



GEO

Environmental Engineering



PHASE 2: GROUND INVESTIGATION REPORT

PROPOSED RESIDENTIAL DEVELOPMENT OF LAND AT

PARKSIDE ROAD, CLEATOR MOOR

CUMBRIA

FOR:

GENESIS HOMES (NORTH) LIMITED

GEO Environmental Engineering

DOCUMENT CONTROL SHEET

Report Ref: 2024-6139

Report Date: 25.02.2024

Report Type: Final - Ground Investigation Report (GIR) v1

Report Tracking: 18.12.2024 – Preliminary Draft Report v1 Issued
25.02.2025 – Final Report v1 Issued

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1.0 Introduction

1.1 Brief

GEO Environmental Engineering Ltd (GEO) were commissioned by the Client, Genesis Homes (North) Limited to carry out a ground investigation on land off Parkside Road in Cleator Moor, Cumbria.

The investigation was carried out to determine the ground conditions across the site to aid the design of foundations, roads and drainage and to assess the risk to human health and environmental receptors from possible contamination and ground gas.

1.2 Site Location and Description

The site, occupying an area of c.5ha is located in the eastern part of Cleator Moor in Cumbria as indicated on the site location plan included in Appendix I. Access to the site is from Parkside Road (A5086) to the south east.

- National Grid Reference: 302890, 515010
- Post Code: CA25 5EE (approximate only)

The site comprises several agricultural fields which are surfaced with grass. The site is partially delineated by fences and hedgerows. Some of the boundaries along the east of the site are not physically delineated.

There was no evidence of any contamination sources (bulk fuel/oil or chemical storage) noted on the site during the walkover.

The site undulates with a rise to the central part of the site. Topographical survey data is presented on the proposed site layout plan in Appendix I. The data indicates that site levels rise from the lowest point in the south east at c.90m OD, rising steadily to the highest point just west of centre at c.101m OD. Site levels along the north western boundary are at c.93m OD.

1.3 Proposed Development

It is understood that the site will be developed for residential end use. A proposed site layout plan has been provided and a copy is included in Appendix I. The plan indicates conventional detached and semi-detached housing with private gardens, general areas of soft landscaping, access roads, car parking and other associated infrastructure.

2.0 Previous Reports

GEO have completed a Phase 1: Desk Top Study (DTS) Report, details of which are included below:

- Phase 1: Desk Top Study (Preliminary Environmental Risk Assessment), ref: 2024-6139, dated: 15.01.2024.

A brief summary is included below, however, it is recommended that the DTS is read in conjunction with this report.

Historical map data indicates that the site has comprised undeveloped agricultural fields, therefore deep made ground and significant contamination was not anticipated.

Geological data indicates Glacial Till (firm and stiff gravelly clays with bands of sand and gravels) overlying solid strata of the Buttermere Formation (folded mudstone, siltstone and sandstone turbidite deposits) and the Frizington Limestone Formation (shales and limestones). The report indicated a negligible and very low risk of dissolution of soluble rocks respectively.

The risk to the site from possible coal or iron ore mining was deemed negligible.

The DTS indicated a very low to low geotechnical risk with the potential for some variable ground conditions.

A negligible to very low risk was deemed appropriate with respect to possible ground contamination and ground gas. A negligible risk was deemed appropriate with respect to groundwater contamination.

The site is recorded as being on the edge of a radon affected area where full radon protection measures are required. Consultation with the Local Authority was recommended in this respect to determine appropriate protection measures. The report stated that *'it is likely that properties along the north eastern part of the site will require radon protection measures, but this should be confirmed'*.

A ground investigation was recommended to determine the ground conditions to aid the design of foundations, roads and drainage and to determine any risks to the end users from contamination or ground gasses (carbon dioxide and methane).

3.0 Ground Investigation Reporting

3.1 Ground Investigation Aims and Objectives

The overall objective of this Ground Investigation is to provide information relating to the geotechnical and environmental properties of the ground and groundwater across the development area in order to facilitate foundation and drainage design and determine any risks to human health or the surrounding environment.

3.2 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 design 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 III.

This Ground Investigation Report has been completed in general accordance with the following documents:

- Land Contamination Risk Management Stages 1 to 4 (LCRM – www.gov.uk) – April 2021.
- BS10175: 2017: Code of Practice for the Investigation of Potentially Contaminated Sites.
- BS5930: 2020: Code of Practice for Site Investigations.
- BS1377: 1990: Methods of test for soils for civil engineering purposes.
- BS8485: 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: 2015.
- BR211: 2023 Radon, Guidance on protective measures for new buildings.
- Eurocode 7 Geotechnical Design (Part 1 General Rules & Part 2 Ground Investigation & Testing).
- UK Specification for Ground Investigation, 2nd Edition. Site Investigation Steering Group, 2011.
- Effective Site Investigation. Site Investigation Steering Group, 2013.
- SP1010 Development of Category 4 Screening Levels Main Report, 2014.
- The LQM/CIEH S4UL's for Human Health Risk Assessment, 2015.
- CIRIA C758D 2019 - Abandoned Mine Workings Manual.

3.3 Ground Investigation Limitations of Use

Although every effort is made to ensure a full and comprehensive investigation has been 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 adopt a “watching brief” during the redevelopment works to ensure that any potential variations encountered are identified and dealt with in an appropriate manner.

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.

The Ground Investigation Report and its contents are limited to the boundaries of the site, as indicated on the Plans in Appendix I. 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.

3.4 Consideration for Residential End Use

It is understood that the site will be developed for residential end use with houses, gardens, car parking, access roads, and other associated infrastructure. Consequently, when considering the intended development, the site is considered suitable for assessment using a Level 1 Generic Quantitative Risk Assessment (GQRA).

A GQRA provides details of potential future risks to Human Health (proposed end users) from any contamination which may be identified on site in made ground or natural soils. For the Human Health Risk Assessment, it is considered that the future residents will be subjected to the greatest exposure periods and consequently the most risk. Therefore, in accordance with current guidance and legislation a CLEA end use classification of *residential* has been considered most appropriate.

4.0 Ground Investigation Fieldwork

4.1 Intrusive Investigation Fieldworks Summary

The ground investigation works were completed during November 2024. The exploratory holes were located across the site to provide general site coverage taking into consideration the locations of buried utilities and surface obstructions (field boundaries).

The exploratory hole location plan is provided in Appendix I.

The ground investigation works comprised:

- 7 No. Mini-Percussive Boreholes (BH01 to BH07) to depths of between c.1.60m and c.3.45m bgl.
- 19 No. Mechanically Excavated Trial Pits (TP01 to TP19) to depths of between c.0.90m and c.2.60m bgl.
- Installation of 7 No. Gas and Groundwater Monitoring wells (Boreholes BH01 to BH07).
 - Gas and groundwater monitoring (6 visits completed).
- 19 No. In-Situ Dynamic Probe Super Heavy Tests (DP01 to DP19).
 - The probes were located adjacent to the trial pits.
- In-situ geotechnical testing (Standard Penetration Tests (SPT).
- In-situ hand shear vane tests in the trial pits.
 - The clay deposits typically proved too gravelly for the hand shear vane.
- 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 accordance with BS5930:2020, BS1377:1990 and Eurocode 7 (Part I and II).

