



GEO

Environmental Engineering



PHASE 2: GROUND INVESTIGATION REPORT

PROPOSED RESIDENTIAL DEVELOPMENT

LAND ADJACENT TO BARFS ROAD

DISTINGTON

CUMBRIA

CA14 5TG

FOR

THOMAS ARMSTRONG (CONSTRUCTION) LIMITED

GEO Environmental Engineering

DOCUMENT CONTROL SHEET

Report Ref: GEO2026-7213

Client Title: Thomas Armstrong (Construction) Limited

Design Team: RG Parkins & Partners Limited, and Architects Plus (UK) Limited

Report Type: Phase 2 Ground Investigation Report (GIR) v1

Report Date: 21st August 2026

Report Tracking: 31st July 2026 – Preliminary Draft Report v1 Issued for Client & Design Team Review
21st August 2026 – Preliminary Report v2 Issued for Planning Submission

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CONTENTS

Section		Page
1.0	Introduction	1
2.0	Ground Investigation Reporting	2
3.0	Ground Investigation Fieldwork	4
4.0	Ground and Groundwater Conditions	5
5.0	Exploratory Hole Testing	7
6.0	Laboratory Testing	10
7.0	Geotechnical Analysis	12
8.0	Generic Quantitative Risk Assessment (GQRA)	13
9.0	Construction Related Excavations and Off-Site Disposal	19
10.0	Discussions and Recommendations	20
Appendix I:	Site Location Plan Existing Site Plan (Topographic Survey) Proposed Site Development Plan	
Appendix II:	Site Investigation Location Plan Exploratory Hole Logs (Windowless Sampling Boreholes) Dynamic Cone Penetration Test Record Sheets Variable Head (Falling) Permeability Tests	
Appendix III:	Ground Gas Monitoring Sheets	
Appendix IV:	Laboratory Test Results	

1.0 Introduction

1.1 Brief

Geo Environmental Engineering Ltd (GEO) have been commissioned by RG Parkins & Partners Ltd on behalf of Thomas Armstrong (Construction) Limited ('the client') acting on behalf of Home Group to undertake a programme of Phase 2 ground investigation works to facilitate a planning application for the construction of a new residential development on land located adjacent to Barfs Road in the Cumbrian village of Distington. The National Grid Reference for the centre of the site is 422563, 601960, and a site location plan of the site can be seen in Appendix I.

This investigation has been carried out to determine the ground conditions across the site to aid with the design of new building foundations, and to assess the risks to human health and environmental receptors from potential ground contamination and hazardous ground gases.

This ground investigation report (GIR) is suitable for submission to the Local Authority, as part of a planning application and to aid the discharge of any planning conditions applied to the site / proposed development.

1.2 Proposed Development

Based on the proposed development plans provided to GEO, it is understood that the client is proposing to redevelop the site with 61 no. new semi-detached residential dwellings with areas of carparking and private gardens. The remaining areas of the site will comprise soft landscaping to meet BNG requirements. A copy of the proposed development plan can be seen in Appendix I. Further details relating to the proposed development can be obtained from the Design Team / Consultant.

1.3 Site Location and Description

The site, occupying an area of c.2.57ha is located southeast off Barfs Road, within the large village of Distington, c.1.4km southwest of Lillyhall Industrial Estate on the outskirts of Workington, as indicated on the site location plan included in Appendix I. Access to the site is from Barfs Road to the north and west.

National Grid Reference: 422563, 601960
Post Code: CA14 5TG (approximate only)

The site is situated within an established residential housing estate. It is encircled by a tarmacked road, which forms a loop around the main area of the site, with a network of interconnected roads and pedestrian paths, providing access throughout the estate. Landscaping within the site comprises areas of grass and mature trees, which includes a section of block paving with seating. Physical boundaries are minimal across most of the site, with some walls noted centrally.

The site is mostly flat, with areas across the site undulating very gently. Two mounds are present on the southeastern portion of the site. A topographical survey has not been provided; however, Ordnance Survey data suggests that the site is at an elevation of between c.71m and c.79m AOD.

1.4 Other Reports/Studies

This ground investigation report (GIR) should be read in conjunction with the Phase 1 Desk Top Study (Preliminary Environmental Risk Assessment) report (DTS) compiled for the site by GEO, reference GEO2025-7005, v1 dated December 2025, which considers the new development proposals. The findings contained within the DTS report were used to aid the design and scope of the intrusive investigation works carried out on site by GEO.

2.0 Ground Investigation Reporting

2.1 Ground Investigation Aims and Objectives

The overall objective of this ground investigation is to provide information relating to the following.

- Identify the ground conditions below the site area to assess the geotechnical properties associated with the existing made ground, superficial and bedrock deposits, to assist with determining suitable and appropriate foundation recommendations for the proposed development
- Identify the groundwater conditions across the site area
- Determine the infiltration / permeability characteristics of the underlying soil deposits to assist with the design of soakaways for the discharge of surface water direct to the ground
- Determine the ground gas regime and any required protection measures for the proposed development
- Identify potential sources of ground contamination and determine the levels of contamination within the shallow soil deposits, to assess the potential risks posed to human health (i.e. future site users) where exposure pathways are present post completion of the proposed development, and also the surrounding environment (Controlled Waters)
- Determine the scope of any further investigation works or remediation measures required for the site prior to commencing with any future development works

2.2 Guidelines, Codes of Practice and Third-Party Accreditations

This report contains information relating to the geotechnical properties of the soils encountered on site to aid foundation and highway designs by a Structural Engineer. The report also incorporates a Level 1 Ground Contamination and Ground Gas Risk Assessment for Human Health (Generic Quantitative Risk Assessment – GQRA).

The laboratory testing (geotechnical and ground contamination) was completed by UKAS and MCERTS accredited laboratories with details given in Sections 6, with copies of the test reports contained within Appendix IV.

This GIR has been completed in general accordance with the following documents.

- Land Contamination Risk Management Stages 1 to 4 (LCRM – www.gov.uk) – June 2025
- UK Specification for Ground Investigation, 3rd Edition. Site Investigation Steering Group, 2022
- Effective Site Investigation. Site Investigation Steering Group, 2013
- BS10175:2026: Investigation of Potentially Contaminated Sites - Code of Practice
- BS5930:2015 + A1:2020: Code of Practice for Site Investigations
- BS EN 1997-1:2024: The Standard for Eurocode 7. Geotechnical design – General Rules
- BS EN 1997-2:2007: The Standard for Eurocode 7. Geotechnical design – Ground investigation and testing
- BS1377-1 to 9:1990 to 2025: Methods of test for soils for civil engineering purposes
- BS EN ISO 17892-1 to 12: 2014 to 2022: Geotechnical investigation and testing. Laboratory testing of soil
- BS8485: 2015 + A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- BS8576: 2013: Guidance on Ground Gas Investigations
- CIRIA Report C665; Assessing risks posed by hazardous ground gases to buildings, 2007
- BR211: 2023 Radon, Guidance on protective measures for new buildings
- SP1010 Development of Category 4 Screening Levels Main Report, 2014
- The LQM/CIEH S4UL's for Human Health Risk Assessment, 2015

2.3 Ground Investigation Limitations of Use

When considering the scope of works completed for the development proposals, any features or issue not specifically mentioned cannot be assumed to have been covered.

Although every effort is made to ensure that a full and comprehensive investigation is completed, it should always be borne in mind that ground conditions have the potential to vary between exploratory hole locations and it is recommended that the developer adopts a “watching brief” during any future development works to ensure that any potential variations encountered are identified and dealt with in an appropriate manner. The GIR and its contents are limited to the boundaries of the site, as indicated on the plans contained in Appendix I.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/or other key stakeholders, including warranty providers in order to seek their approval of the findings prior to undertaking any development works.

Reliance on the report is for the named client only. No reliance, copying or use of this report (in part or whole) by any Third Party is permitted without prior written approval from Geo Environmental Engineering Ltd, with intellectual copyright remaining the sole property of the author. Reliance on the report and its associated information is strictly in accordance with Geo Environmental Engineering Ltd Terms and Conditions, copies of which are available on request.

2.4 Consideration for Residential End Use

It is understood that the site will be developed for a residential end use, comprising the construction of 61 no. residential dwellings with areas of private gardens. Consequently, when considering the sensitivity and intended development, the site will be considered suitable for occupation by assessing levels of ground contamination using a Level 1 Generic Quantitative Risk Assessment (GQRA).

A GQRA provides details of potential future risks to Human Health (proposed end users) and Controlled Waters from any contamination which may be identified on site in made ground deposits, topsoil or natural soils or impacted groundwater.

Therefore, for this human health risk assessment, it is considered that future residents occupying the new residential properties will be subjected to the greatest exposure periods and consequently the most risk. As such, in accordance with current guidance and legislation an end use classification of Residential with homegrown produce has been considered most appropriate for this proposed site development.

3.0 Ground Investigation Fieldwork

3.1 Intrusive Investigation Fieldworks Summary

The ground investigation works designed by the RG Parkins, and were completed between the 13th and 15th May 2026, and the exploratory holes (windowless sampling boreholes) were positioned across and below the proposed footprints of the residential properties and road infrastructure to provide general site coverage, taking into consideration the locations of buried utilities (sewers / drains). As part of the investigation works, and for the purposes of health and safety, a non-intrusive buried utilities survey was carried out at each of the investigation positions to confirm that no live services were present.

The boreholes were set out and surveyed to National Grid and levelled to Ordnance Datum, and the co-ordinates and levels are provided on the borehole record sheets.

The site investigation location plan compiled by RG Parkins is provided in Appendix I, and the ground investigation works comprised the following.

- 15 no. Mini-Percussive Windowless Sampling Boreholes (labelled WS01 to WS15) to depths of up to 5.21m bgl
- 5 no. Insitu Dynamic Cone Penetrometer (DCP) Tests (labelled DCP01 to DCP05)
- 4 no. Variable Head (Falling) Permeability Tests
- Installation of 5 no. Gas and Groundwater Monitoring Wells (WSs 02, 04, 08, 12 and 14)
 - Gas and groundwater monitoring (5 no. visits completed to date)
- In-situ geotechnical testing (Hand Shear Vane Tests and Standard Penetration Tests (SPTs))
- Laboratory based geotechnical testing
- Laboratory chemical screening of soil samples

Site supervision was provided by a qualified and experienced Geo-Environmental Engineer. The fieldworks were undertaken in general accordance with guidelines and codes of practice given in Section 2.2.

At each exploratory hole location, the surfacing type, made ground, natural ground and groundwater conditions were observed, along with in-situ testing undertaken and samples recovered. Details of the ground conditions are included on the exploratory hole logs which are included in Appendix II, together with other relevant ground investigation data. The results of any in-situ geotechnical testing (i.e. SPTs and shear strength) that were carried out are presented on the appropriate logs and record sheets contained in Appendix II.

The geotechnical and chemical laboratory test results are provided in Appendix IV. All depths included in the report are in metres below ground level (m bgl), unless stated otherwise.

The ground investigation findings and recommendations are based on current site levels. If as part of the finalised design, site levels are to be reduced, then it would be recommended to complete deeper investigation works at that time to confirm the deeper underlying ground conditions.

4.0 Ground and Groundwater Conditions

4.1 General

The following section provides a summary of the ground conditions encountered across the site during the investigation. Reference should be made to the exploratory hole logs included in Appendix II for detailed descriptions of the strata and groundwater conditions.

All depths are reported in metres below ground level (m bgl) unless stated otherwise.

4.1.1 Made Ground / Relic Topsoil Deposits

A thin surface cover of topsoil is initially present, typically ranging in thickness between 0.10m and 0.40m overlying made ground which is present across the entire site, and varies significantly in thickness and composition.

The made ground typically ranges between 0.30m and 1.40m thick, comprising sandy gravelly clay and gravelly sand with brick and concrete fragments, ash and coal, sandstone and dolerite fragments, plastic and timber fragments, and occasional cobbles.

The greatest thickness of made ground was recorded at WS02, approximately 4.90m, where no natural deposits were encountered before termination and a 1.20m high void was recorded from 3.70m extending to at least 4.90m. Referring back to historical, geological, coal mining data and statutory service information there is no indication as to what this void represents. At this stage, it is possible that a historical unrecorded drain or culvert has been encountered, however the presence of a significant void recorded in WS02 will require further investigation to determine what this feature actually represents.

This indicates a highly variable anthropogenic fill profile typical of previously developed land.

Localised relic topsoil horizons were recorded beneath the made ground deposits at several locations (WS's 06, 07, 08 & 12).

No visual or olfactory evidence of fuel/oil contamination (no staining, odour or free product) or asbestos containing materials (ACM's) was encountered within the made ground deposits.

Selected samples of the made ground deposits have been recovered for chemical laboratory screening to determine if they represent a risk to human health within a residential end-use setting.

4.1.2 Natural Drift Deposits

The natural ground is predominantly Glacial Till, with most boreholes encountering varying compositions of sandy gravelly clay, very sandy clay and slightly silty clay.

Consistency ranges from soft to very soft locally (particularly WS03 and parts of WS08), although the clays are generally firm to stiff in nature becoming very stiff/high strength with depth.

Frequent sand layers/lenses occur within the Till deposits, again with varying compositions of fine to coarse sand, clayey sand and gravelly sand.

A number of localised weaker zones of deposits were identified:

WS03

- Very soft to soft sandy clay from approximately 1.05–3.00m.
- Deposit noted as becoming wet from 2.30m depth.

- Lowest vane strengths recorded (24–50 kPa).

WS08

- Interbedded soft clay and wet sand layers.
- Peat parting recorded at approximately 1.13m depth.

When considering the nature of the natural drift deposits present, adequate lateral trench support will be required for excavations undertaken below 1.20m, to prevent trench wall collapse or over excavation, as well as to create a safe working environment for construction workers. Any excavations undertaken on this site should remain open for as short a period as possible, since the made ground and natural deposits could be susceptible to deterioration if left open to the natural elements for any significant period of time.

4.1.3 Solid (Bedrock) Geology

The natural bedrock deposits have not been encountered during these investigation works.

4.2 Groundwater

Groundwater observations were limited but indicate localised groundwater ingresses within the Glacial Till deposits.

Recorded water strikes were observed in WS06 at 3.00m, standing at approximately 2.13m below ground level, and WS11 at 3.64m below ground level.

Several investigation locations noted "wet" sand deposits and saturated clay/sand horizons.

Groundwater appears discontinuous and likely associated with granular sand lenses within the Till.

Groundwater monitoring of the installations, placed in boreholes BH's 02, 04, 08, 12 & 14 to depths of between c.2.60m and c.4.90m, has been carried out on five occasions between June and July 2026 to date. Standing water levels have been recorded ranging between 0.18m and 3.10m bgl, with several boreholes noted to be "dry". It is likely that some of the standing water levels recorded represent the presence of trapped surface water infiltration into the monitoring wells, rather than a genuine groundwater surface.

Given the ground conditions and the groundwater observations noted during the investigation works, it is possible that some localised water ingresses may occur where construction related excavations are undertaken. As such, it would be considered prudent to allow for the introduction of temporary groundwater control techniques (i.e. sump pumping and the like) during the construction phase of works to ensure excavations remain dry and stable, and to take care of any ingresses of groundwater which may occur, especially during the wetter periods of the year. It should also be noted that instability within such excavations could occur because of water inflow. Where water is present, granular deposits have the potential to flow in excavations (e.g., running sands).

4.3 General Comments

During the design phase, if site level variations (e.g., areas of cut) are proposed that go beyond the depth of penetration of the current boreholes then it is recommended that the design team consider supplementary deeper investigation.

5.0 Exploratory Hole Testing

In-situ site testing and monitoring was generally undertaken in accordance with BS 5930:2015+A1:2020, BS1377-9:1990 and BS EN 1997-2:2007 (Eurocode 7), and BS8485: 2015 + A1: 2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings and CIRIA Report C665: 2015.

5.1 Insitu Hand Shear Vane Tests

Insitu hand shear vane tests were carried out within the boreholes, where feasible within the natural clay deposits, to confirm field descriptions and to aid foundation design. The results of the hand shear vane tests are presented on the boreholes logs which are included in Appendix II.

The shear vane test results within the clay deposits have recorded variable undrained shear strength values (C_u) ranging between 24 kN/m² up to >120kN/m², which is indicative of low, medium and high strength strata. Overall, the natural till is generally of moderate to high strength, although local soft pockets are present.

5.2 Standard Penetration Tests

5.2.1 Standard Penetration Test Methodology

To determine the relative density and strength of the underlying soils, Standard Penetration Tests (SPT's) were completed within the boreholes. The test uses a "split spoon" sample tube (external diameter of 50mm, internal diameter of 35mm and a length of around 650mm) driven from the base of the borehole as it is progressed, usually at 1.00m spacing's/intervals.

The sample tube is driven by blows of a slide hammer with a weight of 63.5kg falling over a 760mm drop. The sample tube is driven 150mm into the ground (seating blows) and then the number of blows needed for the tube to penetrate each 75mm increment up to a depth of 450mm is recorded.

The number of blows for the final 300mm of penetration is referred to as the "standard penetration resistance" or "N" value, which is presented on the exploratory hole logs adjacent to each sample depth. Where 50 blows are insufficient to advance the test through a 75mm interval the amount of penetration after 50 blows is recorded and the test is referred to as a "refusal".

5.2.2 Standard Penetration Test Results

In-situ Standard Penetration Tests (SPTs) were completed in the boreholes, and the results of the SPTs are presented on the borehole logs which are included in Appendix II.

The SPT N-values generally indicate the following.

Strata	SPT Results	Typical Strength / Density
Made Ground	Variable (N = 6 – 18 typically)	Soft and firm strata
Firm/Stiff Till	N = 15 – 40	Stiff and very stiff strata
Dense Till Sands	N >50 refusal common	Very dense strata
Deep Till	N = 30 – 50+ refusal common	Very stiff strata

5.3 Dynamic Cone Penetrometer Tests (DCP)

The Dynamic Cone Penetration (DCP) test provides a measure of a material's in-situ resistance to penetration. The test is performed by driving a metal cone into the ground by repeated striking it with an 8kg weight dropped from a distance of 575mm.

The penetration of the cone is measured after each blow and is recorded to provide a continuous measure of the penetration resistance up to c.1.00m below the ground surface. Test results can be correlated to a California Bearing Ratio (CBR) value to aid road and pavement design by a Civil Engineer.

The results of the DCP tests and the calculations of the equivalent CBR values are included in Appendix II (Dynamic Cone Penetrometer Calculation Sheets).

Based on the ground conditions recorded across the site, and as expected, CBR values of between 2.7% and 4.5% have been recorded for the initial made ground topsoil deposits. However, when considering the soft and compressible nature of topsoil these deposits are considered unsuitable as a subgrade and should be removed from areas of proposed hardstanding.

Below the initial made ground topsoil layer, made ground deposits are present and CBR values range between 8.2% to >15%. A conservative design value of 8% can be taken for these types of deposits.

The natural deposits recorded CBR values ranging between 4.3% to >10%. A design value of 5% can be taken for these types of deposits where they are used as an undisturbed subgrade in their present condition.

It would be considered prudent to proof roll the exposed subgrade at formation level to identify any potential 'soft spots' which may be present. These can be taken care of with the introduction of additional sub-base and / or the use of geogrid.

It should be borne in mind that the results of the DCP tests can be influenced by the coarse content (gravel, cobbles, etc.) within the materials tested, therefore, it is always recommended that the appropriate CBR value is confirmed by way of plate load testing at formation level.

5.4 Insitu Variable Head (Falling)

Insitu variable head (falling) permeability tests have been completed in general accordance with BS EN ISO 22282-2:2012: Geotechnical investigation and testing. Geohydraulic testing - Water permeability tests in a borehole using open systems, at the locations of WS's 04, 08, 12 & 14, to assess the permeability characteristics of the underlying natural deposits to assist with proposed drainage assessments for the discharge of surface water directly to the ground.

The results of the permeability tests can be seen within the calculation sheets, copies of which can be seen in Appendix II and are summarised as follows.

Test Position	Test Zone	Coeffiecient of Permeability (k)	Permeability Classification / Drainage Characteristic
WS04	2.90	$8.07E^{-09}ms^{-1}$	Practically Impermeable / Practically Impervious
WS08	3.25	$2.58E^{-04}ms^{-1}$	Medium / Good
WS12	0.28	$3.47E^{-07}ms^{-1}$	Low / Poor
WS14	2.80	$6.33E^{-09}ms^{-1}$	Practically Impermeable / Practically Impervious

The results of the falling head tests have identified variable permeability characteristics ranging between medium, low and practically impermeable, with good, poor and practically impervious drainage characteristics. It should be noted that at one location (WS08), an input volume of 50litres of water was added and a significant head could not be maintained, with the remaining water level rapidly discharging in a short period of time (10secs).

These findings should be reviewed by a drainage engineer to determine the suitability of the ground deposits as part of the management of rainwater / surface water generated by the new residential development.

It should be noted that the Groundsure report contained within the Phase 1 DTS notes the probable presence of significant soluble rocks within the underlying geology. While the overall possibility of localised subsidence or dissolution-related degradation of the bedrock is considered low, there remains a potential for such occurrences under adverse conditions, particularly when there is high surface or subsurface water flow.

Furthermore, a sink hole or swallow hole has been recorded c.140m southeast of the site, within the limestone bedrock. The presence of this feature demonstrates the geological susceptibility of the area to dissolution-related ground movements.

If required, alternative methods for the discharge of surface water will need to be considered, such as discharge into a surface water course (if possible) or into the existing public sewer infrastructure likely present adjacent to the site (Barfs Road). It is likely that some form of attenuation and restricted discharge flow rate will need to be accommodated to allow discharge into the sewer infrastructure.

5.5 Ground Gas Monitoring

To confirm the ground gas regime below the site and assess the off-site potential for hazardous ground gases migrating onto the site, selected boreholes (WS's 02, 04, 08, 12 and 14) have been installed with ground gas monitoring wells to facilitate a period of ground gas monitoring.

The boreholes were installed to depths of c.2.60m and c.4.90m bgl with a 63mm diameter HDPE standpipe. The top section of the well comprised solid pipe surrounded by a bentonite seal and the lower section comprised slotted pipe and a gravel filter. A plastic cap was placed at the base of the well and the rubber bung and gas valve were fitted at the surface. The installation details are presented on the borehole logs in Appendix II. Monitoring has been undertaken using a Gas Data GFM436 soil gas analyser with integral flow meter, and a Geotechnical Instruments electronic dip-meter.

The monitoring and risk assessment has been completed in accordance with BS8485:2015 + A19:2019 – Code of practice for the characterisation and remediation from ground gas affected developments, CIRIA Report C665, December 2007, and BS8576:2013 – Guidance on investigations for ground gas and is based on the following criteria.

- The proposed residential development has been classified as high sensitivity
- The risk associated with the generation potential of a source has been assessed as low based on the findings of the Phase 1 report and these ground investigation works
- In accordance with Tables 5.5a and 5.5b in CIRIA C665, the typical / idealised period of monitoring for this site has been determined as 9 no. recorded readings undertaken over a minimum period of 6 months
- Monitoring visits are undertaken to target and correlate with the worst-case conditions for ground gas emissions to occur, comprising falling atmospheric pressure trends and low atmospheric pressures. Monitoring of the weather conditions and predicted atmospheric pressures were carried out up to 72 hours in advance of the monitoring visits, in order that a reasonable period of data is obtained to determine atmospheric trends, and to target the worst-case scenario.

To date the wells have been monitored on 5 no. occasions between June and July 2026 in general accordance with CIRIA C665 (Table 5.5a and 5.5b). The results of monitoring are included in the Ground Gas Monitoring Record Sheets included in Appendix III. The ground gas risk assessment based on the results obtained to date is presented in Section 8.5 of this report.

6.0 Laboratory Testing

6.1 Geotechnical Testing

Geotechnical testing was completed in general accordance with BS1377-1, 2 & 4 by the following UKAS and MCERTS accredited laboratory.

- Northumberland County Council Highways Laboratory, Cramlington, Northumberland (NCC)

Samples of the materials recovered from the boreholes at depths of between 0.53m and 1.50m bgl have been subjected to the following laboratory based geotechnical tests.

- Grading Analysis (Particle Size Distribution – PSD)
- Moisture Content
- Atterberg Test (Determination of Liquid and Plastic Limit)

The results of the testing are summarised in section 7 and are presented in the NCC report (ref: S2578), a copy of which is contained in Appendix IV.

6.2 Chemical Screening

6.2.1 Determination of pH and Water-Soluble Sulphate

Testing was completed in general accordance with BS1377-1:2016 and BS1377-3:2018+A1:2021 by the following UKAS and MCERTS accredited laboratory.

- Normec DETS Limited of Consett, County Durham (DETS)
- Chemtech Environmental of Consett, County Durham (Chemtech)

In order to determine the correct concrete classification for buried structures (foundations, etc.), the following samples were scheduled for laboratory pH and water-soluble sulphate (SO₄) screening.

- 5 No. samples of made ground topsoil (up to depths of 0.40m bgl)
- 13 No. sample of the made ground deposits (0.00m to 0.40m bgl)
- 9 No. samples of the natural drift deposits (between depths of 0.53m to 1.50m bgl)

The results of the testing are summarised in section 7 and are presented in the DETS report (ref: 26-12937) and Chemtech Environmental Analytical Test Report (ref. 26-06051), copies of which are contained in Appendix IV.

6.2.2 Contamination Testing for Human Health

To enable the completion of a Level 1 Generic Quantitative Risk Assessment (GQRA) for Human Health, the following samples were scheduled for chemical screening.

- 5 No. samples of made ground topsoil (up to depths of 0.40m bgl)
- 13 No. sample of the made ground deposits (0.10m to 1.00m bgl)

The samples were subjected to analysis at the following UKAS and MCERTS accredited laboratory.

- Chemtech Environmental of Consett, County Durham (Chemtech)

Potential Contaminants of Concern (PCOC's) have been determined for the development area based on the descriptions of the materials encountered within the exploratory holes and the recorded site history. The samples have been screened for the contaminants as detailed on the following page.

- **Inorganic Soil Suite (Human Health Risk Assessment):** Metals (Arsenic, Cadmium, Chromium (III & VI), Copper, Lead, Mercury, Nickel, Selenium and Zinc), Cyanide and Total Organic Carbon
- **Organic Soil Suite (Human Health Risk Assessment):** Speciated Polycyclic Aromatic Hydrocarbons (PAHs – USEPA 16), Petroleum Hydrocarbons (C5 to C44 Aliphatic & Aromatic split, reported as cleaned-up values), BTEX and MTBE
- Other: Asbestos screening (Qualitative)

The full catalogue of soil screening results and test detection limits can be seen in the Chemtech report (ref: 26-06051) contained in Appendix IV.

The occasional presence of ash was noted in several borehole positions. Whilst no visual or olfactory evidence of fuel/oil contamination (no staining, odour or free product) was encountered within the topsoil or made ground deposits screening has been undertaken for completeness. In addition, no visual evidence of asbestos containing materials (ACMs) or visible bundles of asbestos fibres were identified during the fieldworks.

6.3 Controlled Water Environment Risk Assessment

The Phase 1: Desk Top Study element of work completed, has indicated that the risk to Controlled Waters was considered very low based on the site's history and environmental setting (Superficial deposits classified as a Secondary Aquifer – Undifferentiated). However, the solid geology which lies below the site is classified as a Principal Aquifer. Distington Beck lies c.111m east of the site.

During the intrusive site works, there was no evidence of any significant site wide heavy / gross or potentially mobile contaminants encountered. Whilst our risk rating remains very low, for completeness further assessment has been undertaken to determine the risks to Controlled Waters with more certainty.

Selected samples (6 no.) have been screened for the contaminants as detailed below.

- **Inorganic Soil Suite (Human Health Risk Assessment):** Metals (Arsenic, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc), Cyanide, Sulphide and Alkalinity
- **Organic Soil Suite (Human Health Risk Assessment):** Speciated Polycyclic Aromatic Hydrocarbons (PAHs – USEPA 16)

7.0 Geotechnical Analysis

7.1 Determination of Moisture Content and Atterberg Limits

In total 9 no. samples of the natural clay deposits recovered from the investigation positions across the site area, at depths of between 0.53m up to 1.50m bgl, have been scheduled for classification tests to determine their moisture content, and liquid & plastic limits. The results of the testing are contained in the NCC report (ref; S2578) presented in Appendix IV and are summarised below.

- Natural moisture contents ranged between 14.5% and 42.5%
- Liquid limits of between 29% and 48%, and plastic limits of between 18% and 25% were recorded
- Plasticity indices of between 11% and 23% are noted
- The results indicate clays of low and moderate plasticity

When taking into account the amount passing the 425um sieve, the clays display a negligible, low and medium volume change potential. As such, some of the clay deposits present may undergo significant changes in volume if large changes in their natural water content were to occur due to seasonal variations, and therefore if new foundations were to be placed within these clay deposits they would need to be placed at a minimum depth of 0.90m below finished ground levels.

