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Date: 15.06.2026

Project No: GEO2024-6628

Project Title: Proposed Residential Development at Queens Park, Millom, Cumbria

Dear Troy,

Introduction

Geo Environmental Engineering Ltd (GEO) were commissioned by RG Parkins & Partners Ltd on behalf Thomas Armstrong (Construction) Limited ('the client'), acting on behalf of Homes Group, to carry out a supplementary programme of ground investigation works on a parcel of previously developed land located at Queens Park in the Cumbrian town of Millom. The site is centred on National Grid Reference e 316610, 480160, and a site location plan can be seen in Appendix I. Proposals have been made to develop the site with 47 no. residential dwellings in the near future. A proposed site development layout plan has been provided to GEO a copy of which can be seen in Appendix I.

The supplementary investigation works have been undertaken; 1) in order to confirm the ground conditions with more certainty for foundation designs, and 2) to confirm the presence of a localised 'hot spot' of elevated PAHs identified within the initial topsoil surfacing.

A Phase II Geo-Environmental Assessment report had been compiled for the site by 3e Consulting Engineers, ref. P17-498/P2, dated February 2019, and reference should be made to this in conjunction with this report.

Summary of Previous Findings

The previous investigation by 3e had identified localised and more variable superficial deposits at the locations of WS02 and WS06, and due to the potential for foundations to span between these deposits and the surrounding more competent clay a reduced bearing pressure was recommended. GEO have been requested to confirm the ground conditions with more certainty for foundation designs.

The results of the human health ground contamination risk assessment had identified a potential isolated 'hot spot' of PAHs (comprising Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(a,h)anthracene) at the location of WS01. At the time of the writing of the report, it was recommended that in order to more accurately assess the potential for the levels of PAH contamination within the topsoil at the location of WS01 was representative of an isolated 'hotspot' further sampling and screening of the topsoil from around this location would be required to evaluate the extent of the affected materials. Furthermore, in order to confirm that the identified PAH contamination is not more pervasive within the topsoil below the site as a whole, it was further recommended that additional sampling and screening of the shallow topsoil be completed across the site as a whole.

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In addition, following the subsequent demolition of the residential dwellings between 2020 and 2025, and when considering the age of the previous structures, GEO further recommended carrying out sampling and screening of the topsoil deposits across the site as a whole to ensure that sources of potential Asbestos contamination did not exist within the topsoil surfacing, in order that risks to future end users and construction workers could be dismissed and to confirm the suitability of the topsoil for reuse with private gardens as part of the proposed residential redevelopment of the site.

Scope of Works

As requested by the RG Parkins, GEO attended the site during April 2026 to carry out the supplementary investigation works comprising the sinking of 5 no. dynamic windowless sampling boreholes (WS2-1 to WS2-5) and 5 no. super heavy dynamic probes (DPSH) (DP2-1 to DP2-5). The borehole and dynamic probe locations were also targeted for laboratory contamination testing with surface samples of the initial topsoil also recovered from each location. In addition, 7 no. manually excavated trial holes were undertaken across the site, including the targeting of the area of WS01, to allow surface samples of the initial topsoil to be recovered for laboratory contamination testing.

The positioning of the test locations was chosen by RG Parkins and were set out on site by GEO using the national grid co-ordinates provided. The investigation positions can be seen on the Site Investigation Location Plan in Appendix II.

Ground Conditions

Detailed descriptions of the strata recorded at the borehole locations during the investigation works are presented on the borehole record sheets, copies of which can be seen in Appendix II.

Made ground (Topsoil) & Subsoil

The initial surfacing across the site comprised overgrown grass and dark brown very sandy clayey soil with fragments of brick and concrete to depths between 0.35m up to 0.85m below ground level (bgl).

In some locations, the made ground / topsoil was underlain by a thin layers of sandy clay and sand to depths of between 0.58m up to 1.33m before encountering competent superficial deposits (Devensian Till – clay).

Superficial (Drift) Deposits

The natural drift deposits predominately comprise stiff reddish-brown sandy gravelly clay, underlain in turn by stiff medium brown silty poorly laminated clay and very dense brown gravelly sand with occasional cobbles to the terminal depths of the boreholes. The clay deposits were noted to be interbedded with a band of sand between the depths of 2.00m to 2.43m, and the clay deposits at the interface with the overlying sand appear to have been slightly softened / weakened in strength by the presence of water.

Solid Geology (bedrock)

Bedrock deposits were not encountered during these investigation works.

Groundwater & Stability Observations

When considering the nature of the clay deposits encountered, the boreholes generally remained dry during their progression and on completion, with the exception of a water seepage recorded at a depth of 0.90m within WS2-2 and a water strike recorded in WS2-5 at a depth of 2.00m upon encountering a sand layer.

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Groundwater levels recorded during the investigation are considered indicative and may be subject to seasonal variation.

When considering the groundwater levels observed during this investigation period, it is considered prudent to allow for groundwater control measures (i.e. sump pumping equipment) during any future construction works to deal with any ingresses, particularly during wetter periods of the year, especially where any granular deposits are encountered across the site. It is possible that ground instability could occur within excavations which extend to and beyond the depths of where groundwater has been recorded, due water inflow leading to the generation of 'running sand'.

Excavations undertaken within sand deposits could lead to sidewall instability and the potential for over-dig. It is therefore recommended that allowance is made for trench wall support and that excavations remain open for as short a period as practicably possible as the materials will likely deteriorate once exposed.

Insitu Testing

Standard Penetration Test Results

In total 2 no. insitu Standard Penetration Tests (SPTs) were completed at the base of boreholes WS2-1 and WS2-3, where sand deposits were recorded at the terminal depths of the boreholes (4.00m bgl). The results of the SPTs are presented on the borehole logs attached to this report.

The SPT results recorded 50 blows for limited penetration, indicating the presence of very dense strata.

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 attached to this report.

The shear vane test results within the clay deposits have recorded undrained shear strength values (C_u) ranging between 56kN/m² to >120kN/m², which is indicative of medium and high strength strata.

Dynamic Probing (DPSH)

The Dynamic Probe test is used to determine the resistance of soils in-situ to the intermittent penetration of a cone, driven dynamically in a standard manner and in accordance with BS1377 – Part 9:2025. The equipment consists of a 90° cone which may be sacrificial or retained for recovery, a series of extension or driving rods, a torque wrench and a driving device.

The extension rods used in the test are 1-metre-long, manufactured from 35mm diameter heat-treated alloy steel, with graduations marked every 100mm along their length. The rods are flush-coupled and designed such that rod ends butt-up fully against each other when driving, forming a continuous jointed series with a straight axis. The driving device may be an Automatic Trip Hammer as part of a Dynamic Sampling drilling rig or a purpose-designed Probing Rig with characteristics conforming to BS1377 – Part 9.

As no samples are recovered during the probing, it is not possible to determine what the blow counts relate to within the deeper strata present (i.e. beyond the maximum depths of the trial pits), however, they provide a good indication of the relative strength / density of the soil strata present.

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The blow count is recorded for every 100mm of driving (N100) and the results presented as a plot of blow count against depth. Where the DPSH is utilised, the sum total of three N100 increments (c.300mm penetration – N300 value) correlates to an equivalent SPT “N” value. The N100 values are presented on the In-situ Dynamic Probe Record Sheets which can be seen in Appendix II.

The results have highlighted that near surface (between 0m and 1.5m) there is very low resistance, with typical N300 values ranging between 3 and 9, suggesting the presence of soft to firm strata.

At depths from c.1.5m to 4.0m, the N300 values show a gradual increase to 6 to 18, suggesting firming strata becoming dense where the deposits are believed to transition to gravelly sand with cobbles (up to an N300 value of 45).

Beyond the depths of c.4.0m to 6.5m, there is a clear rise in the N300 values ranging between 30 up to >90, with DP2-2 showing very high values (90 to 130). These high values recorded towards the base of the dynamic probes are potentially suggestive of the presence of the underlying solid geology, recorded as calcareous mudstone.

Based on the results of the dynamic probes, it would suggest that the upper 3 to 4m of the superficial deposits is geotechnically poor, displaying very low, low and medium strength characteristics for the clay deposits positively identified in the boreholes. However, this would not appear to correlate with the findings of the insitu hand shear vane tests, whereby the clay deposits are typically high strength in nature.

Laboratory Geotechnical Testing

Determination of Moisture Content and Atterberg Limits

Geotechnical testing was completed in general accordance with BS EN ISO 17892–1:2014 and BS1377–2:2022 by Northumberland County Council Highways Laboratory, Cramlington, Northumberland (NCC), a UKAS and MCERTS accredited laboratory.

In total 5 no. samples of the natural clay deposits recovered from the investigation positions across the site area at depths of between 1.00m and 1.50m bgl have been subjected to the following laboratory based geotechnical tests.

- Moisture Content
- Atterberg Test (Determination of Liquid and Plastic Limit)

The results of the testing are summarised below and are presented in the NCC report (ref: S2355), a copy of which can be seen in Appendix III.

- Natural moisture contents ranged between 15% and 19.2%
- Liquid limits of between 30% and 43%, and plastic limits of between 17% and 21% were recorded
- Plasticity indices of between 13% and 24% are noted
- The results indicate the clays are predominantly of moderate plasticity, occasionally low

When taking into account the amount passing the 425um sieve, the clays display a low and medium volume change potential. As such, the clay deposits present are likely to 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.

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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.

Determination of pH and water-soluble sulphate

Testing was completed in general accordance with BS1377-1:2016 and BS1377-3:2018+A1:2021 by Normec DETS Limited of Consett, County Durham (DETS), a UKAS and MCERTS accredited laboratory.

In total 6 no. samples of the 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: 26-10294) a copy of which can be seen in Appendix III.

From the results, the following observations can be seen.

- Water Soluble Sulphate (SO₄) levels were recorded as ranging from 18mg/l up to 96mg/l
- pH values in the soils ranged from 7.7 to 8.2 (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 results indicate occasionally slightly acidic ground conditions, therefore based on brownfield locations and mobile water ground conditions, the site should be assessed as an ACEC class of AC-1.

Foundation & Geotechnical Recommendations

The recommendations provided are based on current ground levels and assume the use of shallow conventional strip foundations (i.e. 600mm wide footings with nominal mesh reinforcement based at a minimum founding depth of 0.90m (founded in clay) below ground level). If changes in existing ground levels are envisaged as part of the proposed redevelopment of the site or widened strip footings (>600mm) are considered, then a reassessment of the founding strata and allowable bearing capacity should be undertaken by GEO prior to progressing with foundation designs and on-site construction.