At each exploratory hole location, the surfacing type, made ground, natural ground and groundwater conditions were observed, 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 the in-situ SPT tests are presented on the borehole logs included in Appendix II.

The results of the in-situ hand shear vane tests that were carried out in the trial pits (TP16 only) are presented on the trial pit logs in Appendix II.

The results of the Dynamic Probe tests and are presented on a separate sheet in Appendix II.

The geotechnical and chemical laboratory tests results are provided in Appendix III.

All depths included in the report are in metres below ground level (m bgl), unless stated otherwise.

5.0 Ground and Groundwater Conditions

5.1 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.

5.1.1 Made Ground and Topsoil

Made ground was not encountered during the ground investigation.

Topsoil was encountered across the site to depths of between c.0.19m and 0.34m bgl. The topsoil was described as dark brown sandy gravelly loam with rare fragments of glass.

No visual or olfactory evidence of fuel/oil contamination (no staining, odour or free product) was encountered.

5.1.2 Natural Drift Deposits

The natural drift deposits varied significantly across the site. The Exploratory Hole Location Plan in Appendix I indicates the approximate locations of the granular deposits and shallow bedrock/weathered bedrock.

The topsoil was typically underlain by firm, occasionally firm to stiff orangey brown sandy gravelly clay with occasional cobbles and boulders.

Across the western parts of the site, the firm orangey brown clay was underlain by dark brown firm to stiff or stiff very gravelly clay. These trial pits were typically terminated within firm to stiff or stiff clay which was often noted as clay bound gravel, cobbles and boulders. Trial pit TP01 encountered a band of soft clay between c.0.90m and c.1.40m bgl. The firm to stiff and stiff clays were considered suitable for the proposed foundations.

Across the central parts of the site, the firm orangey brown clay was underlain by clayey sandy gravel and silty gravelly sand (this area is indicated on the Exploratory Hole Location Plan in Appendix I). The deposits were noted as locally unstable with running sand and groundwater ingress. The granular deposits were not considered suitable for the conventional strip foundations.

Across the western parts of the site, the natural drift comprised either firm to stiff / stiff gravelly clay (clay bound gravel, cobbles and boulders) or suspected shallow bedrock / weathered bedrock. See Section 5.1.3 for more information relating to the suspected shallow bedrock.

Numerous attempts were made at undertaking hand shear vane tests within the clay deposits; however, the cohesive drift was typically too gravelly and the tests were abandoned. A hand shear vane tests was only completed successfully in trial pit TP16 at a depth of c.0.70m bgl within firm to stiff sandy gravelly clay. The test gave an undrained shear strength of 75kPa, indicative of clay of medium to high strength.

In-situ Standard Penetration Tests (SPTs) were completed in the boreholes at depths of between c.1.00m and c.3.00m bgl. The tests gave 'N' values of between 9 and 70 within the clay deposits, indicative of medium to very high undrained shear strengths.

None of the SPTs were completed wholly within the granular deposits, however, the results typically suggest medium dense deposits.

The Dynamic Probes were located adjacent to the trial pits so that the results can be correlated to the observed ground conditions. The results have been colour-coded to indicate areas of soft / loose deposits. The results typically confirm the field descriptions encountered in the trial pits suggesting medium or high strength clay deposits. However, where granular deposits were encountered, the corresponding probe values generally indicate loose deposits. Of greatest significance is trial pit TP04 (DP04) which encountered very loose granular deposits to a depth of c.2.20m bgl.

5.1.3 Solid Geological Deposits (Bedrock)

Suspected shallow bedrock or weathered bedrock was encountered across the eastern parts of the site. The suspected weathered bedrock was encountered from depths of between c.0.33m and 1.00m bgl where it comprised red brown fine to coarse angular gravel, cobbles and boulders of sandstone.

Suspected solid strata was encountered at depths of between c.0.90m and c.2.10m bgl with the shallowest rock being encountered in trial pit TP11. The excavator was unable to dig any further and was only able to scrape along the surface of the suspected rock. Without rotary drilling or large trenches, it is not possible to say for sure that the trial pits were terminated on rock and, therefore, large boulders cannot be ruled out at this stage.

Bedrock was not encountered across the central or western parts of the site. However, the boreholes and probes within this area were terminated due to refusal between c.1.80m and c.3.70m bgl, possibly due to encountering weathered bedrock or solid strata. However, boulders cannot be ruled out.

The suspected bedrock / weathered bedrock is likely to provide a suitable foundation horizon.

5.2 Groundwater

Minor perched groundwater ingress was noted in the trial pits at depths of between c.0.90m and 2.30m bgl associated with a band of sand and gravel which was encountered through the central part of the site. The water ingress typically resulted in running sand and instability of the excavation side walls. The trial pits were typically dry on completion.

Perched groundwater was occasionally encountered in the boreholes at depths of between c.0.50m and c.1.80m bgl. This typically resulted in standing water at the similar depths.

Groundwater monitoring of installations placed in the boreholes has been carried out on six occasions between November 2024 and February 2025. Standing groundwater was recorded between ground level and c.1.40m bgl. Given the site elevation and topography, a shallow groundwater table is considered very unlikely, therefore, it is probable that the water has percolated through the ground from the surface (following very heavy rainfall) and has become perched within the wells and surrounding soils.

To avoid damage to the gas analyser, wells with very shallow standing water on the 27th November and the 5th December 2024 were not monitored. The wells were bailed out to reduce the water level. During the third visit, it was noted that the water level in these wells had remained low.

Significant groundwater ingress is not anticipated during construction. However, localised running sand and associated unstable ground should be anticipated. An allowance should be made for groundwater control measures (i.e. pumping equipment) and shoring, particularly during wetter periods of the year. Care should be taken when pumping to avoid undermining the surrounding ground by removing fines.

6.0 Exploratory Hole Testing

In-situ site testing and monitoring was generally undertaken in accordance with BS5930:1999, BS1377:1990 and Eurocode 7 (Part I and II).

6.1 Standard Penetration Tests

6.1.1 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 c.50mm, internal diameter of c.35mm and a length of around c.650mm) driven from the base of the borehole as it is progressed, usually at c.1.00m spacing's/intervals.

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

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

6.1.2 Standard Penetration Test Results

In-situ Standard Penetration Tests (SPTs) were completed in the boreholes at depths of between c.1.00m and c.3.00m bgl. The tests gave 'N' values of between 9 and 70 within the clay deposits, indicative of medium to very high undrained shear strengths.

None of the SPTs were completed wholly within the natural granular deposits, however, the results typically suggest medium dense deposits.

The results of the standard penetration tests are presented on the borehole logs which are included in Appendix II.