Consideration will need to be given to any buildings which are placed within close proximity to existing, recently removed or proposed trees, in order to avoid the effects of future shrinkage and swelling of the clay deposits. As such the minimum foundation depth may need to be increased to take this into account and reference should be made to BS5837:2012 – Trees in relation to design, demolition and construction – Recommendations.

7.2 Grading Analysis (Particle Size Distribution)

Representative samples of the natural sand deposits recovered from WS's 01, 07 & 09 were scheduled for grading analysis to determine their particle size distribution (PSD). The results of the testing are contained in the NCC report (ref; S2578) a copy of which can be seen in Appendix IV and is summarised below.

The results of the PSD testing have identified the presence of poorly graded and well graded deposits, comprising very clayey/silty slightly gravelly fine to medium sand, very clayey/silty very gravelly fine to coarse sand and gravelly silty 'clay-bound' fine to coarse sand.

7.3 Determination of pH and Water-Soluble Sulphate

As indicated in Section 6, selected samples of the made ground topsoil, made ground and natural drift deposits have been screened to determine their pH value and soluble sulphate potential to aid the design of buried concrete. The results of the chemical screening are presented in the DETS report (ref: 26-12937) and Chemtech Environmental Analytical Test Report (ref. 26-06051), copies of which are contained in Appendix IV.

From the results, the following observations can be seen.

- Water Soluble Sulphate (SO₄) levels were recorded as ranging from 12mg/l up to 297mg/l
- pH values in the soils ranged from 6.7 to 8.1 (slightly acidic to slightly alkali)

In accordance with BRE Special Digest 1: 2005, Concrete in Aggressive Ground, the soluble sulphate results recorded equate to a Design Sulphate class of DS-1. With respect to the pH levels, the site should be assessed as an ACEC class of AC-1, based on brownfield locations and mobile water ground conditions.

8.0 Generic Quantitative Risk Assessment (GQRA)

8.1 Methodology for Assessing Risks to Human Health

Within the UK, the current framework for assessing potential ground contamination utilises the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model (dated 2020), and as set out by Land Contamination Risk Management Stages 1 to 4, June 2025 and the Department of the Environment, Farming and Rural Affairs (DEFRA) Contaminated Land Statutory Guidance, dated April 2012. This comprises of using the established pollutant linkage model of *Source – Pathway – Receptor*. For a risk to be present to the proposed end user (*Receptor*) there must be an identified *Source* and a plausible *Pathway*. Where one or more of the links are missing then the risk is negated. In order for the land to be classified as contaminated under Part IIA of the Environmental Protection Act (EPA) 1990 all three elements of the pollutant linkage must be present.

A human health risk assessment can be completed using the contamination levels recorded in the soils by comparing the values against published Generic Assessment Criteria (GAC), such as Land Quality Management (LQM) and Chartered Institute of Environmental Health (CIEH) S4UL Values, CL:AIRE/DEFRA Category 4 Screening Levels (C4SLs), and Atkins ATRISK^{SOIL} Soil Screening Values (SSV's). The guidelines are generally based on the land uses as outlined below.

- *Residential*
(with or without
homegrown produce)
- *Commercial*
- *Allotments*
- *Public Open Space*
(Residential or Park)

It is anticipated that the proposed development will incorporate the construction of new residential dwellings with areas of private gardens. Therefore, for the purposes of this Human Health ground contamination risk assessment, the maximum site recorded values for the soil samples have been compared to the GACs for the most sensitive end use classification of Residential with homegrown produce, to determine if a potential risk is present to proposed end users.

8.2 Human Health Risk Assessment – Comparison with Guidance Levels

8.2.1 Inorganic Contaminants – Soil

The maximum concentration values for each inorganic analyte have been compared to the most relevant published Generic Assessment Criteria (GAC) as part of the Maximum Value Test. The GACs have been selected using the following guidance documents.

- LQM/CIEH S4UL 2015 (Residential with homegrown produce) – The LQM/CIEH S4UL assessment levels utilised by GEO are copyrighted by Land Quality Management Limited reproduced with permission; Publication Number S4UL3481
- CL:AIRE/DEFRA Cat 4 Screening Levels C4SL (Residential with home-grown produce)
- Atkins ATRISK Screening Values (Residential)

As discussed in Section 8.1, the contaminant concentrations have been assessed against the appropriate GAC for a Residential end use. A summary of the findings can be seen in the Table below and continues on the following page.

Generic Analytes	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Arsenic	37 ⁽¹⁾	18	27.1
Cadmium	11 ⁽¹⁾	18	1.3
Chromium III	910 ⁽¹⁾	18	29.5
Chromium VI	6 ⁽¹⁾	18	<0.04
Copper	2,400⁽¹⁾	18	2,590 (WS11)

Generic Analytes (Cont'd)	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Lead	200⁽²⁾	18	234 (WS02)
Mercury	40 ⁽¹⁾	18	<0.6
Nickel	130 ⁽¹⁾	18	40.6
Selenium	250 ⁽¹⁾	18	<3.0
Zinc	3,700 ⁽¹⁾	18	341
Cyanide	34 ⁽³⁾	18	<1.0

⁽¹⁾ = The LQM / CIEH Suitable 4 Use Levels (Residential with homegrown produce end-use), ⁽²⁾ = CL:AIRE C4SLs (Residential with home-grown produce end-use), ⁽³⁾ = ATRISK^{SOIL} SSV (2015)

Based on the results of the risk assessment, the majority of the generic contaminants recorded do not exceed the assessment criteria values adopted for this site and as such the majority of the topsoil and made ground deposits present do not pose a risk to human health. However, marginally elevated concentrations of Copper & Lead, recorded at the locations of WS11 and WS02 respectively, represent localised hot spots of contamination. As such, further risk assessment and / or remediation will be required prior to the development commencing.

It should be noted that the majority of the topsoil deposits screened (outwith WS02), are considered suitable for re-use and can remain in a residential setting.

8.2.2 Organic Contaminants – Soil

The maximum concentration values for the organic analytes tested for (i.e. PAH congeners, Petroleum Hydrocarbons, BTEX and MTBE) have been compared to the most relevant and appropriate published guidance values (generic assessment criteria) as part of the Maximum Value Test. The GACs have been selected using the following guidance document.

- LQM/CIEH S4UL 2015 (Residential with homegrown produce)
- EIC/AGS/CL:AIRE GAC 2010 (Residential with consumption of homegrown produce)

Taking in to account the average TOC of the soils on the site, this assessment has been completed utilising a 6% SOM. A summary of the findings can be seen in the Table below.

PAH Congeners	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Acenaphthene	1,100 ⁽¹⁾	18	0.9
Acenaphthylene	920 ⁽¹⁾	18	0.1
Anthracene	11,000 ⁽¹⁾	18	3.5
Benzo(a)anthracene	13 ⁽¹⁾	18	7.2
Benzo(a)pyrene	3.0⁽¹⁾	18	4.4 (WS12)
Benzo(b)fluoranthene	3.7⁽¹⁾	18	6.6 (WS12)
Benzo(ghi)perylene	350 ⁽¹⁾	18	2.6
Benzo(k)fluoranthene	100 ⁽¹⁾	18	2.9
Chrysene	27 ⁽¹⁾	18	5.1
Dibenzo(ah)anthracene	0.3⁽¹⁾	18	0.7 (WS12)
Fluoranthene	890 ⁽¹⁾	18	19.8
Fluorene	860 ⁽¹⁾	18	1.5
Indeno(123cd)pyrene	41 ⁽¹⁾	18	3.8
Naphthalene	13 ⁽¹⁾	18	0.1
Phenanthrene	440 ⁽¹⁾	18	15.5
Pyrene	2,000 ⁽¹⁾	18	14.2

⁽¹⁾ = The LQM / CIEH Suitable 4 Use Levels (Residential with homegrown produce end-use)

Based on the results of the risk assessment, the majority of the PAH congeners recorded do not exceed the assessment criteria values adopted for this site and as such the majority of the topsoil and made ground deposits present do not pose a risk to human health.

However, marginally elevated concentrations of Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(ah)anthracene was recorded at the location of WS12, representing a localised hot spot of PAH contamination. As such, further risk assessment and / or remediation will be required prior to the development commencing.

It should be noted that the majority of the topsoil deposits screened (outwith WS12), are considered suitable for re-use and can remain in a residential setting.

Petroleum Hydrocarbons	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
>C5-C6 Aliphatic	160 ⁽¹⁾	8	<0.1
>C6-C8 Aliphatic	530 ⁽¹⁾	8	<0.1
>C8-C10 Aliphatic	150 ⁽¹⁾	8	<0.1
>C10-C12 Aliphatic	760 ⁽¹⁾	8	<0.1
>C12-C16 Aliphatic	4,300 ⁽¹⁾	8	1.8
>C16-C35 Aliphatic	110,000 ⁽¹⁾	8	12.3
>C35-C44 Aliphatic	100,000 ⁽¹⁾	8	0.7
>C5-C7 Aromatic	300 ⁽¹⁾	8	<0.01
>C7-C8 Aromatic	660 ⁽¹⁾	8	<0.01
>C8-C10 Aromatic	190 ⁽¹⁾	8	<0.01
>C10-C12 Aromatic	380 ⁽¹⁾	8	1.9
>C12-C16 Aromatic	660 ⁽¹⁾	8	7.8
>C16-C21 Aromatic	930 ⁽¹⁾	8	16.7
>C21-C35 Aromatic	1,700 ⁽¹⁾	8	39.2
>C35-C44 Aromatic	1,700 ⁽¹⁾	8	7.9
BTEX Compounds			
Benzene	0.37 ⁽¹⁾	8	<0.001
Toluene	660 ⁽¹⁾	8	<0.001
Ethylbenzene	260 ⁽¹⁾	8	<0.001
<i>m,p</i> -Xylene	310 ⁽¹⁾	8	<0.002
<i>o</i> -Xylene	330 ⁽¹⁾	8	<0.002
Petrol Additive			
MTBE	160 ⁽²⁾	8	<0.002

⁽¹⁾ = The LQM / CIEH Suitable 4 Use Levels (Residential with homegrown produce end-use), ⁽²⁾ = EIC/AGS/CL:AIRE GAC 2010 (Residential with consumption of homegrown produce)

Based on the results of the risk assessment, levels of Petroleum Hydrocarbons do not exceed the assessment criteria values adopted for this site and as such the majority of the topsoil and made ground deposits present do not pose a risk to human health.

8.2.3 Determination of presence of Asbestos – Soil

In total 18 no. samples of the made ground topsoil and made ground have been subjected to laboratory microscopic analysis to determine the presence or not of loose asbestos fibres or Asbestos Containing Materials (ACMs) in accordance with the methodology within HSG 248.

All the samples screened returned a negative result for the presence of asbestos and were recorded as NAD (no asbestos detected), i.e. no asbestos was encountered.

8.2.4 Human Health Risk Assessment – Summary

The following is a summary of the Human Health risk assessment based on a *Residential* end use.

- **Generic Contamination:** Two localised 'hot spots' of elevated Copper and Lead have been recorded (WS11 and WS02 respectively)
- **Organic Contamination:** A localised 'hot spot' of PAHs has been recorded at the location of WS12
- **Asbestos Contamination:** None recorded

Based on the human health risk assessment above, the majority of the contaminants screened have been identified as not posing a potential risk to human health with respect to a residential end use. Therefore, generally the made ground topsoil and made ground deposits present across the site are not considered to pose a risk to human health and remediation or further risk assessment is not required.

However, 3 no. localised 'hot spots' of Copper, Lead and PAH contamination has been recorded within the initial made ground topsoil and made ground at the locations of WS's 02, 11 & 12 which could represent a risk to future end users (i.e. residents) post development of the site. Therefore, further risk assessment and / or remediation will be required prior to the development commencing, comprising the delineation of the Copper, Lead and PAH contamination, followed by the excavation and removal of the impacted soils from site to negate the risks posed to future end users.

8.3 Methodology for Assessing Risks to Controlled Waters

A Controlled Waters risk assessment is a tiered, phased process used to identify, characterise, and quantify the risks posed by land contamination on groundwater and surface water. It follows the source-pathway-receptor pollutant linkage model. The primary goal is to determine acceptable contaminant concentrations and inform site remediation requirements. The methodology consists of a structured, phased approach in alignment with the UK Environment Agency's Land Contamination Risk Management (LCRM) framework.

The objective of the risk assessment is to compare site-specific chemical data against relevant regulatory thresholds, such as Environmental Quality Standards (EQS) for surface water or UK Drinking Water Standards (DWS). If concentrations fall below Generic Assessment Criteria (GAC), the risks are deemed acceptable. If concentrations exceed their respective GAC, then further detailed modelling is required.

Whilst the site's history and environmental setting was assessed to be very low, there could be physical routes through which contaminants could migrate (e.g., leaching through unsaturated zones, surface runoff) which could potentially impact the underlying Principal Aquifer (solid geology) and nearby Distinguon Beck, which lies c.111m east of the site.

8.4 Controlled Waters Risk Assessment – Comparison with Guidance Levels

The maximum concentration leachate values for each analyte (metals & speciated PAHs) have been compared to the most relevant published Generic Assessment Criteria (GAC) as part of the Maximum Value Test. The GACs have been selected using the following guidance document.

- EU Environmental Quality Standards (EQS) Directive, 2008/105/EC; updated May 2026

A summary of the findings can be seen in the Table below and continues on the following page.

Generic Analytes	Critical concentration (µg/l)	No. of samples screened	Max. concentration recorded (µg/l)
Arsenic	50	6	1.99
Boron	2,000	6	22.2
Cadmium	0.25	6	<0.1
Chromium	4.7	6	1.74
Copper	28	6	5.93
Lead	250	6	2.70
Mercury	0.07	6	<0.05
Nickel	4.0	6	1.76
Selenium	10	6	<1.1
Zinc	10.9	6	<3.5
Cyanide	5	6	<5.0

PAH Congeners	Critical concentration (µg/l)	No. of samples screened	Max. concentration recorded (µg/l)
Acenaphthene	-	6	<0.10
Acenaphthylene	-	6	<0.10
Anthracene	0.05	6	<0.10
Benzo(a)anthracene	-	6	<0.10
Benzo(a)pyrene	0.005	6	<0.10
Benzo(b)fluoranthene	0.05	6	<0.10
Benzo(ghi)perylene	0.05	6	<0.10
Benzo(k)fluoranthene	0.05	6	<0.10
Indeno(123cd)pyrene	0.05	6	<0.10
Chrysene	-	6	<0.10
Dibenzo(ah)anthracene	-	6	<0.10
Fluoranthene	0.12	6	<0.10
Fluorene	-	6	<0.10
Naphthalene	130	6	<0.10
Phenanthrene	4.0	6	<0.10
Pyrene	0.023	6	<0.10

Based on the results of the risk assessment, the concentrations of leachable metals do not exceed the assessment criteria values adopted for this site. Whilst the laboratory detection limits for the PAH congeners are above the assessment values adopted for this site, the results have identified no detectable concentrations of any of the PAH congeners. As such the made ground is not considered to represent a risk to the underlying Principal Aquifer or nearby Distington Beck.

8.5 Hazardous Ground Gas Risk Assessment

As indicated in Section 5.4, gas and groundwater monitoring wells have been installed in the boreholes (WSs 02, 04, 08, 12 & 14) and monitoring has been completed between the period of June and July 2026 to date. A summary of the gas monitoring results obtained can be seen within the Ground Gas Monitoring Record Sheets Included in Appendix III.

During the monitoring completed, atmospheric air pressures have varied between 1002mb and 1013mb, with rising and falling pressure trends.

No detectable concentrations of Methane have been recorded during the monitoring period to date. Carbon Dioxide (CO₂) concentrations have been recorded up to a maximum of 5.8%v/v on two occasions within WS04 only (1st & 2nd visit). Typically, Carbon Dioxide concentrations have remained below 5%, with the maximum being 4.6%. Carbon Dioxide concentrations are accompanied with the presence of reduced levels of Oxygen (O₂), the minimum concentration being typically 15.4%. Typically, negligible flow rates have been recorded within the monitoring wells (<0.1 to 0.1l/hr), with the exception of WS04 on the 1st visit, where a positive flow rate was initially recorded upon opening the gas value, which then reduced to <0.1l/hr after a short period of time.

For the purposes of assessing the proposed development in accordance with Tables 8.5 and 8.7 in CIRIA C665, and Table 2 in BS8485:2015 + A1:2019, the site is characterised based on the limiting borehole gas flow rate (*Q_{hg}*) for Methane and Carbon Dioxide, known as the Gas Screening Value (GSV). The GSV equates to a Characteristic Situation classification which in turn determines the level of gas protection measures required in a building, in accordance with Table 4 in the BS8485 guidance.

The GSV calculation can be seen below.

- CO₂ GSV = (Typical Max CO₂ (%) / 100) x Typical Max Flow (l/hr); (4.6 / 100) x 0.1 = 0.0046l/hr
- No GSV can be calculated for Methane, as no detectable concentrations have been recorded

Based on the results, the calculated GSV for Carbon Dioxide falls below the threshold assessment value of 0.07l/hr for a Characteristic Situation 1 (CS1) classification. Whilst the maximum concentration for Carbon Dioxide in WS04 has exceeded the action trigger value of 5%, this has only been on two occasions and is not typical of the site as a whole. Therefore, we are not recommending that the characteristic situation is increased by an order to 1 to take into account the elevated concentrations detected. As such, it is felt that the site should remain classified as Characteristic Situation 1 (CS1), and consequently it will not be necessary for gas protection measures to be incorporated within the construction of the proposed residential dwelling proposed on this site. However, a final assessment will be completed once the final monitoring visit has been completed.

It should be noted that depleted oxygen levels have been recorded. Whilst these levels are unlikely to pose a risk to above ground structures (residential properties with no basements), this could potentially pose a risk to the construction workforce for any ground works carried out below ground (i.e. installing utilities etc.). As a result of this the information presented in this report, this should be passed to the main contractor as a Workforce Health and Safety risk assessment lies out-with the scope of this report.

According to the information presented in the DTS, the site is at risk from Radon and therefore requires the implementation of **FULL** Radon protection measures.

9.0 Construction Related Excavations and Off-Site Disposal

During the construction works it is likely that materials will be excavated (i.e. future foundations and buried utilities, etc.) which cannot be accommodated on site, due to space and level constraints, and will need to be discarded of and removed from site as a waste.

During the construction works, different materials should be stockpiled separately (i.e. made ground, topsoil, natural strata, etc.), and an appropriate waste disposal classification should be determined by the Design Team prior to removal, in accordance with Environment Agency's technical guidance; WM3: Waste Classification – Guidance on the classification and assessment of waste (1st edition, v.1.2.GB, October 2021). Following preliminary assessment to determine the waste classification (i.e. Non-Hazardous or Hazardous), it may be the case that additional WAC testing is required to determine the choice of landfill for the disposal of the waste soils.

Where any materials are being removed from site they should be disposed of at a suitably licensed and appropriate landfill based on their classification, with a duty of care system in place and maintained throughout the disposal operation.

When considering the sampling and testing carried out to date on the made ground topsoil and made ground present across the site, and based on the physical (visual and olfactory) appearance of the materials, we would assess these materials from the WM3 List of Waste (LoW) codes as 17 05 04 (soil and stones other than those mentioned in 17 05 03), and the majority of the soil deposits present on this site are likely to be classified as Non-Hazardous waste. In order to confirm the correct waste code assigned to these materials they should be accurately assessed using either the HazWasteOnline™ software assessment tool or by the receiving waste management / landfill operator.

If these materials were taken off-site as Non-Hazardous waste, then no further assessment or testing would be required. Based on the TOC values record, typically ranging above 3%, it is unlikely that any excavated made ground materials originating from the site could be disposed of at an Inert waste landfill.

The only exception to this preliminary assessment would be the 'hot spot' of Copper recorded at the location of WS11, which is likely to exceed the threshold for being classified as hazardous (specifically HP 14 Ecotoxic), and therefore Waste Acceptance Criteria (WAC) testing will be required prior to this material being disposed of at a Hazardous waste disposal facility.

In accordance with the WM3 guidance, it is likely that natural strata (providing it is uncontaminated) can be disposed of at an Inert waste landfill, although this will be subject to the completion of appropriate chemical screening and WAC testing to confirm this. The number of samples required for screening will be dependent on the overall volume of material requiring disposal.

Any material movements may potentially require a Material Management Plan (MMP) in accordance with CL:AIRE. This should be in place before commencing development works as an MMP cannot be applied for retrospectively.

10.0 Discussion and Recommendations

10.1 Ground and Groundwater Conditions Summary

The key geotechnical conclusions for the site indicate that the site is underlain by variable made ground overlying Devensian glacial till.

The made ground thickness is highly variable, ranging between 0.30m and 1.40m thick, and is locally substantial (up to ~4.9m) at the location of WS02 where the presence of a 1.20m void has been encountered from 3.70m extending to at least 4.90m. Further investigation will be required to identify this anomaly / feature and how it will affect the proposed development.

The natural deposits are predominantly firm to stiff sandy gravelly clay till with sand and gravel lenses. Localised soft clay, wet sand, and a thin peat horizon were identified, particularly around WS03 and WS08.

Outside the isolated weak zones, the glacial till generally exhibits good bearing characteristics, with many boreholes showing dense/stiff conditions and high SPT values at depth.

Water ingresses were encountered in several boreholes and appears associated with permeable sand layers within the till. This does not represent a continuous groundwater surface.

Nonetheless, some water ingresses should be anticipated, and it is recommended that an allowance is made for groundwater control measures (i.e. sump pumping equipment) when excavations extend down to and beyond the depths of where groundwater has been observed, and particularly during wetter periods of the year, to ensure excavations remain dry prior to constructing foundations and the like. Granular soils may be susceptible to running conditions if excavated below where groundwater has been observed

During the investigation, GEO did not identify any visual or olfactory evidence of fuel/oil type contamination (no staining, odour or free product) or any landfill type waste, with no potentially biodegradable, decomposable or putrescible materials.

10.2 Future Foundations, Pavements and Buried Structures

It is understood that the proposed development will comprise the construction of new residential dwellings with private gardens, driveways and associated road infrastructure.

Taking into account the variable ground conditions encountered and the geotechnical information recorded, there appears to be no consistent founding depth or singular ABP available for the site as a whole. As such recommendations have been provided based on the use of conventional strip footings (incorporating mesh reinforcement) based at the minimum foundation depths provided along with the maximum allowable bearing pressure (ABP) available at each borehole location. All foundations should be based within a uniform bearing medium, i.e. clay or sand, to avoid the potential for differential settlements.

<u>Borehole</u>	<u>Foundation Depth</u>	<u>Founding Strata</u>	<u>Allowable Bearing Pressure (kN/m²)</u>
WS01	0.90m 1.20m	Firm CLAY Medium dense SAND	100 150
WS02	Anomalous ground conditions	~	~
WS03	1.05m 2.35m	Very soft/soft CLAY Firm CLAY	60 80

Borehole	Foundation Depth	Founding Strata	Allowable Bearing Pressure (kN/m²)
WS04	1.00m	Firm CLAY	110
WS05	0.90m	Firm CLAY	100
WS06	1.15m	Firm/stiff CLAY	80
WS07	0.75m ^{see note below}	Firm CLAY	90
	0.90m	Loose/medium dense SAND	100
WS08	1.40m	Firm CLAY	90
WS09	Insufficient geotech information	Likely to be SAND	~
WS10	1.30m	Firm/stiff CLAY	150
WS11	0.90m	Firm CLAY	110
WS12	1.30m	Firm/stiff CLAY	150
WS13	1.45m	Firm CLAY	80
WS14	0.90m	Stiff CLAY	140
WS15	0.90m	Firm/stiff CLAY	120

Note – Foundation depths may need to be increased to take into shrink/swell potential, as well as the presence of existing, recently removed or proposed trees in accordance with guidance

As standard, it would be prudent to make an allowance for all foundation excavations to be inspected by a suitably qualified Engineer during the construction process to verify the correct founding strata and depths have been achieved, and to ensure that there are no significant changes or variations in the ground conditions identified as part of these investigation works.

During the design phase, if site level variations (e.g., areas of cut) are proposed that go beyond the depth of GEO's foundation recommendations which are taken from current ground levels, then a reassessment of the founding strata and allowable bearing pressures should be reviewed.

With respect to buried structures (concrete), the pH levels and soluble sulphate concentrations in the soils equate to a Design Sulphate classification of DS-1 and an ACEC classification of AC-1 (BRE Special Digest 1: 2005).

10.3 Ground Contamination

In total 18 no. samples of the topsoil (made ground) and made ground recovered from across the site were analysed for a standard inorganic suite, including metals, cyanide and organics (PAHs and Petroleum Hydrocarbons). Generally, across the site as a whole, all recorded concentrations were below the applicable Generic Assessment Criteria (GAC) for the most sensitive end use, Residential with homegrown produce.

However, localised marginal exceedances of Copper, Lead and PAHs were recorded at the locations of WS's 02, 11 & 12, representing 3 no. individual "hot spots". These exceedances are limited in extent and do not indicate widespread contamination. As such, remediation is required for these isolated areas only, comprising further investigation in the form of delineation, followed by targeted excavation and removal of the impacted soils in order to negate the potential risks to future end users. Once these impacted soils are removed, the remaining topsoil and made ground present can be left insitu / reused in areas of private gardens without representing a risk.

All samples screened for the presence of asbestos, found no asbestos was detected (NAD). As such, asbestos impacted soils does not represent a constraint to development.

In conclusion, generally there is no risk from heavy or gross ground contamination, with the exception of the 3 no. localised 'hot spots' requiring targeted remedial management. With appropriate treatment of the isolated exceedances, the site is considered suitable for residential development from a human health perspective.

10.4 Ground Gas

The results of the ground gas monitoring to date indicates the presence of no detectable concentrations of Methane. Whilst marginally elevated concentrations of Carbon Dioxide (5.8%) has been recorded on two occasions at one borehole location only, Carbon Dioxide concentrations have typically been recorded up to 4.6%. Generally negligible flow rates (<0.1 to 0.1l/hr) have been recorded to date.

When taking into account the typical Carbon Dioxide concentration, the calculated GSV for the site has determined that the site can be placed within a Characteristic Situation 1 (CS1) classification, and therefore gas protection measures are not considered necessary. As there are outstanding gas monitoring visits to be completed, an updated report will be issued once all the gas monitoring results are available.

The site lies within a high-risk Radon area and requires the provision of **FULL** Radon protection measures to be implemented within the construction of new buildings.

10.5 General Comments

Consideration must be made for variations to occur in the ground conditions between the exploratory hole locations for which GEO holds no responsibility and areas where limited access was available. It is therefore recommended that a “watching brief” and “observational technique” be applied to this site to ensure that if ground conditions appear to vary from those identified within this investigation report then advice should be sought from a suitably qualified and experienced Engineering Geologist, Geotechnical or Geo-Environmental Engineer.

The recommendations and opinions expressed in this report are based on the strata observed within the exploratory holes, in addition to the results of the site and laboratory tests commissioned by GEO. Consequently, GEO takes no responsibility for conditions that have not been revealed or which occur between them. GEO takes no responsibility for the accuracy of third-party information provided by sub-contract drillers or laboratories.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders including warranty providers in order to seek their approval of the findings prior to undertaking any works on site.