Topsoil and made ground deposits are variable and potentially compressible, and therefore all foundations should generally be taken through the initial topsoil and made ground horizons into natural strata.

Typically, new foundations for Plot 1 to 8 and 25 to 47 should be taken down to depths of between 0.90m and 1.00m bgl based within the natural stiff clay deposits where a maximum allowable pressure of 180kN/m² is available. Foundation excavations may need to be locally deepened where the presence of shallow sand deposits is encountered during the construction phase at the founding depth, in order to found entirely on a homogenous bearing medium (i.e. clay), or where potential delamination of the overlying clay with underlying sand deposits may occur, for example at the location of WS2-2 (GEO) where excavations may need to extend to depths of 1.25m to found in clay. Some foundations may need to be locally stepped to follow the contour of the clay founding strata.

For Plots 14 to 24 and based on the findings of WS03 to WS05 (3e) and WS2-5 (GEO), foundations should be taken down to depths of c.1.33m bgl to found within the initially firm clay where a maximum allowable pressure of 110kN/m² is available.

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However, in the vicinity of WS02 which affects Plots 9 to 13, if sand is encountered within foundation excavations, and if shallow footings are to be based within these sand deposits, then the maximum allowable bearing pressure should be limited to 60kN/m², based on the insitu geotechnical results recorded at the location of DP2-2.

When considering the variability in the ground conditions (presence of sand and clay) and the geotechnical results for WS02, WS03 and DP2-2, it may be beneficial for plot specific targeted works to be undertaken for Plots 9 to 13 to define the ground conditions with even more accuracy.

Since some variability in the ground conditions has been recorded between the borehole locations, it would be prudent to make an allowance for all foundation excavations to be inspected by a suitably qualified Geotechnical Engineer during the construction phase of works to verify that the correct founding strata, depths and bearing capacities have been achieved, and to ensure there are no significant changes or variations in the ground conditions below parts of the site where investigation positions have not been sunk.

Foundations would need to be deepened to take into consideration the presence of existing, proposed or recently removed vegetation to avoid the effects of future shrinkage and swelling of the natural clay deposits, and as such minimum foundation depths may need to be increased to take this into account. Reference should be made to BS5837:2012 – Trees in relation to design, demolition and construction – Recommendations.

Supplementary Ground Contamination Risk Assessment

The previous investigation works completed by 3e had identified a potential isolated ‘hot spot’ of PAHs (comprising Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(a,h)anthracene) at the location of WS01. It was recommended that in order to more accurately assess the potential for the levels of PAH contamination within the topsoil at the location of WS01 to be representative of an isolated ‘hotspot’ further sampling and screening of the topsoil from around this location would be required to delineate the lateral extent of the impacted topsoil. Furthermore, in order to confirm that the identified PAH contamination is not more pervasive within the topsoil below the site as a whole, it was further recommended that additional sampling and screening of the shallow topsoil be completed across the site as a whole.

In addition, GEO further recommended carrying out sampling and screening of the topsoil deposits across the site as a whole to ensure that sources of potential Asbestos contamination did not exist within the topsoil surfacing following the subsequent demolition of the residential dwellings between 2020 and 2025, in order that risks to future end users and construction workers could be dismissed, as well as confirming the suitability of the topsoil for reuse with private gardens as part of the proposed residential redevelopment of the site.

As such, 7 no. manually excavated trial holes were undertaken across the site (TPs 01 to 07), including the targeting of the area of WS01, and also the borehole and dynamic probe locations, to allow surface samples of the initial topsoil to be recovered for laboratory contamination testing for Speciated PAHs and Asbestos screening.

The samples were subjected to analysis at Chemtech Environmental of Consett, County Durham (Chemtech), a UKAS and MCERTS accredited laboratory.

The full catalogue of soil screening results and test detection limits can be seen in the Chemtech report (ref: 26-04771) a copy of which can be seen in Appendix III.

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No visual or olfactory evidence of fuel/oil contamination (no staining, odour or free product) or 'ashy' type materials (ash, cinder and clinker) was encountered within the topsoil / made ground deposits. In addition, no visual evidence of asbestos containing materials (ACMs) or visible bundles of asbestos fibres were identified during the fieldworks.

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.

- | | | | |
|--|---------------------|---------------------|---|
| ■ <i>Residential</i>
(with or without
homegrown produce) | ■ <i>Commercial</i> | ■ <i>Allotments</i> | ■ <i>Public Open Space</i>
(Residential or Park) |
|--|---------------------|---------------------|---|

It is understood that the proposed development will incorporate the construction of a 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.

PAH Contamination Risk Assessment

The maximum concentration values for the organic analytes tested for (i.e. PAH congeners) 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) – The LQM/CIEH S4UL assessment levels utilised by GEO are copyrighted by Land Quality Management Limited reproduced with permission; Publication Number S4UL3481

Taking in to account the previous TOC values of the soils on the site, this assessment has been completed utilising a 1% SOM. A summary of the findings can be seen in the Table on the following page.

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 in general, the presence of elevated PAH contamination does not appear to be pervasive or widespread across the site area. As such the majority of the topsoil / made ground deposits present do not pose a risk to human health.

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PAH Congeners	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Acenaphthene	210 ⁽¹⁾	10	0.233
Acenaphthylene	170 ⁽¹⁾	10	0.982
Anthracene	2,400 ⁽¹⁾	10	0.772
Benzo(a)anthracene	7.2 ⁽¹⁾	10	1.990
Benzo(a)pyrene	2.2 ⁽¹⁾	10	2.310 (TP04)
Benzo(b)fluoranthene	2.6 ⁽¹⁾	10	3.190 (TP04)
Benzo(ghi)perylene	320 ⁽¹⁾	10	1.420
Benzo(k)fluoranthene	77 ⁽¹⁾	10	1.330
Chrysene	15 ⁽¹⁾	10	3.050
Dibenzo(ah)anthracene	0.24 ⁽¹⁾	10	0.337 (TP04)
Fluoranthene	280 ⁽¹⁾	10	10.100
Fluorene	170 ⁽¹⁾	10	1.410
Indeno(123cd)pyrene	27 ⁽¹⁾	10	2.340
Naphthalene	2.3 ⁽¹⁾	10	0.440
Phenanthrene	95 ⁽¹⁾	10	14.200
Pyrene	6.20 ⁽¹⁾	10	7.080

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

However, the previous investigation by 3e had identified a potential localised 'hot spot' at the location of WS01. A sample taken in close proximity to this location (TP07) identified levels of PAHs below the human health assessment criteria values adopted for this site. This suggests a small localised 'hot spot' around the location of WS01.

Marginally elevated concentrations of Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(ah)anthracene were however recorded at the location of TP04, representing a second localised 'hot spot' of PAH contamination.

The actual extent of the two PAH 'hot spots' at the locations of WS01 and TP04 has not yet been proven by these works and as such further delineation works will be required, so that these impacted soils can be removed from site in order to negate the risks posed to future end users. This will need to be undertaken before the development / groundworks commence.

Asbestos Risk Assessment

In total 10 no. samples of the topsoil deposits from across the site 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.

Conclusions and Recommendations

Generally, it is felt that the topsoil deposits present over most of the site area can remain onsite without representing a significant or unacceptable risk towards future end-users.

However, two localised 'hot spots' of some elevated PAH congeners at the locations of WS01 (3e) and TP04 (GEO) which typically will require further delineation works, followed by excavation and removal from site.

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The remedial approach recommended above should be detailed in a Phase III Remediation Strategy and agreed with the LPA prior to commencing with the development, and to allow the discharge of any relevant outstanding planning conditions.

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. It is therefore recommended that a “watching brief” be applied to ensure that if ground conditions vary from those identified during this investigation, then advice should be sought from a suitably qualified and experienced Geo-Environmental Engineer.

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 site works or development on site.

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If there are any queries, please do not hesitate to contact Geo Environmental Engineering Ltd.

Yours Faithfully


.....
Richard Stripp BSc. (Hons) MSc. FGS MEnvSc.
Associate



GEO

Environmental Engineering

Appendices:

Appendix I

- Site Location Plan
- Proposed Development Plan

Appendix II

- Site Investigation Location Plan
- Borehole & Dynamic Probe Record Sheets

Appendix III

- Laboratory Geotechnical Testing Results (NCC & DETS)
- Laboratory Contamination Testing Results (Chemtech)