6.2 Hand Shear Vane Tests

Numerous attempts were made at undertaking hand shear vane tests within the clay deposits, however, the cohesive drift was typically too gravelly and the tests were abandoned. A hand shear vane tests was only completed successfully in trial pit TP16 at a depth of c.0.70m bgl within firm to stiff sandy gravelly clay. The test gave an undrained shear strength of 75kPa, indicative of clay of medium to high strength.

The results of the hand shear vane tests are presented on the trial pit logs which are included in Appendix II.

6.3 In-situ Dynamic Probe

6.3.1 In-situ Dynamic Probe Test Methodology

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 to B.S. 1377: Part 9. 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.

There are two types of test: Heavy Dynamic Probing (DPH) and Super Heavy Dynamic Probing (DPSH). The dimensions of the cone and the mass and drop height of the driving weight differ between the two tests.

The extension rods used in the test are either 0.5-metre-long (for top of the hole) or 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 BS 1377: Part 9.

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. Both N100 and N300 values are presented on the In-situ Dynamic Probe Record Sheet which is presented in Appendix II.

As no samples are recovered during the probing, it is not possible to determine if the blow count relate to made ground or natural deposits, however, they provide a good indication of the relative density of the materials.

6.3.2 In-situ Dynamic Probe Test Results

The Dynamic Probes were located adjacent to the trial pits so that the results can be correlated to the observed ground conditions. The results have been colour-coded to indicate areas of soft / loose deposits.

The results typically confirm the field descriptions encountered in the trial pits suggesting medium or high strength clay deposits. However, where granular deposits were encountered, the corresponding probe values generally indicate loose deposits. Of greatest significance is trial pit TP04 (DP04) which encountered very loose granular deposits to a depth of c.2.20m bgl.

6.4 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 575 mm. The penetration of the cone is measured after each blow and is recorded to provide a continuous measure of shearing resistance up to c.0.85m below the ground surface. Test results can be correlated to California Bearing Ratio to aid pavement design by a Civil Engineer.

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

It should be borne in mind that the results of the Dynamic Cone Penetrometer 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.

6.5 Ground Gas Monitoring

To assess the on-site potential for hazardous ground gases, the boreholes (BH01 to BH07) were installed with ground gas monitoring wells to facilitate a period of ground gas monitoring.

The boreholes were installed to depths of between c.1.60m and c.3.00m bgl with a 50mm 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.

The monitoring and assessment have been completed in accordance with BS8485: 2015: Code of practice for the characterisation and remediation from ground gas affected developments, CIRIA Report C665, November 2015 and the NHBC Document; Guidance on the evaluation of development proposals on site where methane and carbon dioxide are present, March 2015.

As it is the intention of the Client to develop the site for Residential end use, the monitoring of ground gas monitoring must comprise at least six site visits over a minimum period of three months.

The wells have been monitored on six occasions between the November 2024 and February 2025, in general accordance with CIRIA C665 (Table 5.5a and 5.5b) using a GFM436 Gas Analyser with Integral Flow Pod.

The results of monitoring are included on the Ground Gas Monitoring Record Sheets included in Appendix II. The ground gas risk assessment is presented in Section 9.3 of this report.

7.0 Laboratory Testing

7.1 Geotechnical Testing

Geotechnical testing was completed in general accordance with BS1377:1990: Part 1 to 4 by the following UKAS and MCERTS accredited laboratory:

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

14 No. samples of the natural cohesive soil recovered from the exploratory holes at depths of between c.0.60m and c.1.80m bgl were subjected to the following laboratory based geotechnical tests:

- Moisture Content.
- Atterberg - Liquid and Plastic Limits.

7.2 Chemical Screening

7.2.1 Determination of pH and Water-Soluble Sulphate

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

- 10 No. samples of topsoil (c.0.10m to c.0.15m bgl).
- 13 No. samples of the natural drift deposits (c.0.60m to c.3.00m bgl).
- 1 No. samples of the weathered bedrock (c.1.20m bgl).

The testing was completed in general accordance with BS1377:1990: Part 1 to 4 by the following UKAS and MCERTS accredited laboratory:

- Normec DETS Limited of Consett, County Durham (DETS).

The results of the testing are summarised in section 10 and presented in the DETS reports (ref: 24-25669 and 24-25941) contained in Appendix III.

7.2.2 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:

- 10 No. samples of topsoil (c.0.10m to c.0.15m bgl).

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

- Normec DETS Limited of Consett, County Durham (DETS).

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 potential for made ground of an unknown source. The samples were screened for the contaminants detailed below:

- **Inorganic Soil Suite (Human Health Risk Assessment):** Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc), Cyanide and Total Organic Carbon.

- **Organic Soil Suite (Human Health Risk Assessment):** Speciated Polycyclic Aromatic Hydrocarbons (PAH – USEPA 16).
- **Other:** Asbestos.

The full catalogue of soil screening results and test detection limits can be seen in the DETS report (ref: 24-25669) contained in Appendix III.

No visual or olfactory evidence of organic contamination was identified during the fieldworks as expected given the site history. Therefore, the samples were not screened for TPH's, BTEX, MTBE, SVOC's or VOC'S.

No evidence of contamination was noted within the natural drift deposits; therefore, no samples of the drift were scheduled for chemical screening.

7.3 Controlled Waters Risk Assessment

The Phase 1: Desk Top Study indicated that the risk to Controlled Waters was considered negligible based on the site's history and the lack of sensitive receptors. During the intrusive site works, no evidence of significant contamination or mobile contaminants was encountered. As such, no further assessment is deemed to be required with respect to controlled waters.

8.0 Geotechnical Analysis

8.1 Testing for Moisture Content, Liquid and Plastic Limits

14 No. samples of the natural clay deposits recovered from the exploratory holes at depths of between c.0.60m and c.1.80m bgl were scheduled for classification tests to determine their moisture content, liquid and plastic limits. The results of the testing are contained in the NCC report (ref: S1940) presented in Appendix III and summarised below.

Natural moisture contents of between 10.9% and 25.5% were observed, with liquid limits of between 27% and 47% and plasticity indices of between 10% and 19% being recorded. The results indicate clays of low and intermediate plasticity.

The percentage of material passing the 425 micron sieve varied between 57% and 76%, giving a modified plasticity of between 6% and 14%.

In accordance with NHBC Guidelines (2024), the results of the modified plasticity indices suggest a minimum foundation depth of c.0.75m bgl. However, Given the presence of existing mature trees/hedgerows on site, it is recommended that the foundations are designed in accordance with NHBC Standards (Chapter 4.2, "Building Near Trees"). Therefore, some over-deepening may be required.

8.2 Determination of pH and Water-Soluble Sulphate

As indicated in Section 7, selected samples of topsoil and natural soil have been screened to determine their pH and soluble sulphate potential to aid the design of buried concrete. The results of the chemical screening are presented in the DETS reports (ref: 24-25669 and 24-25941) contained in Appendix III.

From the results, the following observations can be seen:

- pH values in the soils ranged from 5.6 to 8.7 (acidic to slightly alkali).
- Water Soluble Sulphate (SO_4) levels were recorded as ranging from 11mg/l to 29mg/l.

