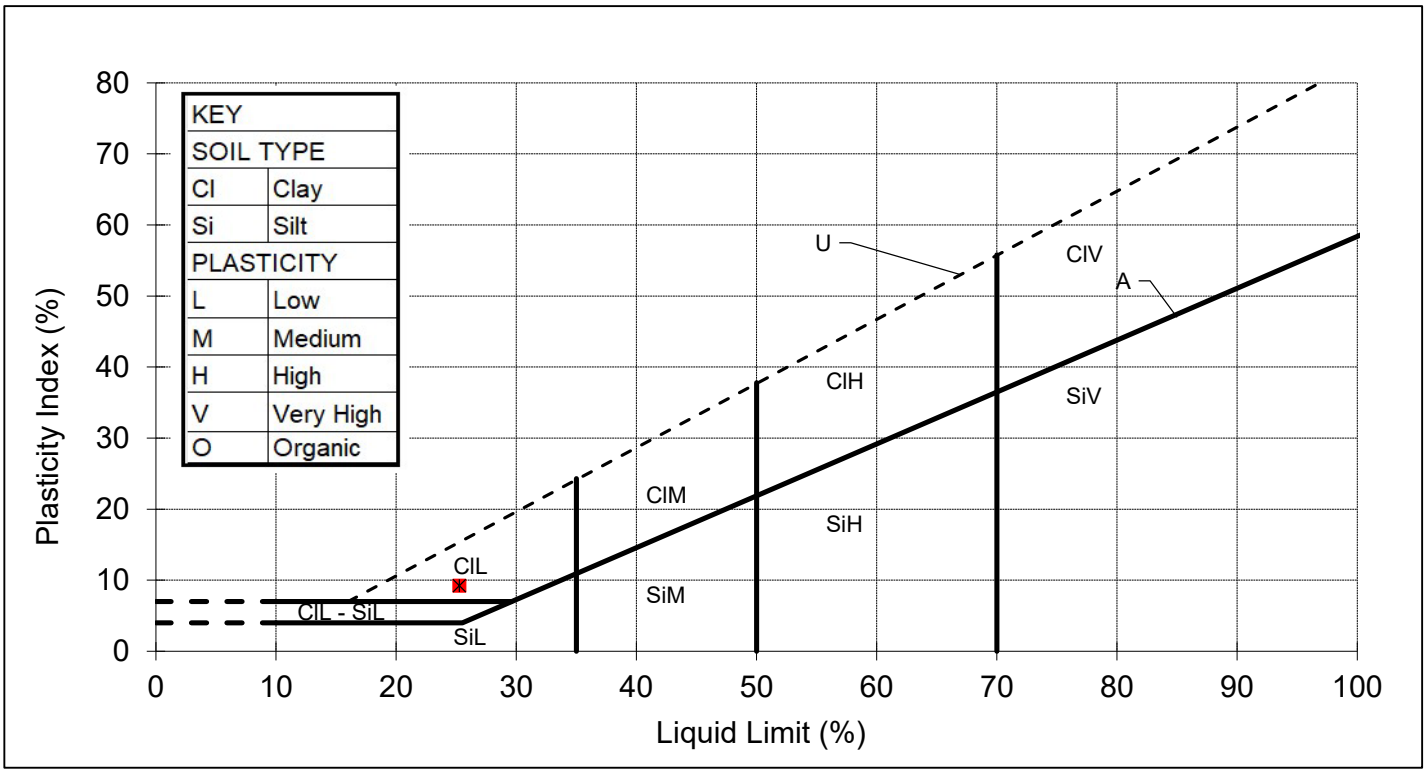
CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	WS110 1-1.45m	DATE SAMPLED	31-Oct-24
SAMPLE No.	604206	DATE RECEIVED	27-Nov-24
DATE TESTED	28-Nov-24	SAMPLED BY	Client

MATERIAL	Grey silty slightly sandy slightly gravelly CLAY. Gravel was fine.		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	24.4	26.1	0.955	
Determination 2 (avg)	24.6	26.8		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
22.0	25	16	9	97



REMARKS

SIGNED [redacted]

NAME [redacted] Hons) DATE 16-Dec-24
of Laboratory)