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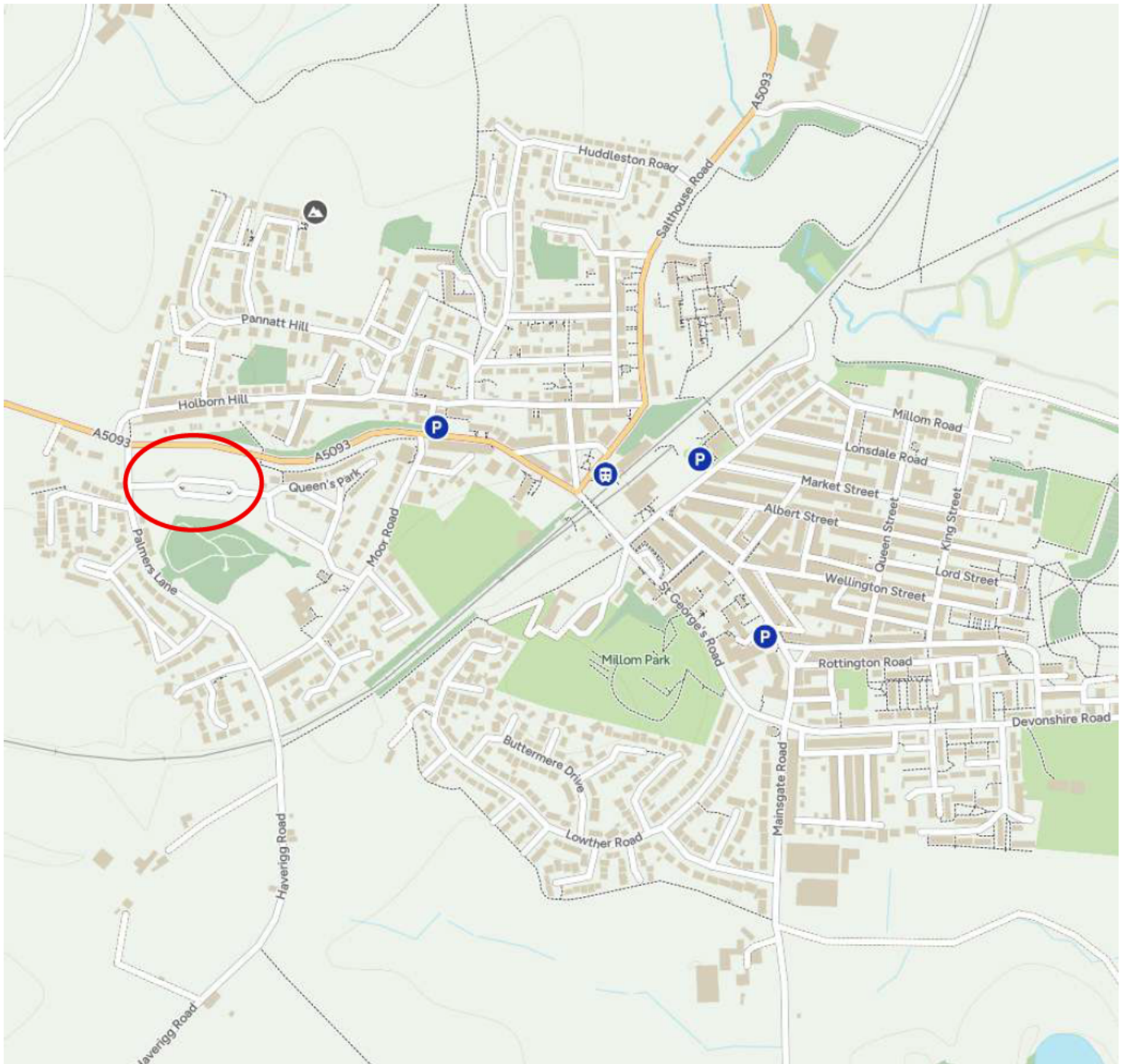
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Company No.: 07180338
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Appendix I

- Site Location Plan
- Proposed Development Plan

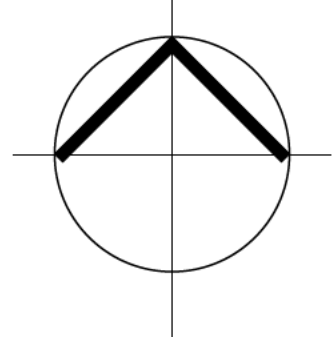
GEO2024-6628: Queens Park, Millom, Cumbria
Site Location Plan





Site Plan

Queen's Park, Millom



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no 422140

Drawing
Site Plan

Status
For Comment

Project
Residential Development
Queen's Park, Millom

Client
Thomas Armstrong
(Construction) Ltd

RIBA stage
2 - Concept

Date
12/25

Drawn by
BG

Scale @ A1
1:200

Computer No.
P01

Drawing Number
25034-02

Revision
F

Appendix II

- Site Investigation Location Plan
- Borehole & Dynamic Probe Record Sheets

GEO2024-6628: Queens Park, Millom, Cumbria
Site Investigation Location Plan





GEO Environmental Engineering

Dynamic (Windowless) Sampler

WS2-1

Sheet 1 of 1

Hole Type
WLS

Easting
316468.27

Northing
480229.18

Ground Level (m)

Scale
1:25

Project Name
Queens Park, Millom

Project No.
GEO2024-6628

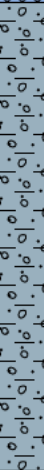
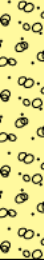
Start Date
20.04.2026

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 (thickness) (m)	Strata			
		Depth (m)	Type/ Ref	Results			Legend	Description		
		0.00-0.40	ES			(0.40)		Overgrown grass overlying dark brown sandy clayey soil [MADE GROUND]		
						0.40		Stiff (high strength) reddish-brown, occasional orange and grey sandy gravelly CLAY [DEVENSIAN TILL]	0.5	
		0.60	HV	84 (kPa)						
		1.00	HV	94 (kPa)					1.0	
		1.00	B			(1.55)				
		1.30	HV	102 (kPa)					1.5	
		1.85	HV	92 (kPa)		1.95		Stiff (high strength) medium brown silty poorly laminated CLAY with occasional sand lenses [DEVENSIAN TILL]	2.0	
		2.20	HV	>120 (kPa)						
		2.55	HV	110 (kPa)		(1.53)				2.5
		2.90	HV	80 (kPa)						3.0
		3.13	HV	60 (kPa)						
		3.43	HV	74 (kPa)		3.48		Very dense brown gravelly SAND with occasional cobbles [DEVENSIAN TILL]	3.5	
		4.00	SPT(C)	N=50 for 235mm (14,11/15,15,15,5 for 10mm)		(0.87)				4.0
				4.35		End of Borehole at 4.35m		4.5		
								5.0		

Remarks

Method, Plant, Stability, Dimensions
0.00 - 4.35m WLS Competitor Dart Rig

Logger
RS

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



Dynamic (Windowless) Sampler

WS2-1
SUPPLEMENTARY INFO

Hole Type WLS	Easting 316468.27	Northing 480229.18	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 20.04.2026	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
4.00 (C)					N=50 for 235mm (14,11/15,15,15,5 for 10mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.40	ES		
1.00	B		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.35m WLS Competitor Dart Rig	Logger RS
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL

Dynamic (Windowless) Sampler

Hole Type WLS	Easting 316468.27	Northing 480229.18	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 20.04.2026	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 - 4.35m WLS Competitor Dart Rig	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



GEO Environmental Engineering

Dynamic (Windowless) Sampler

WS2-2

Sheet 1 of 1

Hole Type WLS	Easting 316469.19	Northing 480182.99	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 20.04.2026	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
		0.00-0.35	ES			(0.35)		Overgrown grass overlying dark brown sandy clayey soil with occasional fragments of brick and concrete [MADE GROUND]
						0.35 (0.23)		Light brown sandy CLAY and SAND [DEVENSIAN TILL]
						0.58 (0.42)		Stiff (high strength) reddish-brown sandy gravelly CLAY [DEVENSIAN TILL]
		0.78	HV	100 (kPa)				
		1.00	B			1.00 (0.25)		Brown silty fine to coarse SAND [DEVENSIAN TILL]
						1.25		Stiff (high strength) reddish-brown sandy gravelly CLAY [DEVENSIAN TILL]
		1.35	HV	94 (kPa)				
		1.66	HV	86 (kPa)				
		2.00	HV	90 (kPa)				
		2.12	HV	90 (kPa)		(1.75)		
		2.42	HV	100 (kPa)				
		2.82	HV	76 (kPa)				
						3.00		End of Borehole at 3.00m

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.00m WLS Competitor Dart Rig Borehole collapsed at 1.00m	Logger RS
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS2-2
SUPPLEMENTARY INFO

Hole Type WLS	Easting 316469.19	Northing 480182.99	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 20.04.2026	End Date	

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

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
0.70				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
0.70	0.90		

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.35	ES		
1.00	B		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 3.00m WLS Competitor Dart Rig Borehole collapsed at 1.00m	Logger RS
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL

Hole Type WLS	Easting 316469.19	Northing 480182.99	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 20.04.2026	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 - 3.00m WLS Competitor Dart Rig Borehole collapsed at 1.00m	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



GEO Environmental Engineering

Dynamic (Windowless) Sampler

WS2-3

Sheet 1 of 1

Hole Type

WLS

Easting

316498.95

Northing

480174.89

Ground Level (m)

Scale

1:25

Project Name

Queens Park, Millom

Project No.

GEO2024-6628

Start Date

21.04.2026

End Date

Client

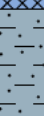
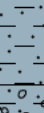
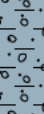
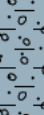
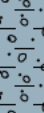
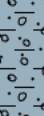
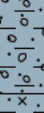
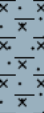
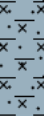
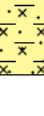
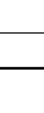
Thomas Armstrong (Construction) Ltd

Consultant

Richard Stripp

Contractor

Geo Environmental Engineering Ltd

Inst/ Backfill	Water Levels	Samples and Tests		Level (m)	Depth (thickness) (m)	Strata			
		Depth (m)	Type/ Ref			Results	Legend		Description
		0.00-0.37	ES				Overgrown grass overlying dark brown sandy clayey soil [MADE GROUND]		
						(0.37)			
		0.45	HV	76 (kPa)		0.37		Firm to stiff (medium & high strength) reddish-brown slightly sandy CLAY [DEVENSIAN TILL]	0.5
						(0.63)			
		0.80	HV	70 (kPa)					
						1.00			1.0
		1.15	HV	120 (kPa)				Stiff (high strength) reddish-brown sandy gravelly CLAY [DEVENSIAN TILL]	
									
		1.50	HV	92 (kPa)					1.5
									
		1.85	HV	120 (kPa)		(1.90)			2.0
									
		2.20	HV	98 (kPa)					2.5
									
		2.55	HV	102 (kPa)					
2.85	HV	82 (kPa)		2.90		Firm (medium strength) medium brown slightly silty slightly sandy poorly laminated CLAY [DEVENSIAN TILL]	3.0		
									
3.13	HV	68 (kPa)							
				(0.95)			3.5		
3.40	HV	56 (kPa)							
3.75	HV	64 (kPa)		3.85					
4.00	SPT(C)	N=50 for 180mm (2,2/12,24,14 for 30mm)		(0.48)		Very dense brown slightly clayey silty fine to medium 'wet' SAND [DEVENSIAN TILL]	4.0		
				4.33					
End of Borehole at 4.33m								4.5	
								5.0	

Remarks

Method, Plant, Stability, Dimensions

0.00 - 4.33m WLS Competitor Dart Rig

Logger

RS

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



Dynamic (Windowless) Sampler

WS2-3
SUPPLEMENTARY INFO

Hole Type WLS	Easting 316498.95	Northing 480174.89	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	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
4.00 (C)					N=50 for 180mm (2,2/12,24,14 for 30mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.37	ES		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 4.33m WLS Competitor Dart Rig	Logger RS
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		

Hole Type WLS	Easting 316498.95	Northing 480174.89	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	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 - 4.33m WLS Competitor Dart Rig	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Environmental Engineering