In accordance with BRE Special Digest 1: 2005 the results recorded equate to a Design Sulphate classification of DS-1 (for brownfield land).

With respect to the pH levels, the results equate to an acidic to slightly alkali chemical environment which is not considered excessively aggressive with respect to concrete. In view of this, an ACEC classification of AC-1 should be adopted (natural ground with mobile groundwater).

9.0 Generic Quantitative Risk Assessment (GQRA)

9.1 Methodology for Assessing Risks to Human Health

Within the UK, the current framework for assessing potential ground contamination is utilising the Contaminated Land Exposure Assessment (CLEA) model as set out by the Department of the Environment, Farming and Rural Affairs (DEFRA) and comprises of 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 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 CLEA Soil Guideline Values (SGV's), CL:AIRE/DEFRA Category 4 Screening Levels (C4SLs), Land Quality Management (LQM) and Chartered Institute of Environmental Health (CIEH) S4UL Values and Atkins ATRISK^{SOIL} Soil Screening Values (SSV's). The guidelines are generally based on three main land uses as outlined below:

■ *Residential*
(with or without plant uptake)

■ *Allotments*

■ *Commercial*

Where these land uses are not deemed appropriate, other land use values can be considered with the DEFRA C4SLs, LQM S4UL's values and the ATRISK^{SOIL} SSV's (i.e. parks/playing fields/Public Open Space). Alternatively, it is possible to determine site specific intervention values as part of a Detailed Quantitative Risk Assessment (DQRA).

It is anticipated that the proposed development will incorporate a residential development with private gardens. Therefore, for the purposes of this basic Human Health ground contamination risk assessment, the maximum site recorded values for the soil samples have been compared to GAC for a CLEA end use classification of: *Residential with Plant Uptake End Use* to determine if a potential risk is present to the proposed end users.

Contaminant Analysis Sheets that include the results of the relevant Human Health Risk Assessment and the Generic Assessment Criteria (GAC) values are presented in Appendix IV.

9.2 Human Health Risk Assessment – Comparison with Guidance Levels

9.2.1 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 GAC have been selected using the following guidance documents:

- LQM/CIEH S4UL 2015 (Residential with Plant Uptake End Use).
- CL:AIRE/DEFRA Cat 4 Screening Levels C4SL (Residential with Plant Uptake End Use).
- Atkins ATRISK Screening Values (Residential with Consumption of Homegrown Produce).

As discussed in section 8.1, the contaminant concentrations have been assessed against GAC for a residential with plant uptake end use as it is anticipated that the proposed development will incorporate private gardens.

Based on the results of the contaminant analysis sheet contained in Appendix IV none of the inorganic contaminant concentrations exceed the assessment criteria and as such do not pose a risk to human health.

In addition, phytotoxic elements (copper, nickel and zinc) are within the acceptable limits for topsoil (BS3882: Specification for Topsoil, 2015).

9.2.2 Organic Contaminants – Soil

The maximum concentration values for the organic analytes tested for (i.e. Speciated PAH) have been compared to the most relevant and appropriate published guidance values (generic assessment criteria) as part of the Maximum Value Test. The GAC have been selected using the following guidance documents:

- LQM/CIEH S4UL 2015 (Residential with Plant Uptake End Use).

Taking in to account the average TOC of the soils on the site, this assessment has been completed utilising a 2.5% SOM.

Based on the results of the contaminant analysis sheet contained in Appendix IV it can be seen that none of the organic contaminant concentrations exceed the assessment criteria and as such do not pose a risk to human health.

9.2.3 Asbestos Containing Materials (ACM's) – Soil

10 No. samples of the topsoil have been subjected to laboratory microscopic analysis to determine the presence or not of Asbestos Containing Materials (ACM's) in accordance with the methodology within HSG 248.

Of the samples tested, all returned a negative result for ACM's and were recorded as NAD (no asbestos detected), i.e. no asbestos was encountered.

9.2.4 Human Health Risk Assessment – Summary

The following is a summary of the Human Health risk assessment based on a *Residential with Plant Uptake End Use*:

- **Generic Contamination:** None.
- **Organic Contamination:** None.
- **Other Contamination:** None.

Based on the Human Health risk assessment above, none of the contaminants have been identified as posing a potential risk to human health with respect to a residential end use with plant uptake.

As such, the topsoil is not considered to pose a risk to human health or plants and remediation is not required. The topsoil materials noted on site are considered suitable for re use in a residential context in accordance with BS3882: Specification for Topsoil, 2015.

9.3 Ground Gas Risk Assessment (Carbon Dioxide and Methane)

As indicated in section 5.5, gas and groundwater monitoring wells have been installed in the boreholes (BH01 to BH07) and monitoring has been completed on three occasions to date.

During the monitoring, atmospheric air pressures varied between 1005mb and 1015mb and included both rising and falling pressure trends.

A maximum Carbon Dioxide (CO₂) concentration of 7.4%v/v has been recorded and no Methane (CH₄) was detected. The minimum Oxygen (O₂) concentration was 14.7% and the flow was typically <0.1l/h throughout. The flow within borehole BH01 initially peaked at 1.8l/h before dropping back to <0.1l/h which was considered to be associated with pressure equalisation (including hydraulic action within the sealed section of pipe).

In accordance with CIRIA C665 the maximum recorded CO₂ concentration has been converted to a Gas Screening Value (GSV), summarised as follows.

In this instance, the CO₂ GSV is:

- **CO₂ GSV = (Max CO₂ (%) / 100) x Max Flow (l/hr),**
- **Therefore; (7.4 / 100) x 0.1 = 0.0057 l/hr GSV**

Since no Methane have been detected no GSV has or can be formulated.

Taking into consideration the GSV for CO₂, the site falls into Characteristic Situation 1 (CS1). This indicates that gas precautions are not necessary at this stage for Carbon Dioxide and Methane.

The maximum CO₂ value marginally exceeds the 5% value where CIRIA C665 (Table 8.5) indicates that consideration should be given to increasing to basic gas protection measures in line with CS2, however, as no consistent flow was recorded within the wells, there is no driver present that could force the gasses into the proposed buildings and the risk is, therefore, considered negligible.

9.4 Ground Gas Risk Assessment (Radon)

The GSR in the P1 DTS indicates that the development site is located on the boundary of a high risk Radon Affected Area as defined by the British Geological Survey and UK Health Security Agency, as between 10% and 30% of properties are affected (see Figure 3). This area along the northern boundary requires full radon protection measures.

However, the majority of the site is not located within a Radon Affected Area as less than 1% of properties are above the action level. This area does not normally require radon protection measures.

It is recommended that the Local Authority are consulted in regard to which properties require radon protection measures. It is likely that properties along the north eastern part of the site will require radon protection measures, but this should be confirmed. The LA may require all properties to include protection measures as a precaution due to the high risk radon affected area falling within a potentially influencing distance (i.e., within c.250m of the site).