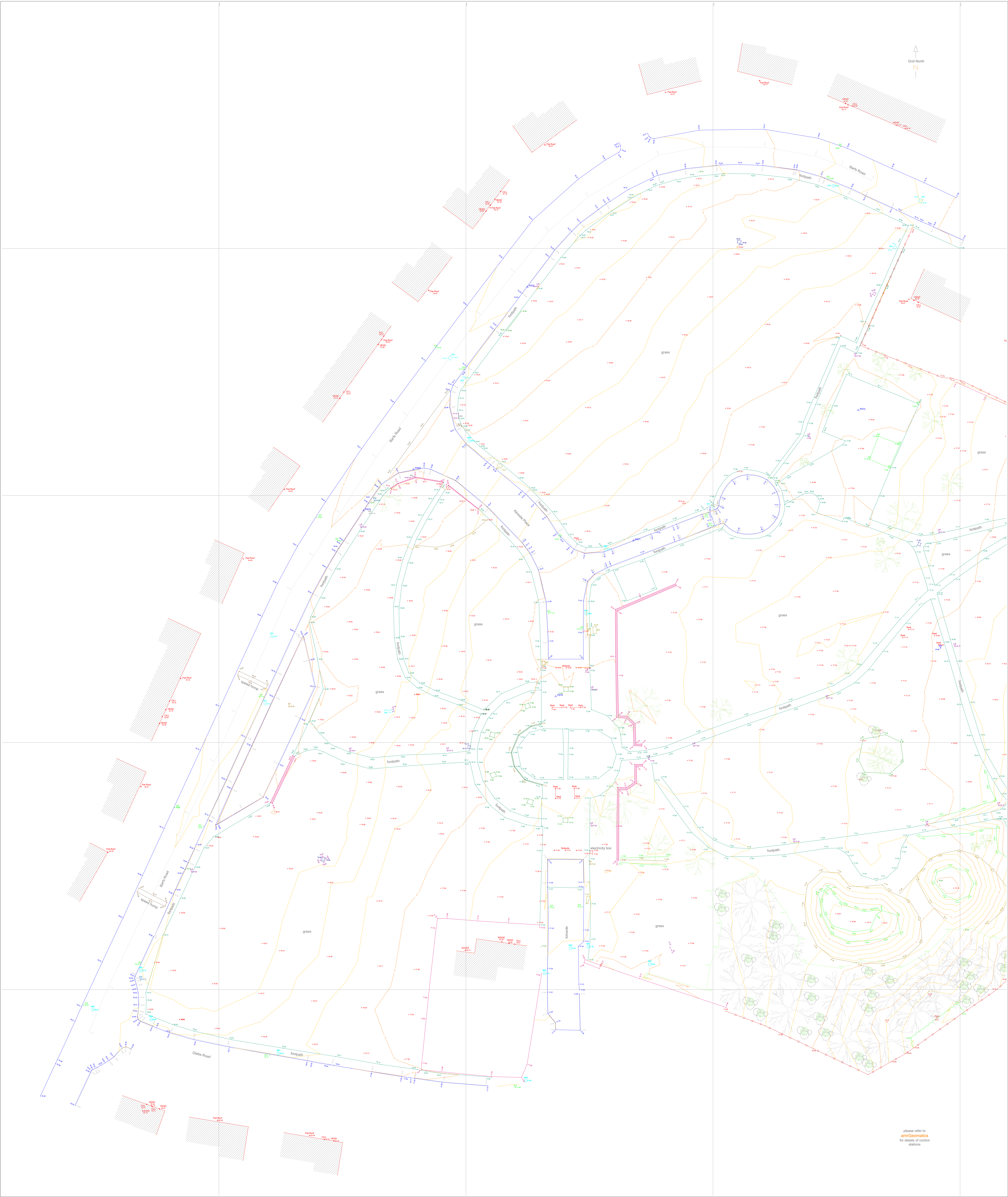
End of Report

Appendix I

- Site Location Plan
- Existing Site Layout Plan (Topographic Survey)
- Proposed Site Development Plan

GEO2026-7213: Barfs Road, Distington, Workington, Cumbria
Site Location Plan





please refer to
amrGeomatics
for details of control
stations

Legend			
	Building		Steep Slope
	Barrier		Spot height in metres
	Bottom of Bank		Post Box
	British Telecom		Borehole
	Concrete		Bus Stop
	Canopy		Cable TV
	Drop Kerb		Electricity Pole
	Drain		Earth Rod
	Fence		Fire Hydrant
	Flower Bed		Floor Level
	Fence - Birdsmouth		Flag Pole
	Foliage		Gas Valve
	Footpath		Gas Marker
	Fence - Security		Gate Post
	Fence - Wire		Gully
	Grass		Inspection Chamber
	Gate		Invert Level
	Hedge		Lamp Post
	Kerb		Manhole
	Kerb Top		Marker
	Lake / Pond		Rodding Eye
	Marsh		Road Sign
	Overhead Electricity Line		Stop Cock
	Overhead Telephone Line		Septic Tank
	Ramp		Survey Station
	Sign Post		Sign Post
	Tarmac		Stop Valve
	Top of Bank		Traffic Light
	Track		Telegraph Pole
	Verge		Water Meter
	Wall		Tree (deciduous)
	Contours		Tree (coniferous)
	Tree (unsurveyed)		
	Shrub		
	Road Markings		

SURVEY STATIONS MARKED WITH ROAD NAILS AND PEGS
WITH COORDINATES RELATING TO OSGB36 NATIONAL GRID

SITE LEVELS MARKED AT STATIONS RELATE TO
ORDNANCE DATUM OSGM15, VIA DIFFERENTIAL GPS.

USE ONLY FOR THE PURPOSE INDICATED BELOW

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Drawn By	MRH	Checked By	LR
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DRAWING REVISION RECORD			
No. Detail	DWG No.	Date	Intl.
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2			
3			
4			

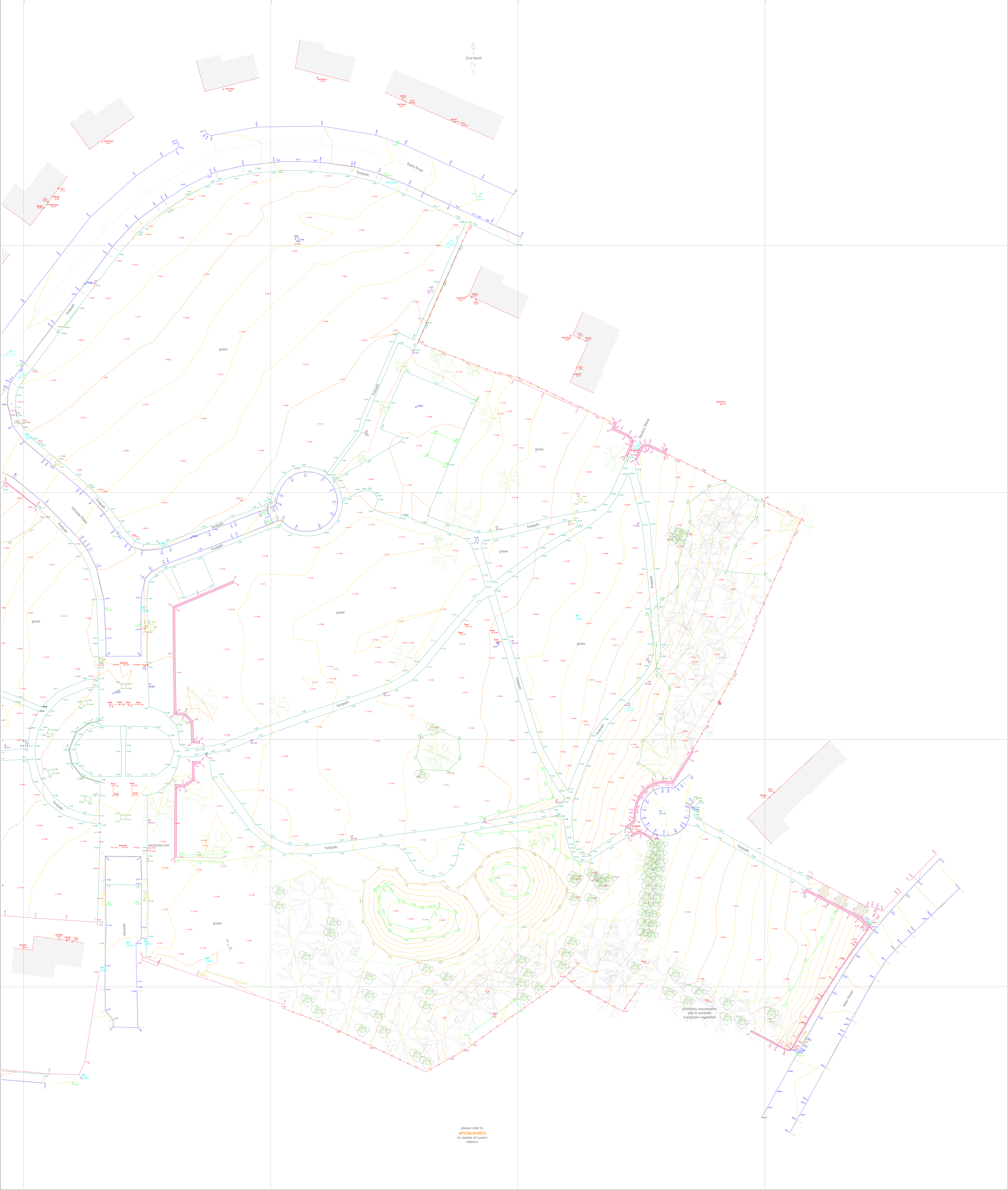
Chartered Land
Surveyors

www.amrGeomatics.co.uk

Site	"BARF'S ROAD, DISTINGTON"	
	CUMBRIA	
Drawing	TOPOGRAPHICAL SURVEY	
Date	28 NOV 2025	Drawing No. P17366/amr/1
Scale	1: 250 @ A0	Subm. 01

Chartered Land Surveyors
mail@amrGeomatics.co.uk

amrGeomatics Northern Ltd
1 Fore Street
Hexham
Northumberland
NE46 1ND
T: 01434 600320
M: 07971 672071



Building

Barrier

Bottom of Bank

British Telecom

Concrete

Canopy

Drop Kerb

Drain

Fence

Fence - Birdsmouth

Foliage

Footpath

Fence - Security

Fence - Wire

Grass

Gate

Hedge

Kerb

Kerb Top

Lake / Pond

Marsh

Overhead Electricity Line

Overhead Telephone Line

Ramp

Sign Post

Tarmac

Top of Bank

Track

Verge

Wall

Contours

Steep Slope

Spot height in metres

Post Box

Borehole

Bus Stop

Cable TV

Electricity Pole

Earth Rod

Fire Hydrant

Floor Level

Flag Pole

Gas Valve

Gas Marker

Gate Post

Gully

Inspection Chamber

Invert Level

Lamp Post

Manhole

Marker

Rodding Eye

Road Sign

Stop Cock

Septic Tank

Survey Station

Sign Post

Stop Valve

Traffic Light

Telegraph Pole

Water Meter

Tree (deciduous)

Tree (coniferous)

Tree (unsurveyed)

Shrub

Road Markings

SURVEY STATIONS MARKED WITH ROAD NAILS AND PEGS
WITH COORDINATES RELATING TO OSGB36 NATIONAL GRID

SITE LEVELS MARKED AT STATIONS RELATE TO
ORDNANCE DATUM OSGM15, VIA DIFFERENTIAL GPS.

USE ONLY FOR THE PURPOSE INDICATED BELOW

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Drawn By

MRH

Checked By

LR

DRAWING REVISION RECORD

No.	Detail	DWG No.	Date	Intl.
1				
2				
3				
4				

amrGeomatics

Chartered Land Surveyors

www.amrGeomatics.co.uk

Site

"BARFS ROAD, DISTINGTON"

CUMBRIA

Drawing

TOPOGRAPHICAL SURVEY

Date

28 NOV 2025

Scale

1: 250 @ A0

Drawing No.

P17366/amr/2

Subm. 01

Chartered Land Surveyors

mail@amrGeomatics.co.uk

amrGeomatics Northern Ltd

1 Fore Street

Hexham

Northumberland

NE46 1ND

T: 01434 600320

M: 07971 672071

House Type	Count	Floor Area
HT-A 2 bed 3 person bungalow	9	61m2
HT-B 2 bed 3 person house	14	70.3m2
HT-C 3 Bed 5 Person House	30	94.1m2
HT-D 4 Bed 6 Person House	8	107.44m2

Demolition

Roof Protection Area

Note

This drawing must be printed in colour.



Proposed Site Plan Distington, Barf's Road

0m 10m 20m 30m 40m 50m
VISUAL SCALE 1:500 © A1

This drawing is to be read in conjunction with all related drawings. Dimensions must be checked and verified on site before commencing work or producing shop drawings. The originator must be notified immediately of any discrepancy. This drawing is copyright and remains the property of Architects Plus, and may not be reproduced in any way without written consent from Architects Plus.

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Company Registration
Architects Plus (UK) Limited
Registered in England no. 4221140

Drawing			Proposed Site Plan		Status
Project			Distington, Barf's Road		PL - Planning
Client name			Thomas Armstrong (Construction) Ltd		RIBA stage
Date			15/05/2026		3 - Spatial Coordination
Drawn by			TP		Revision
Scale @ A1			As indicated		A
Drawing number			25030-PL004A		

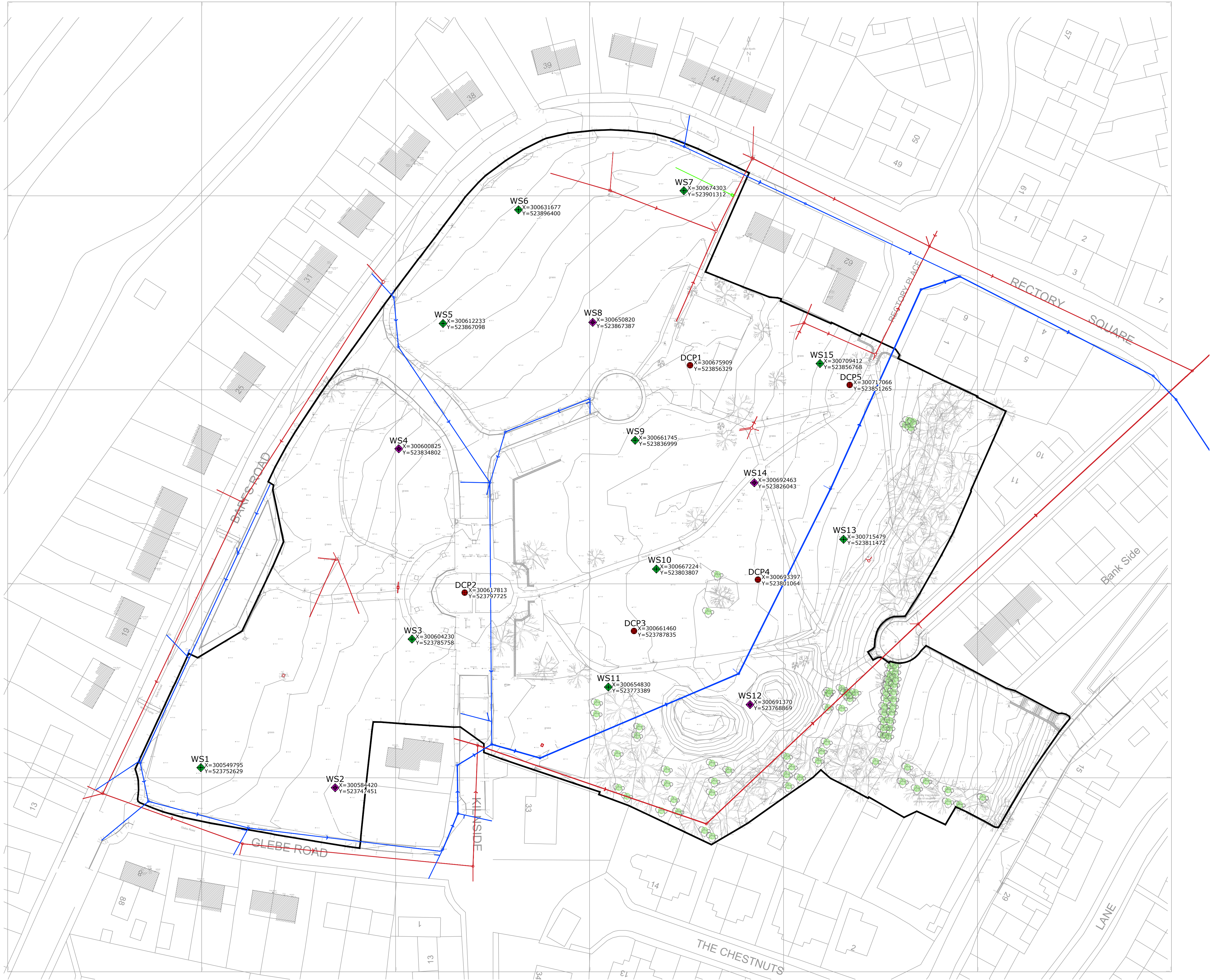
Appendix II

- Site Investigation Location Plan
- Exploratory Hole Logs (Windowless Sampling Boreholes)
- Dynamic Cone Penetration Test Record Sheets



General

1. This drawing should not be scaled - use figured dimensions only. If in doubt, ask.
2. All dimensions are in millimetres unless stated otherwise.
3. This drawing is to be read in conjunction with all relevant Architects drawings as well as all other drawings by RG Parkins (refer to RG Parkins drawing register).
4. The Contractor is responsible for verifying all dimensions on site prior to commencing works.
5. Any specified proprietary products are to be installed in strict accordance with manufacturers guidelines. No specified product should be substituted without gaining approval from RG Parkins.



KEY	
	Window sample probehole
	Window sample probehole with GW monitoring standpipe
	DCP test

R G PARKINS
Kendal | 01539 729393 Lancaster | 01524 32548

Scale @ A1: 1/500	First Issue: 08/05/26	Office of Origin: Kendal
Drawn by: TM	Checked by: CA	Approved: TM
Project No: K42601	Drawing No: 50	Rev:
BIM No:		

Client: Thomas Armstrong
Project: Barfs Road, Distington
Drawing Title: Proposed Ground Investigation Location Plan

Rev	Description	Date	Revised by	Checked by	Approved
Information					
Do not scale from this drawing					



Dynamic (Windowless) Sampler

WS01
Sheet 1 of 1

Hole Type WLS	Easting 300548.97	Northing 523751.99	Ground Level (m) 79.01	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
--	-------------------------------------	--

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.00-0.31	JDV			(0.31)		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]	
						78.70 0.31 (0.24)		Medium brown slightly clayey fine to coarse SAND [SUBSOIL]	0.5
		0.62 0.70-0.90	HV BD	>120 (kPa)		78.46 0.55 (0.35)		Stiff (high strength) medium brown and dark brown sandy gravelly CLAY [DEVENSIAN TILL]	
		0.86 0.95 1.00	HV HV SPT(C)	110 (kPa) 50 (kPa) N=15 (2,3/3,3,4,5)		78.11 0.90 (0.30)		Firm (medium strength) medium brown, orange-brown and grey sandy gravelly CLAY [DEVENSIAN TILL]	1.0
						77.81 1.20 (1.22)		Medium dense becoming dense medium brown clayey silty slightly gravelly fine to medium SAND [DEVENSIAN TILL]	1.5
		1.50	BD						
		2.00	SPT(C)	N=50 for 255mm (3,7/9,19,15,7 for 30mm)					2.0
						76.59 2.42 (0.83)		Dense medium brown very sandy GRAVEL [DEVENSIAN TILL]	2.5
		2.80	SPT(C)	N=50 for 295mm (9,12/14,14,11,11 for 70mm)					3.0
						75.76 3.25		End of Borehole at 3.25m	3.5
									4.0
									4.5
									5.0

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.25m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS01
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300548.97	Northing 523751.99	Ground Level (m) 79.01	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---

SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=15 (2,3/3,3,4,5)
2.00 (C)					N=50 for 255mm (3,7/9,19,15,7 for 30mm)
2.80 (C)					N=50 for 295mm (9,12/14,14,11,11 for 70mm)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.00-0.31	JDV		
0.70-0.90	BD		
1.50	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.25m WLS Competitor Dart Rig	Logger R Stripp
---------	--	--------------------

Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS01
PHOTO PAGE

Hole Type WLS	Easting 300548.97	Northing 523751.99	Ground Level (m) 79.01	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 15.05.2026	End Date

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
--	-------------------------------------	--



Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.25m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS02
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300584.08	Northing 523746.94	Ground Level (m) 78.03	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---

SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=10 (1,2/2,3,3,2)
2.00 (C)					N=18 (2,4/5,4,5,4)
3.00 (C)					N=6 (1,2/1,2,2,1)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.00-0.40	JDV		
0.60-1.00	JDV		
1.50	JDV		
2.30	JDV		
3.00	JDV		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.90m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS02
PHOTO PAGE

Hole Type WLS	Easting 300584.08	Northing 523746.94	Ground Level (m) 78.03	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---



Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.90m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS03
Sheet 1 of 1

Hole Type WLS	Easting 300601.83	Northing 523783.34	Ground Level (m) 77.96	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.10-0.45	JDV			(0.45)		Grass overlying dark brown slightly clayey silty sandy soil with occasional shale [MADE GROUND]
					77.51	0.45 (0.25)		Dark brown slightly clayey slightly gravelly sandy SOIL [SUBSOIL]
		0.70-1.00	BD		77.26	0.70 (0.35)		Very soft medium brown and rusty-brown very sandy gravelly CLAY [DEVENSIAN TILL]
		1.05-1.50	BD		76.91	1.05		Soft (low strength) light grey, light brown and light orange very sandy CLAY [DEVENSIAN TILL]
		1.20	HV	30 (kPa)				
						(1.30)		
		2.18	HV	24 (kPa)				
					75.61	2.35		Becoming 'wet' from 2.30m (2.30m)
		2.53	HV	50 (kPa)				Firm (medium strength) silty sandy slightly laminated CLAY [DEVENSIAN TILL]
		2.65-2.85	BD					Noted to be very soft between 2.65-3.02m (2.65 - 3.02m)
		2.80	HV	40 (kPa)				
		3.00	SPT(C)	N=7 (1,1/1,1,2,3)		(1.22)		
					74.39	3.57 (0.31)		Stiff (high strength) brownish-grey sandy gravelly CLAY [DEVENSIAN TILL]
		3.75 3.80	HV SPT(C)	84 (kPa) N=50 for 65mm (25 for 65mm)	74.08 74.02	3.88 (0.06) 3.94		Very dense dark rusty-brown-black gravelly coarse SAND [DEVENSIAN TILL]
								End of Borehole at 3.94m

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.94m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS03
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300601.83	Northing 523783.34	Ground Level (m) 77.96	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---

SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
3.00 (C)					N=7 (1,1/1,1,2,3)
3.80 (C)					N=50 for 65mm (25 for 65mm)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.10-0.45	JDV		
0.70-1.00	BD		
1.05-1.50	BD		
2.65-2.85	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.94m WLS Competitor Dart Rig	Logger R Stripp
---------	--	--------------------

Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS03
PHOTO PAGE

Hole Type WLS	Easting 300601.83	Northing 523783.34	Ground Level (m) 77.96	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.94m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



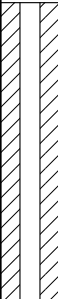
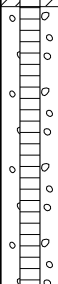
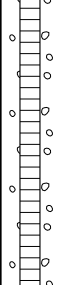
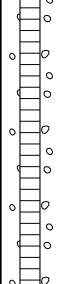
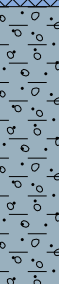
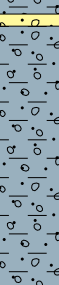
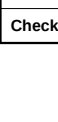
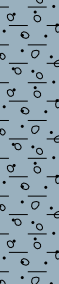
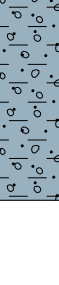
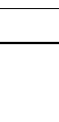
Dynamic (Windowless) Sampler

WS04

Sheet 1 of 1

Hole Type WLS	Easting 300599.92	Northing 523834.18	Ground Level (m) 78.47	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
--	-------------------------------------	--

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.00-0.30	JDV					Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]	
						(0.30)			
					78.17	0.30		Medium brown and orange-brown very sandy clay with fragments/rubble of brick [MADE GROUND]	0.5
						(0.70)			
		1.00	BD		77.47	1.00		Firm (medium strength) medium brown and rusty-brown sandy gravelly CLAY [DEVENSIAN TILL]	1.0
		1.05	HV	62 (kPa)					
		1.25	HV	56 (kPa)					
		1.40	HV	56 (kPa)					
		1.50	BD			(0.96)			1.5
		1.66	HV	62 (kPa)					
		1.95	HV	>120 (kPa)	76.51 76.47	1.96 (0.04) 2.00		Medium brown gravelly fine to coarse SAND [DEVENSIAN TILL]	2.0
		2.30	HV	>120 (kPa)				Firm becoming stiff (high strength) greyish-brown sandy gravelly CLAY, occasionally very gravelly [DEVENSIAN TILL]	
									2.5
		3.00	SPT(C)	N=34 (8,7/8,10,8,8)		(2.45)			3.0
		3.50	HV	>120 (kPa)					3.5
		4.00	SPT(C)	N=19 (2,8/7,3,4,5)					4.0
					74.02	4.45			4.5
		<i>End of Borehole at 4.45m</i>							
									5.0

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS04
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300599.92	Northing 523834.18	Ground Level (m) 78.47	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
3.00 (C)					N=34 (8,7/8,10,8,8)
4.00 (C)					N=19 (2,8/7,3,4,5)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.30	JDV		
1.00	BD		
1.50	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
---------	--	--------------------

Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS04
PHOTO PAGE

Hole Type WLS	Easting 300599.92	Northing 523834.18	Ground Level (m) 78.47	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 15.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
---	------------------------------	---



Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS05

Sheet 1 of 1

Hole Type WLS	Easting 300610.62	Northing 523866.97	Ground Level (m) 78.98	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
--	-------------------------------------	--

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.00-0.12	JDV			(0.12)		Grass overlying dark brown slightly clayey silty sandy soil
		0.12-0.30	JDV		78.86	0.12		[MADE GROUND]
						(0.18)		Dark brown sandy soil
		0.34	HV	74 (kPa)	78.68	0.30		[MADE GROUND]
					78.61	(0.07)		Firm (medium strength) medium brown sandy gravelly CLAY
		0.50-1.00	BD		78.48	(0.13)		[DEVENSIAN TILL]
		0.65	HV	70 (kPa)				Light brown slightly gravelly fine to coarse SAND
						(0.50)		[DEVENSIAN TILL]
		0.90	HV	54 (kPa)				Firm (medium strength) light brown, medium brown and grey sandy gravelly CLAY
		1.10-1.20	BD		77.98	1.00		[DEVENSIAN TILL]
		1.40	HV	54 (kPa)				Stiff (medium strength becoming high strength) medium brown sandy gravelly CLAY
		1.70	HV	78 (kPa)		(1.15)		[DEVENSIAN TILL]
		2.00	BD				Unable to hand shear vane from 1.80m - too gravelly (1.80m)	
					76.83	2.15		Stiff grey sandy very gravelly CLAY
								[DEVENSIAN TILL]
		3.00	SPT(C)	N=29 (5,7/7,7,7,8)				
						(2.30)		
		4.00	SPT(C)	N=42 (6,7/8,10,10,14)				
					74.53	4.45	End of Borehole at 4.45m	

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS05
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300610.62	Northing 523866.97	Ground Level (m) 78.98	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
3.00 (C)					N=29 (5,7/7,7,7,8)
4.00 (C)					N=42 (6,7/8,10,10,14)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.00-0.12	JDV		
0.12-0.30	JDV		
0.50-1.00	BD		
1.10-1.20	BD		
2.00	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS05
PHOTO PAGE

Hole Type WLS	Easting 300610.62	Northing 523866.97	Ground Level (m) 78.98	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client
Thomas Armstrong (Construction) Ltd

Consultant
Richard Stripp

Contractor
Geo Environmental Engineering Ltd



Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.45m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS06

Sheet 1 of 1

Hole Type WLS	Easting 300630.14	Northing 523896.22	Ground Level (m) 79.18	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.00-0.13	JDV		79.05	(0.13)		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]
		0.23-0.53	JDV		78.95	(0.10)		Medium brown and orange-brown sandy gravelly clay with occasional fine coal and sandstone [MADE GROUND]
		0.53-0.90	BD		78.65	(0.30)		Soft dark greyish-brown slightly clayey sandy SOIL [RELIC TOPSOIL]
		0.70	HV	38 (kPa)		(0.42)		Soft (low strength) light brown very sandy slightly cobbly CLAY [DEVENSIAN TILL]
		1.15	HV	40 (kPa)	78.23	0.95		Initially soft becoming firm to stiff (medium strength) dark brown, medium brown and grey very sandy very gravelly CLAY [DEVENSIAN TILL]
		1.35	HV	48 (kPa)		(0.95)		Very gravelly with cobbles between 1.40-1.80m (1.40 - 1.80m)
		1.90-2.20	BD		77.28	1.90		Stiff (high strength becoming medium strength) dark brown sandy gravelly CLAY [DEVENSIAN TILL]
		1.95	HV	90 (kPa)		(0.60)		
		2.45	HV	60 (kPa)	76.68	2.50		Stiff (medium strength) grey sandy gravelly CLAY [DEVENSIAN TILL]
		2.85	HV	64 (kPa)	76.18	3.00		Grey slightly clayey gravelly fine to coarse SAND [DEVENSIAN TILL]
						(1.00)		
					75.18	4.00		Stiff (high strength) grey sandy gravelly CLAY [DEVENSIAN TILL]
		4.30	HV	88 (kPa)		(0.85)		
		4.40	SPT(C)	N=44 (5,6/9,11,12,12)				

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.85m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS06
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300630.14	Northing 523896.22	Ground Level (m) 79.18	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.00				
3.03				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
3.00	2.13		
3.03			Standing water level on completion of borehole

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
4.40 (C)					N=44 (5,6/9,11,12,12)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.13	JDV		
0.23-0.53	JDV		
0.53-0.90	BD		
1.90-2.20	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.85m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS06
PHOTO PAGE

Hole Type WLS	Easting 300630.14	Northing 523896.22	Ground Level (m) 79.18	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client
Thomas Armstrong (Construction) Ltd