Dynamic (Windowless) Sampler

WS2-4

Sheet 1 of 1

Hole Type WLS	Easting 316558.84	Northing 480167.97	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	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			Legend	Description
		0.00-0.60	ES				Overgrown grass overlying dark brown sandy clayey soil [MADE GROUND]
					(0.60)		
		0.70	HV		0.60 (0.05) 0.65		Light brown slightly silty fine SAND [DEVENSIAN TILL]
		0.95 1.00	HV B				Firm (medium strength) becoming stiff (high strength, occasionally medium strength) reddish-brown sandy slightly gravelly CLAY [DEVENSIAN TILL]
		1.13	HV				
		1.50 1.50	HV ES				
		1.93	HV				
		2.17	HV				
		2.50	HV				
		2.93	HV		(4.35)		
		3.15	HV				
		3.50	HV				
		3.85	HV				
		4.30	HV				
		4.70	HV				
					5.00		
							End of Borehole at 5.00m

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m WLS Competitor Dart Rig	Logger RS
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL



Dynamic (Windowless) Sampler

WS2-4

SUPPLEMENTARY INFO

Hole Type WLS	Easting 316558.84	Northing 480167.97	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

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

Sample ID	Type	Water Level (m)	Remarks
0.00-0.60	ES		
1.00	B		
1.50	ES		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m WLS Competitor Dart Rig	Logger RS
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Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL

Hole Type WLS	Easting 316558.84	Northing 480167.97	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	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 - 5.00m WLS Competitor Dart Rig	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	



Environmental Engineering

Dynamic (Windowless) Sampler

WS2-5

Sheet 1 of 1

Hole Type
WLS

Easting
316587.93

Northing
480227.31

Ground Level (m)

Scale
1:25

Project Name
Queens Park, Millom

Project No.
GEO2024-6628

Start Date
21.04.2026

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 (thickness) (m)	Strata			
		Depth (m)	Type/ Ref	Results			Legend	Description		
		0.00-0.85	ES			(0.85)		Overgrown grass overlying dark brown very sandy clayey soil with brick and concrete rubble [MADE GROUND]	0.5	
		1.00	B			(0.48)		Light brown gravelly SAND [DEVENSIAN TILL]	1.0	
		1.45 1.50	HV B	56 (kPa)		(0.67)		Initially firm (medium strength) becoming stiff (high strength) reddish-brown slightly sandy slightly gravelly CLAY [DEVENSIAN TILL]	1.5	
		1.83	HV	>120 (kPa)		2.00		Brown gravelly fine to coarse SAND [DEVENSIAN TILL]	2.0	
		2.65	HV	>120 (kPa)		2.43		Firm (medium strength) and stiff (high strength) reddish-brown sandy slightly gravelly CLAY [DEVENSIAN TILL]	2.5	
										3.0
		3.50	HV	56 (kPa)		(2.57)			3.5	
										4.0
		4.50	HV	76 (kPa)						4.5
										5.0
							5.00		End of Borehole at 5.00m	

Remarks

Method, Plant, Stability, Dimensions
0.00 - 5.00m WLS Competitor Dart Rig

Logger
RS

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



Dynamic (Windowless) Sampler

WS2-5
SUPPLEMENTARY INFO

Hole Type WLS	Easting 316587.93	Northing 480227.31	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom		Project No. GEO2024-6628	Start Date 21.04.2026	End Date
Client Thomas Armstrong (Construction) Ltd		Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd	

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
0.95				
2.00				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
0.95			Seepage at 0.95m
2.00	0.95		

Sample Details

Sample ID	Type	Water Level (m)	Remarks
0.00-0.85	ES		
1.00	B		
1.50	B		

Remarks	Method, Plant, Stability, Dimensions 0.00 - 5.00m WLS Competitor Dart Rig	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	

Hole Type WLS	Easting 316587.93	Northing 480227.31	Ground Level (m)	Scale 1:25
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	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 - 5.00m WLS Competitor Dart Rig	Logger RS
	Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	

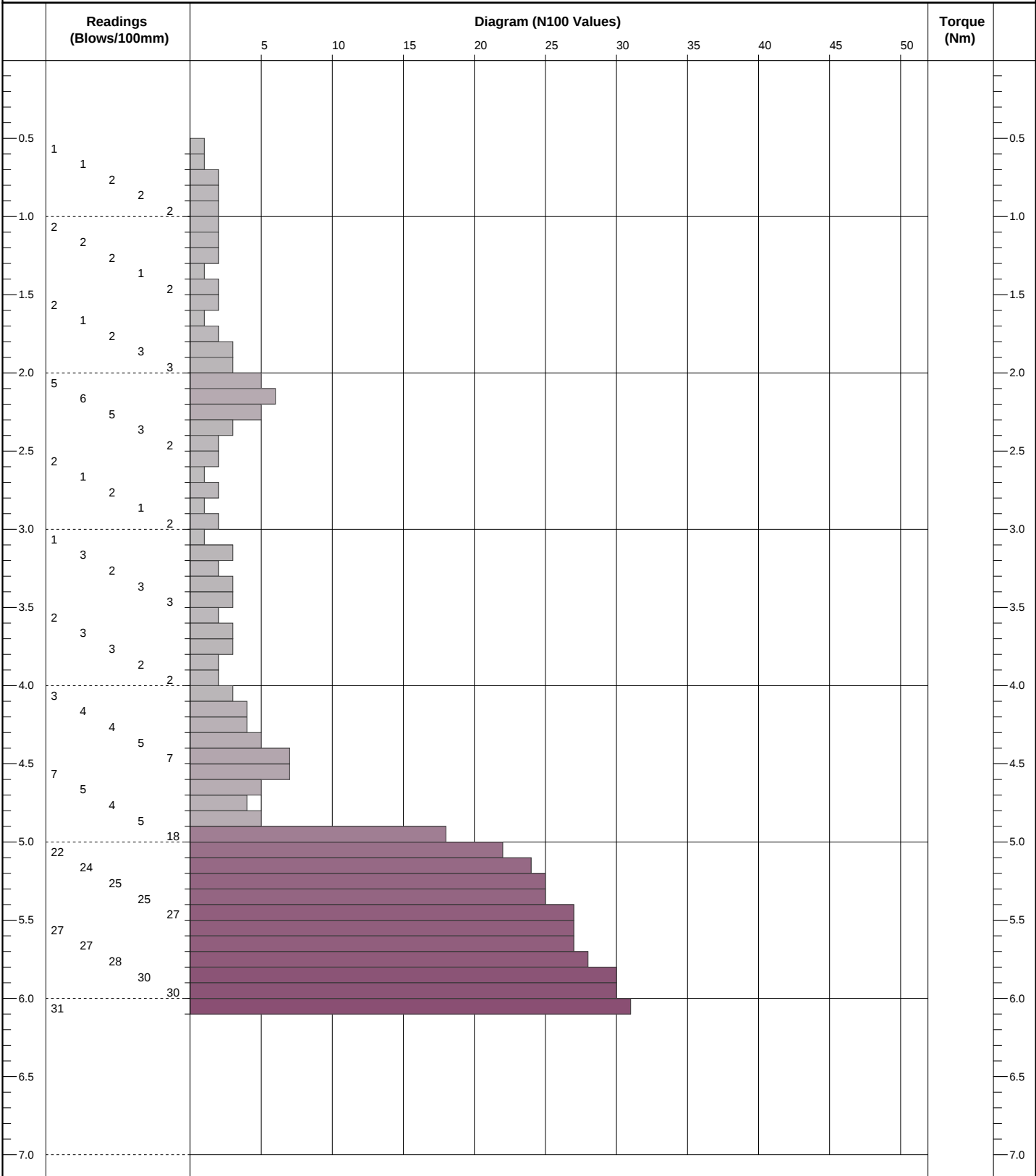


Dynamic Probe

DP2-1
Sheet 1 of 1

Probe Type DPSH	Easting 316493.52	Northing 480226.06	Ground Level (m)	Scale 1:35
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant 0.00 - 6.00m DP Competitor Dart Rig	Logger RS
	Hammer Weight (kg)	65.5
	Hammer Drop (mm)	750
	Cone Diameter (mm)	50
	Cone Angle	90
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	Rod Diameter (mm)	35
	Damper	None