The site will require consultation with the Local Authority (LA) with respect to the appropriate protection measures and their installation. The LA may require a Ground Gas Verification Plan which provides details of the protection measures that are required and how they will be installed, along with the verification parameters. At this stage, it would be prudent to allow for full radon protection measures.

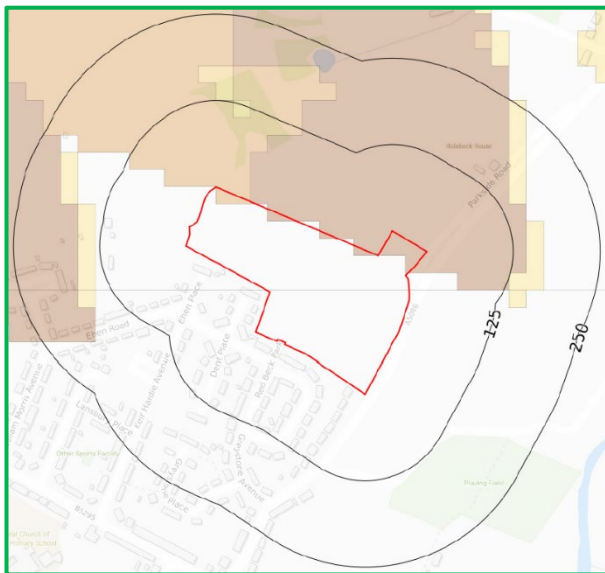


Figure 1. Radon Protection Zones

10.0 Construction Related Excavations and Off-Site Disposal

During the construction works it is likely that materials will be excavated on site (i.e. future foundations and buried utilities, etc.) that will not be able to be accommodated on site during to space and level constraints, ultimately requiring removal off site.

During the construction works, different materials should be stockpiled separately, and an appropriate waste disposal classification should be determined by the Design Team prior to removal. It may be the case that WAC testing is required to aid the assessment.

Where made ground materials or disturbed natural strata is to be removed, the results of the soil testing undertaken within this report can be used as a preliminary assessment and the anticipated waste disposal facility should be provided with a copy of the results for review. It may be the case that the waste facility requires additional contamination screening to aid the characterisation of the made ground for off-site disposal (i.e. Waste Acceptance Criteria – WAC) and it is recommended that this be confirmed by the design team prior to commencing on site.

During the construction phase, it may be the case that WAC screening is required to aid classification for disposal and it is recommended that all materials are classified prior to excavation and disposal off site.

Conversely, if materials are required to be brought to site to raise site levels or as part of a clean cover system then certification and/or soil testing results should be reviewed by a suitably experienced and qualified geo-environmental engineer to ensure that potentially contaminated materials are not being brought to site.

Any material movements may require a Material Management Plan (MMP) in accordance with CL:AIRE.

11.0 Discussion and Recommendations

11.1 Ground and Groundwater Conditions Summary

The ground investigation has encountered topsoil overlying natural firm to stiff sandy, gravelly clay. Across the western parts of the site, this was typically underlain by firm to stiff and stiff gravelly clay.

A band of loose and medium dense clayey/silty sandy gravel / gravelly sand was encountered through the central parts of the site. The deposits were noted as unstable with the side walls of the trial pits collapsing during excavation. Groundwater ingress and associated running sand was noted within the granular deposits. The granular deposits were typically underlain by stiff gravelly clay.

A combination of shallow bedrock / weathered rock or stiff gravelly clay were encountered across the eastern parts of the site.

The locations of the granular deposits and shallow bedrock are indicated on the exploratory hole location plan in Appendix I.

Minor perched groundwater ingress was noted in the trial pits and boreholes at depths of between c.0.50m and 2.30m bgl. The groundwater was typically associated with a band of sand and gravel which was encountered through the central parts of the site. The water ingress typically resulted in running sand and instability of the excavation side walls. The trial pits were typically dry on completion, however, where groundwater ingress was noted in the boreholes, this typically resulted in standing water at the same depths. Groundwater monitoring has encountered standing water between ground level and c.0.95m bgl.

Given the site elevation and topography, a shallow groundwater table is considered very unlikely, therefore, it is probable that the water has percolated through the ground from the surface due to the recent very heavy rainfall and has become perched within the wells and surrounding soils.

Significant groundwater ingress is not anticipated. However, localised running sand and associated unstable ground should be anticipated. An allowance should be made for groundwater control measures (i.e. pumping equipment) and shoring, particularly during wetter periods of the year. Care should be taken when pumping to avoid undermining the surrounding ground by removing fines.

Based on the ground conditions and water ingress, the use of soakaway drainage is not considered appropriate for the site.

11.2 Future Foundations, Pavements and Buried Structures

A sheet summarising the potential foundation options at each exploratory hole has been included in Appendix I.

It is understood that the proposed development will incorporate residential housing. Based on the results of the ground investigation, conventional strip foundations are considered appropriate across the eastern and western parts of the site where firm to stiff / stiff gravelly clays or shallow bedrock / weathered bedrock are present.

However, the clayey/silty granular deposits (sands and gravels) that were encountered through the central parts of the site are not considered suitable for standard strip foundations. These materials appeared to succumb to liquefaction and became very loose during excavation. Therefore, through the central parts of the site, consideration should be given to alternative foundation solutions such as mini-piles or a raft. Consideration could also be given to mass trench fill extending through the

granular deposits into the stiff gravelly clay below, however, given the poor stability of the granular deposits and running sands, shoring and groundwater control measures are likely to be required if this option is considered. Deeper boreholes may be required for design purposes and warranty providers.

Any strip foundations placed within the firm to stiff or stiff clays should be at least 0.75m deep. Given the presence of existing mature trees, it is recommended that the foundations are designed in accordance with NHBC Standards (Chapter 4.2, "Building Near Trees").

A safe bearing resistance for the strip foundations within the firm to stiff or stiff gravelly clay of 120kN/m² is considered appropriate. For a raft foundation placed on the sand and gravel deposits, a safe bearing resistance of between 50 and 80kPa is considered appropriate.

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 (in accordance with BRE Special Digest 1: 2005).

Based on the ground conditions, conventional road and pavement construction techniques should be suitable. However, it is always recommended that the appropriate CBR value is confirmed by way of plate load testing at formation level prior to construction.

11.3 Ground Contamination

11.3.1 Ground Contamination – Human Health

Following the results of the contamination assessment it can be seen that none of the contaminant concentrations exceed the assessment criteria for a residential development with plant uptake and asbestos fibres have not been detected. As such, the topsoil does not pose a risk to human health and is suitable for re-use in areas of private gardens and soft landscaping. In addition, phytotoxic elements (copper, nickel and zinc) are within the acceptable limits for topsoil.

In view of the above, remediation is not considered necessary in order to develop the site for residential end use.

Given the results of the chemical screening, standard water supply pipes are considered suitable. However, it is recommended that the relevant utility suppliers are contacted in this respect, as a site-specific risk assessment may be required.

Any imported materials required on site should be screened prior to placement on site to ensure contaminated materials are not being brought to site and that they are suitable for use within a residential setting.