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

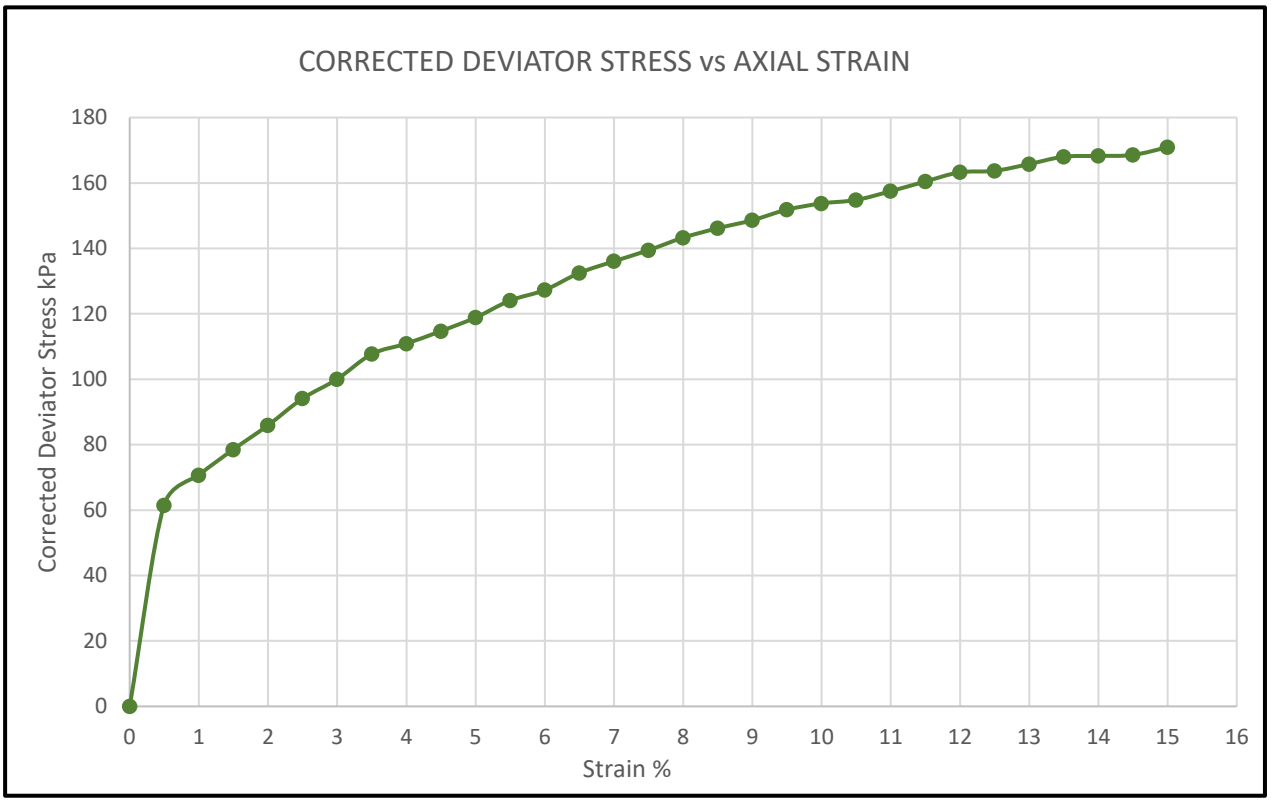
BS EN ISO 17892-8:2018

CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	WS110 3.50-4.00m	**DATE SAMPLED**	31-Oct-24
LAB SAMPLE No.	604207	**DATE RECEIVED**	27-Nov-24
DATE TESTED	02-Dec-24	**SAMPLED BY**	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY. Gravel was fine.		
ADVISED SOURCE	Site Investigation Sample		

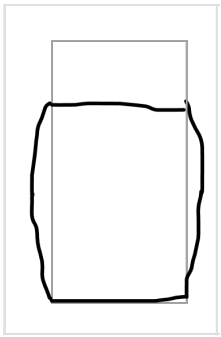
INITIAL CONDITIONS

Specimen Location 	Sample Length (mm)	380	Specimen depth from top of Sample (mm)	30
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	120	Specimen Water Content (%)	17.3
	Specimen Diameter (mm)	60	Specimen Bulk Density (Mg/m3)	2.40
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	2.05
	Membrane Correction	3.39		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



PLASTIC

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
75	15.0	2.0	171	85

Remarks/Abnormalities

Name O.P. Davies BA (Hons)
(Director / Head of Laboratory)

Signed [redacted]