Consultant
Richard Stripp

Contractor
Geo Environmental Engineering Ltd



Remarks

Method, Plant, Stability, Dimensions
0.00 - 4.85m WLS Competitor Dart Rig

Logger
R Stripp

Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS07

Sheet 1 of 2

Hole Type WLS	Easting 300673.10	Northing 523900.81	Ground Level (m) 78.58	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.20-0.59	JDV		78.48	(0.10)		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]
					78.38	(0.10)		
						(0.10)		
		0.73 0.75 0.85 0.90-1.30	HV BD HV BD	36 (kPa) 48 (kPa)		(0.39)		Medium brown and orange-brown slightly sandy slightly gravelly clay with occasional fine ash and fine brick fragments [MADE GROUND]
						(0.59)		Dark brown very clayey slightly gravelly sandy soil with occasional coal and ash [RELIC TOPSOIL]
					77.99	(0.31)		Firm (medium strength) light brown and occasional orange-brown very sandy slightly gravelly CLAY [DEVENSIA TILL]
		1.00	SPT(C)	N=10 (3,4/2,3,3,2)	77.68	(0.90)		Loose / medium dense Dark rusty-brown and dark grey very clayey gravelly fine to coarse SAND [DEVENSIA TILL]
						(0.40)		
					77.28	(1.30)		Firm (medium strength) greyish-brown and grey sandy gravelly CLAY [DEVENSIA TILL]
		1.45 1.45	HV BD	58 (kPa)	76.98	(1.60)		Firm (medium strength) becoming stiff (high strength) dark greyish-brown sandy gravelly CLAY [DEVENSIA TILL]
		1.75 1.85	HV HV	50 (kPa) 80 (kPa)		(0.65)		Unable to hand shear vane from 1.90m - too gravelly (1.90m)
		4.00	SPT(C)	N=41 (4,6/10,10,10,11)	76.33	(2.25)		Stiff grey slightly sandy very gravelly CLAY with occasional cobbles [DEVENSIA TILL]
						(2.96)		
						(2.96)		
		4.80	SPT(C)	N=50 for 255mm (7,9/11,13,16,10 for 30mm)				

Continued on next page

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.21m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS07
Sheet 2 of 2

Hole Type WLS	Easting 300673.10	Northing 523900.81	Ground Level (m) 78.58	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level	Depth	Strata		
		Depth (m)	Type/ Ref	Results	(m)	(m)	Legend	Description	
					73.37	5.21		As previous page.	
								End of Borehole at 5.21m	
									5.5
									6.0
									6.5
									7.0
									7.5
									8.0
									8.5
									9.0
									9.5
									10.0

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.21m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS07
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300673.10	Northing 523900.81	Ground Level (m) 78.58	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=10 (3,4/2,3,3,2)
4.00 (C)					N=41 (4,6/10,10,10,11)
4.80 (C)					N=50 for 255mm (7,9/11,13,16,10 for 30mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.20-0.59	JDV		
0.75	BD		
0.90-1.30	BD		
1.45	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.21m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS07
PHOTO PAGE

Hole Type WLS	Easting 300673.10	Northing 523900.81	Ground Level (m) 78.58	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.21m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS08

Sheet 1 of 1

Hole Type WLS	Easting 300649.47	Northing 523864.84	Ground Level (m) 78.14	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.00-0.14	JDV			(0.14)		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]
		0.14-0.30	JDV		78.00	0.14		
		0.30-0.60	JDV		77.84	0.30		Medium brown sandy gravelly clay with single piece of plastic [MADE GROUND]
						(0.30)		Dark brown-black slightly silty gravelly fine to coarse sand [MADE GROUND]
					77.54	0.60		
		0.75-1.40	BD		77.39	0.75		Dark brownish-grey clayey slightly silty slightly gravelly fine to coarse SAND with pieces of coal and sandstone [RELIC TOPSOIL]
						(0.15)		
						(0.65)		Soft to firm dark greyish-brown with fine orange-brown veins slightly silty sandy CLAY [DEVENSIAN TILL]
						(0.38)		
		1.45	HV	45 (kPa)	76.74	1.40		Firm (medium strength) orange-brown, medium brown and grey silty slightly sandy CLAY [DEVENSIAN TILL]
		1.50	BD			(0.38)		
		1.70	HV	62 (kPa)	76.36	1.78		Firm (medium strength) grey and dark borange-brown silty slightly sandy CLAY [DEVENSIAN TILL]
		1.90	HV	56 (kPa)		(0.49)		
		2.10	HV	56 (kPa)				
					75.87	2.27		Medium brown clayey very gravelly fine to coarse SAND [DEVENSIAN TILL]
						(0.41)		
					75.46	2.68		Firm (medium strength) grey sandy gravelly CLAY [DEVENSIAN TILL]
		2.86	HV	58 (kPa)	75.21	2.93		Grey very clayey fine to coarse SAND [DEVENSIAN TILL]
		3.00	SPT(C)	N=10 (2,2/3,3,2,2)		(0.21)		
					75.00	3.14		Soft grey sandy gravelly CLAY [DEVENSIAN TILL]
					74.83	3.31		Grey silty fine to coarse 'wet' SAND [DEVENSIAN TILL]
					74.60	3.54		Stiff (high strength) grey slightly sandy gravelly CLAY [DEVENSIAN TILL]
		3.66	HV	82 (kPa)		(0.46)		
		3.88	HV	82 (kPa)	74.14	4.00		Soft grey sandy gravelly CLAY [DEVENSIAN TILL]
					74.04	4.10		
					73.86	4.28		Grey silty fine to coarse 'wet' SAND [DEVENSIAN TILL]
		4.40	SPT(C)	N=42 (9,10/10,10,11,11)		(0.57)		Stiff grey sandy gravelly CLAY with occasional cobbles [DEVENSIAN TILL]
					73.29	4.85	End of Borehole at 4.85m	

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.85m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS08

SUPPLEMENTARY INFO

Hole Type WLS	Easting 300649.47	Northing 523864.84	Ground Level (m) 78.14	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
3.00 (C)					N=10 (2,2/3,3,2,2)
4.40 (C)					N=42 (9,10/10,10,11,11)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.14	JDV		
0.14-0.30	JDV		
0.30-0.60	JDV		
0.75-1.40	BD		
1.50	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.85m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

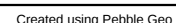
WS08
PHOTO PAGE

Hole Type WLS	Easting 300649.47	Northing 523864.84	Ground Level (m) 78.14	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.85m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		





Dynamic (Windowless) Sampler

WS09
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300659.97	Northing 523835.71	Ground Level (m) 77.74	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
2.00 (C)					N=16 (3,3/3,4,5,4)
4.00 (C)					N=50 for 85mm (7,7/38,12 for 10mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.15	JDV		
0.15-0.24	JDV		
0.59-0.94	BD		
1.50-1.90	BD		
2.00	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.24m WLS Competitor Dart Rig	Logger R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS09
PHOTO PAGE

Hole Type WLS	Easting 300659.97	Northing 523835.71	Ground Level (m) 77.74	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 13.05.2026	End Date	

Client
Thomas Armstrong (Construction) Ltd

Consultant
Richard Stripp

Contractor
Geo Environmental Engineering Ltd

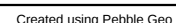


Remarks

Method, Plant, Stability, Dimensions
0.00 - 4.24m WLS Competitor Dart Rig

Logger
R Stripp

Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL





Dynamic (Windowless) Sampler

WS10
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300667.16	Northing 523802.82	Ground Level (m) 77.43	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=15 (2,3/3,4,4,4)
2.00 (C)					N=15 (2,2/3,3,4,5)
3.00 (C)					N=17 (2,3/3,4,4,6)
4.00 (C)					N=50 for 145mm (3,4/12,38 for 70mm)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.07-0.35	JDV		
0.80-1.00	BD		
1.50	BD		
2.50	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.29m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS10
PHOTO PAGE

Hole Type WLS	Easting 300667.16	Northing 523802.82	Ground Level (m) 77.43	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

Client
Thomas Armstrong (Construction) Ltd

Consultant
Richard Stripp

Contractor
Geo Environmental Engineering Ltd



Remarks

Method, Plant, Stability, Dimensions
0.00 - 4.29m WLS Competitor Dart Rig

Logger
R Stripp

Checked By: Richard Stripp **Approved By:** Curtis Evans **Status:** FINAL



Dynamic (Windowless) Sampler

WS11

Sheet 1 of 1

Hole Type WLS	Easting 300654.05	Northing 523773.15	Ground Level (m) 77.80	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata				
		Depth (m)	Type/ Ref	Results			Legend	Description			
		0.10-0.40	JDV			(0.40)		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]			
					77.40	0.40 (0.20)		Medium brown clayey silty SAND [SUBSOIL]	0.5		
		0.70-0.80	BD			77.20	0.60		Firm (medium strength) orange-brown, medium brown and grey sandy gravelly CLAY with occasional cobbles [DEVENSIAN TILL]		
		0.90	HV	58 (kPa)							
		1.00	SPT(C)	N=10 (1,1/2,2,3,3)		(0.80)				1.0	
		1.23	HV	58 (kPa)							
		1.40	BD		76.40	1.40			Stiff (high strength) dark brown and grey sandy gravelly CLAY [DEVENSIAN TILL]	1.5	
		1.96	HV	90 (kPa)							
		2.00	SPT(C)	N=38 (4,5/7,8,11,12)		(1.30)			2.0		
		2.00	BD								
		2.39	HV	110 (kPa)							
		2.56	HV	>120 (kPa)						2.5	
		2.75	HV	>120 (kPa)		75.10	2.70		Stiff (high strength) brownish-grey sandy gravelly CLAY [DEVENSIAN TILL]		
		3.00	SPT(C)	N=30 (3,4/6,7,7,10)						3.0	
										3.5	
				3.60	HV	90 (kPa)		(1.95)			
				4.00	SPT(C)	N=36 (5,6/6,8,9,13)				Becoming 'wet' from 4.00m (4.00m)	4.0
		4.50	SPT(C)	N=50 for 20mm (10,15 for 50mm/50 for 20mm)					4.5		
					73.15	4.65	End of Borehole at 4.65m				
									5.0		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.64m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS11
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300654.05	Northing 523773.15	Ground Level (m) 77.80	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.64				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
3.64			Standing water level on completion of borehole

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=10 (1,1/2,2,3,3)
2.00 (C)					N=38 (4,5/7,8,11,12)
3.00 (C)					N=30 (3,4/6,7,7,10)
4.00 (C)					N=36 (5,6/6,8,9,13)
4.50 (C)					N=50 for 20mm (10,15 for 50mm/50 for 20mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.10-0.40	JDV		
0.70-0.80	BD		
1.40	BD		
2.00	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.64m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS11
PHOTO PAGE

Hole Type WLS	Easting 300654.05	Northing 523773.15	Ground Level (m) 77.80	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

Client
Thomas Armstrong (Construction) Ltd

Consultant
Richard Stripp

Contractor
Geo Environmental Engineering Ltd



Remarks

Method, Plant, Stability, Dimensions
0.00 - 4.64m WLS Competitor Dart Rig

Logger
R Stripp

Checked By: Richard Stripp **Approved By:** Curtis Evans **Status:** FINAL



Dynamic (Windowless) Sampler

WS12

Sheet 1 of 1

Hole Type WLS	Easting 300687.86	Northing 523771.43	Ground Level (m) 77.35	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.10-0.37	JDV		77.25	(0.10) 0.10		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]
						(0.27)		Dark brown sandy gravelly soil [MADE GROUND]
					76.98	0.37		Firm medium brown sandy gravelly clay [MADE GROUND]
						(0.36)		
		0.73-1.00	BD		76.62	0.73		Sandstone cobbles overlying very soft dark brown very sandy gravelly clay [MADE GROUND]
		1.00	SPT(C)	N=6 (1,1/1,1,2,2)		(0.44)		
					76.18	1.17		Dark brownish-grey sandy SOIL [RELIC TOPSOIL]
					76.05	(0.13) 1.30		
		1.40	HV	82 (kPa)		(0.30)		Firm to stiff (high strength) grey and brown sandy gravelly CLAY [DEVENSIAN TILL]
		1.50	BD					
		1.55	HV	80 (kPa)				
		1.70	HV	102 (kPa)				
		1.80	BD			(0.50)		
		2.00	SPT(C)	N=17 (2,3/3,4,4,6)				
					75.75	1.60		
						(0.50)		
					75.25	2.10		Becoming 'wet' from 2.00m (2.00m) Stiff greyish-brown sandy gravelly CLAY [DEVENSIAN TILL]
		2.50	BD			(0.95)		
		2.60	SPT(C)	N=50 for 300mm (7,10/10,10,14,16)				
					74.30	3.05		End of Borehole at 3.05m

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.05m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS12
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300687.86	Northing 523771.43	Ground Level (m) 77.35	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=6 (1,1/1,1,2,2)
2.00 (C)					N=17 (2,3/3,4,4,6)
2.60 (C)					N=50 for 300mm (7,10/10,10,14,16)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.10-0.37	JDV		
0.73-1.00	BD		
1.5	BD		
1.8	BD		
2.5	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.05m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS12
PHOTO PAGE

Hole Type WLS	Easting 300687.86	Northing 523771.43	Ground Level (m) 77.35	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.05m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS13

Sheet 1 of 1

Hole Type WLS	Easting 300715.73	Northing 523813.02	Ground Level (m) 76.21	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
		0.15-0.36	JDV		76.06	(0.15) 0.15		Grass overlying dark brown slightly clayey silty sandy soil with ash towards the base [MADE GROUND]	0.5
		0.36-1.00	JDV		75.85	(0.21) 0.36		Light brown sandy gravelly clay with occasional cobbles [MADE GROUND]	
						(0.69)		Dark brown-black slightly clayey sandy soil with concrete fragment [MADE GROUND]	
		1.00	SPT(C)	N=8 (1,1/1,2,2,3)	75.16	1.05		Firm medium brown sandy gravelly CLAY [DEVENSIAN TILL]	1.0
		1.30-1.40	BD	N=50 for 300mm (10,15 for 60mm/17,13,10,10)		(0.58)		Initially disturbed with brick to 1.20m (1.05 - 1.20m)	1.5
					74.58	1.63		Stiff greyish-brown sandy gravelly CLAY [DEVENSIAN TILL]	2.0
		2.00	SPT(C)			(0.72)		Unable to hand shear vane from 1.63m - too gravelly (1.63m)	
		2.00	BD		73.86	2.35		Stiff brownish-grey sandy gravelly CLAY [DEVENSIAN TILL]	2.5
		2.70	SPT(C)	N=50 for 290mm (6,7/7,7,16,20 for 65mm)		(0.79)			3.0
					73.07	3.14		End of Borehole at 3.14m	3.5
									4.0
									4.5
									5.0

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.14m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS13
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300715.73	Northing 523813.02	Ground Level (m) 76.21	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details					
Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=8 (1,1/1,2,2,3)
2.00 (C)					N=50 for 300mm (10,15 for 60mm/17,13,10,10)
2.70 (C)					N=50 for 290mm (6,7/7,7,16,20 for 65mm)

Sample Details			
Sample ID	Type	Water Level (m)	Remarks
0.15-0.36	JDV		
0.36-1.00	JDV		
1.30-1.40	BD		
2.00	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.14m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL

Dynamic (Windowless) Sampler

WS13
PHOTO PAGE

Hole Type WLS	Easting 300715.73	Northing 523813.02	Ground Level (m) 76.21	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.14m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS14

Sheet 1 of 1

Hole Type WLS	Easting 300692.18	Northing 523825.98	Ground Level (m) 77.13	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.00-0.09	JDV		77.04	(0.09) 0.09		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]
		0.28-0.80	JDV		76.85	(0.19) 0.28		Dark brown clayey gravelly sand with fragments of brick, sandstone and wood [MADE GROUND]
						(0.52)		Soft to firm medium brown very sandy gravelly clay with fragments of brick, dolerite and sandstone [MADE GROUND]
		0.74	HV	32 (kPa)	76.33	0.80		Stiff (high strength) greyish-brown and grey sandy gravelly CLAY [DEVENSIA TILL]
		1.00	SPT(C)	N=14 (2,2/3,3,3,5)				
		1.00	BD					Becoming less grey from 1.20m (1.20m)
		1.45	HV	106 (kPa)		(1.30)		
		2.00	SPT(C)	N=28 (3,5/5,6,8,9)				
		2.00	BD		75.03	2.10		Stiff brownish-grey sandy gravelly CLAY with occasional cobbles [DEVENSIA TILL]
		3.00	SPT(C)	N=29 (4,4/6,6,7,10)				
						(2.30)		
		4.00	SPT(C)	N=50 for 295mm (4,4/10,12,13,15 for 70mm)				
					72.73	4.40		End of Borehole at 4.40m

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.40m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Dynamic (Windowless) Sampler

WS14

SUPPLEMENTARY INFO

Hole Type WLS	Easting 300692.18	Northing 523825.98	Ground Level (m) 77.13	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=14 (2,2/3,3,3,5)
2.00 (C)					N=28 (3,5/5,6,8,9)
3.00 (C)					N=29 (4,4/6,6,7,10)
4.00 (C)					N=50 for 295mm (4,4/10,12,13,15 for 70mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.09	JDV		
0.28-0.80	JDV		
1.00	BD		
2.00	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.40m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS14
PHOTO PAGE

Hole Type WLS	Easting 300692.18	Northing 523825.98	Ground Level (m) 77.13	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

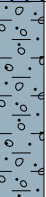
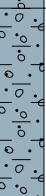
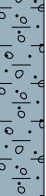
Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.40m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	300708.40	523855.44	77.15	1:25
Project Name	Project No.		Start Date	End Date
Barfs Road, Distington, Workington, Cumbria	GEO2026-7213		14.05.2026	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness)		Strata	
		Depth (m)	Type/ Ref	Results		(m)	Legend	Description	
		0.10-0.53	JDV	60 (kPa) N=13 (3,4/4,3,3,3)	77.05	(0.10) 0.10		Grass overlying dark brown slightly clayey silty sandy soil [MADE GROUND]	
		(0.43)			Medium brown and dark brown slightly clayey gravelly sand with fragments of concrete, mortar, brick and single piece of plastic [MADE GROUND]				
					76.62	0.53		Initially firm (medium strength) becoming stiff medium brown very sandy gravelly CLAY with occasional cobbles [DEVANSIAN TILL]	
		0.80-1.00	BD		(0.67)				
			0.90			HV			
			1.00			SPT(C)			
		1.45 1.50	HV BD		>120 (kPa)	75.95	1.20		Stiff (high strength) medium brown and dark grey sandy gravelly CLAY [DEVANSIAN TILL]
			2.00		SPT(C)				N=31 (3,5/6,6,10,9)
		3.00	SPT(C)		N=27 (4,4/5,7,7,8)				
		4.00	SPT(C)		N=50 for 285mm (6,6/6,6,14,24 for 60mm)	74.79	2.36		Stiff (high strength) brownish-grey sandy gravelly CLAY [DEVANSIAN TILL]
									(2.09)
		72.70	4.45			End of Borehole at 4.45m			

Remarks	Method, Plant, Stability, Dimensions	Logger
	0.00 - 4.43m WLS Competitor Dart Rig	R Stripp
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



Dynamic (Windowless) Sampler

WS15
SUPPLEMENTARY INFO

Hole Type WLS	Easting 300708.40	Northing 523855.44	Ground Level (m) 77.15	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213	Start Date 14.05.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.00 (C)					N=13 (3,4/4,3,3,3)
2.00 (C)					N=31 (3,5/6,6,10,9)
3.00 (C)					N=27 (4,4/5,7,7,8)
4.00 (C)					N=50 for 285mm (6,6/6,6,14,24 for 60mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.10-0.53	JDV		
0.80-1.00	BD		
1.50	BD		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.43m WLS Competitor Dart Rig	Logger R Stripp
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS15
PHOTO PAGE

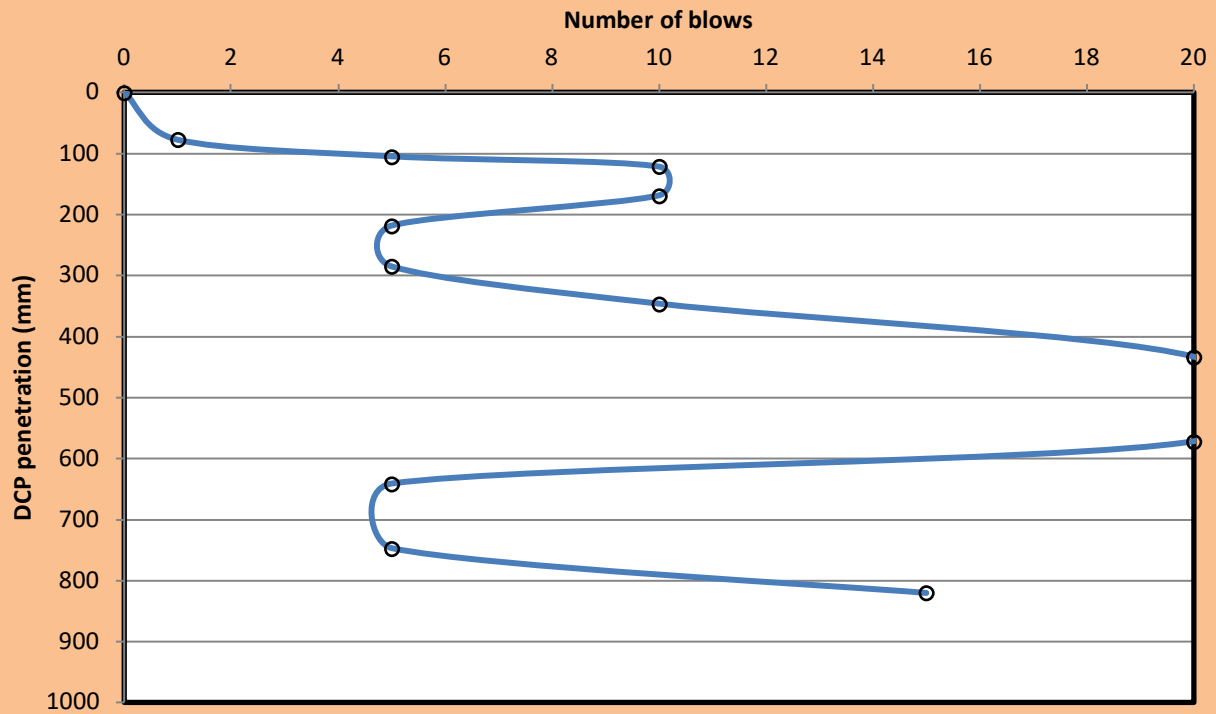
Hole Type WLS	Easting 300708.40	Northing 523855.44	Ground Level (m) 77.15	Scale 1:25
Project Name Barfs Road, Distington, Workington, Cumbria	Project No. GEO2026-7213		Start Date 14.05.2026	End Date

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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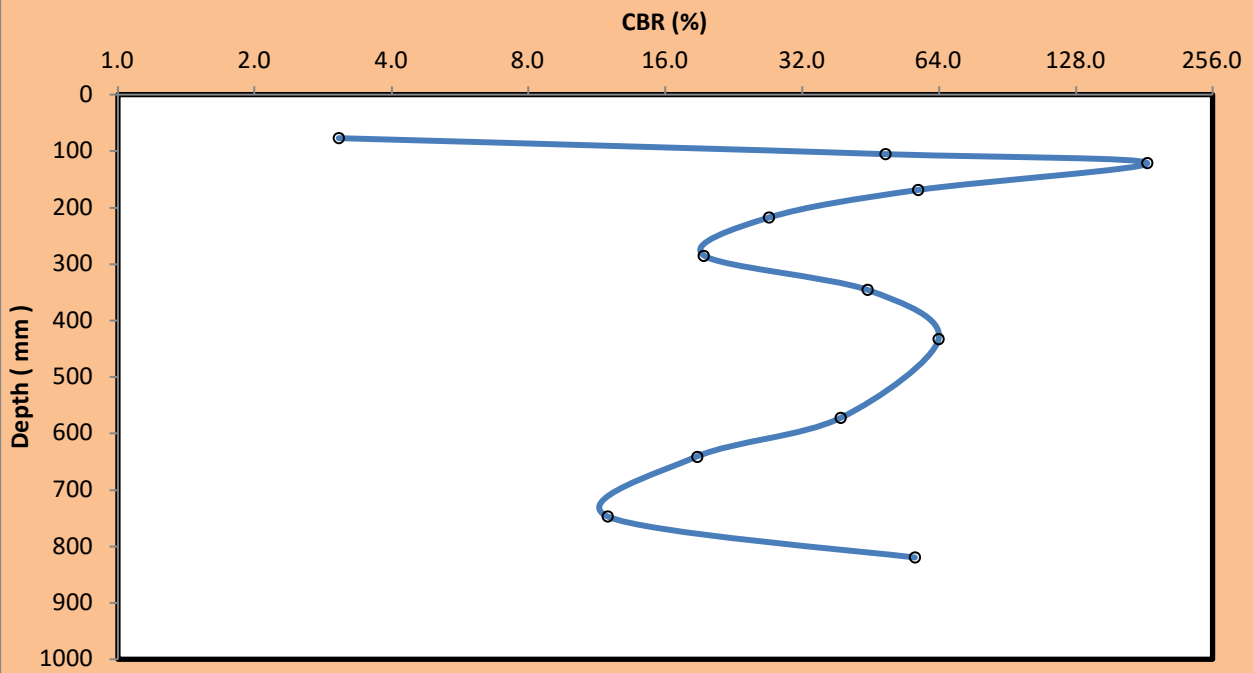


Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.43m WLS Competitor Dart Rig	Logger R Stripp
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	

Cumulative Penetration (cm)



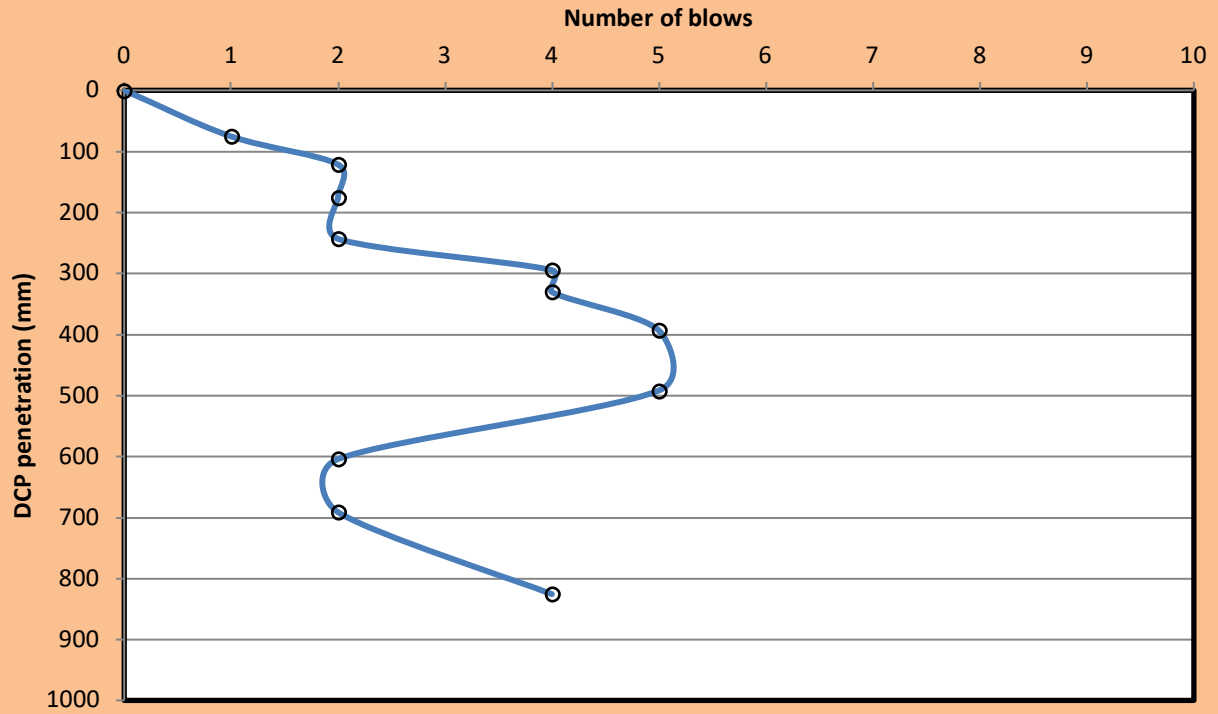
Variation of CBR with Depth



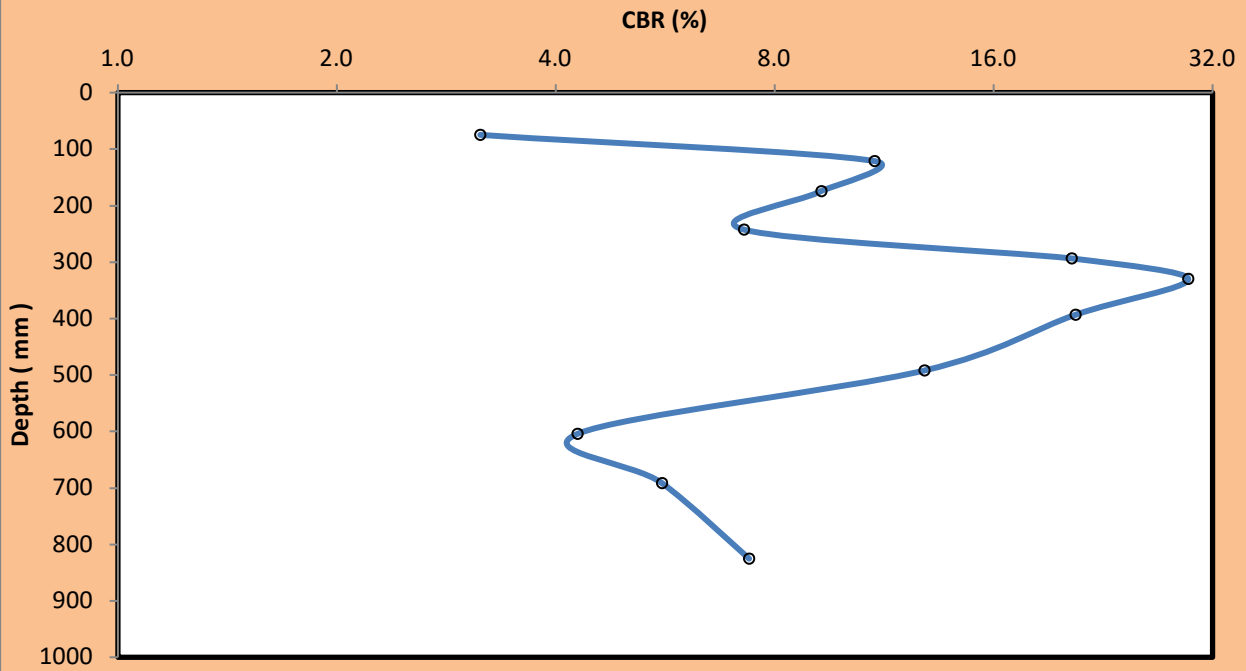
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT - DCP02