If topsoil is brought on to site, the materials should be as specified in BS 3882:2015 as 'suitable for the intended purpose'. BS3882:2015 relates to nutrient content of topsoil and phytotoxic contamination and does not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to BS3882:2015 to ensure that they are suitable for their intended use. All materials brought on to site that are to be used as part of soft landscaped areas should be assessed with regards to human health criteria.

11.4 Ground Gas

The results of the ground gas monitoring indicate no methane, low concentrations of carbon dioxide and low flow rates. Therefore, gas protection measures are not considered necessary at this stage for carbon dioxide and methane.

At this stage, consideration is made for full Radon protection measures to be installed due to the high risk radon area along the northern site boundary.

11.5 Post Investigation Works

Redundant boreholes should be made safe and secure and should not cause a preferential pathway for contaminants and ground gasses.

Based on the ground gas levels recorded on the site throughout the monitoring period and the ground conditions encountered, the wells that were installed as part of this investigation are not considered to pose a significant risk to the proposed development and are very unlikely to provide a preferential pathway for contaminants based on current or proposed land uses.

Where decommissioning is required, the works should be completed in accordance Environment Agency Guidelines: "Guidance on the design and installation of groundwater Monitoring points", Section 5.5 Decommissioning (Page 59), and "Decommissioning abandoned boreholes and wells".

11.6 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.

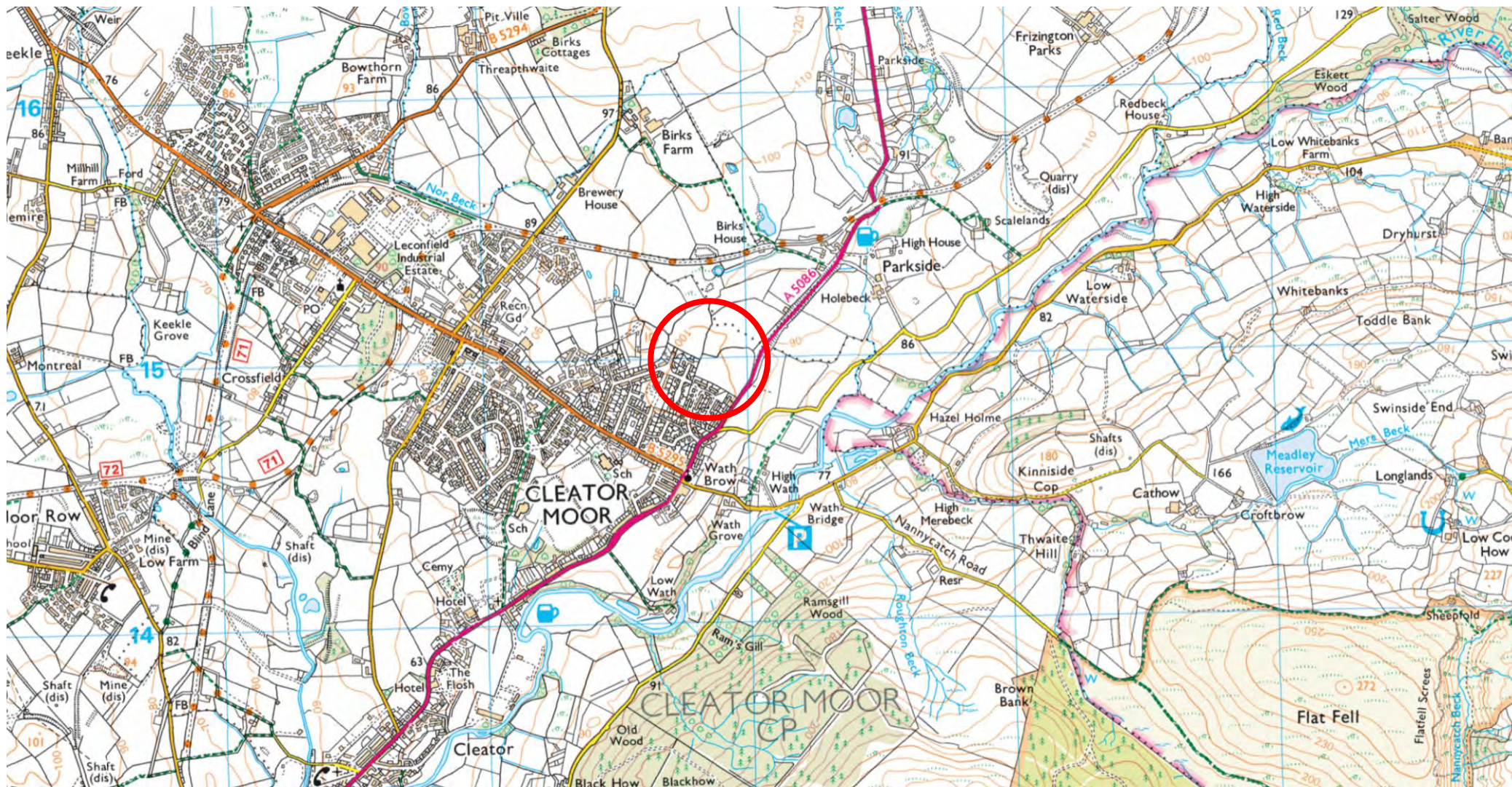
The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders 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
- Exploratory Hole Location Plan
- Proposed Site Layout Plan
- Aerial Images (Post Site Works)
- Foundation Summary Sheet

GEO2024-6221: Parkside, Cleator Moor, Cumbria – Site Location



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GEO2024-6221: Parkside, Cleator Moor, Cumbria – Exploratory Hole Location Plan*



* Exploratory Hole Locations are approximate. Do Not Scale.

GEO2024-6221: Parkside, Cleator Moor, Cumbria – Aerial Image 1 of 2



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GEO2024-6221: Parkside, Cleator Moor, Cumbria – Aerial Image 2 of 2



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Foundation Summary Summary Sheet