Date 16 December 2024

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

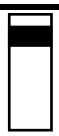
TEST CERTIFICATE

INCREMENTAL LOADING OEDOMETER TEST
BS EN ISO 17892-5:2017

CLIENT	e3p
SITE	Hinchley Road, Charlestown
JOB NUMBER	MRN 24005/329

SAMPLE LABEL	CP103 6.5-6.95m	**DATE SAMPLED**	30-Oct-24
LAB SAMPLE No.	604208	**DATE RECEIVED**	27-Nov-24
DATE TESTED	06-Dec-24	**SAMPLED BY**	Client
MATERIAL	Brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

Specimen Location



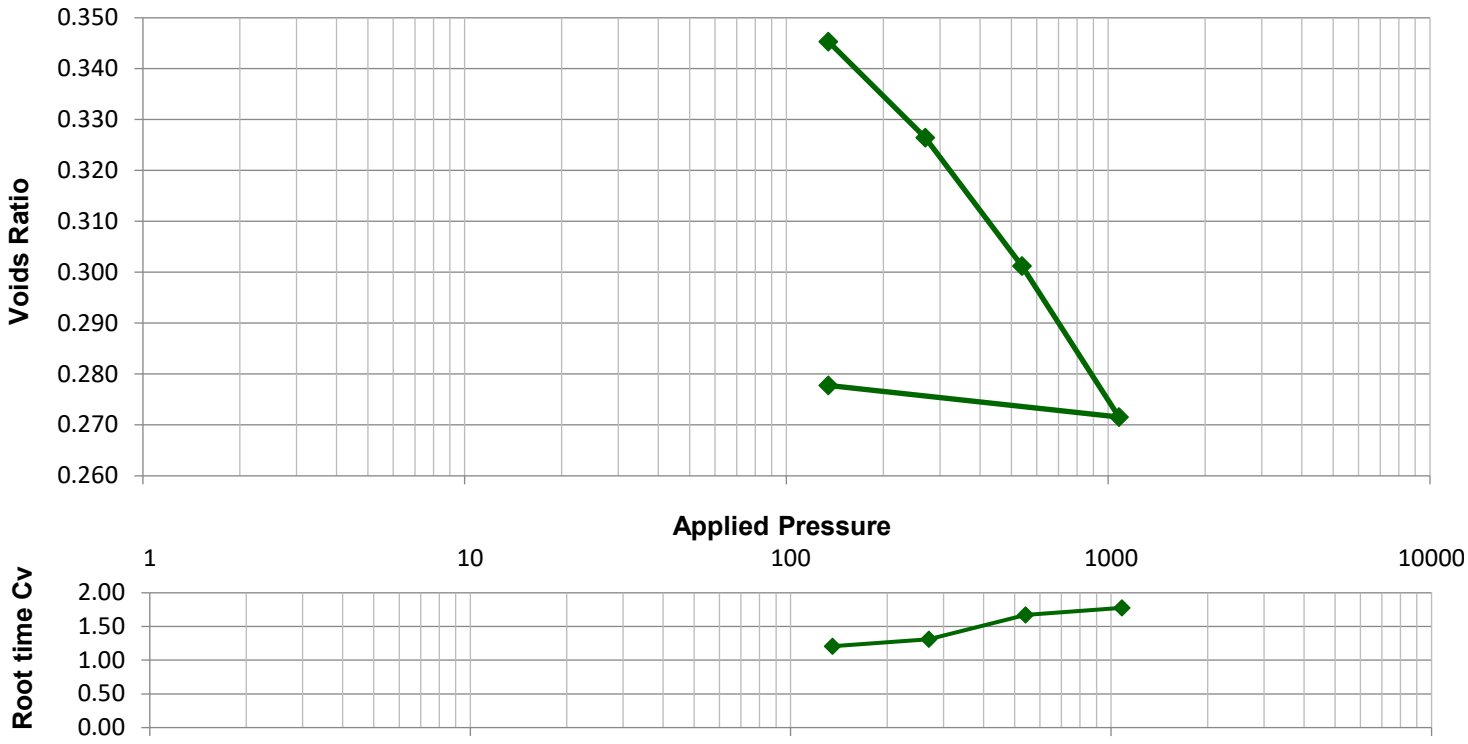
Sample Length (mm)	450	Specimen depth from top of Sample (mm)	20
Sample Orientation	Vertical	Specimen Condition	Undisturbed

INITIAL CONDITIONS

Height	20.0	mm	Particle density	2.65	Ass
Diameter	69.7	mm	Initial void ratio	0.41	
Weight wet	165.1	g	Deg. of sat.	97	%
Water cont.*	14.9	%	Swell. press.	0	kN/m^2
Bulk Density	2.16	Mg/m^3	Dry density	1.88	Mg/m^3