[illegible]

Cumulative Penetration (cm)



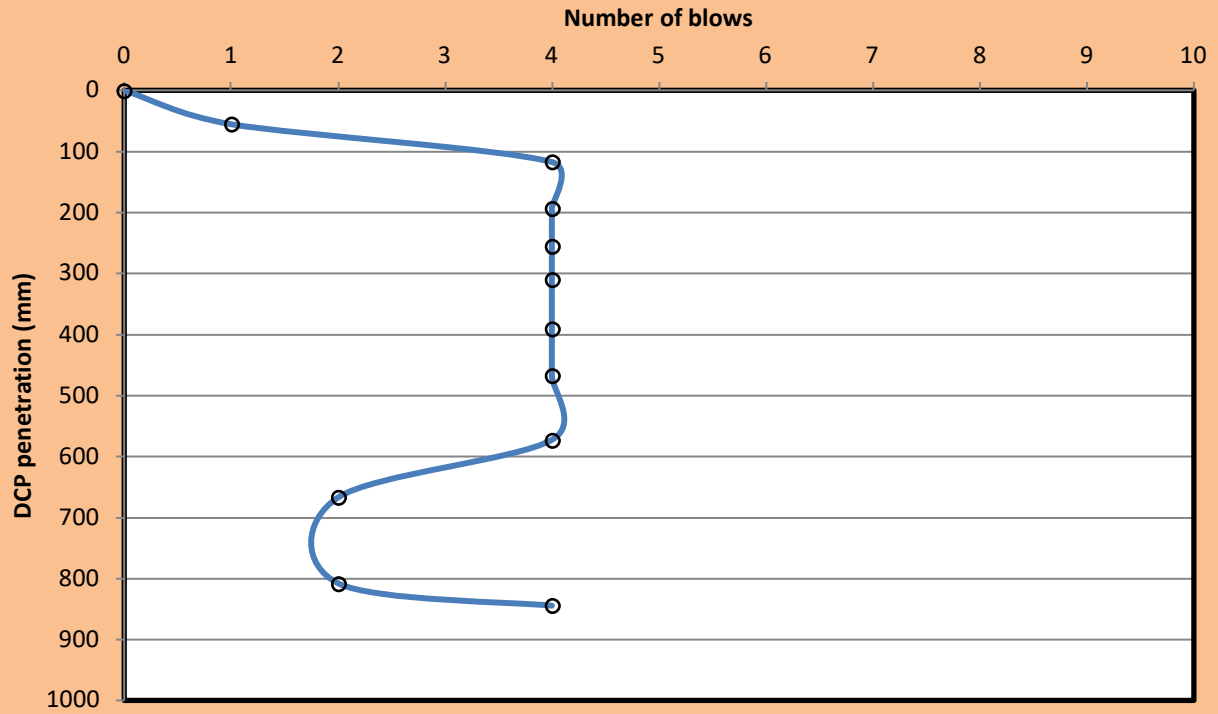
Variation of CBR with Depth



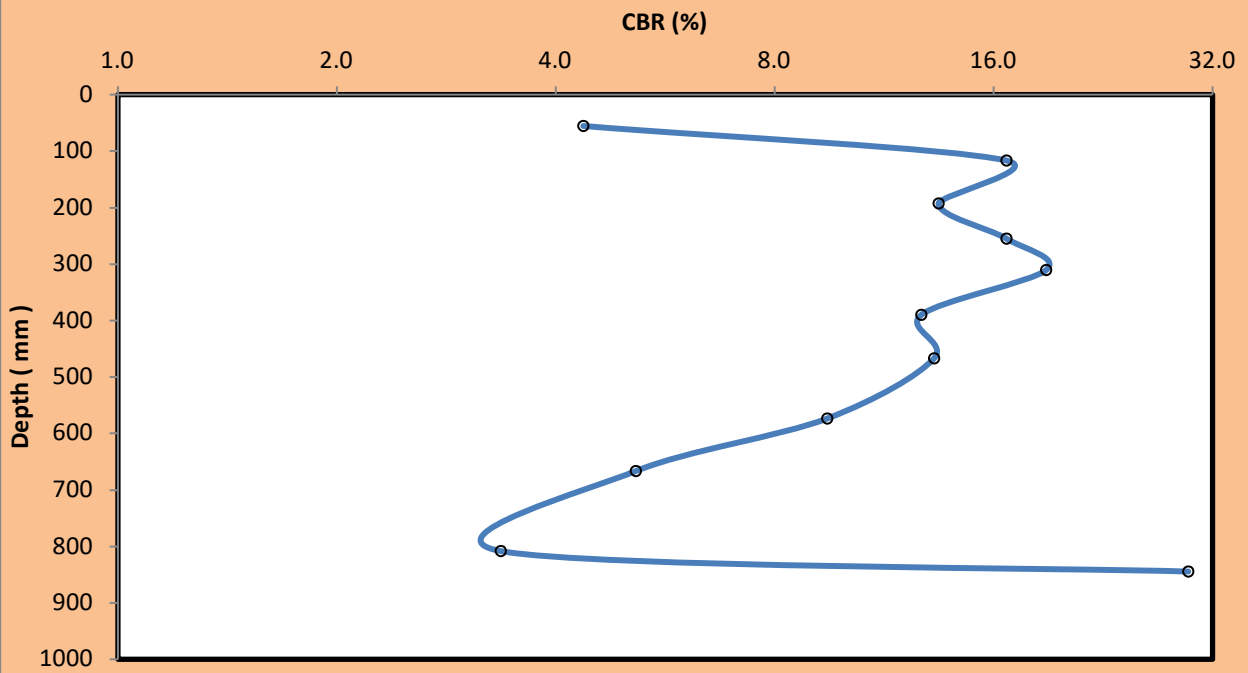
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT - DCP03

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Cumulative Penetration (cm)



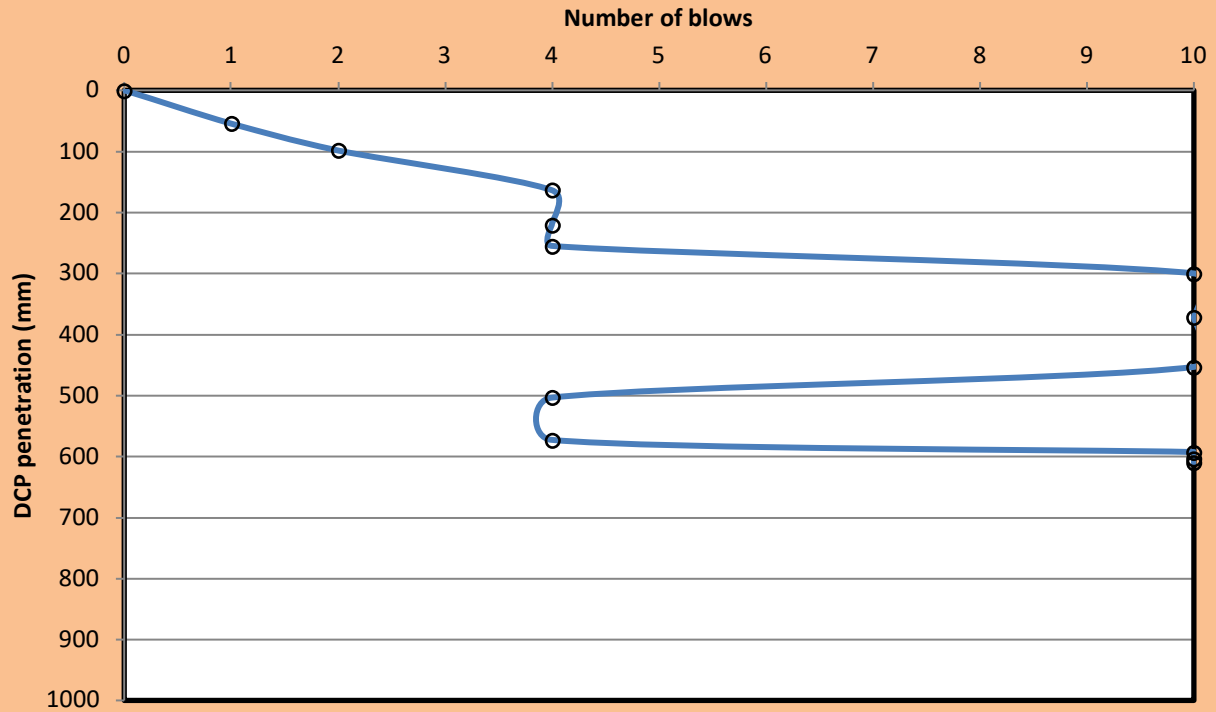
Variation of CBR with Depth



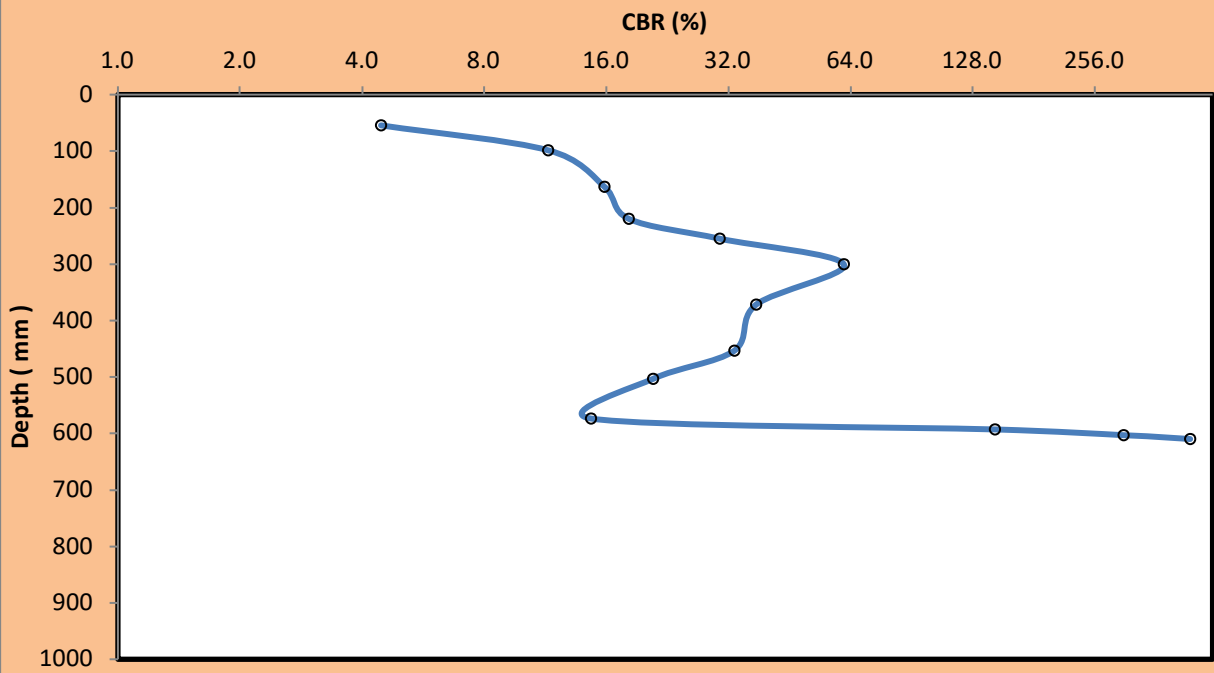
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT - DCP04

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Cumulative Penetration (cm)



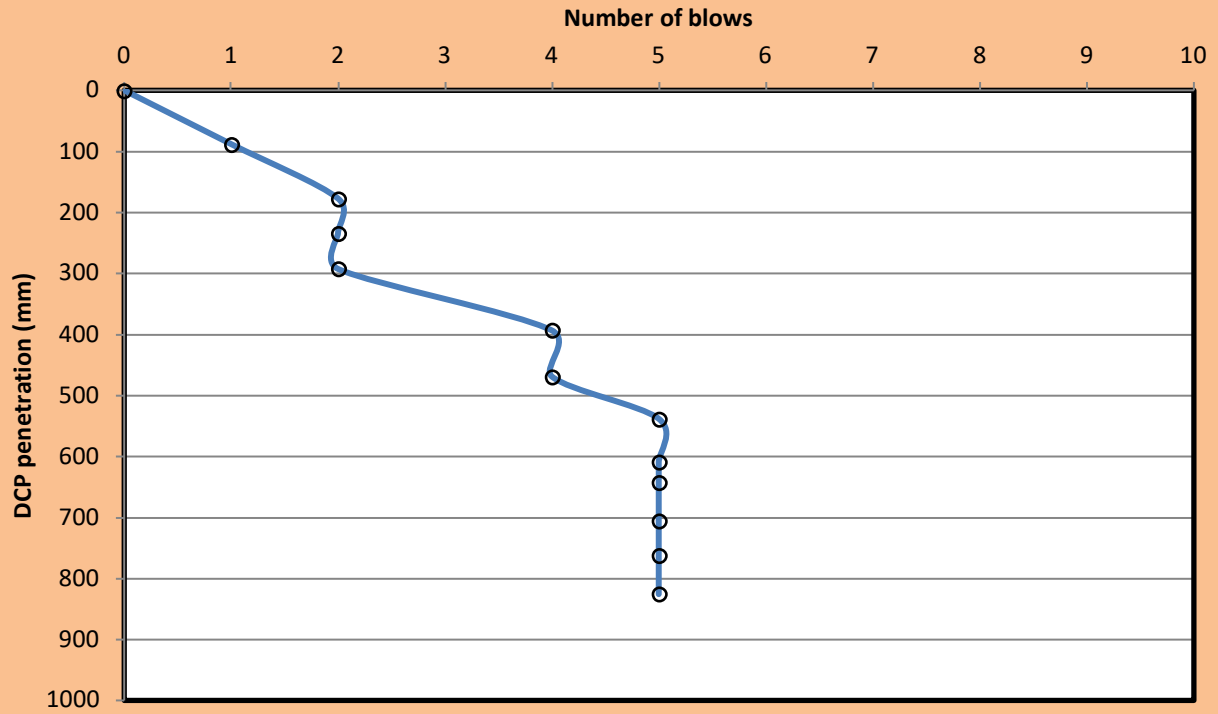
Variation of CBR with Depth



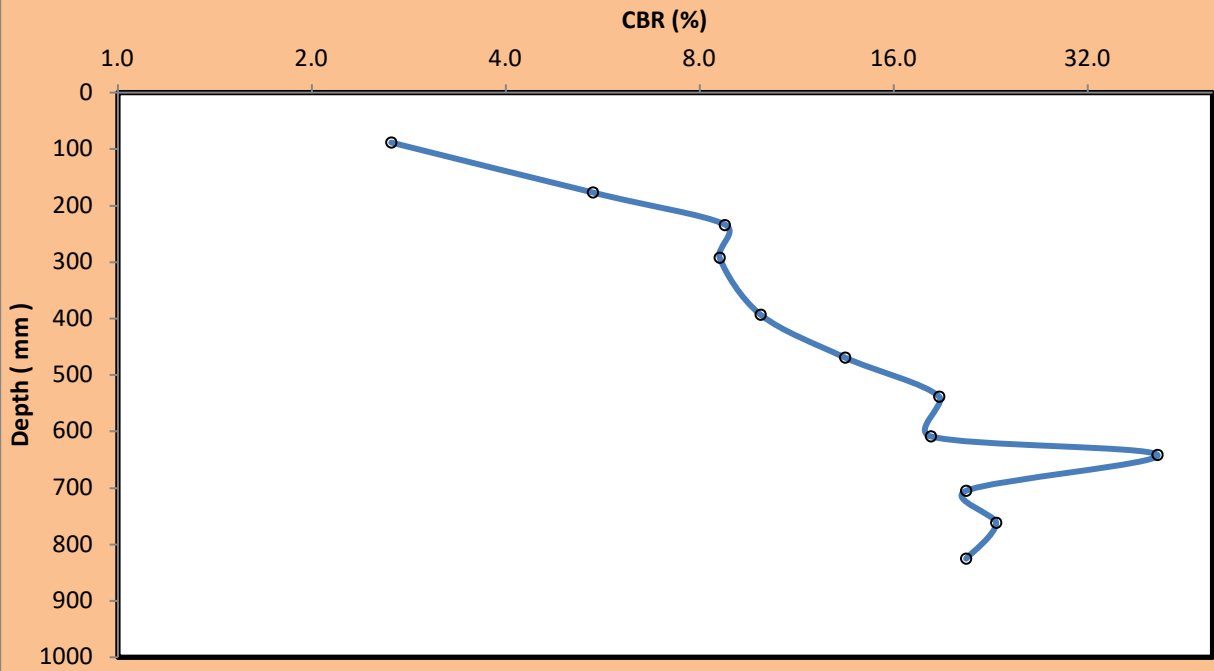
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT - DCP05

[illegible]

Cumulative Penetration (cm)



Variation of CBR with Depth



Geo Environmental Engineering Limited

VARIABLE HEAD (FALLING) PERMEABILITY TEST

SITE DETAILS: Barfs Road, Distington

TEST LOCATION: WS04

Project No.: GEO2026-7213

Bottom of Borehole	4.25	mBGL
Base of casing	1.00	mBGL
Diameter of casing	50.00	mm
Height of casing	0.00	mAGL
Elevation of Borehole		mAOD
Groundwater Level	4.10	mBGL

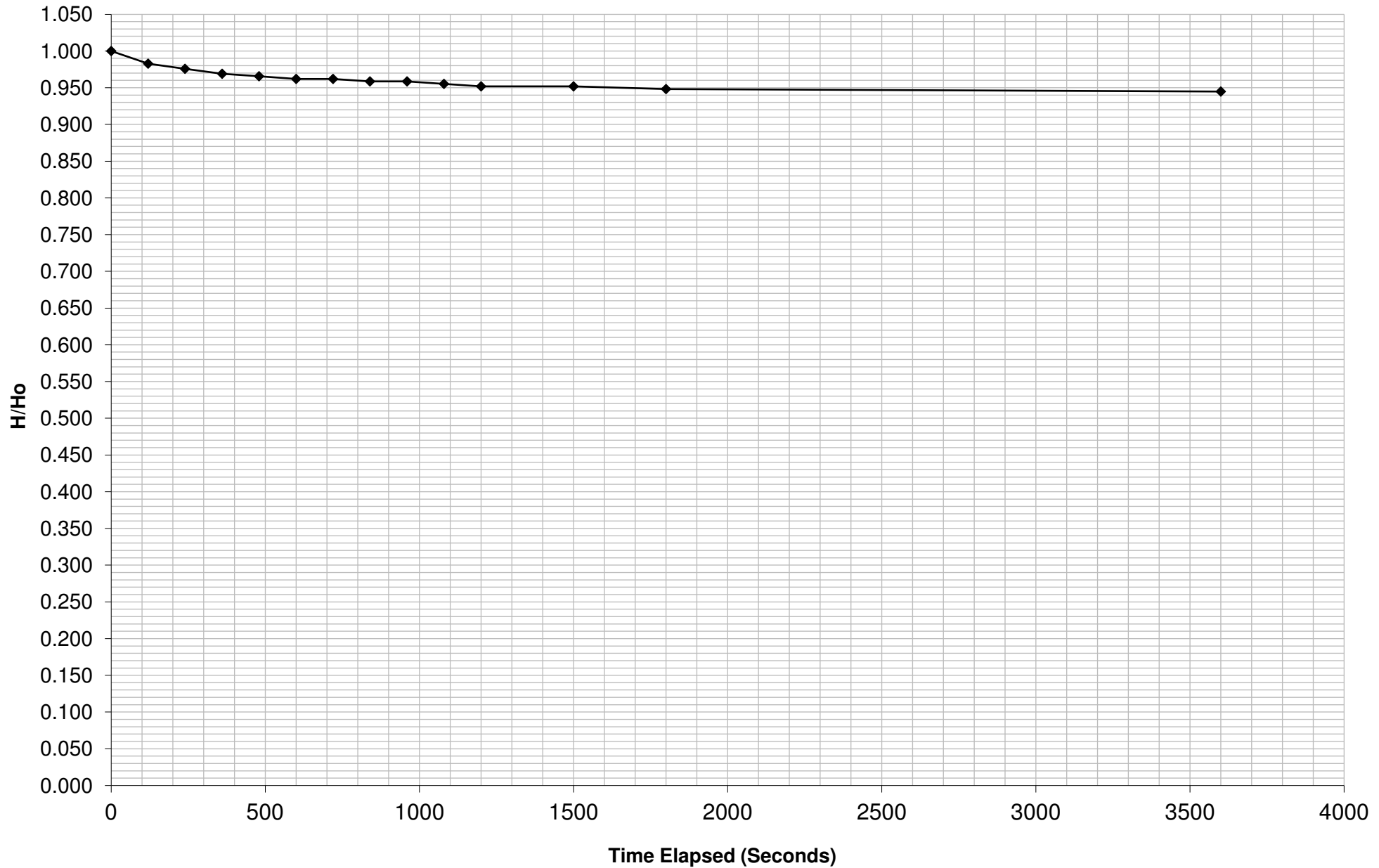
Operator	LD
Date	27/07/2026
Time	-
Weather	Slight drizzle
Input volume of water	- litres
Test Zone	2.90 m

TEST CALCULATION	Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/Ho
<u>Intake Factor (F)</u>	0	0	0	1.20	2.900	1.000
	2	0	120	1.25	2.850	0.983
	4	0	240	1.27	2.830	0.976
F= $\frac{2 \pi L}{\text{Log}_e [(L/D) + \sqrt{1 + (L/D)^2}]}$ (i)	6	0	360	1.29	2.810	0.969
	8	0	480	1.30	2.800	0.966
(From BS 5930:2015 for standpipes)	10	0	600	1.31	2.790	0.962
	12	0	720	1.31	2.790	0.962
	14	0	840	1.32	2.780	0.959
L=length of test zone	16	0	960	1.32	2.780	0.959
D=diameter of standpipe	18	0	1080	1.33	2.770	0.955
	20	0	1200	1.34	2.760	0.952
	25	0	1500	1.34	2.760	0.952
<u>Permeability (k)</u>	30	0	1800	1.35	2.750	0.948
k= $\frac{A}{F(t_2 - t_1)} \times \text{Log}_e (H_1/H_2)$ (ii)	60	0	3600	1.36	2.740	0.945
or						
k= $\frac{A}{FT}$ (iii)						
Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37						
L= 2.90 m						
D= 0.050 m						
L/D= 58.00						
t ₁ = 0 s						
t ₂ = 3600 s						
H ₁ = 2.90 m						
H ₂ = 2.74 m						
A= 0.00196 m ²						
F= 3.8331 From (i)						
T= s						
k= 8.07543E-09 ms ⁻¹ From (ii)						
k= From (iii)						
Ave k=						
Remarks						

Drainage Characteristics: PRACTICALLY IMPERVIOUS

Permeability Classification: PRACTICALLY IMPERMEABLE

Variable Head (Falling) Permeability Test at WS04



Geo Environmental Engineering Limited

VARIABLE HEAD (FALLING) PERMEABILITY TEST

SITE DETAILS: Barfs Road, Distington

TEST LOCATION: WS08

Project No.: GEO2026-7213

Bottom of Borehole	4.25	mBGL
Base of casing	1.00	mBGL
Diameter of casing	50.00	mm
Height of casing	0.00	mAGL
Elevation of Borehole		mAOD
Groundwater Level	4.25	mBGL

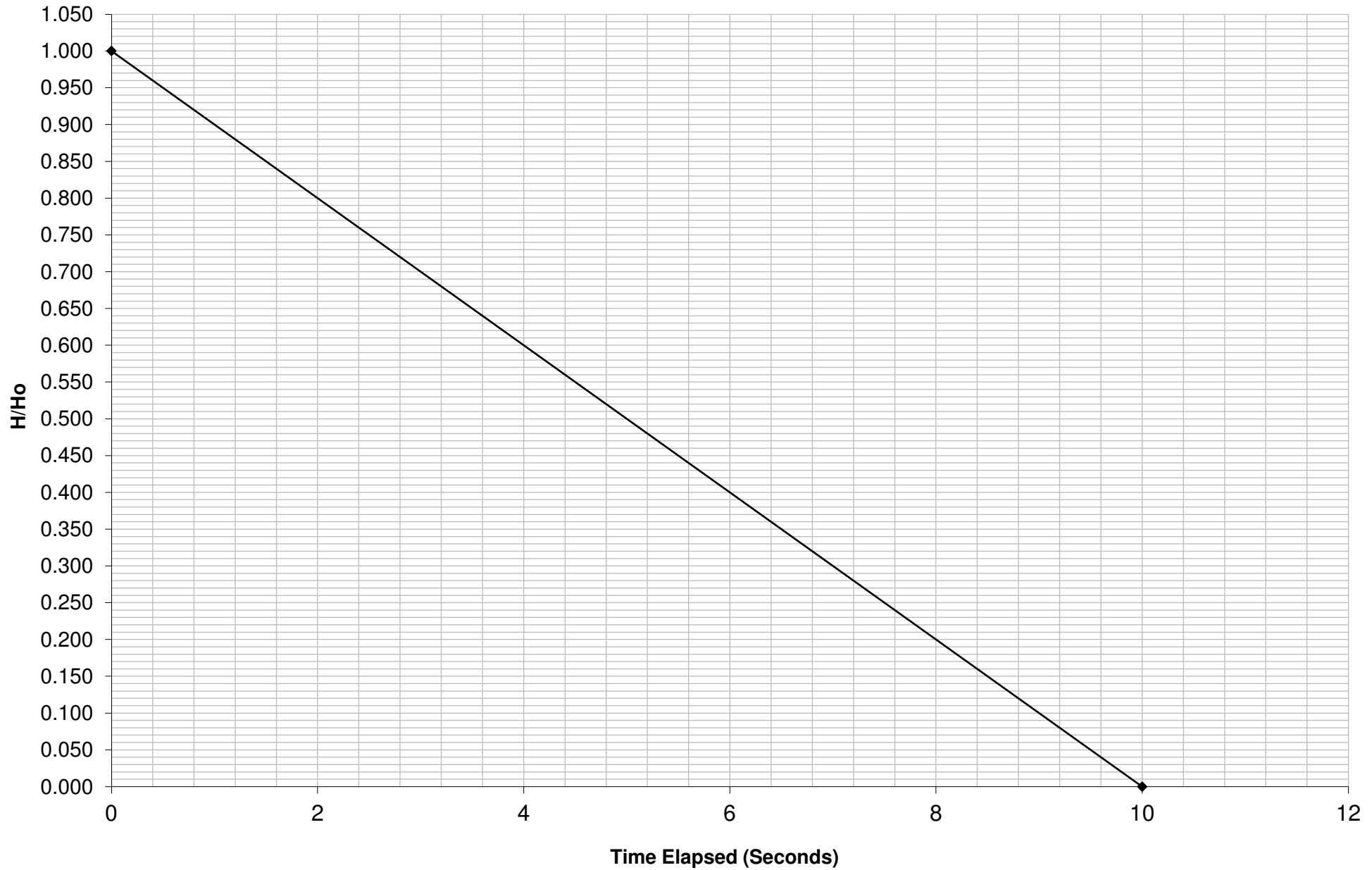
Operator	LD
Date	27/07/2026
Time	-
Weather	Slight drizzle
Input volume of water	50 litres
Test Zone	3.25 m