Site: Parkside, Cleator Moor, Cumbria
Project Ref: 2024-6221



Borehole	Terminal Depth (m bgl)	Possible Foundation Depth * (m bgl)	Foundation Type	Safe Bearing Resitance (kPa)	Formation	Notes
BH01	3.45	0.75	Strip	120	Stiff gravelly clay	
BH02	2.65	0.75	Strip	120	Stiff gravelly clay	
BH03	2.80	1.10	Strip	120	Stiff gravelly clay	
BH04	3.40	1.05	Raft	80	Medium dense clayey gravelly sand	
		1.80	Strip	120	Stiff gravelly clay	
BH05	2.90	0.75	Strip	120	Stiff gravelly clay	
BH06	1.80	1.00	Strip	90	Firm gravelly clay	
BH07	1.60	1.00	Strip	120	Stiff gravelly clay	
TP01	2.20	1.40	Strip	100	Firm to stiff gravelly clay	
TP02	2.30	1.00	Strip	100	Firm to stiff gravelly clay	
		1.50	Strip	120	Stiff gravelly clay	
TP03	1.90	0.90	Strip	100	Firm to stiff gravelly clay	
		1.40	Strip	120	Stiff gravelly clay	
TP04	2.30	1.00	Strip	50	Loose sandy gravel	
		2.10	Strip	120	Stiff gravelly clay	
TP05	2.30	0.90	Raft	60	Gravelly clay and loose sand and gravel	
		1.90	Strip	120	Stiff gravelly clay	
TP06	2.10	0.90	Strip	80	Firm to stiff gravelly clay	
		1.70	Strip	120	Stiff gravelly clay	
TP07	2.20	1.00	Raft	60	Soft to firm and firm gravelly clay	
		2.00	Strip	120	Stiff gravelly clay	
TP08	2.60	1.00	Raft	60	Soft to firm gravelly clay and loose gravels	
		2.30	Strip	120	Stiff gravelly clay.	Overlying ground is very unstable - shoring will be required.
TP09	2.20	1.40	Strip	120	Stiff gravelly clay	
TP10	2.20	0.80	Strip	120	Stiff gravelly clay	
TP11	0.90	0.80	Strip	150	Suspected bedrock.	
TP12	2.10	1.00	Strip	120	Stiff gravelly clay	
TP13	1.70	0.80	Strip	120	Suspected weathered bedrock.	
TP14	1.20	1.20	Strip	150	Suspected bedrock.	
TP15	2.40	1.00	Strip	100	Firm to stiff gravelly clay	
TP16	2.10	0.90	Strip	120	Suspected weathered bedrock.	
TP17	1.30	1.30	Strip	150	Suspected weathered bedrock.	
TP18	2.10	1.20	Strip	120	Stiff gravelly clay	
TP19	2.10	0.80	Strip	120	Stiff gravelly clay	
		1.20	Strip	120	Suspected weathered bedrock.	

Notes:
* - Minimum foundation depth is 0.75m bgl in cohesive soil. This is based on geotechnical plasticity test results. Foundations should be designed in accordance with NHBC GuidelinesChapter 4.2, “Building Near Trees”, therefore overdeepening may be required in close proximity to trees.

Appendix II

- Exploratory Hole Logs
- Dynamic Probe Result Sheet
- Ground Gas Monitoring Sheets

In-Situ Dynamic Probe Record Sheet - Super Heavy DPSH

Site Location: Parkside Road, Cleator Moor, Cumbria

Project Ref: 2024-6221

Driller: AJ / JM

Engineer: JB

Fieldworks Date: 18/11/2024 to 19/11/2024

Fieldworks Notes: N/A

Standard: BS1377 Part 9 DPSH

KEY:

	N300 ≤ 4
	N300 = 5 to 9
	N300 ≥ 10

Probe Location:	DP01 (TP01)		DP02 (TP02)		DP03 (TP03)		DP04 (TP04)		DP05 (TP05)		DP06 (TP06)		DP07 (TP07)		DP08 (TP08)		DP09 (TP09)		DP10 (TP10)		DP11 (TP11)		DP12 (TP12)		DP13 (TP13)		DP14 (TP14)		DP15 (TP15)		DP16 (TP16)		DP17 (TP17)		DP18 (TP18)		DP19 (TP19)			
Depth (m bgl):	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300	N100	N300		
0.1	0		0		0		0		0		0		0		0		0		0		N/A		0		0		0		0		0		0		0		0		0	
0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.3	0		0		0		0		0		0		0		0		0		0				0		0		0		0		0		0		0		0		0	
0.4	0		1		1		0		0		0		1		0		0		1				1	4	2	5	5	16	0	3	1	3	0	0	1	1	4	12		
0.5	1	4	2	5	0	4	10	10	1	1	10	11	1	7	1	1	1	1	2				2	4	1	5	5	16	0	3	1	3	0	0	1	1	4	12		
0.6	3		2		3		0		0		1		5		0		0		0				1		2		9		2		1		0		0		7			
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1.7	4	13	4	12	4	11	1	3	4	9	3	11	11	29	1	4	2	8	23	43			8	16	20	41			29	43	1	5	9	27			3	12		
1.8	4		6		2		1		2		6		11		1		3						4								2		10				4			
1.9	5		5		3		1		2		5		23		3		6						6								1		14				4			
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2.2	15		4		4		6		6		3				1		5						4								2		29				5			
2.3	15	45	5	14	5	18	4	14	4	11	5	13			1	8	5	18					2	8							4	9		>29			5	14		
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2.6			5	18	6	21	6	20	2	10	4	16			6	16	6	17					2	9							6	29					9	31		
2.7			7		8		7		7		8				7		7						4								18						13			
2.8			10		14		7		8		6				5		18						12								23						17			
2.9			10	31	17	49	7	24	6	19	8	24			11	33	28	46					38	50						22	>45					26	71			
3			11		18		10		5		10				17																						28			
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3.2			20	54			8	34	11	43	11	37				>28																								
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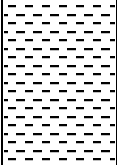
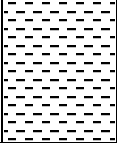
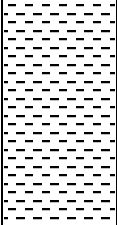
Notes:

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 to B.S. 1377: Part 9. 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.

There are two types of test: Heavy Dynamic Probing (DPH) and Super Heavy Dynamic Probing (DPSH). The dimensions of the cone and the mass and drop height of the driving weight differ between the two tests. The extension rods used in the test are either 0.5-metre-long (for top of the hole) or 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 BS 1377: Part 9.

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.

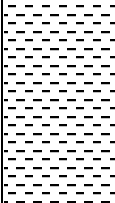
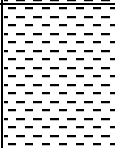
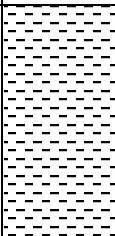
GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP01

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.26	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.26	0.90	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles.		0.80 - T
0.90	1.40	Soft grey brown sandy very gravelly CLAY with many sub-rounded cobbles and occasional boulders. Minor perched groundwater ingress.		
1.40	2.20	Firm to stiff, becoming stiff dark grey brown slightly sandy very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		1.80 - T
		End of trial hole at 2.20m. Trial pit remained stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



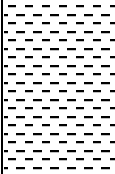
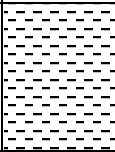
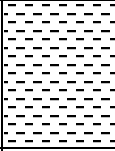
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GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.27	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.27	1.00	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders.		
1.00	1.50	Firm to stiff grey brown sandy very gravelly CLAY with occasional sub-rounded cobbles and boulders. Localised pockets of very clayey fine to coarse angular gravel.		1.20 – T
1.50	2.30	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.30m. Trial pit remained stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP03

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.27	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.27	0.90	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders.		0.60 - T
0.90	1.40	Firm to stiff grey brown sandy very gravelly CLAY with occasional sub-rounded cobbles and boulders. Localised pockets of very clayey fine to coarse angular gravel.		
1.40	1.90	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 1.90m. Trial pit remained stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.