*determined from specimen trimmings

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m^2/MN	Temp °C	Cv t90 root m^2/yr	Cv t50 log m^2/yr
1	135	19.11	0.345	0.33	20	1.21	1.05
2	270	18.84	0.326	0.10	20	1.31	1.32
3	540	18.49	0.301	0.07	20	1.67	1.65
4	1080	18.06	0.272	0.04	20	1.78	1.90
5	135	18.15	0.278	0.01	20		
6							
7							



REMARKS

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory)

SIGNED [redacted]

DATE 16-Dec-24

APPENDIX IX
ORIGIN OF CHEMICAL 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 C_5-C_6 (aliphatic)	
TPH C_6-C_8 (aliphatic)	
TPH C_8-C_{10} (aliphatic)	
TPH C_{10}-C_{12} (aliphatic)	
TPH C_{12}-C_{16} (aromatic)	
TPH C_{16}-C_{21} (aromatic)	
TPH C_{21}-C_{35} (aromatic)	

APPENDIX X
PERMEABILITY TEST CERTIFICATES



Site:	Hinchley Rd	**Trial Pit Number:**	SA101
Job Number:	17-994	**Length:**	2.80 m
Date of Test:	30-31/10/2024	**Width:**	0.70 m
		Depth:	1.70 m
		Groundwater Level:	Not Encountered m

Drafted	Rev	Auth
MSD	1	DC

Remarks

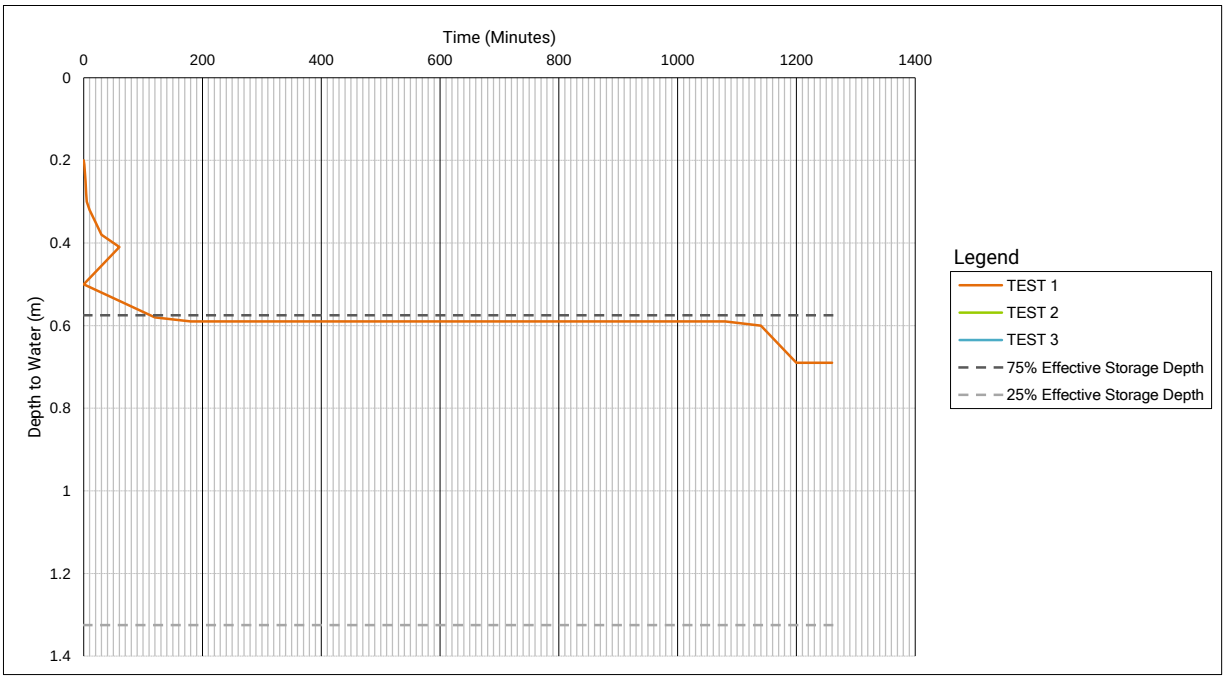
Effective Depth - For a standard test in which the pit is filled with water, the effective depth will be equal to the actual depth. If the pit is not completely filled, it will be equal to the depth at the start of each test.