TEST CALCULATION	Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/Ho
<u>Intake Factor (F)</u> F= $\frac{2 \pi L}{\text{Log}_e [(L/D) + \sqrt{1 + (L/D)^2}]}$ (i) (From BS 5930:2015 for standpipes) L=length of test zone D=diameter of standpipe	0 0	0 10	0 10	4.00 4.25	0.250 0.000	1.000 0.000
<u>Permeability (k)</u> k= $\frac{A}{F(t_2 - t_1)}$ x Log_e (H₁/H₂) (ii) or k= $\frac{A}{FT}$ (iii) Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37						
L= 3.25 m D= 0.050 m L/D= 65.00 t₁= 0 s t₂= 10 s H₁= 0.25 m H₂= 0.00 m A= 0.00196 m² F= 4.1952 From (i) T= s k= 2.58425E-04 ms⁻¹ From (ii) k= From (iii) Ave k=						
Remarks						

Drainage Characteristics: GOOD

Permeability Classification: MEDIUM

Variable Head (Falling) Permeability Test at WS08



Geo Environmental Engineering Limited

VARIABLE HEAD (FALLING) PERMEABILITY TEST

SITE DETAILS: Barfs Road, Distington

TEST LOCATION: WS12

Project No.: GEO2026-7213

Bottom of Borehole	2.60	mBGL
Base of casing	1.00	mBGL
Diameter of casing	50.00	mm
Height of casing	0.00	mAGL
Elevation of Borehole		mAOD
Groundwater Level	1.50	mBGL

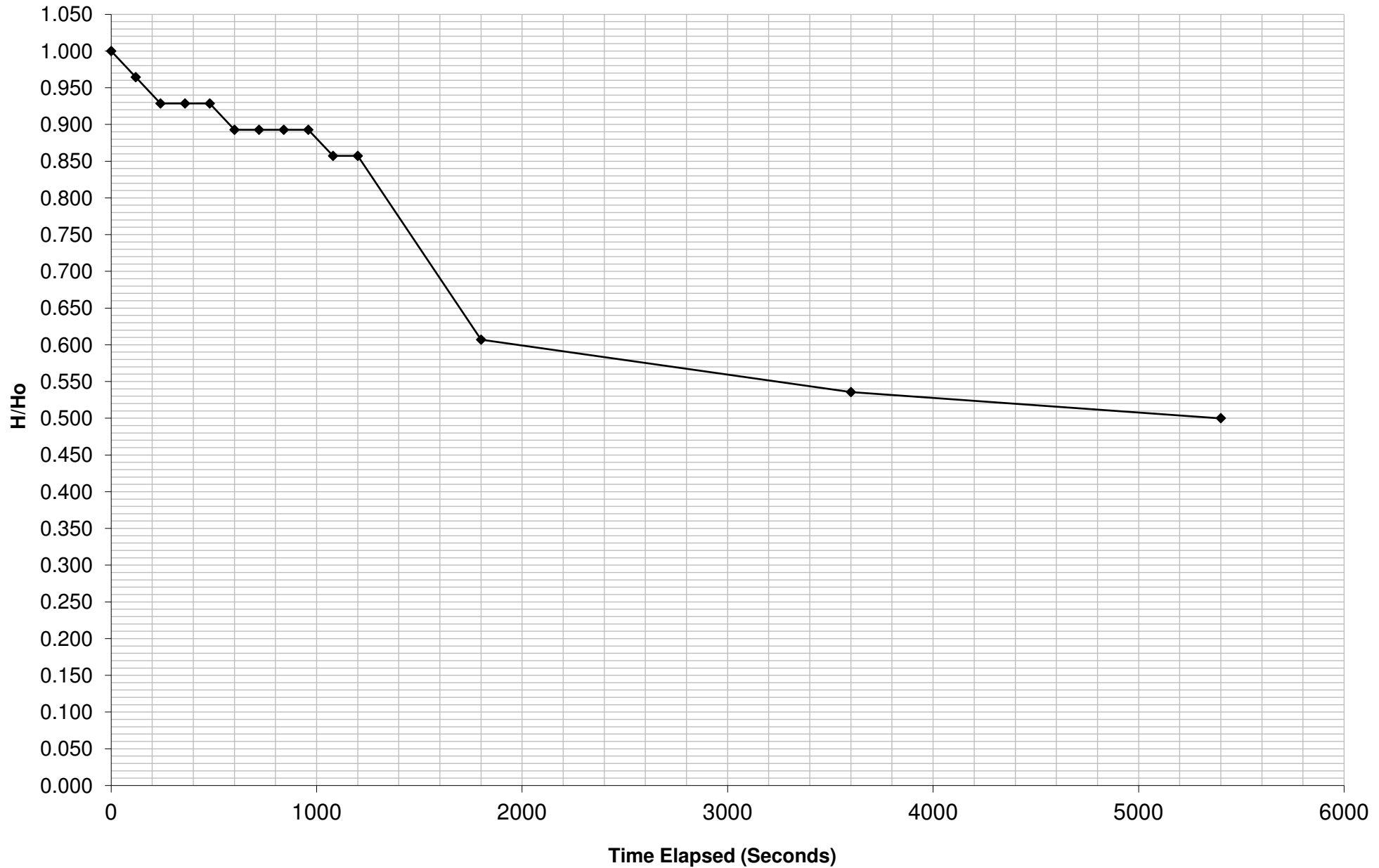
Operator	LD
Date	27/07/2026
Time	-
Weather	Slight drizzle
Input volume of water	- litres
Test Zone	0.28 m

TEST CALCULATION	Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/Ho
<u>Intake Factor (F)</u>	0	0	0	1.22	0.280	1.000
	2	0	120	1.23	0.270	0.964
	4	0	240	1.24	0.260	0.929
F= $\frac{2 \pi L}{\text{Log}_e [(L/D) + \sqrt{1 + (L/D)^2}]}$ (i)	6	0	360	1.24	0.260	0.929
	8	0	480	1.24	0.260	0.929
(From BS 5930:2015 for standpipes)	10	0	600	1.25	0.250	0.893
	12	0	720	1.25	0.250	0.893
	14	0	840	1.25	0.250	0.893
L=length of test zone	16	0	960	1.25	0.250	0.893
D=diameter of standpipe	18	0	1080	1.26	0.240	0.857
	20	0	1200	1.26	0.240	0.857
	30	0	1800	1.33	0.170	0.607
<u>Permeability (k)</u>	60	0	3600	1.35	0.150	0.536
k= $\frac{A}{F(t_2 - t_1)} \times \text{Log}_e (H_1/H_2)$ (ii)	90	0	5400	1.36	0.140	0.500
or						
k= $\frac{A}{FT}$ (iii)						
Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37						
L= 0.28 m						
D= 0.050 m						
L/D= 5.60						
t ₁ = 0 s						
t ₂ = 5400 s						
H ₁ = 0.28 m						
H ₂ = 0.14 m						
A= 0.00196 m ²						
F= 0.7258 From (i)						
T= s						
k= 3.47231E-07 ms ⁻¹ From (ii)						
k= From (iii)						
Ave k=						
Remarks						

Drainage Characteristics: POOR

Permeability Classification: LOW

Variable Head (Falling) Permeability Test at WS12



Geo Environmental Engineering Limited

VARIABLE HEAD (FALLING) PERMEABILITY TEST

SITE DETAILS: Barfs Road, Distington

TEST LOCATION: WS14

Project No.: GEO2026-7213

Bottom of Borehole	4.00	mBGL
Base of casing	1.00	mBGL
Diameter of casing	50.00	mm
Height of casing	0.00	mAGL
Elevation of Borehole		mAOD
Groundwater Level	3.10	mBGL

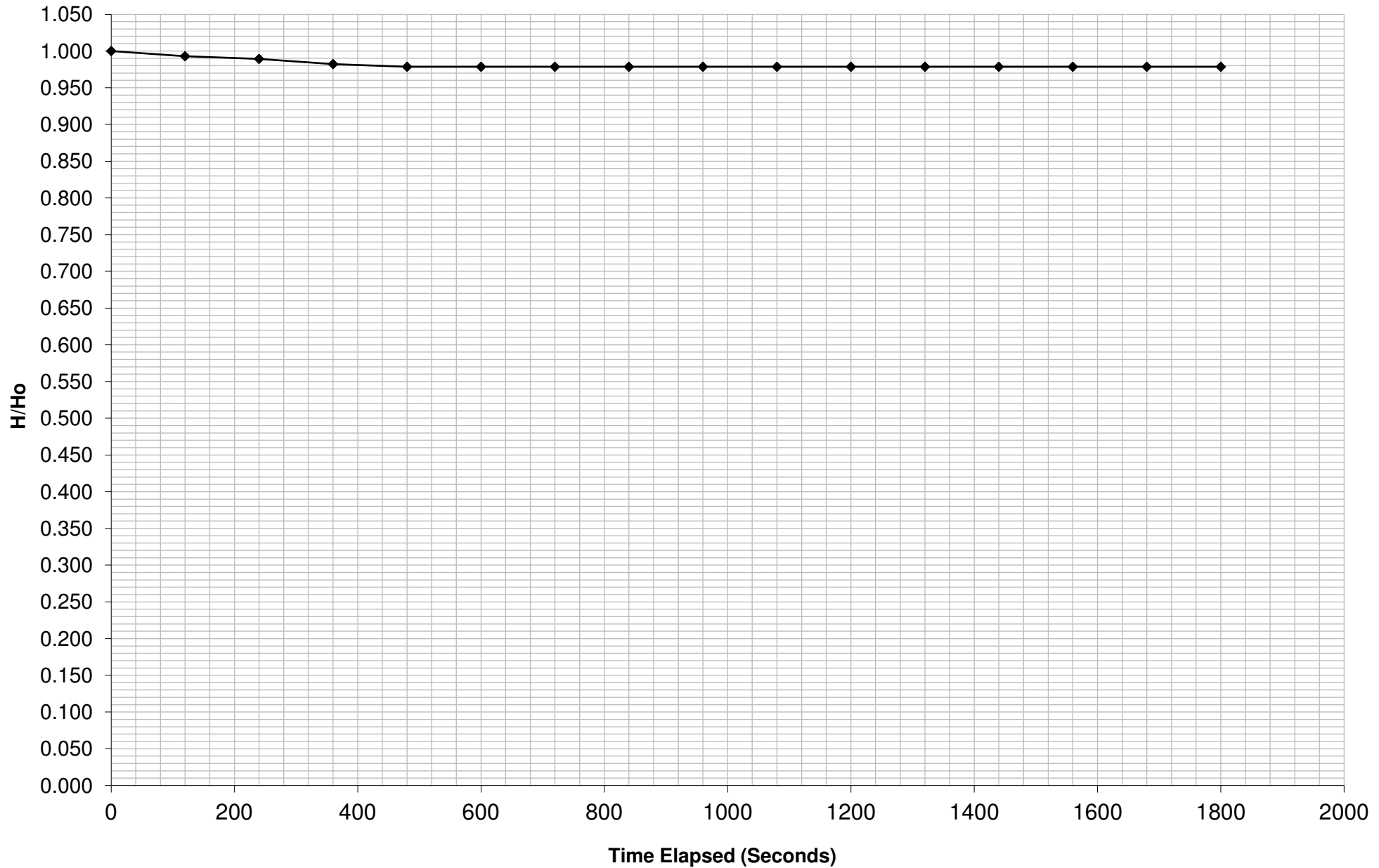
Operator	LD
Date	27/07/2026
Time	-
Weather	Slight drizzle
Input volume of water	- litres
Test Zone	2.80 m

TEST CALCULATION	Elapsed (minutes)	Elapsed (seconds)	Total seconds	Water Depth (m)	Head (metres)	H/Ho
<u>Intake Factor (F)</u>	0	0	0	0.30	2.800	1.000
	2	0	120	0.32	2.780	0.993
	4	0	240	0.33	2.770	0.989
$F = \frac{2 \pi L}{\log_e [(L/D) + \sqrt{1 + (L/D)^2}]}$ (i)	6	0	360	0.35	2.750	0.982
	8	0	480	0.36	2.740	0.979
	10	0	600	0.36	2.740	0.979
(From BS 5930:2015 for standpipes)	12	0	720	0.36	2.740	0.979
	14	0	840	0.36	2.740	0.979
L=length of test zone	16	0	960	0.36	2.740	0.979
D=diameter of standpipe	18	0	1080	0.36	2.740	0.979
	20	0	1200	0.36	2.740	0.979
<u>Permeability (k)</u>	22	0	1320	0.36	2.740	0.979
	24	0	1440	0.36	2.740	0.979
$k = \frac{A}{F(t_2 - t_1)} \times \log_e (H_1/H_2)$ (ii)	26	0	1560	0.36	2.740	0.979
	28	0	1680	0.36	2.740	0.979
or	30	0	1800	0.36	2.740	0.979
$k = \frac{A}{FT}$ (iii)						
Where T is the Basic Time Lag Factor corresponding to an H/Ho value of 0.37						
L= 2.80 m						
D= 0.050 m						
L/D= 56.00						
t ₁ = 0 s						
t ₂ = 1800 s						
H ₁ = 2.80 m						
H ₂ = 2.74 m						
A= 0.00196 m ²						
F= 3.7284 From (i)						
T= s						
k= 6.33752E-09 ms ⁻¹ From (ii)						
k= From (iii)						
Ave k=						
Remarks						

Drainage Characteristics: PRACTICALLY IMPERVIOUS

Permeability Classification: PRACTICALLY IMPERMEABLE

Variable Head (Falling) Permeability Test at WS14



Appendix III

- Ground Gas Monitoring Sheets

Ground Gas & Groundwater Monitoring Record Sheet 01

Site: Barf's Road, Distington, Cumbria

Project No: 2026-7213

Date: 12/06/2026

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Steady (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Steady (% v/v)	Oxygen Initial (% v/v)	Oxygen Steady (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
WS02	1002 (R)	-	0.0	-	1.1	-	20.1	<0.1	Dry	4.60	-
WS04	1002 (R)	-	0.0	-	5.1	-	14.2	(21.9) <0.1	Nm	4.00	-
WS08	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	4.85	-
WS12	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	0.99	2.60	-
WS14	1002 (R)	-	-	-	-	-	-	<0.1	0.18	4.00	-

Notes:

Initial Value = First recorded concentration taken immediately upon opening the gas valve; Residual Value = Constant or "steady" reading following peak.

Monitoring undertaken for a minimum of three minutes. Where high concentrations are initially noted then the monitoring should be increased to five minutes.

Nm = Not monitored

F = Falling Atmospheric Pressure, R = Rising Atmospheric Pressure, S = Steady Atmospheric Pressure

Monitoring Completed By: RS

Equipment Used: GFM436 Gas Analyser with Flow Pod, and Geotechnical Instruments Dipmeter.

Weather Conditions: Slight drizzle, breezy

Temperature: 19°C

Notes: Flow rates in brackets refer to maximum flow rate when gas valve is opened.

Ground Gas & Groundwater Monitoring Record Sheet 02

Site: Barf's Road, Distington, Cumbria

Project No: 2026-7213

Date: 03/07/2026

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Steady (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Steady (% v/v)	Oxygen Initial (% v/v)	Oxygen Steady (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
WS02*	-	-	-	-	-	-	-	-	-	4.60	-
WS04	1015 (R)	-	<0.1	-	5.8	-	14.4	<0.1	Bung stuck	4.00	-
WS08*	-	-	-	-	-	-	-	-	-	4.85	-
WS12	1015 (R)	-	<0.1	-	3.4	-	14.4	<0.1	1.25	2.60	-
WS14	1015 (R)	-	<0.1	-	<0.1	-	16.9	<0.1	0.61**	4.00	-

Notes:

* Locations could not be located due to grass cuttings.

**Borehole purged due to water above response zone. Water level then recorded at 2.00m and gas monitoring retaken.

Initial Value = First recorded concentration taken immediately upon opening the gas valve; Residual Value = Constant or "steady" reading following peak.

Monitoring undertaken for a minimum of three minutes. Where high concentrations are initially noted then the monitoring should be increased to five minutes.

Nm = Not monitored

F = Falling Atmospheric Pressure, R = Rising Atmospheric Pressure, S = Steady Atmospheric Pressure

Monitoring Completed By: LD

Equipment Used: GFM436 Gas Analyser with Flow Pod, and Geotechnical Instruments Dipmeter.

Weather Conditions: Hot and dry

Temperature: 26°C

Notes: Flow rates in brackets refer to maximum flow rate when gas valve is opened.

Ground Gas & Groundwater Monitoring Record Sheet 03

Site: Barf's Road, Distington, Cumbria

Project No: 2026-7213

Date: 13/07/2026

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Steady (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Steady (% v/v)	Oxygen Initial (% v/v)	Oxygen Steady (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
WS02*	-	-	-	-	-	-	-	-	-	4.60	-
WS04	1015 (R)	<0.1	<0.1	4.6	4.6	14.9	14.9	0	3.52	4.25	-
WS08*	-	-	-	-	-	-	-	-	-	4.85	-
WS12	1016 (R)	<0.1	<0.1	0.2	0.2	16.1	16.1	0	1.40	2.60	-
WS14	1016 (R)	<0.1	<0.1	<0.1	<0.1	16.3	16.3	0	2.52	4.00	-

Notes:

*Location could not be found due to grass cuttings

Initial Value = First recorded concentration taken immediately upon opening the gas valve; Residual Value = Constant or "steady" reading following peak.

Monitoring undertaken for a minimum of three minutes. Where high concentrations are initially noted then the monitoring should be increased to five minutes.

Nm = Not monitored

F = Falling Atmospheric Pressure, R = Rising Atmospheric Pressure, S = Steady Atmospheric Pressure

Monitoring Completed By: LD

Equipment Used: GFM436 Gas Analyser with Flow Pod, and Geotechnical Instruments Dipmeter.

Weather Conditions: Slight drizzle, breezy

Temperature: 24°C

Notes: Flow rates in brackets refer to maximum flow rate when gas valve is opened.

Ground Gas & Groundwater Monitoring Record Sheet 04

Site: Barf's Road, Distington, Cumbria

Project No: 2026-7213

Date: 16/07/2026

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Steady (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Steady (% v/v)	Oxygen Initial (% v/v)	Oxygen Steady (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
WS02	1013 (F)	-	0.0	-	2.1	-	19.5	<0.1	Dry	4.60	-
WS04	1013 (F)	-	0.0	-	4.6	-	18.1	<0.1	Nm	4.00	-
WS08	1013 (F)	-	0.0	-	4.2	-	16.6	0.1	Damp @ Base	4.85	-
WS12	1012 (F)	-	0.0	-	1.9	-	17.8	<0.1	1.40	2.60	-
WS14	1013 (F)	-	0.0	-	3.4	-	17.0	-0.2	2.76	4.00	-

Notes:

Initial Value = First recorded concentration taken immediately upon opening the gas valve; Residual Value = Constant or "steady" reading following peak.

Monitoring undertaken for a minimum of three minutes. Where high concentrations are initially noted then the monitoring should be increased to five minutes.

Nm = Not monitored

F = Falling Atmospheric Pressure, R = Rising Atmospheric Pressure, S = Steady Atmospheric Pressure

Monitoring Completed By: RS

Equipment Used: GFM436 Gas Analyser with Flow Pod, and Geotechnical Instruments Dipmeter.

Weather Conditions: Sunny, very slight breeze

Temperature: 21°C

Notes: Flow rates in brackets refer to maximum flow rate when gas valve is opened.

Ground Gas & Groundwater Monitoring Record Sheet 05

Site: Barf's Road, Distington, Cumbria

Project No: 2026-7213

Date: 27/07/2026

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Steady (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Steady (% v/v)	Oxygen Initial (% v/v)	Oxygen Steady (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
WS02	1005 (R)	-	<0.1	-	0.4	-	19.7	<0.1	Dry	4.60	-
WS04	1004 (R)	-	<0.1	-	4.4	-	15.4	<0.1	Dry	4.00	-
WS08	1005 (R)	-	<0.1	-	0.4	-	17.9	-2.4	Dry	4.25	-
WS12	1005 (R)	-	<0.1	-	3.5	-	16.8	<0.1	1.50	2.60	-
WS14	1005 (R)	-	<0.1	-	3.8	-	16.8	<0.1	3.10	4.00	-

Notes:

Initial Value = First recorded concentration taken immediately upon opening the gas valve; Residual Value = Constant or "steady" reading following peak.

Monitoring undertaken for a minimum of three minutes. Where high concentrations are initially noted then the monitoring should be increased to five minutes.

Nm = Not monitored

F = Falling Atmospheric Pressure, R = Rising Atmospheric Pressure, S = Steady Atmospheric Pressure

Monitoring Completed By: LD

Equipment Used: GFM436 Gas Analyser with Flow Pod, and Geotechnical Instruments Dipmeter.

Weather Conditions: Overcast, drizzle

Temperature: 21°C

Notes: Flow rates in brackets refer to maximum flow rate when gas valve is opened.

Appendix IV

■ Laboratory Test Results



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Tel (01670) 737575 • Email highwayslaboratory@northumberland.gov.uk

TEST REPORT

Client: **GEO Environmental Engineering Ltd, 31 Casshow Way, Cockermouth, CA13 9**
Engineer: **Richard Stripp**
Project: **GEO2026-7213 - Barfs Road, Distington, Cumbria**
Supplier/Source: **Site**
Date Sampled:
Date Received: **27/05/2026**
Sampled By: **Clients Staff**
SampleSpec: **Sampled by Site Staff/Client**
Remarks: **None**

Signed:  ☒ M. Newton, Laboratory Manager
[] P. Fletcher. Senior Technician

ADDITIONAL INFORMATION

Notes:

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

If Northumberland County Council carried out the sampling then all sampling was carried out at the named project above. All testing is carried out at Northumberland County Council Laboratory, testing is carried out to the specification stated in this report, except for subcontracted testing.

Uncertainty of measurement available on request..

Results reported herein relate only to the material supplied to the laboratory.

No decision rule will be given

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Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.



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Report/Sample ID No: S2578/01

Location: WS01 at 1.50m
Material Type: Brown SAND with clay inclusions

Test Results

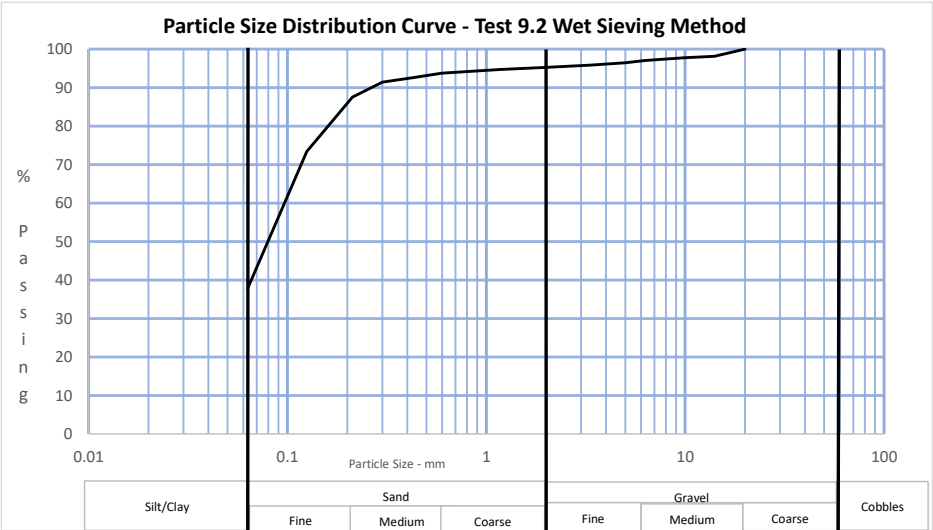
Determination of Water Content in accordance with BS EN ISO 17892-1:2014

Water Content (%) 18.6

Determination of Particle Size Distribution in accordance with BS1377-2:2022

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	98		
6.3	97		
5	96		
3.35	96		
2	95		
1.18	95		
0.6	94		
0.425	93		
0.300	91		
0.212	88		
0.150	73		
0.063	38		

Gravel %	5
Sand %	58
Silt/Clay %	38





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Report/Sample ID No: **S2578/02**

Location: WS03 at 1.05 - 1.50m
Material Type: Yellow, brown CLAY

Test Results

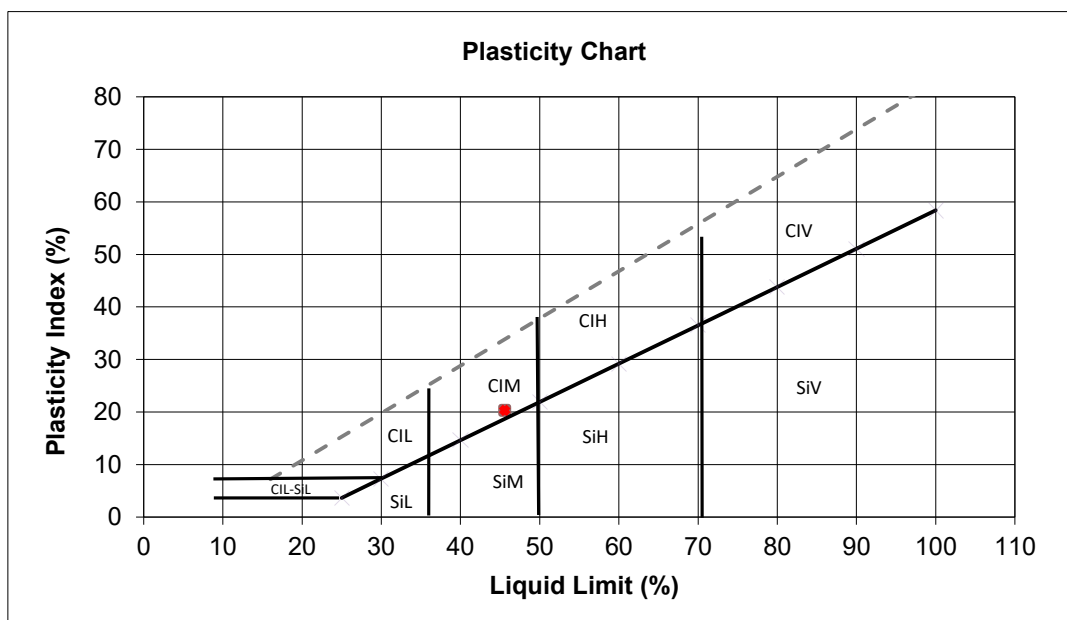
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **37.7**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **0.0**

Liquid Limit (%)	46
Plastic Limit (%)	25
Plasticity Index (%)	20
Passing 425mic (%)	96
Soil Classification:	CIM



Remarks: None



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Report/Sample ID No: **S2578/03**

Location: WS04 at 1.00m
Material Type: Brown, grey slightly sandy CLAY with gravel

Test Results

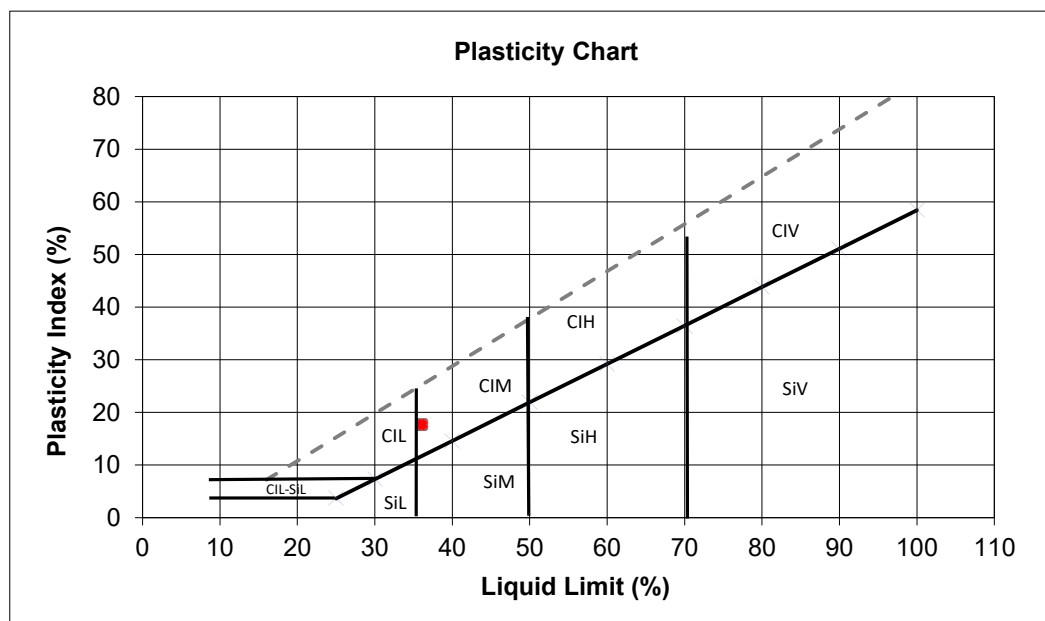
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **15.8**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **7.2**