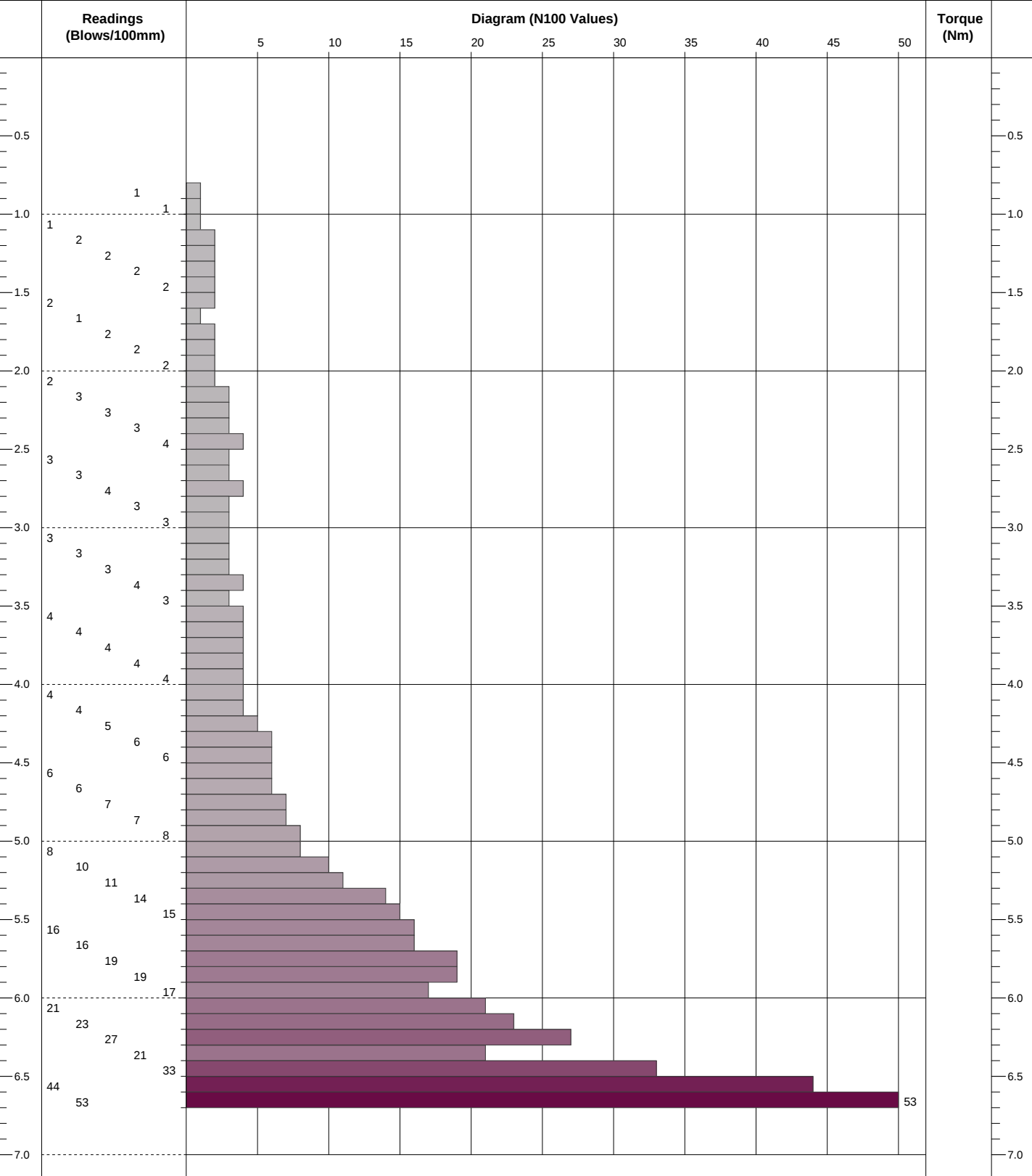


Dynamic Probe

DP2-2
Sheet 1 of 1

Probe Type DPSH	Easting 316543.15	Northing 480229.19	Ground Level (m)	Scale 1:35
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant 0.00 - 6.60m DP Competitor Dart Rig	Logger RS
	Hammer Weight (kg) 750 Hammer Drop (mm) 50 Cone Diameter (mm) 90 Cone Angle 35 Rod Diameter (mm) None Damper	
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL		



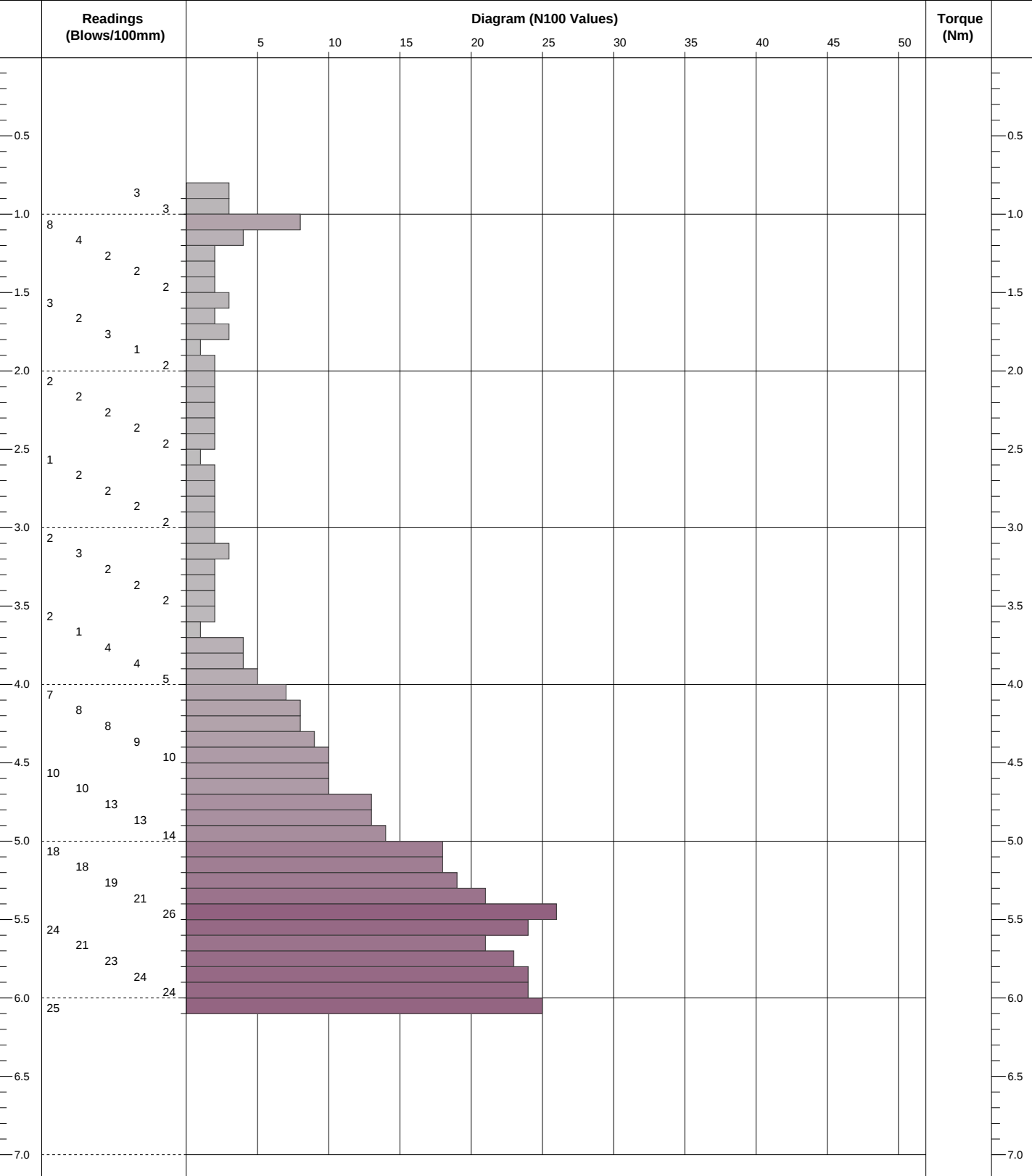
Dynamic Probe

DP2-3

Sheet 1 of 1

Probe Type DPSH	Easting 316617.48	Northing 480219.27	Ground Level (m)	Scale 1:35
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

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



Remarks	Method, Plant 0.00 - 6.00m DP Competitor Dart Rig	Logger RS
	Hammer Weight (kg) 750	
	Cone Diameter (mm) 50	
	Cone Angle 90	
	Rod Diameter (mm) 35	
Checked By: Richard Stripp Approved By: Curtis Evans Status: FINAL	Damper None	



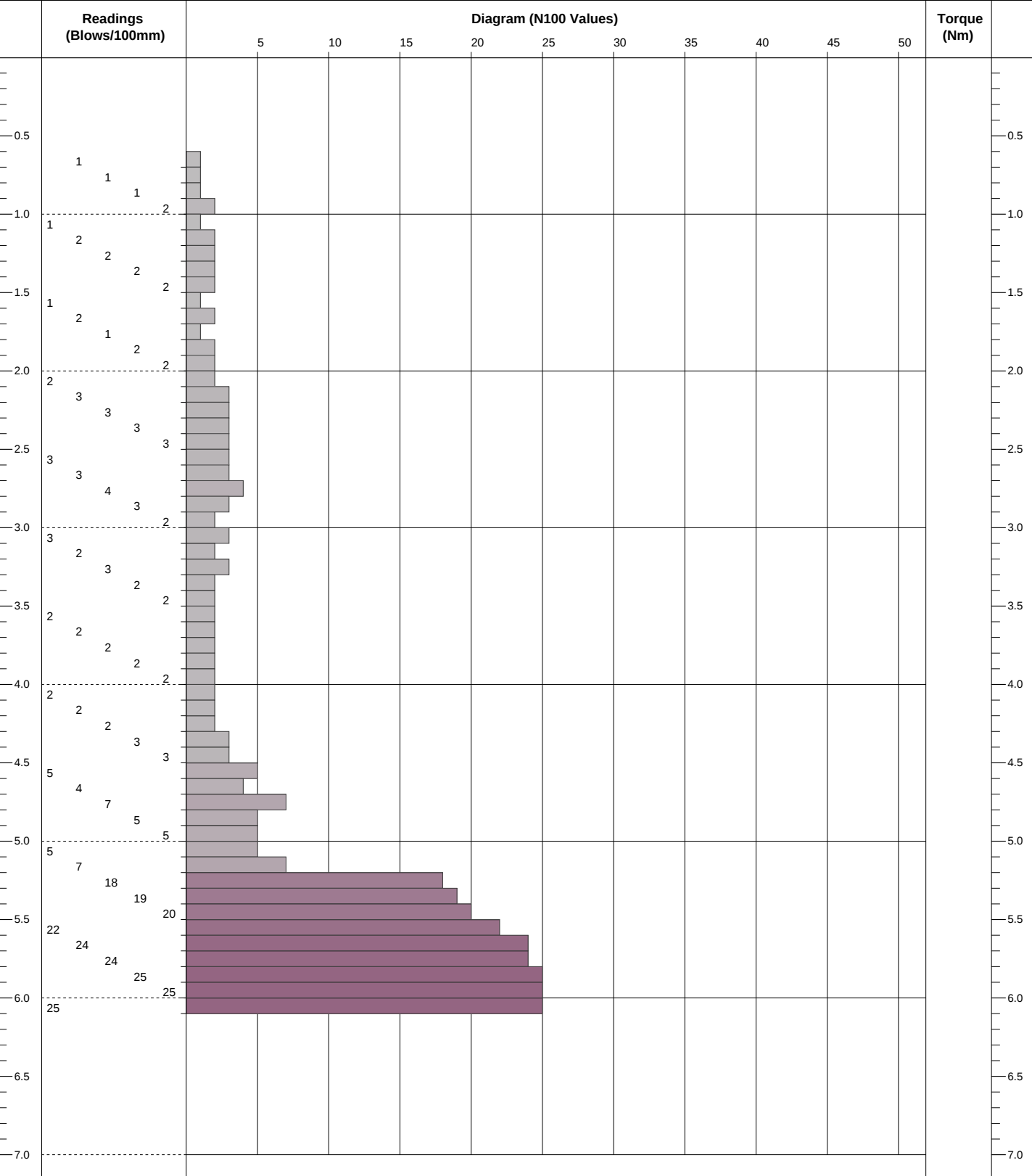
Dynamic Probe

DP2-4

Sheet 1 of 1

Probe Type DPSH	Easting 316524.95	Northing 480169.67	Ground Level (m)	Scale 1:35
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant 0.00 - 6.00m DP Competitor Dart Rig	Logger RS
	Hammer Weight (kg) 750 Hammer Drop (mm) 50 Cone Diameter (mm) 90 Cone Angle 35 Rod Diameter (mm) None Damper	