Gravel Filled Pits - Typically, the proportion of volume occupied by gravel is 0.70 (i.e. 70%), leaving 30% free storage volume. If the pit is left open (gravel is not used) then Pg = 0

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	0.20				
1	0.21				
2	0.23				
3	0.25				
4	0.28				
5	0.30				
10	0.32				
20	0.35				
30	0.38				
60	0.41				
120	0.50				
180	0.58				
1080	0.59				
1140	0.59				
1200	0.60				
1260	0.69				
1320	0.69				
1380	0.69				
1440	0.69				

		TEST 1	TEST 2	TEST 3
Effective Storage Depth	m	1.50	N/A	N/A
75% Effective Storage Depth	m	1.13	N/A	N/A
(i.e. depth below GL)	m	0.58	N/A	N/A
25% Effective Storage Depth	m	0.38	N/A	N/A
(i.e. depth below GL)	m	1.33	N/A	N/A
Effective Storage Depth 75%-25%	m	0.75	N/A	N/A
Time to fall to 75% effective depth	mins	113	N/A	N/A
Time to fall to 25% effective depth	mins	N/A	N/A	N/A
Effective Volume of Pit - V(75%-25%) x (1-Pg)	m3	1.47	N/A	N/A
Area of Pit - ap50 (50%)	m2	7.21	N/A	N/A
t (75%-25%)	mins	N/A	N/A	N/A
SOIL INFILTRATION RATE	m/s	**N/A**	**N/A**	**N/A**

DESIGN SOIL INFILTRATION RATE, f	**N/A - Failed to reach 25% effective depth within 24 hours and therefore tests were terminated.**



Site:	Hinchley Rd		**Trial Pit Number:**	SA102	
Job Number:	17-994		**Length:**	2.90	m
Date of Test:	30-31/10/2024		**Width:**	0.70	m
			Depth:	1.50	m
Drafted	Rev	Auth	**Groundwater Level:**	Not Encountered	m
MSD	1	DC			

Remarks

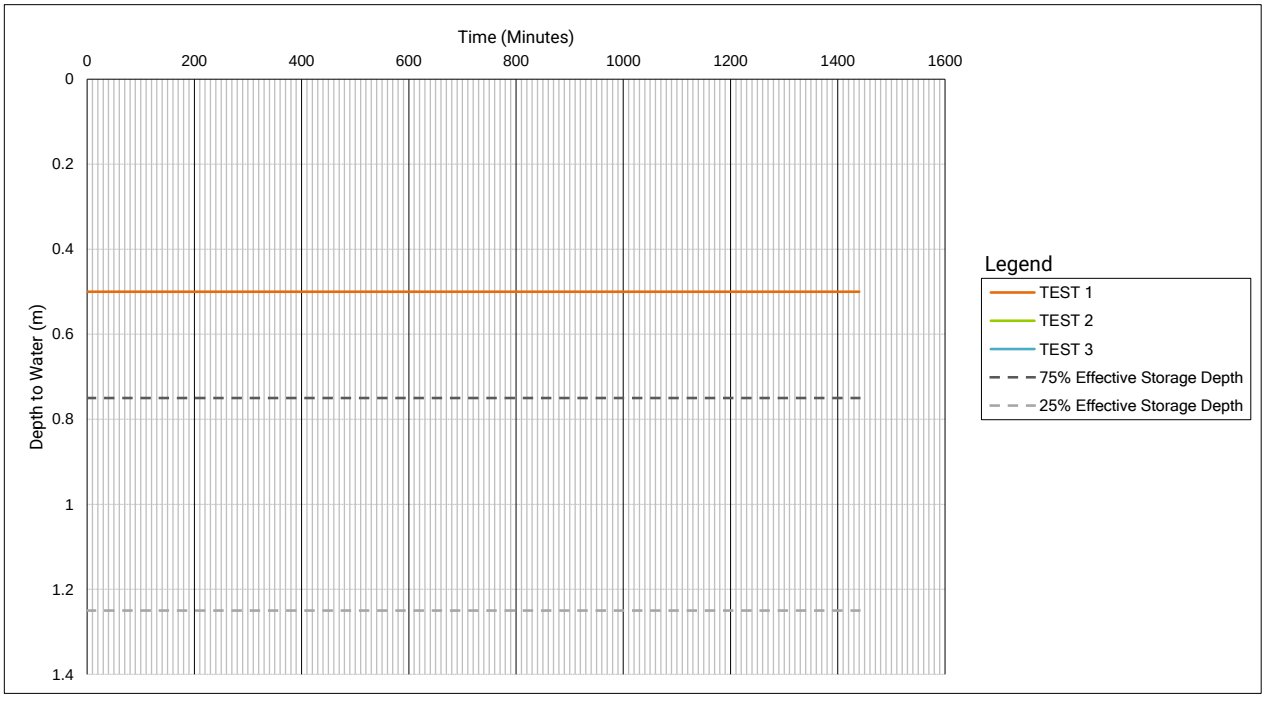
Effective Depth - For a standard test in which the pit is filled with water, the effective depth will be equal to the actual depth. If the pit is not completely filled, it will be equal to the depth at the start of each test.