Liquid Limit (%) **36**
Plastic Limit (%) **18**
Plasticity Index (%) **18**
Passing 425mic (%) **76**
Soil Classification: **CIM**



Remarks: None



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Report/Sample ID No: **S2578/04**

Location: WS06 at 0.53 - 0.90m
Material Type: Brown, orange sandy CLAY with gravel

Test Results

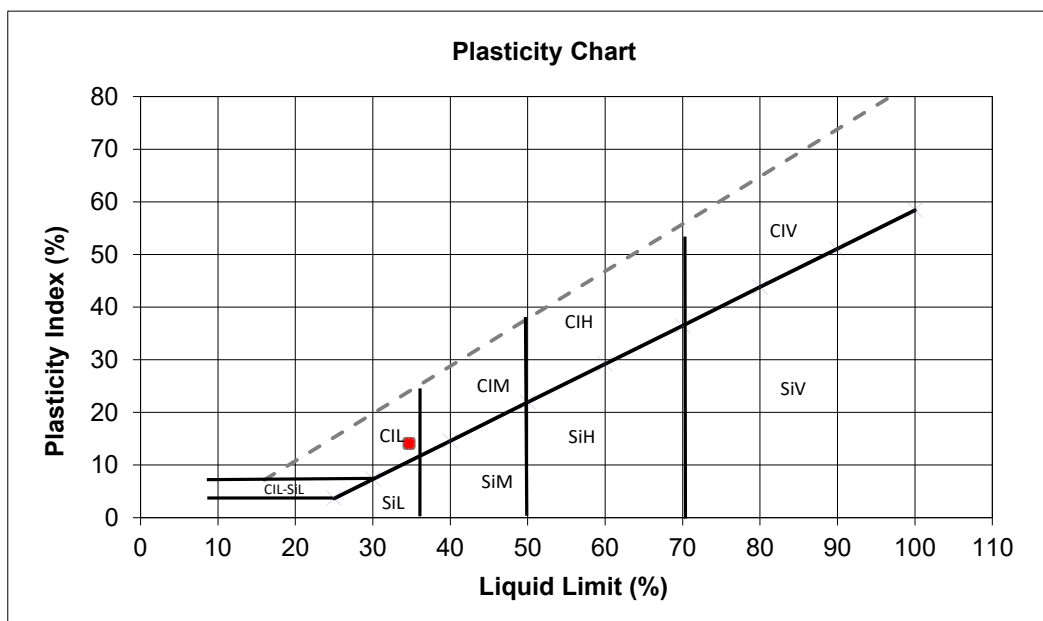
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **25.5**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **3.0**

Liquid Limit (%)	35
Plastic Limit (%)	21
Plasticity Index (%)	14
Passing 425mic (%)	76
Soil Classification:	CIL



Remarks: None



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Report/Sample ID No: **S2578/05**

Location: WS07 at 0.75m
Material Type: Brown, orange sandy CLAY with gravel

Test Results

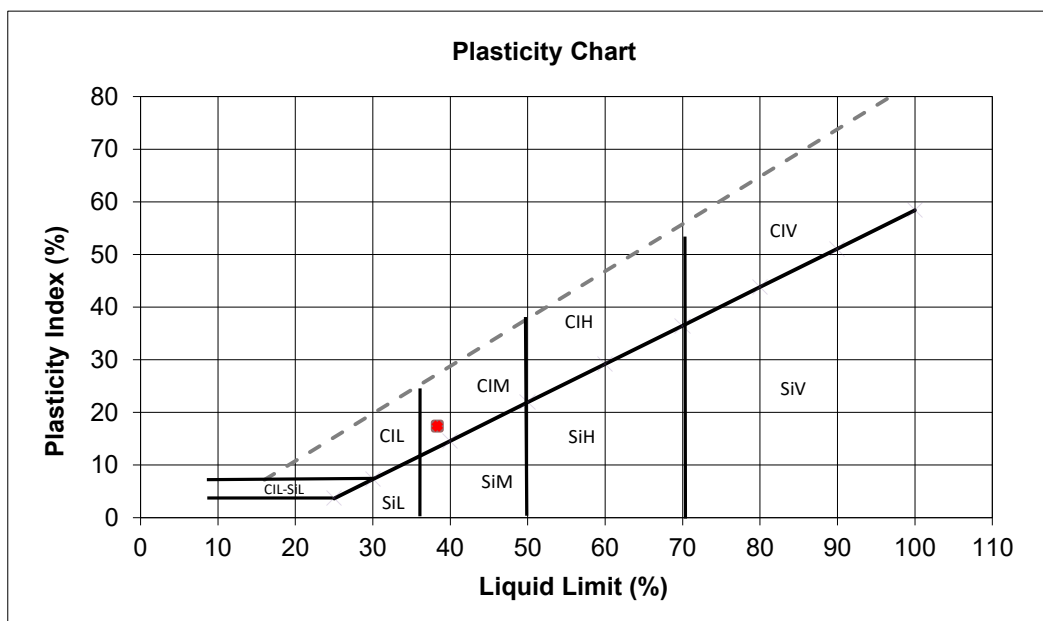
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **28.2**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **4.7**

Liquid Limit (%)	38
Plastic Limit (%)	21
Plasticity Index (%)	17
Passing 425mic (%)	79
Soil Classification:	CIM



Remarks: None



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Report/Sample ID No: S2578/06

Location: WS07 at 0.90 - 1.30m
Material Type: Brown SAND with gravel and clay inclusions

Test Results

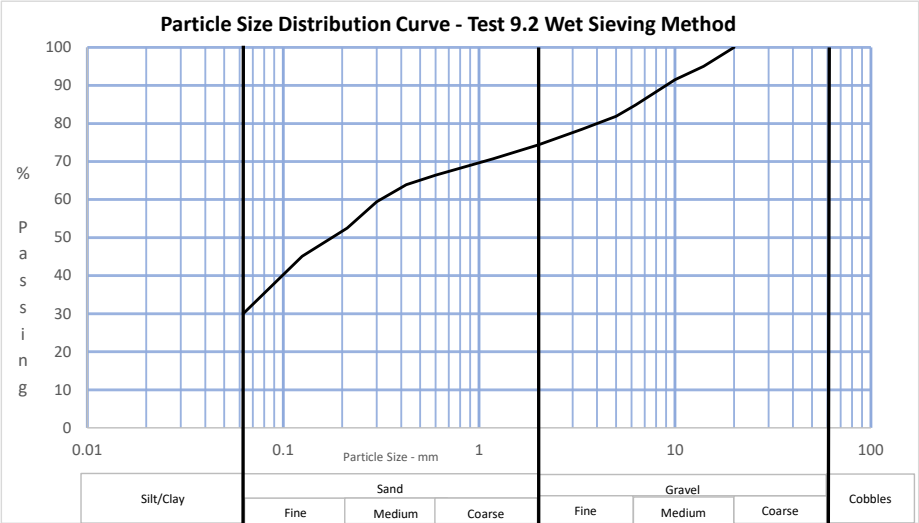
Determination of Water Content in accordance with BS EN ISO 17892-1:2014

Water Content (%) 12.9

Determination of Particle Size Distribution in accordance with BS1377-2:2022

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	95		
10	91		
6.3	85		
5	82		
3.35	78		
2	74		
1.18	71		
0.6	66		
0.425	64		
0.300	59		
0.212	53		
0.150	45		
0.063	30		

Gravel %	26
Sand %	44
Silt/Clay %	30





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Report/Sample ID No: **S2578/07**

Location: WS08 at 0.75 - 1.40m
Material Type: Brown sandy CLAY with gravel

Test Results

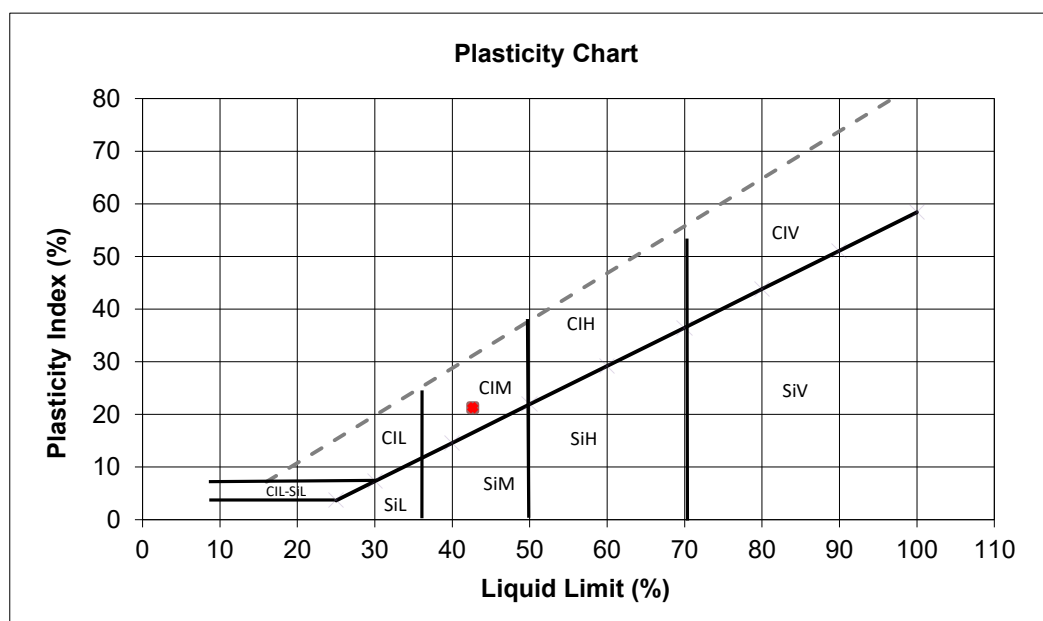
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **42.5**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **0.0**

Liquid Limit (%) **43**
Plastic Limit (%) **21**
Plasticity Index (%) **21**
Passing 425mic (%) **60**
Soil Classification: **CIM**



Remarks: None



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Report/Sample ID No: S2578/09

Location: WS09 at 0.59 - 0.94m
Material Type: Grey, Brown, orange mottled silty CLAY with sand inclusions and gravel

Test Results

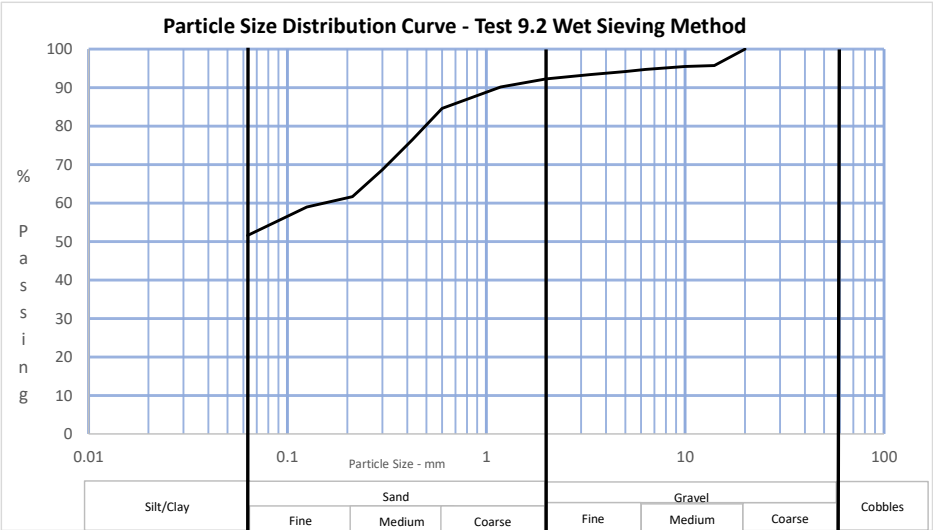
Determination of Water Content in accordance with BS EN ISO 17892-1:2014

Water Content (%) 15.1

Determination of Particle Size Distribution in accordance with BS1377-2:2022

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	95		
6.3	95		
5	94		
3.35	93		
2	92		
1.18	90		
0.6	85		
0.425	76		
0.300	69		
0.212	62		
0.150	59		
0.063	52		

Gravel %	8
Sand %	41
Silt/Clay %	52





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Report/Sample ID No: **S2578/09**

Location: WS10 at 0.80 - 1.00m
Material Type: Brown sandy CLAY

Test Results

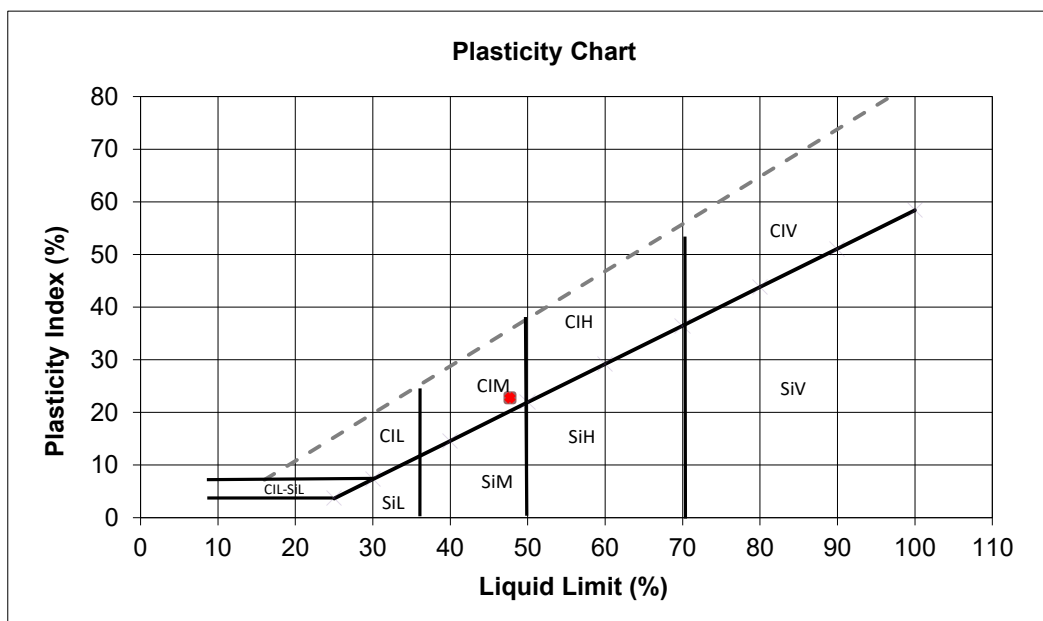
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **37.9**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **0.0**

Liquid Limit (%) **48**
Plastic Limit (%) **25**
Plasticity Index (%) **23**
Passing 425mic (%) **95**
Soil Classification: **CIM**



Remarks: None



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Report/Sample ID No: **S2578/10**

Location: WS11 at 0.70 - 0.80m
Material Type: Brown, orange sandy CLAY with gravel

Test Results

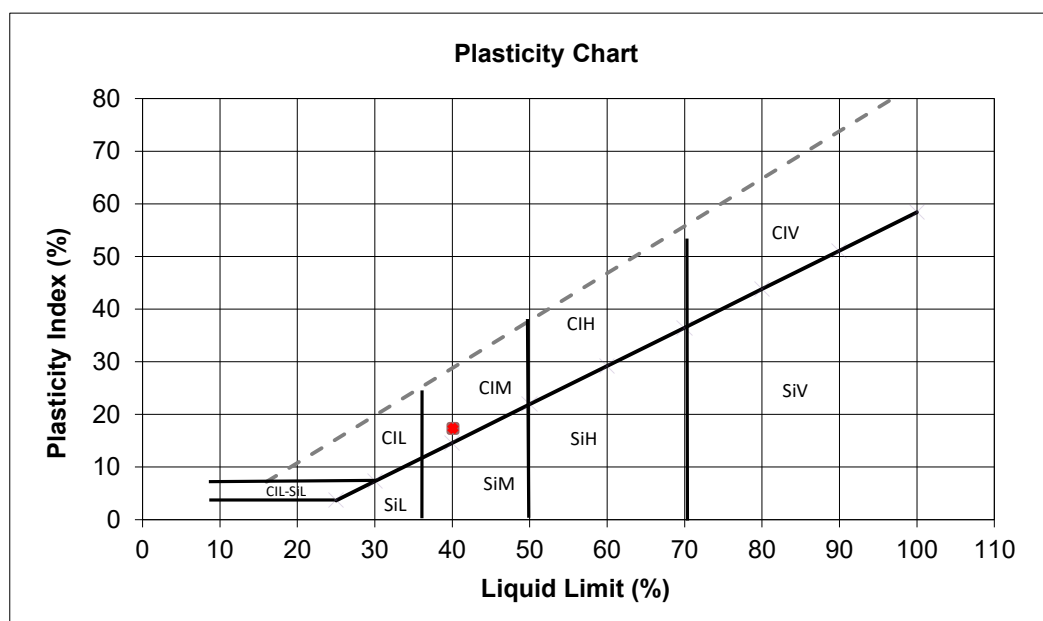
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **22.4**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **4.8**

Liquid Limit (%)	40
Plastic Limit (%)	23
Plasticity Index (%)	17
Passing 425mic (%)	72
Soil Classification:	CIM



Remarks: None



Highways Laboratory
Bassington Drive • Cramlington • Northumberland • NE23 8AJ
Tel (01670) 737575 • Email highwayslaboratory@northumberland.gov.uk

Report/Sample ID No: **S2578/11**

Location: WS13 at 1.30 - 1.40m
Material Type: Brown sandy CLAY with gravel

Test Results

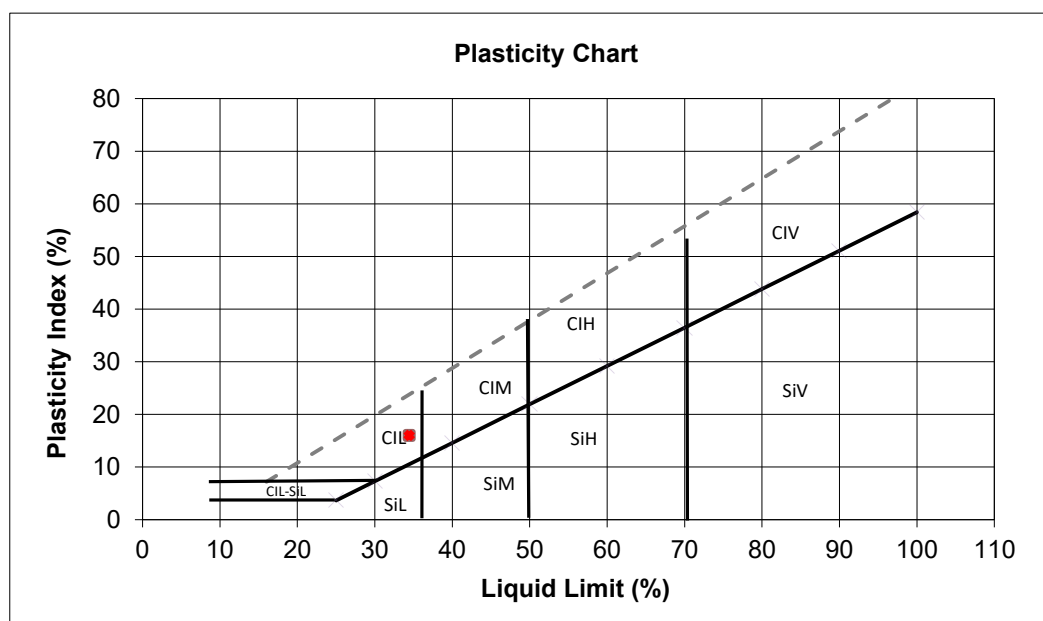
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **14.5**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **12.0**

Liquid Limit (%) **34**
Plastic Limit (%) **18**
Plasticity Index (%) **16**
Passing 425mic (%) **69**
Soil Classification: **CIL**



Remarks: None



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Report/Sample ID No: **S2578/12**

Location: WS15 at 0.80 - 1.00m
Material Type: Brown sandy CLAY with gravel

Test Results

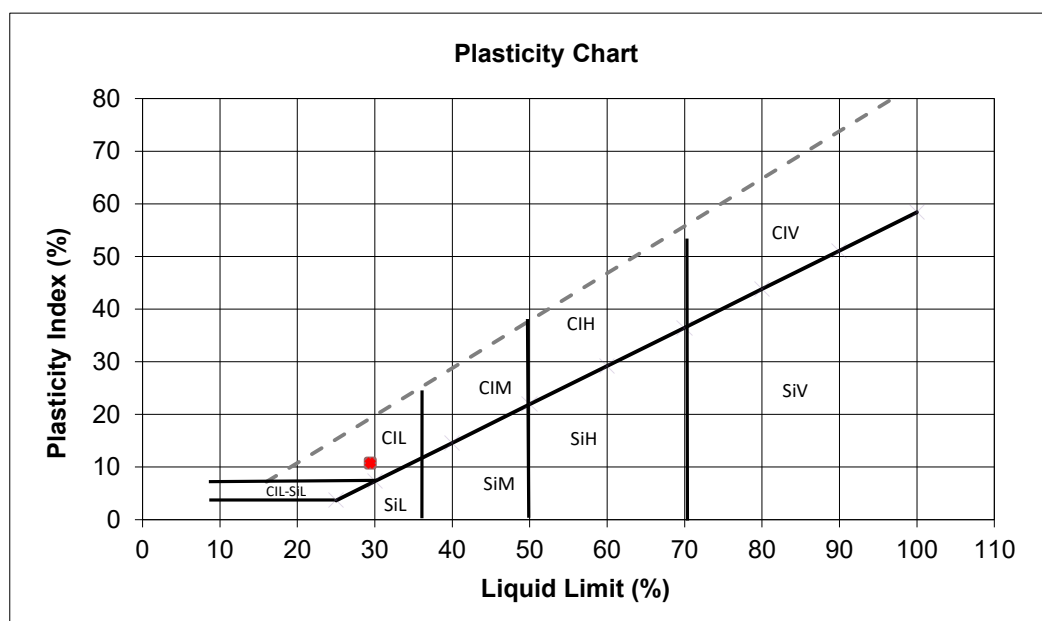
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **14.6**

Determination of liquid and plastic limit (one point method) in accordance with BS1377-2:2022

Material greater than 20mm, removed prior to test (%): **0.0**

Liquid Limit (%)	29
Plastic Limit (%)	19
Plasticity Index (%)	11
Passing 425mic (%)	60
Soil Classification:	CIL



Remarks: None

SUMMARY OF PLASTIC & LIQUID TESTS

Location	Sample Number	Depth (m)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425 mm sieve (%)	Soil Classification
WS03	S2578/02	1.05 - 1.50	37.7	46	25	20	96	CIM
WS04	S2578/03	1.00	15.8	36	18	18	76	CIM
WS06	S2578/04	0.53 - 0.90	25.5	35	21	14	76	CIL
WS07	S2578/05	0.75	28.2	38	21	17	79	CIM
WS08	S2578/07	0.75 - 1.40	42.5	43	21	21	60	CIM
WS10	S2578/09	0.80 - 1.00	37.9	48	25	23	95	CIM
WS11	S2578/10	0.70 - 0.80	22.4	40	23	17	72	CIM
WS13	S2578/11	1.30 - 1.40	14.5	34	18	16	69	CIL
WS15	S2578/12	0.80 - 1.00	14.6	29	19	11	60	CIL



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DEVIATING SAMPLE INFORMATION

Comments:

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards. For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling. If Northumberland County Council Laboratory did not undertake the sampling. Such samples may be deviating.

Certificate of Analysis

Certificate Number 26-12937

Issued: 10-Jun-26

Client Northumberland County Council
Highways Laboratory
Bassington Drive
Cramlington
NE23 8AJ

Our Reference 26-12937

Client Reference ~ S2578

Order No ~ NCC6286839

Contract Title ~ Barfs Road, Distington - GEO Environmental Engineering

Description 9 Soil samples.

Date Received 01-Jun-26

Date Started 01-Jun-26

Date Completed 10-Jun-26

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Reyhan Irfan
Operations Manager



Sample Deviations present. See Deviation Table Section for details.

Summary of Chemical Analysis

Soil Samples

Our Ref 26-12937

Client Ref ~ S2578

Contract Title ~ Barfs Road, Distington - GEO Environmental Engineering

Lab No	2694441	2694442	2694443	2694444	2694445	2694446	2694447	2694448	2694449
Sample ID ~	WS01	WS03	WS06	WS07	WS08	WS09	WS11	WS13	WS15
Depth ~									
Other ID ~	S2578/01	S2578/02	S2578/04	S2578/06	S2578/07	S2578/08	S2578/10	S2578/11	S2578/12
Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date ~	15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units									
Inorganics												
pH	DETSC 2008#		pH	7.6	7.7	7.8	7.7	7.2	7.5	7.6	7.5	7.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	12	43	30	18	190	14	25	29	21

Information in Support of the Analytical Results

Our Ref 26-12937

Client Ref ~ S2578

Contract ~ Barfs Road, Distington - GEO Environmental Engineering

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2694441	WS01 SOIL	15/05/26	PT 1L	pH + Conductivity (7 days)	
2694442	WS03 SOIL	15/05/26	PT 1L	pH + Conductivity (7 days)	
2694443	WS06 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694444	WS07 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694445	WS08 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694446	WS09 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694447	WS11 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694448	WS13 SOIL	15/05/26	PG	pH + Conductivity (7 days)	
2694449	WS15 SOIL	15/05/26	PG	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub G-Bag

Normec DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

ANALYTICAL TEST REPORT

Report Number 26-06051, issue number 1

Contract name: Barfs Road, Distington, Cumbria

Client reference: GEO2026-7213

Clients name: Geo Environmental Engineering

Clients address: Geo Environmental Engineering
NW Office
31 Casshow Way
Cockermouth
Cumbria CA13 9PL

Samples received: 26/05/2026

Analysis started: 26/05/2026

Analysis completed: 04/06/2026

Report issued: 04/06/2026

Key

U UKAS accredited test

M MCERTS & UKAS accredited test

(B) Analysis performed at Southampton Site

I/S Insufficient sample to carry out test

U/S Sample not suitable for testing

NAD No Asbestos Detected

Full key available on Information page



Approved by: Georgia Hunter
Senior Reporting Administrator

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

% Moisture reported as MCERTS drying at 30°C

Lab ref	Sample ID	Depth (m)	Sample description	Material removed	% Removed	% Moisture
108108	WS01	0.00 - 0.31	Brown Loamy Clay with Gravel and Vegetation.	-	-	15.1
108109	WS02	0.00 - 0.40	Brown Loamy Clay with Gravel and Vegetation.	-	-	17.8
108110	WS02	0.60 - 1.00	Brown Loamy Clay with Gravel and Vegetation.	-	-	14.9
108111	WS03	0.10 - 0.45	Brown Loamy Clay with Gravel and Vegetation.	-	-	16.2
108112	WS05	0.12 - 0.30	Brown Loamy Clay with Gravel and Vegetation.	-	-	17.5
108113	WS06	0.00 - 0.13	Brown Loamy Clay with Gravel and Vegetation.	-	-	31.1
108114	WS06	0.23 - 0.53	Brown Loamy Clay with Gravel and Vegetation.	-	-	22.2
108115	WS07	0.20 - 0.59	Brown Loamy Clay with Gravel and Vegetation.	-	-	26.4
108116	WS08	0.00 - 0.14	Brown Loamy Clay with Gravel and Vegetation.	-	-	19.3
108117	WS08	0.14 - 0.30	Brown Loamy Clay with Gravel and Vegetation.	-	-	17.8
108118	WS09	0.00 - 0.15	Brown Loamy Clay with Gravel and Vegetation.	-	-	18.3
108119	WS09	0.15 - 0.24	Brown Loamy Clay with Gravel and Vegetation.	-	-	16.8
108120	WS10	0.07 - 0.35	Brown Loamy Clay with Gravel and Vegetation.	-	-	17.5
108121	WS11	0.10 - 0.40	Brown Loamy Clay with Gravel and Vegetation.	-	-	17.6
108122	WS12	0.10 - 0.37	Brown Loamy Clay with Gravel and Vegetation.	-	-	11.5
108123	WS13	0.36 - 1.00	Brown Loamy Clay with Gravel and Vegetation.	-	-	19.3
108124	WS14	0.28 - 0.80	Brown Loamy Clay with Gravel and Vegetation.	-	-	15.8
108125	WS15	0.10 - 0.53	Brown Loamy Clay with Gravel and Vegetation.	-	-	14.5