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

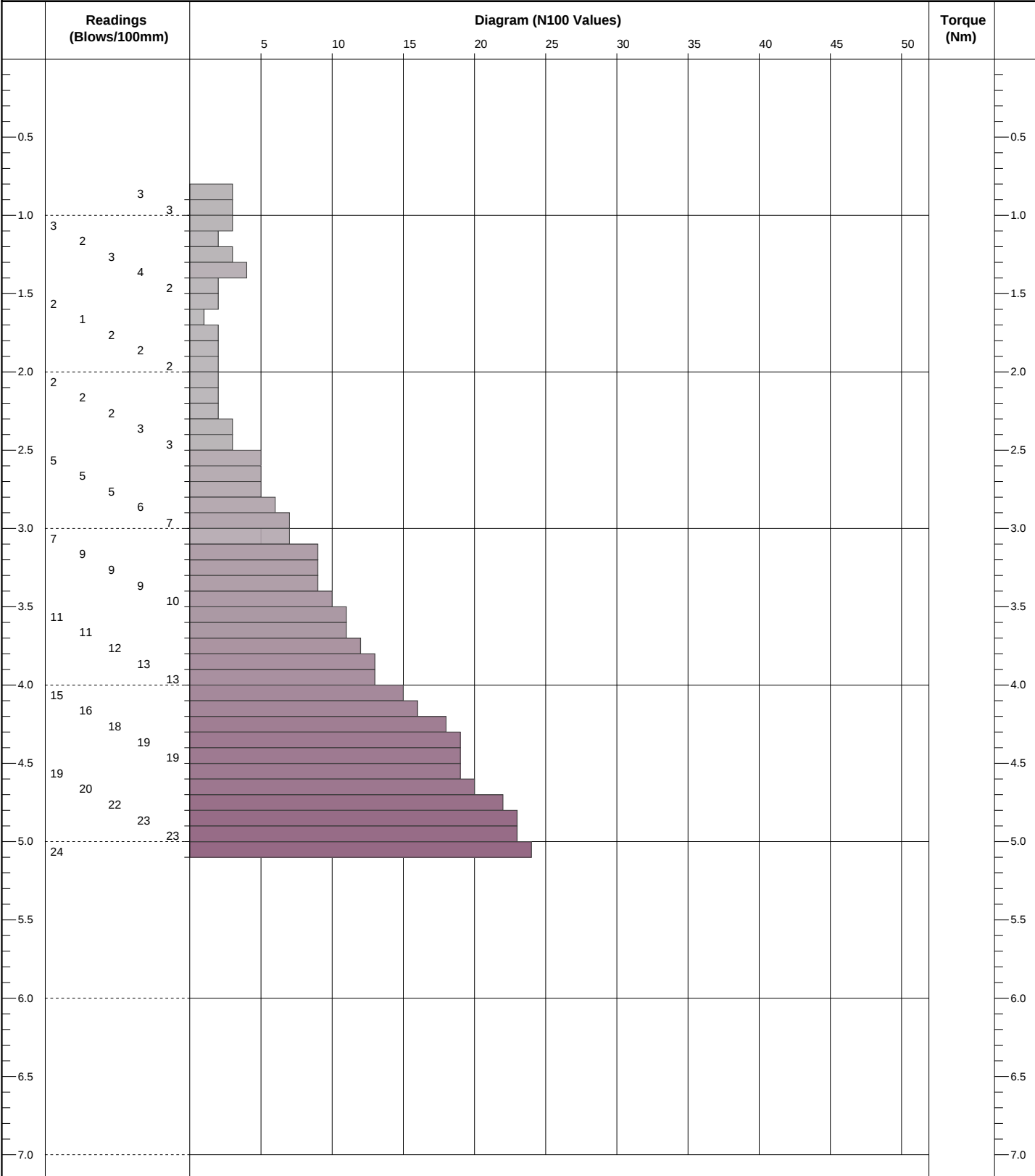


Dynamic Probe

DP2-5
Sheet 1 of 1

Probe Type DPSH	Easting 316591.17	Northing 480161.74	Ground Level (m)	Scale 1:35
Project Name Queens Park, Millom	Project No. GEO2024-6628	Start Date 21.04.2026	End Date	

Client Thomas Armstrong (Construction) Ltd	Consultant Richard Stripp	Contractor Geo Environmental Engineering Ltd
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Remarks	Method, Plant 0.00 - 5.00m DP Competitor Dart Rig	Logger RS
	Hammer Weight (kg) 750	
	Cone Diameter (mm) 50	
	Hammer Drop (mm) 750	
Checked By: Richard Stripp	Approved By: Curtis Evans	Status: FINAL

Appendix III

- Laboratory Geotechnical Testing Results (NCC & DETS)
- Laboratory Contamination Testing Results (Chemtech)



Highways Laboratory
Bassington Drive • Cramlington • Northumberland • NE23 8AJ
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: **GEO2024-6628 Queens Park, Millom**
Supplier/Source: **Site**
Date Sampled: **22/04/2026**
Date Received: **27/04/2026**
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

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

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



Highways Laboratory
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Report/Sample ID No: **S2355/01**

Location: WS2-1 at 1.00m
Material Type: Brown red slightly sandy CLAY with very occasional gravel

Test Results

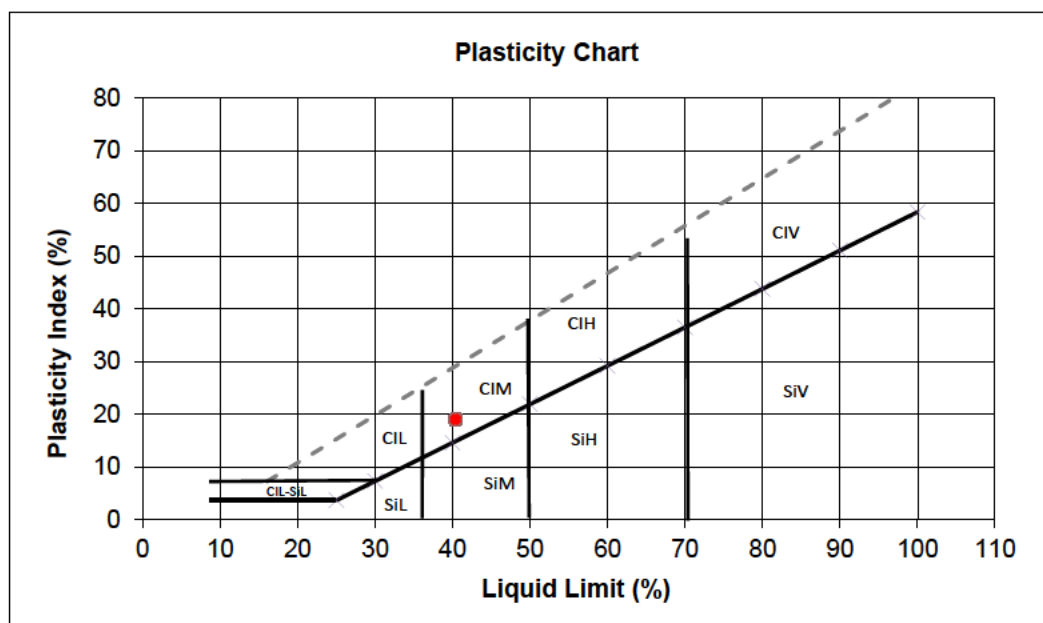
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **16.9**

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 (%)	40
Plastic Limit (%)	21
Plasticity Index (%)	19
Passing 425mic (%)	93
Soil Classification:	CIM



Remarks: None

Start of test date: 29/04/2026 End of test date: 09/05/2026 Report Date: 09/05/2026



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Report/Sample ID No: **S2355/02**

Location: WS2-2 at 1.00m
Material Type: Brown slightly sandy CLAY with very occasional gravel

Test Results

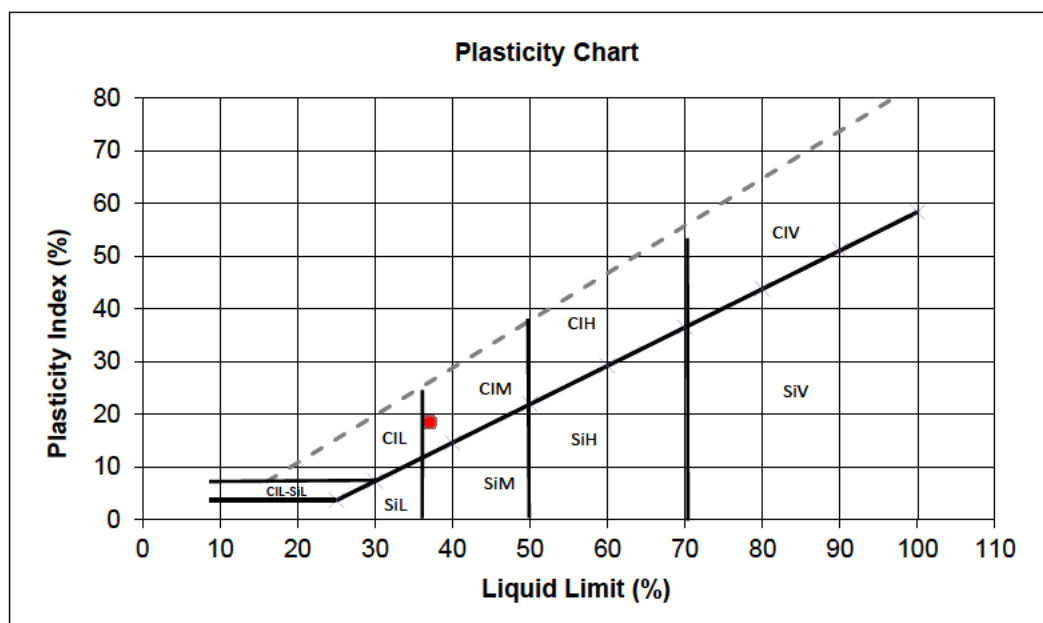
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **15.0**