Gravel Filled Pits - Typically, the proportion of volume occupied by gravel is 0.70 (i.e. 70%), leaving 30% free storage volume. If the pit is left open (gravel is not used) then Pg = 0

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	0.50				
1	0.50				
2	0.50				
3	0.50				
4	0.50				
5	0.50				
10	0.50				
20	0.50				
30	0.50				
60	0.50				
120	0.50				
180	0.50				
1080	0.50				
1140	0.50				
1200	0.50				
1260	0.50				
1320	0.50				
1380	0.50				
1440	0.50				

Effective Storage Depth	m	1.00	N/A	N/A
75% Effective Storage Depth	m	0.75	N/A	N/A
(i.e. depth below GL)	m	0.75	N/A	N/A
25% Effective Storage Depth	m	0.25	N/A	N/A
(i.e. depth below GL)	m	1.25	N/A	N/A
Effective Storage Depth 75%-25%	m	0.50	N/A	N/A
Time to fall to 75% effective depth	mins	N/A	N/A	N/A
Time to fall to 25% effective depth	mins	N/A	N/A	N/A
Effective Volume of Pit - V(75%-25%) x (1-Pg)	m3	1.02	N/A	N/A
Area of Pit - ap50 (50%)	m2	5.63	N/A	N/A
t (75%-25%)	mins	N/A	N/A	N/A
SOIL INFILTRATION RATE	m/s	**N/A**	**N/A**	**N/A**

DESIGN SOIL INFILTRATION RATE, f	**N/A - Failed to reach 25% effective depth within 24 hours and therefore tests were terminated.**



Site:	Hinchley Rd	**Trial Pit Number:**	SA103
Job Number:	17-994	**Length:**	2.60 m
Date of Test:	30-31/10/2024	**Width:**	0.70 m
		Depth:	2.20 m
		Groundwater Level:	Not encountered m

Drafted	Rev	Auth
MSD	1	DC

Remarks

Effective Depth - For a standard test in which the pit is filled with water, the effective depth will be equal to the actual depth. If the pit is not completely filled, it will be equal to the depth at the start of each test.

Gravel Filled Pits - Typically, the proportion of volume occupied by gravel is 0.70 (i.e. 70%), leaving 30% free storage volume. If the pit is left open (gravel is not used) then Pg = 0

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	0.50				
1	0.51				
2	0.51				
3	0.51				
4	0.51				
5	0.51				
10	0.52				
20	0.52				
30	0.52				
60	0.54				
120	0.55				
180	0.56				
1140	0.57				
1200	0.70				
1260	0.70				
1320	0.70				
1380	0.70				
1440	0.70				

		TEST 1	TEST 2	TEST 3
Effective Storage Depth	m	1.70	N/A	N/A
75% Effective Storage Depth	m	1.28	N/A	N/A
(i.e. depth below GL)	m	0.93	N/A	N/A
25% Effective Storage Depth	m	0.43	N/A	N/A
(i.e. depth below GL)	m	1.78	N/A	N/A
Effective Storage Depth 75%-25%	m	0.85	N/A	N/A
Time to fall to 75% effective depth	mins	N/A	N/A	N/A
Time to fall to 25% effective depth	mins	N/A	N/A	N/A
Effective Volume of Pit - V(75%-25%) x (1-Pg)	m3	1.55	N/A	N/A
Area of Pit - ap50 (50%)	m2	7.43	N/A	N/A
t (75%-25%)	mins	N/A	N/A	N/A
SOIL INFILTRATION RATE	m/s	**N/A**	**N/A**	**N/A**

DESIGN SOIL INFILTRATION RATE, f	**N/A - Failed to reach 25% effective depth within 24 hours and therefore tests were terminated.**