SOILS

Lab Number					108108	108109	108110	108111	108112
Client Reference					1	1	1	1	1
Sample ID					WS01	WS02	WS02	WS03	WS05
Depth (m)					0.00 - 0.31	0.00 - 0.40	0.60 - 1.00	0.10 - 0.45	0.12 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	NAD	NAD	NAD
Metals									
Water Soluble Sulphate	CE061	M	20	mg/kg	26.3	34.3	26.1	37.2	80.7
Arsenic	CE264	M	2.3	mg/kg	15.0	22.1	10.5	16.5	14.6
Cadmium	CE264	M	1.1	mg/kg	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Copper	CE264	M	1.2	mg/kg	22.5	45.9	13.2	29.6	17.9
Lead	CE264	U	2.4	mg/kg	43.7	234	46.6	61.3	40.9
Mercury	CE264	M	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Nickel	CE264	M	1.6	mg/kg	20.4	27.3	8.8	21.0	17.1
Selenium	CE264	M	3	mg/kg	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Zinc	CE264	M	2.4	mg/kg	47.1	221	44.9	152	54.5
Colourimetric									
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040
Total Cyanide	CE077	N	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium III	CE208	N	2	mg/kg	15.5	24.6	14.8	19.3	19.3
Combustion									
Moisture Content	CE001	N	0.1	%	15.1	17.8	14.9	16.2	17.5
Total Organic Carbon	CE197	M	0.1	%	5.12	4.64	1.16	4.48	4.18
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	0.040	0.038	< 0.016	0.031	< 0.016
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	0.056	< 0.015	< 0.015	< 0.015
Acenaphthene	CE087	M	0.013	mg/kg	0.098	0.048	< 0.013	0.050	0.055
Fluorene	CE087	U	0.013	mg/kg	0.077	0.052	< 0.013	0.045	0.060
Phenanthrene	CE087	M	0.014	mg/kg	1.27	0.813	0.085	0.701	0.700
Anthracene	CE087	U	0.017	mg/kg	0.216	0.175	< 0.017	0.103	0.145
Fluoranthene	CE087	M	0.017	mg/kg	2.41	1.98	0.177	1.47	1.08
Pyrene	CE087	M	0.016	mg/kg	1.82	1.73	0.154	1.12	0.841
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.990	1.04	0.089	0.623	0.451
Chrysene	CE087	M	0.028	mg/kg	0.922	1.01	0.083	0.573	0.391

SOILS

Lab Number					108108	108109	108110	108111	108112
Client Reference					1	1	1	1	1
Sample ID					WS01	WS02	WS02	WS03	WS05
Depth (m)					0.00 - 0.31	0.00 - 0.40	0.60 - 1.00	0.10 - 0.45	0.12 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	1.23	1.42	0.131	0.799	0.499
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.531	0.594	0.055	0.320	0.196
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.784	0.992	0.080	0.502	0.321
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.736	0.892	0.071	0.452	0.272
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.137	0.181	< 0.017	0.092	0.051
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.521	0.647	0.051	0.339	0.204
Total PAH(16)	CE087	N	0.28	mg/kg	11.8	11.7	0.976	7.21	5.27
BTEX									
Benzene	CE267	U	0.001	mg/kg	n/t	n/t	< 0.001	n/t	n/t
Toluene	CE267	U	0.001	mg/kg	n/t	n/t	< 0.001	n/t	n/t
Ethylbenzene	CE267	U	0.001	mg/kg	n/t	n/t	< 0.001	n/t	n/t
MTBE	CE267	N	0.002	mg/kg	n/t	n/t	< 0.002	n/t	n/t
m,p-Xylene	CE267	U	0.002	mg/kg	n/t	n/t	< 0.002	n/t	n/t
oXylenes	CE267	U	0.002	mg/kg	n/t	n/t	< 0.002	n/t	n/t
Total Petroleum Hydrocarbons									
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	n/t	< 0.10	n/t	n/t
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	n/t	< 0.10	n/t	n/t
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	n/t	< 0.10	n/t	n/t
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	n/t	n/t	< 1.0	n/t	n/t
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	n/t	< 0.5	n/t	n/t
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	n/t	n/t	< 0.7	n/t	n/t
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	n/t	n/t	< 4.0	n/t	n/t
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	n/t	< 0.5	n/t	n/t
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	n/t	< 0.010	n/t	n/t
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	n/t	< 0.010	n/t	n/t
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	n/t	< 0.010	n/t	n/t
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	n/t	n/t	< 0.6	n/t	n/t
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	n/t	n/t	< 1.0	n/t	n/t
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	n/t	< 2.0	n/t	n/t
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	n/t	n/t	< 4.5	n/t	n/t

SOILS

Lab Number					108108	108109	108110	108111	108112
Client Reference					1	1	1	1	1
Sample ID					WS01	WS02	WS02	WS03	WS05
Depth (m)					0.00 - 0.31	0.00 - 0.40	0.60 - 1.00	0.10 - 0.45	0.12 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	n/t	< 2.0	n/t	n/t
Wet Chem									
pH	CE004	M	0.1	pH units	7.8	7.5	7.9	7.8	7.7

SOILS

Lab Number					108113	108114	108115	108116	108117
Client Reference					1	1	1	1	1
Sample ID					WS06	WS06	WS07	WS08	WS08
Depth (m)					0.00 - 0.13	0.23 - 0.53	0.20 - 0.59	0.00 - 0.14	0.14 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	NAD	NAD	NAD
Metals									
Water Soluble Sulphate	CE061	M	20	mg/kg	38.7	46.6	45.2	68.6	71.4
Arsenic	CE264	M	2.3	mg/kg	11.4	19.4	25.0	13.5	25.5
Cadmium	CE264	M	1.1	mg/kg	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Copper	CE264	M	1.2	mg/kg	13.1	31.5	41.1	22.4	50.4
Lead	CE264	U	2.4	mg/kg	49.6	76.1	84.7	73.3	74.7
Mercury	CE264	M	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Nickel	CE264	M	1.6	mg/kg	11.2	30.5	37.1	15.5	36.0
Selenium	CE264	M	3	mg/kg	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Zinc	CE264	M	2.4	mg/kg	38.1	86.8	73.3	66.0	192
Colourimetric									
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040
Total Cyanide	CE077	N	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium III	CE208	N	2	mg/kg	15.1	16.8	21.6	17.0	19.2
Combustion									
Moisture Content	CE001	N	0.1	%	31.1	22.2	26.4	19.3	17.8
Total Organic Carbon	CE197	M	0.1	%	5.54	5.92	5.79	5.55	5.74
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	< 0.016	0.031	0.029	0.027	0.111
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	0.016	< 0.015	0.017	0.019
Acenaphthene	CE087	M	0.013	mg/kg	< 0.013	< 0.013	< 0.013	0.020	0.061
Fluorene	CE087	U	0.013	mg/kg	< 0.013	< 0.013	< 0.013	0.022	0.063
Phenanthrene	CE087	M	0.014	mg/kg	0.167	0.195	0.098	0.324	1.04
Anthracene	CE087	U	0.017	mg/kg	0.044	0.033	0.023	0.079	0.158
Fluoranthene	CE087	M	0.017	mg/kg	0.454	0.308	0.095	0.904	1.74
Pyrene	CE087	M	0.016	mg/kg	0.375	0.256	0.079	0.757	1.34
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.239	0.183	0.070	0.478	0.754
Chrysene	CE087	M	0.028	mg/kg	0.215	0.162	0.052	0.354	0.722

SOILS

Lab Number					108113	108114	108115	108116	108117
Client Reference					1	1	1	1	1
Sample ID					WS06	WS06	WS07	WS08	WS08
Depth (m)					0.00 - 0.13	0.23 - 0.53	0.20 - 0.59	0.00 - 0.14	0.14 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.307	0.241	0.075	0.635	1.01
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.124	0.105	0.033	0.253	0.362
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.206	0.151	0.049	0.413	0.597
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.182	0.131	0.037	0.398	0.558
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.033	0.025	< 0.017	0.076	0.108
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.132	0.098	0.029	0.283	0.415
Total PAH(16)	CE087	N	0.28	mg/kg	2.48	1.94	0.670	5.04	9.05
BTEX									
Benzene	CE267	U	0.001	mg/kg	n/t	< 0.001	< 0.001	n/t	< 0.001
Toluene	CE267	U	0.001	mg/kg	n/t	< 0.001	< 0.001	n/t	< 0.001
Ethylbenzene	CE267	U	0.001	mg/kg	n/t	< 0.001	< 0.001	n/t	< 0.001
MTBE	CE267	N	0.002	mg/kg	n/t	< 0.002	< 0.002	n/t	< 0.002
m,p-Xylene	CE267	U	0.002	mg/kg	n/t	< 0.002	< 0.002	n/t	< 0.002
oXylenes	CE267	U	0.002	mg/kg	n/t	< 0.002	< 0.002	n/t	< 0.002
Total Petroleum Hydrocarbons									
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	< 0.10	n/t	< 0.10
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	< 0.10	n/t	< 0.10
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	< 0.10	n/t	< 0.10
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	n/t	< 1.0	< 1.0	n/t	< 1.0
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	0.6	< 0.5	n/t	1.8
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	n/t	2.2	< 0.7	n/t	3.3
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	n/t	8.3	< 4.0	n/t	8.9
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	< 0.5	< 0.5	n/t	0.5
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	< 0.010	n/t	< 0.010
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	< 0.010	n/t	< 0.010
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	< 0.010	n/t	< 0.010
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	n/t	1.0	< 0.6	n/t	1.9
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	n/t	2.7	1.1	n/t	7.8
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	2.7	< 2.0	n/t	16.7
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	n/t	15.0	< 4.5	n/t	38.3

SOILS

Lab Number					108113	108114	108115	108116	108117
Client Reference					1	1	1	1	1
Sample ID					WS06	WS06	WS07	WS08	WS08
Depth (m)					0.00 - 0.13	0.23 - 0.53	0.20 - 0.59	0.00 - 0.14	0.14 - 0.30
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	3.9	2.8	n/t	7.6
Wet Chem									
pH	CE004	M	0.1	pH units	7.1	7.8	7.9	7.2	8.0

SOILS

Lab Number					108118	108119	108120	108121	108122
Client Reference					1	1	1	1	1
Sample ID					WS09	WS09	WS10	WS11	WS12
Depth (m)					0.00 - 0.15	0.15 - 0.24	0.07 - 0.35	0.10 - 0.40	0.10 - 0.37
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	NAD	NAD	NAD
Metals									
Water Soluble Sulphate	CE061	M	20	mg/kg	48.9	45.0	87.2	44.0	24.4
Arsenic	CE264	M	2.3	mg/kg	18.7	20.8	23.6	27.1	20.4
Cadmium	CE264	M	1.1	mg/kg	< 1.1	1.1	< 1.1	1.3	< 1.1
Copper	CE264	M	1.2	mg/kg	48.9	51.4	66.3	2590	234
Lead	CE264	U	2.4	mg/kg	189	132	119	101	34.3
Mercury	CE264	M	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Nickel	CE264	M	1.6	mg/kg	25.8	37.2	40.6	40.3	28.3
Selenium	CE264	M	3	mg/kg	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Zinc	CE264	M	2.4	mg/kg	341	275	213	142	52.0
Colourimetric									
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040
Total Cyanide	CE077	N	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium III	CE208	N	2	mg/kg	22.6	23.1	25.2	29.5	24.8
Combustion									
Moisture Content	CE001	N	0.1	%	18.3	16.8	17.5	17.6	11.5
Total Organic Carbon	CE197	M	0.1	%	6.66	6.13	8.34	5.57	0.98
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	0.053	0.059	0.059	0.048	0.038
Acenaphthylene	CE087	M	0.015	mg/kg	0.061	0.071	0.071	0.042	0.061
Acenaphthene	CE087	M	0.013	mg/kg	0.066	0.060	0.068	0.114	0.898
Fluorene	CE087	U	0.013	mg/kg	0.063	0.059	0.072	0.127	1.50
Phenanthrene	CE087	M	0.014	mg/kg	1.05	1.17	1.30	1.78	15.5
Anthracene	CE087	U	0.017	mg/kg	0.231	0.219	0.444	0.343	3.54
Fluoranthene	CE087	M	0.017	mg/kg	2.55	2.99	4.67	3.39	19.8
Pyrene	CE087	M	0.016	mg/kg	2.03	2.32	3.68	2.47	14.2
Benzo(a)anthracene	CE087	U	0.012	mg/kg	1.27	1.51	2.37	1.49	7.19
Chrysene	CE087	M	0.028	mg/kg	1.17	1.24	2.00	1.31	5.06

SOILS

Lab Number					108118	108119	108120	108121	108122
Client Reference					1	1	1	1	1
Sample ID					WS09	WS09	WS10	WS11	WS12
Depth (m)					0.00 - 0.15	0.15 - 0.24	0.07 - 0.35	0.10 - 0.40	0.10 - 0.37
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	1.64	1.98	2.48	1.87	6.59
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.647	0.803	0.942	0.765	2.89
Benzo(a)pyrene	CE087	U	0.019	mg/kg	1.05	1.24	1.60	1.14	4.39
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.944	1.16	1.37	0.968	3.79
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.187	0.220	0.271	0.183	0.725
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.671	0.845	0.903	0.675	2.61
Total PAH(16)	CE087	N	0.28	mg/kg	13.7	16.0	22.3	16.7	88.8
BTEX									
Benzene	CE267	U	0.001	mg/kg	n/t	< 0.001	n/t	n/t	n/t
Toluene	CE267	U	0.001	mg/kg	n/t	< 0.001	n/t	n/t	n/t
Ethylbenzene	CE267	U	0.001	mg/kg	n/t	< 0.001	n/t	n/t	n/t
MTBE	CE267	N	0.002	mg/kg	n/t	< 0.002	n/t	n/t	n/t
m,p-Xylene	CE267	U	0.002	mg/kg	n/t	< 0.002	n/t	n/t	n/t
oXylenes	CE267	U	0.002	mg/kg	n/t	< 0.002	n/t	n/t	n/t
Total Petroleum Hydrocarbons									
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	n/t	n/t	n/t
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	n/t	n/t	n/t
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	n/t	< 0.10	n/t	n/t	n/t
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	n/t	< 1.0	n/t	n/t	n/t
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	1.1	n/t	n/t	n/t
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	n/t	2.6	n/t	n/t	n/t
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	n/t	6.0	n/t	n/t	n/t
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	n/t	< 0.5	n/t	n/t	n/t
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	n/t	n/t	n/t
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	n/t	n/t	n/t
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	n/t	< 0.010	n/t	n/t	n/t
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	n/t	1.3	n/t	n/t	n/t
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	n/t	5.4	n/t	n/t	n/t
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	16.1	n/t	n/t	n/t
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	n/t	39.2	n/t	n/t	n/t

SOILS

Lab Number					108118	108119	108120	108121	108122
Client Reference					1	1	1	1	1
Sample ID					WS09	WS09	WS10	WS11	WS12
Depth (m)					0.00 - 0.15	0.15 - 0.24	0.07 - 0.35	0.10 - 0.40	0.10 - 0.37
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	n/t	7.9	n/t	n/t	n/t
Wet Chem									
pH	CE004	M	0.1	pH units	6.7	7.9	7.6	7.8	7.7

SOILS

Lab Number					108123	108124	108125
Client Reference					1	1	1
Sample ID					WS13	WS14	WS15
Depth (m)					0.36 - 1.00	0.28 - 0.80	0.10 - 0.53
Sampling Date					15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units			
Asbestos							
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	NAD
Metals							
Water Soluble Sulphate	CE061	M	20	mg/kg	60.9	49.1	297
Arsenic	CE264	M	2.3	mg/kg	17.3	16.3	12.5
Cadmium	CE264	M	1.1	mg/kg	< 1.1	< 1.1	< 1.1
Copper	CE264	M	1.2	mg/kg	36.8	18.6	19.3
Lead	CE264	U	2.4	mg/kg	126	52.6	44.0
Mercury	CE264	M	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Nickel	CE264	M	1.6	mg/kg	26.4	19.8	21.7
Selenium	CE264	M	3	mg/kg	< 3.0	< 3.0	< 3.0
Zinc	CE264	M	2.4	mg/kg	175	60.6	110
Colourimetric							
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	< 0.040
Total Cyanide	CE077	N	1	mg/kg	< 1.0	< 1.0	< 1.0
Chromium III	CE208	N	2	mg/kg	24.0	18.8	18.6
Combustion							
Moisture Content	CE001	N	0.1	%	19.3	15.8	14.5
Total Organic Carbon	CE197	M	0.1	%	4.79	2.84	2.59
Polyaromatic hydrocarbons							
Naphthalene	CE087	M	0.016	mg/kg	0.029	0.058	0.016
Acenaphthylene	CE087	M	0.015	mg/kg	0.039	< 0.015	0.015
Acenaphthene	CE087	M	0.013	mg/kg	0.047	0.018	0.050
Fluorene	CE087	U	0.013	mg/kg	0.046	0.015	0.031
Phenanthrene	CE087	M	0.014	mg/kg	0.726	0.266	1.01
Anthracene	CE087	U	0.017	mg/kg	0.133	0.039	0.105
Fluoranthene	CE087	M	0.017	mg/kg	1.62	0.446	2.15
Pyrene	CE087	M	0.016	mg/kg	1.27	0.338	2.30
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.706	0.186	0.826
Chrysene	CE087	M	0.028	mg/kg	0.616	0.165	1.05

SOILS

Lab Number					108123	108124	108125
Client Reference					1	1	1
Sample ID					WS13	WS14	WS15
Depth (m)					0.36 - 1.00	0.28 - 0.80	0.10 - 0.53
Sampling Date					15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units			
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.945	0.243	1.33
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.402	0.093	0.575
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.540	0.154	0.897
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.508	0.138	0.805
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.098	0.027	0.133
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.379	0.105	0.653
Total PAH(16)	CE087	N	0.28	mg/kg	8.11	2.29	11.9
BTEX							
Benzene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	< 0.001
Toluene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	< 0.001
Ethylbenzene	CE267	U	0.001	mg/kg	< 0.001	< 0.001	< 0.001
MTBE	CE267	N	0.002	mg/kg	< 0.002	< 0.002	< 0.002
m,p-Xylene	CE267	U	0.002	mg/kg	< 0.002	< 0.002	< 0.002
oXylenes	CE267	U	0.002	mg/kg	< 0.002	< 0.002	< 0.002
Total Petroleum Hydrocarbons							
>C5-C6 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	< 0.10
>C6-C8 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	< 0.10
>C8-C10 Aliphatic (HS_1D_AL)	CE267	N	0.1	mg/kg	< 0.10	< 0.10	< 0.10
>C10-C12 Aliphatic (EH_2D_AL)	CE250	N	1	mg/kg	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	< 0.5	< 0.5	0.7
>C16-C21 Aliphatic (EH_2D_AL)	CE250	N	0.7	mg/kg	1.3	1.0	2.1
>C21-C35 Aliphatic (EH_2D_AL)	CE250	N	4	mg/kg	< 4.0	< 4.0	10.2
>C35-C44 Aliphatic (EH_2D_AL)	CE250	N	0.5	mg/kg	< 0.5	< 0.5	0.7
>C5-C7 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	< 0.010
>C7-C8 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	< 0.010
>C8-C10 Aromatic (HS_1D_AR)	CE267	N	0.01	mg/kg	< 0.010	< 0.010	< 0.010
>C10-C12 Aromatic (EH_2D_AR)	CE250	N	0.6	mg/kg	0.9	< 0.6	1.2
>C12-C16 Aromatic (EH_2D_AR)	CE250	N	1	mg/kg	2.7	1.0	3.5
>C16-C21 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	7.6	< 2.0	10.7
>C21-C35 Aromatic (EH_2D_AR)	CE250	N	4.5	mg/kg	21.0	5.0	32.4

SOILS

Lab Number					108123	108124	108125
Client Reference					1	1	1
Sample ID					WS13	WS14	WS15
Depth (m)					0.36 - 1.00	0.28 - 0.80	0.10 - 0.53
Sampling Date					15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units			
>C35-C44 Aromatic (EH_2D_AR)	CE250	N	2	mg/kg	5.1	< 2.0	6.2
Wet Chem							
pH	CE004	M	0.1	pH units	7.5	8.0	8.1

LEACHATE

Lab Number					108110	108115	108117	108119	108123
Client Reference					1	1	1	1	1
Sample ID					WS02	WS07	WS08	WS09	WS13
Depth (m)					0.60 - 1.00	0.20 - 0.59	0.14 - 0.30	0.15 - 0.24	0.36 - 1.00
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Metals									
Arsenic Leachate	CE265	U	0.1	µg/l	0.79	1.79	1.81	1.94	1.99
Boron Leachate	CE265	N	4	µg/l	16.3	11.0	10.8	22.2	16.7
Cadmium Leachate	CE265	U	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chromium Leachate	CE265	U	0.5	µg/l	0.71	0.74	1.35	0.98	1.74
Copper Leachate	CE265	U	0.5	µg/l	3.24	2.83	5.93	5.01	3.88
Lead Leachate	CE265	U	0.6	µg/l	0.75	1.62	2.07	2.70	1.40
Mercury Leachate	CE265	N	0.05	µg/l	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Nickel Leachate	CE265	U	0.4	µg/l	< 0.40	< 0.40	< 0.40	1.76	< 0.40
Selenium Leachate	CE265	U	1.1	µg/l	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Zinc Leachate	CE265	U	3.5	µg/l	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5
Colourimetric									
Sulphate	CE257	U	0.3	mg/l	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Total Cyanide	CE147	N	5	µg/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide	CE283	N	0.4	mg/l	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Miscellaneous									
Hardness (CaCO3)	CE265	N	0.1	mg/l CaCO3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Polyaromatic hydrocarbons									
Naphthalene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)anthracene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(b)fluoranthene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

LEACHATE

Lab Number					108110	108115	108117	108119	108123
Client Reference					1	1	1	1	1
Sample ID					WS02	WS07	WS08	WS09	WS13
Depth (m)					0.60 - 1.00	0.20 - 0.59	0.14 - 0.30	0.15 - 0.24	0.36 - 1.00
Sampling Date					15/05/2026	15/05/2026	15/05/2026	15/05/2026	15/05/2026
Test	Method	Accred	LoD	Units					
Benzo(a)pyrene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenzo(a,h)anthracene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(g,h,i)perylene	CE051	N	0.1	µg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total PAH(16)	CE051	N	1.6	µg/l	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60
Wet Chem									
pH (10:1 extract)	CE213	U	0.1	pH units	5.9	6.3	6.7	7.1	8.4

LEACHATE

Lab Number					108124
Client Reference					1
Sample ID					WS14
Depth (m)					0.28 - 0.80
Sampling Date					15/05/2026
Test	Method	Accred	LoD	Units	
Metals					
Arsenic Leachate	CE265	U	0.1	µg/l	1.87
Boron Leachate	CE265	N	4	µg/l	20.2
Cadmium Leachate	CE265	U	0.1	µg/l	< 0.10
Chromium Leachate	CE265	U	0.5	µg/l	0.72
Copper Leachate	CE265	U	0.5	µg/l	1.80
Lead Leachate	CE265	U	0.6	µg/l	< 0.60
Mercury Leachate	CE265	N	0.05	µg/l	< 0.050
Nickel Leachate	CE265	U	0.4	µg/l	< 0.40
Selenium Leachate	CE265	U	1.1	µg/l	< 1.1
Zinc Leachate	CE265	U	3.5	µg/l	< 3.5
Colourimetric					
Sulphate	CE257	U	0.3	mg/l	< 0.30
Total Cyanide	CE147	N	5	µg/l	< 5.0
Sulphide	CE283	N	0.4	mg/l	< 0.40
Miscellaneous					
Hardness (CaCO ₃)	CE265	N	0.1	mg/l CaCO ₃	< 0.10
Polyaromatic hydrocarbons					
Naphthalene	CE051	N	0.1	µg/l	< 0.10
Acenaphthylene	CE051	N	0.1	µg/l	< 0.10
Acenaphthene	CE051	N	0.1	µg/l	< 0.10
Fluorene	CE051	N	0.1	µg/l	< 0.10
Phenanthrene	CE051	N	0.1	µg/l	< 0.10
Anthracene	CE051	N	0.1	µg/l	< 0.10
Fluoranthene	CE051	N	0.1	µg/l	< 0.10
Pyrene	CE051	N	0.1	µg/l	< 0.10
Benzo(a)anthracene	CE051	N	0.1	µg/l	< 0.10
Chrysene	CE051	N	0.1	µg/l	< 0.10
Benzo(b)fluoranthene	CE051	N	0.1	µg/l	< 0.10
Benzo(k)fluoranthene	CE051	N	0.1	µg/l	< 0.10

LEACHATE

Lab Number					108124
Client Reference					1
Sample ID					WS14
Depth (m)					0.28 - 0.80
Sampling Date					15/05/2026
Test	Method	Accred	LoD	Units	
Benzo(a)pyrene	CE051	N	0.1	µg/l	< 0.10
Indeno(1,2,3-cd)pyrene	CE051	N	0.1	µg/l	< 0.10
Dibenzo(a,h)anthracene	CE051	N	0.1	µg/l	< 0.10
Benzo(g,h,i)perylene	CE051	N	0.1	µg/l	< 0.10
Total PAH(16)	CE051	N	1.6	µg/l	< 1.60
Wet Chem					
pH (10:1 extract)	CE213	U	0.1	pH units	7.1

METHOD DETAILS

METHOD	TESTNAME	METHOD SUMMARY	ANALYSIS BASIS
CE267	VPH in Soil	HS-GCFID	As submitted sample
CE250	GCXGC in Soil	DCM Extraction and GCxGC-FID	As submitted sample
SUBCON	Asbestos Soil	HSG248	Air Dried Sample
CE213	pH of Leachate	Potentiometric	-
CE061	W. Sol Metals	ICPOES	Air dried sample
CE265	Dissolved metals by ICP in Leachate	ICPMS	As submitted sample
CE264	Metals by ICP in Soil	ICPOES	Air dried sample
CE267	BTEX in Soils	Analysis by HSGCFID	As submitted sample
CE263	ChromiumVI by Discrete Analyser in Soil	Gallery	Air dried sample
CE257	Anions by Discrete Analyser in Leachate	Gallery	As submitted sample
CE051	PAH in Leachate	DCM Extraction and GCMS	As submitted sample
CE087	PAH in Soil	DCM Extraction and GCMS	As submitted sample
CE147	Cyanides in Leachate	Continuous Flow Analyser	As submitted sample
CE077	Cyanides in Soils	Continuous Flow Analyser	As submitted sample
CE283	Sulphide By DA in Leachate	Gallery Discrete Analyser	As submitted sample
CE208	Chromium Hexavalent in Soil	Colorimetry	Air dried sample
CE197	TOC In Soil	PRIMACS Combustion Analyser	Air dried sample
CE265	Hardness in Leachate	Calculation from Ca and Mg	As submitted sample

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

- a Sampling date not provided
- b Sampling time not provided (waters only)
- c Sample not received in appropriate containers
- d Storage Temperature
- e Headspace present in sample container
- f Sample exceeded sampling to receipt
- g Sample exceeded holding time(s)

Lab ref	Sample ID	Depth (m)	Deviating	Tests (Reason for deviation)
108108	WS01	0.00 - 0.31	N	
108109	WS02	0.00 - 0.40	N	
108110	WS02	0.60 - 1.00	N	
108111	WS03	0.10 - 0.45	N	
108112	WS05	0.12 - 0.30	N	
108113	WS06	0.00 - 0.13	N	
108114	WS06	0.23 - 0.53	N	
108115	WS07	0.20 - 0.59	N	
108116	WS08	0.00 - 0.14	N	
108117	WS08	0.14 - 0.30	N	
108118	WS09	0.00 - 0.15	N	
108119	WS09	0.15 - 0.24	N	
108120	WS10	0.07 - 0.35	N	
108121	WS11	0.10 - 0.40	N	
108122	WS12	0.10 - 0.37	N	
108123	WS13	0.36 - 1.00	N	
108124	WS14	0.28 - 0.80	N	
108125	WS15	0.10 - 0.53	N	

REPORT INFORMATION

Report No.:26-06051, issue number 1

Key	
U	ISO17025 Accredited Result
M	ISO17025 and MCERTS Accredited Result
N	Do not currently hold accreditation
^	MCERTS accreditation not applicable for sample matrix
*	ISO17025 accreditation not applicable for sample matrix
S	Subcontracted
I/S	Insufficient Sample
U/S	Unsuitable sample
N/T	Not tested
<	Means "less than"
>	Means "greater than"

LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.

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

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

The results relate only to the sample received.

Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Moisture Content Calculated on a Wet Weight basis (at 30°C)

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Where sampling was undertaken by Chemtech Environmental Limited it is outside the UKAS accreditation scope.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis (30°C). Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones and 'inert' material, where applicable.

'Client Reference', 'Sample ID', 'Sample Location', 'Sample Type', 'Depth', 'Sample Date' and 'Sample Time' information is provided by the customer

Sample Retention and Disposal

All soil samples will be retained for a period of 4 weeks from the point of receipt

All water samples will be retained for a period of 2 weeks from the point of Reporting

Charges may apply to extended sample storage

TPH Classification - 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	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

Unless specifically identified (noted as "(B)" in analyte name) all internal analysis performed at Durham site
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