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 (%)	37
Plastic Limit (%)	19
Plasticity Index (%)	19
Passing 425mic (%)	92
Soil Classification:	CIM



Remarks: None

Start of test date: 29/04/2026 End of test date: 09/05/2026 Report Date: 09/05/2026



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Report/Sample ID No: **S2355/03**

Location: WS2-4 at 1.00m
Material Type: Brown silty CLAY

Test Results

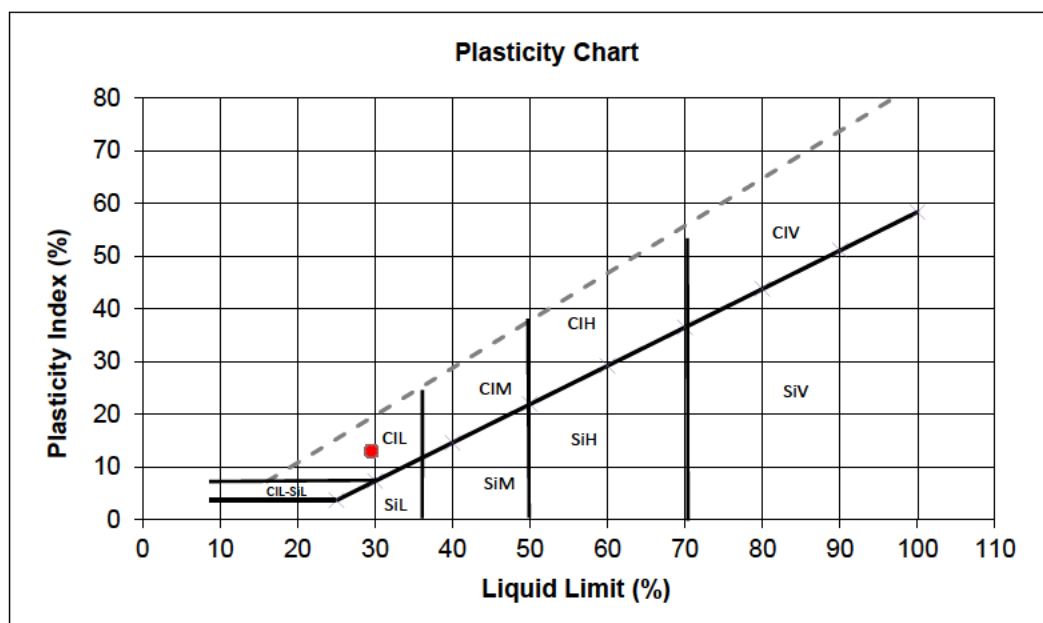
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **19.2**

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 (%)	30
Plastic Limit (%)	17
Plasticity Index (%)	13
Passing 425mic (%)	90
Soil Classification:	CIL



Remarks: None

Start of test date: 29/04/2026 End of test date: 09/05/2026 Report Date: 09/05/2026



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

Report/Sample ID No: **S2355/04**

Location: WS2-4 at 1.50m
Material Type: Brown slightly sandy CLAY with very occasional gravel

Test Results

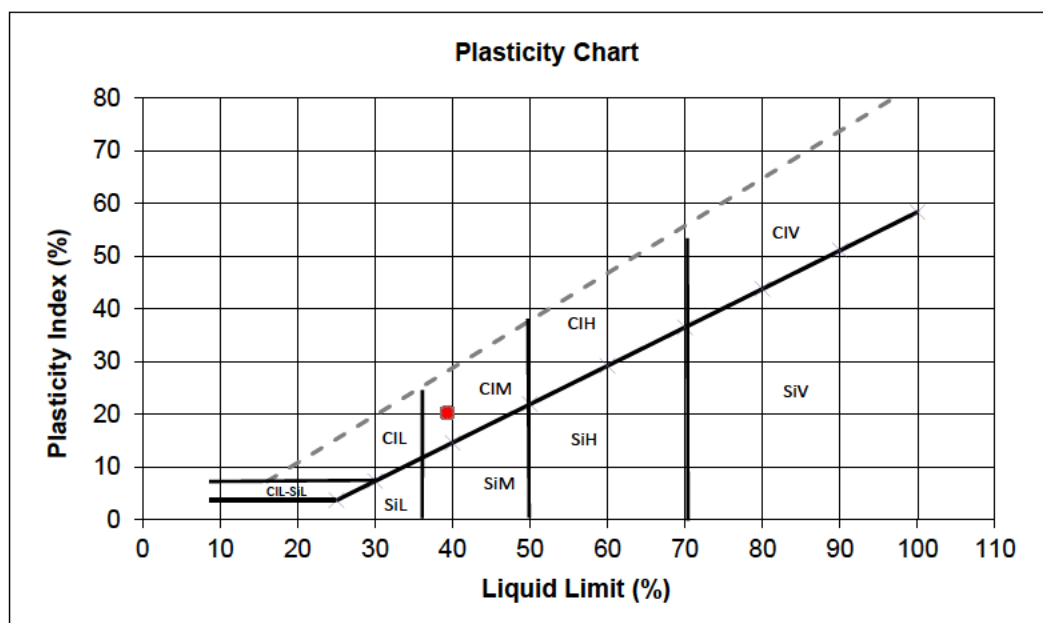
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **17.1**

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 (%)	39
Plastic Limit (%)	19
Plasticity Index (%)	20
Passing 425mic (%)	90
Soil Classification:	CIM



Remarks: None

Start of test date: 29/04/2026 End of test date: 09/05/2026 Report Date: 09/05/2026



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Report/Sample ID No: **S2355/06**

Location: WS2-5 at 1.50m
Material Type: Brown grey silty CLAY with very occasional gravel

Test Results

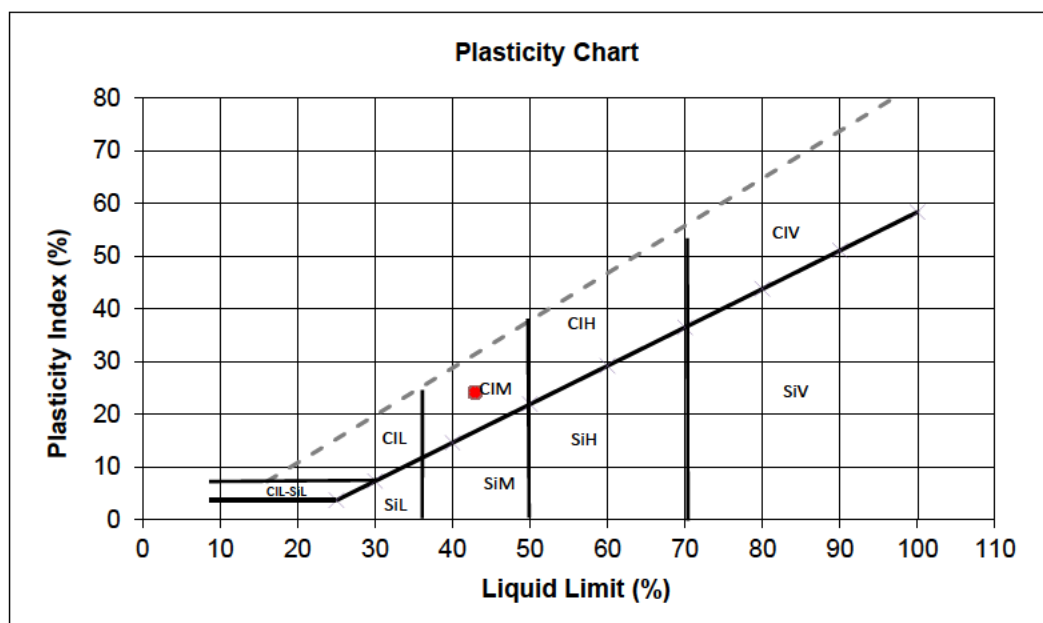
Determination of water content in accordance with BS EN ISO 17892-1:2014

Water Content (%) **18.6**

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 (%)	43
Plastic Limit (%)	19
Plasticity Index (%)	24
Passing 425mic (%)	91
Soil Classification:	CIM



Remarks: None

Start of test date: 29/04/2026 End of test date: 09/05/2026 Report Date: 09/05/2026



Telephone: 01670 737575 - Email: highwayslaboratory@northumberland.gov.uk

[illegible]



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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 26-10294

Issued: 07-May-26

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

Our Reference 26-10294

Client Reference ~ S2355

Order No ~ (not supplied)

Contract Title ~ Queens Park, Millom, GEO

Description 6 Soil samples.

Date Received 30-Apr-26

Date Started 30-Apr-26

Date Completed 07-May-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

A handwritten signature in black ink, appearing to read "Louise".

Louise Cook
Contracts Manager



Sample Deviations present. See Deviation Table Section for details.

Summary of Chemical Analysis

Soil Samples

Our Ref 26-10294

Client Ref ~ S2355

Contract Title ~ Queens Park, Millom, GEO

Lab No	2679147	2679148	2679149	2679150	2679151	2679152
Sample ID ~	WS2-1	WS2-2	WS2-4	WS2-4	WS2-5	WS2-5
Depth ~	1.00	1.00	1.00	1.50	1.00	1.50
Other ID ~	S2355/01	S2355/01	S2355/03	S2355/04	S2355/05	S2355/06
Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date ~	22/04/2026	22/04/2026	22/04/2026	22/04/2026	22/04/2026	22/04/2026
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Inorganics									
pH	DETSC 2008#		pH	7.7	7.9	7.7	7.8	8.2	7.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	57	96	23	19	48	18

Information in Support of the Analytical Results

Our Ref 26-10294
 Client Ref ~ S2355
 Contract ~ Queens Park, Millom, GEO

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2679147	WS2-1 1.00 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	
2679148	WS2-2 1.00 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	
2679149	WS2-4 1.00 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	
2679150	WS2-4 1.50 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	
2679151	WS2-5 1.00 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	
2679152	WS2-5 1.50 SOIL	22/04/26	PT 1L	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Key:

~ Sample details are provided by the client and can affect the validity of the results
 * -not accredited.
 # -MCERTS (accreditation only applies if report carries the MCERTS logo).
 \$ -subcontracted.
 n/s -not supplied.
 I/S -insufficient sample.
 U/S -unsuitable sample.
 t/f -to follow.
 nd -not detected.

End of Report Ver 26.03.15

ANALYTICAL TEST REPORT

Report Number 26-04771, issue number 1

Contract name: Queens Park, Millom

Client reference: GEO2024-6628

Clients name: Geo Environmental Engineering

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

Samples received: 23/04/2026

Analysis started: 23/04/2026

Analysis completed: 01/05/2026

Report issued: 01/05/2026

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: Rachael Burton
Technical Support Manager

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
102168	TP01	0.05 - 0.30	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	18.8
102169	TP02	0.10 - 0.35	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	24.6
102170	TP03	0.10 - 0.20	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	17.6
102171	TP04	0.05 - 0.30	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	24.2
102172	TP05	0.10 - 0.30	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	26.2
102173	TP06	0.10 - 0.40	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	26.6
102174	TP07	0.10 - 0.40	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	24.5
102175	WS2-1	0.00 - 0.40	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	18.6
102176	WS2-2	0.00 - 0.35	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	20.3
102177	WS2-3	0.00 - 0.37	-	-	-	-
102178	WS2-4	0.00 - 0.60	-	-	-	-
102179	WS2-5	0.00 - 0.85	-	-	-	-
102180	DP2-1	0.00 - 0.25	Brown Sandy Clayey Loam with Gravel and Vegetation.	-	-	10.3
102181	DP2-2	0.00 - 0.40	-	-	-	-
102182	DP2-3	0.00 - 0.60	-	-	-	-
102183	DP2-4	0.00 - 0.43	-	-	-	-
102184	DP2-5	0.00 - 0.50	-	-	-	-

SOILS

Lab Number					102168	102169	102170	102171	102172
Sample ID					TP01	TP02	TP03	TP04	TP05
Depth (m)					0.05 - 0.30	0.10 - 0.35	0.10 - 0.20	0.05 - 0.30	0.10 - 0.30
Sampling Date					20/04/2026	20/04/2026	20/04/2026	20/04/2026	20/04/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	n/t	n/t	n/t	n/t	n/t
Combustion									
Moisture Content	CE001	N	0.1	%	18.8	24.6	17.6	24.2	26.2
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	< 0.016	0.019	0.254	0.440	0.036
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	0.043	< 0.015	0.982	0.044
Acenaphthene	CE087	M	0.013	mg/kg	< 0.013	0.042	0.097	0.233	0.060
Fluorene	CE087	U	0.013	mg/kg	< 0.013	0.067	0.069	1.41	0.096
Phenanthrene	CE087	M	0.014	mg/kg	0.026	0.749	0.668	14.2	0.398
Anthracene	CE087	U	0.017	mg/kg	< 0.017	0.142	0.134	0.772	0.175
Fluoranthene	CE087	M	0.017	mg/kg	0.053	1.32	0.493	10.1	0.644
Pyrene	CE087	M	0.016	mg/kg	0.050	1.06	0.469	7.08	0.565
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.041	0.596	0.288	1.99	0.428
Chrysene	CE087	M	0.028	mg/kg	< 0.028	0.560	0.273	3.05	0.417
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.055	0.703	0.490	3.19	0.438
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	< 0.025	0.274	0.147	1.33	0.300
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.053	0.545	0.596	2.31	0.336
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.053	0.533	0.531	2.34	0.325
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	< 0.017	0.081	0.236	0.337	0.182
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.066	0.308	0.873	1.42	0.263
Total PAH(16)	CE087	N	0.28	mg/kg	0.396	7.04	5.62	51.3	4.70

SOILS

Lab Number					102173	102174	102175	102176	102177
Sample ID					TP06	TP07	WS2-1	WS2-2	WS2-3
Depth (m)					0.10 - 0.40	0.10 - 0.40	0.00 - 0.40	0.00 - 0.35	0.00 - 0.37
Sampling Date					20/04/2026	20/04/2026	20/04/2026	20/04/2026	20/04/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	n/t	n/t	NAD	NAD	NAD
Combustion									
Moisture Content	CE001	N	0.1	%	26.6	24.5	18.6	20.3	n/t
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	< 0.016	0.029	< 0.016	< 0.016	n/t
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	0.047	< 0.015	< 0.015	n/t
Acenaphthene	CE087	M	0.013	mg/kg	0.014	0.059	< 0.013	0.015	n/t
Fluorene	CE087	U	0.013	mg/kg	0.014	0.166	< 0.013	0.019	n/t
Phenanthrene	CE087	M	0.014	mg/kg	0.229	1.40	0.016	0.207	n/t
Anthracene	CE087	U	0.017	mg/kg	0.038	0.233	< 0.017	0.023	n/t
Fluoranthene	CE087	M	0.017	mg/kg	0.538	1.67	0.039	0.310	n/t
Pyrene	CE087	M	0.016	mg/kg	0.447	1.27	0.033	0.249	n/t
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.296	0.685	0.023	0.139	n/t
Chrysene	CE087	M	0.028	mg/kg	0.267	0.604	< 0.028	0.142	n/t
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.355	0.740	0.029	0.244	n/t
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.146	0.293	< 0.025	0.091	n/t
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.263	0.527	0.021	0.210	n/t
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.311	0.482	0.020	0.244	n/t
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.048	0.089	< 0.017	0.078	n/t
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.168	0.348	< 0.019	0.308	n/t
Total PAH(16)	CE087	N	0.28	mg/kg	3.13	8.64	< 0.280	2.28	n/t

SOILS

Lab Number					102178	102179	102180	102181	102182
Sample ID					WS2-4	WS2-5	DP2-1	DP2-2	DP2-3
Depth (m)					0.00 - 0.60	0.00 - 0.85	0.00 - 0.25	0.00 - 0.40	0.00 - 0.60
Sampling Date					20/04/2026	20/04/2026	20/04/2026	20/04/2026	20/04/2026
Test	Method	Accred	LoD	Units					
Asbestos									
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD	NAD	NAD	NAD
Combustion									
Moisture Content	CE001	N	0.1	%	n/t	n/t	10.3	n/t	n/t
Polyaromatic hydrocarbons									
Naphthalene	CE087	M	0.016	mg/kg	n/t	n/t	< 0.016	n/t	n/t
Acenaphthylene	CE087	M	0.015	mg/kg	n/t	n/t	< 0.015	n/t	n/t
Acenaphthene	CE087	M	0.013	mg/kg	n/t	n/t	< 0.013	n/t	n/t
Fluorene	CE087	U	0.013	mg/kg	n/t	n/t	< 0.013	n/t	n/t
Phenanthrene	CE087	M	0.014	mg/kg	n/t	n/t	< 0.014	n/t	n/t
Anthracene	CE087	U	0.017	mg/kg	n/t	n/t	< 0.017	n/t	n/t
Fluoranthene	CE087	M	0.017	mg/kg	n/t	n/t	0.027	n/t	n/t
Pyrene	CE087	M	0.016	mg/kg	n/t	n/t	0.022	n/t	n/t
Benzo(a)anthracene	CE087	U	0.012	mg/kg	n/t	n/t	0.029	n/t	n/t
Chrysene	CE087	M	0.028	mg/kg	n/t	n/t	< 0.028	n/t	n/t
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	n/t	n/t	< 0.020	n/t	n/t
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	n/t	n/t	< 0.025	n/t	n/t
Benzo(a)pyrene	CE087	U	0.019	mg/kg	n/t	n/t	< 0.019	n/t	n/t
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	n/t	n/t	< 0.019	n/t	n/t
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	n/t	n/t	< 0.017	n/t	n/t
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	n/t	n/t	< 0.019	n/t	n/t
Total PAH(16)	CE087	N	0.28	mg/kg	n/t	n/t	< 0.280	n/t	n/t

SOILS

Lab Number					102183	102184
Sample ID					DP2-4	DP2-5
Depth (m)					0.00 - 0.43	0.00 - 0.50
Sampling Date					20/04/2026	20/04/2026
Test	Method	Accred	LoD	Units		
Asbestos						
Asbestos Identification	SUBCO N	SU	0	-	NAD	NAD
Combustion						
Moisture Content	CE001	N	0.1	%	n/t	n/t
Polyaromatic hydrocarbons						
Naphthalene	CE087	M	0.016	mg/kg	n/t	n/t
Acenaphthylene	CE087	M	0.015	mg/kg	n/t	n/t
Acenaphthene	CE087	M	0.013	mg/kg	n/t	n/t
Fluorene	CE087	U	0.013	mg/kg	n/t	n/t
Phenanthrene	CE087	M	0.014	mg/kg	n/t	n/t
Anthracene	CE087	U	0.017	mg/kg	n/t	n/t
Fluoranthene	CE087	M	0.017	mg/kg	n/t	n/t
Pyrene	CE087	M	0.016	mg/kg	n/t	n/t
Benzo(a)anthracene	CE087	U	0.012	mg/kg	n/t	n/t
Chrysene	CE087	M	0.028	mg/kg	n/t	n/t
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	n/t	n/t
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	n/t	n/t
Benzo(a)pyrene	CE087	U	0.019	mg/kg	n/t	n/t
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	n/t	n/t
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	n/t	n/t
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	n/t	n/t
Total PAH(16)	CE087	N	0.28	mg/kg	n/t	n/t

METHOD DETAILS

METHOD	TESTNAME	METHOD SUMMARY	ANALYSIS BASIS
SUBCON	Asbestos Soil	HSG248	Air Dried Sample
CE087	PAH in Soil	DCM Extraction and GCMS	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)
102168	TP01	0.05 - 0.30	N	
102169	TP02	0.10 - 0.35	N	
102170	TP03	0.10 - 0.20	N	
102171	TP04	0.05 - 0.30	N	
102172	TP05	0.10 - 0.30	N	
102173	TP06	0.10 - 0.40	N	
102174	TP07	0.10 - 0.40	N	
102175	WS2-1	0.00 - 0.40	N	
102176	WS2-2	0.00 - 0.35	N	
102177	WS2-3	0.00 - 0.37	N	
102178	WS2-4	0.00 - 0.60	N	
102179	WS2-5	0.00 - 0.85	N	
102180	DP2-1	0.00 - 0.25	N	
102181	DP2-2	0.00 - 0.40	N	
102182	DP2-3	0.00 - 0.60	N	
102183	DP2-4	0.00 - 0.43	N	
102184	DP2-5	0.00 - 0.50	N	

REPORT INFORMATION

Report No.:26-04771, 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.

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

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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