Engineer: J.Brock

Site Works Date: 18.11.2024

Plant: Tracked 360 Excavator

Log Notes:

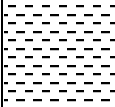
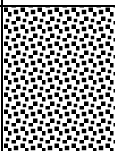
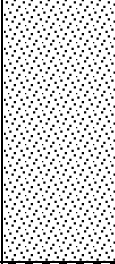
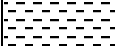
HSV = Hand Shear Vane (kN/m²)

LP = Limited Penetration (HSV/CBR)

B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

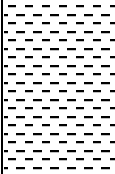
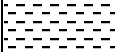
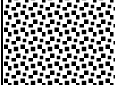
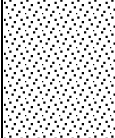
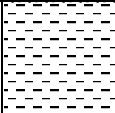


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP04

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.32	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.32	0.70	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders. Localised lenses of clayey gravelly sand.		
0.70	1.20	Dark brown very clayey sandy sub-rounded GRAVEL.		
1.20	2.10	Dark brown silty very gravelly medium and coarse SAND. Running sand and groundwater ingress from c.1.20m bgl. Localised collapse of side walls from c.1.40m bgl.		1.50 - T
2.10	2.30	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.30m. Some instability of side walls within sand and gravel deposits. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

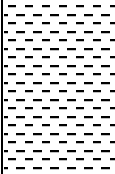
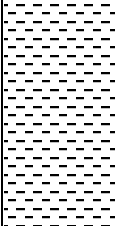
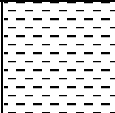


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP05

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.29	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.29	0.90	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders. Localised lenses of clayey gravelly sand.		
0.90	1.10	Firm to stiff dark brown sandy very gravelly CLAY with many sub-rounded cobbles.		
1.10	1.40	Dark brown very silty sandy fine to coarse sub-angular GRAVEL.		
1.40	1.90	Dark brown silt very gravelly medium SAND. Occasional sub-rounded cobbles. Running sand and groundwater ingress from c.1.40m bgl. Localised collapse of side walls from c.1.40m bgl.		
1.90	2.30	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.30m. Some instability of side walls within sand and gravel deposits. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP06

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.29	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.29	0.90	Firm to stiff orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders. Thin plastic water pipe at 0.50m bgl. Repaired.		0.70 - T
0.90	1.70	Firm to stiff dark brown sandy very gravelly CLAY with many sub-rounded cobbles. Occasional boulders.		
1.70	2.10	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.10m. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

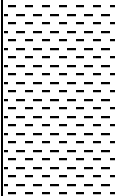
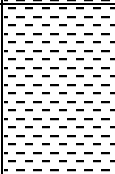
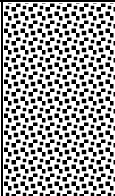
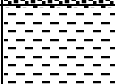


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP07

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.30	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.30	1.00	Firm to stiff orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders. 0.90 – Field drain – groundwater ingress. Lenses of silty very gravelly sand at base of clay.		
1.00	1.40	Firm dark grey brown sandy very gravelly CLAY with many sub-rounded cobbles. Occasional boulders. Becoming soft to firm with depth.		
1.40	2.00	Soft to firm dark grey brown silty very sandy gravelly CLAY with lenses of very silty gravelly sand and gravel.		
2.00	2.20	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.20m. Trial pit stable. Trial hole dry on completion (localised ingress at 0.90m bgl). Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

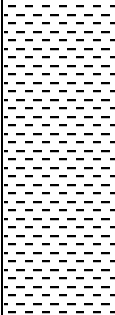
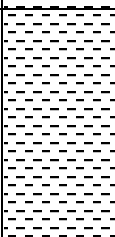


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP08

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.28	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.28	1.00	Firm orangey brown sandy very gravelly CLAY. Occasional cobbles and boulders.		0.50 - T
1.00	1.60	Soft to firm, locally soft grey brown sandy very gravelly CLAY with pockets of clayey sandy gravel and cobbles. Running sand noted.		1.20 - T
1.60	2.30	Dark grey silty very sandy fine to coarse sub-rounded GRAVEL and COBBLES with occasional boulders. Running sand noted. Unstable - collapse of both side walls between 0.60m and 2.30m bgl.		
2.30	2.60	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.60m – very unstable. Collapse of both side walls between 0.60m and 2.30m bgl. Groundwater ingress and running sand 1.00m to 2.30m bgl. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP09

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.29	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.29	1.40	Firm to stiff dark brown sandy very gravelly CLAY with occasional lenses of silty gravelly sand. 0.60 – Field drain at 0.60m bgl.		
1.40	2.20	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.20m. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

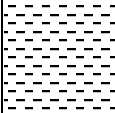


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP10

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.28	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.28	0.80	Firm desiccated red brown sandy gravelly CLAY.		
0.80	2.20	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		1.00 - T
		End of trial hole at 2.20m. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 18.11.2024 Plant: Tracked 360 Excavator		Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub		

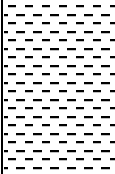
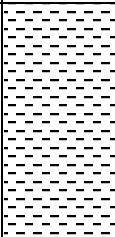
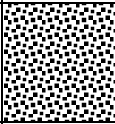


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP11

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.33	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.33	0.70	Firm sandy very gravelly CLAY with many COBBLES and BOULDERS (clay bound GRAVEL, COBBLES and BOULDERS). Granular fraction becoming angular with depth.		0.60 - T
0.70	0.90	Suspected weathered bedrock. Recovered as angular COBBLES and BOULDERS of sandstone.		
0.90		Suspected solid bedrock – scraping only. Refusal.		
		End of trial hole at 0.90m – refusal. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

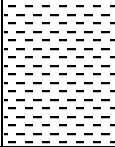
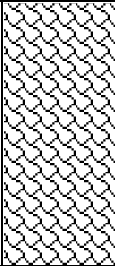


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP12

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.34	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.34	0.90	Firm sandy very gravelly CLAY with many COBBLES and BOULDERS (clay bound GRAVEL, COBBLES and BOULDERS).		
0.90	1.70	Stiff dark grey brown very gravelly CLAY with many cobbles and occasional boulders. Occasional lenses of clayey sandy gravel. Localised perched water ingress.		1.40 - T
1.70	2.10	Dark brown silty sandy fine to coarse GRAVEL and COBBLES with occasional boulders.		
2.10		Possible bedrock? – unable to excavate – scraping only.		
		End of trial hole at 2.10m - refusal. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP13

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.33	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.33	0.80	Firm red brown sandy very gravelly CLAY with many COBBLES and BOULDERS (clay bound GRAVEL, COBBLES and BOULDERS). Angular cobbles and boulders at base.		0.70 - T
0.80	1.70	Dark red brown very silty sandy angular GRAVEL, COBBLES and BOULDERS (possible weathered bedrock).		
1.70		Refusal on very large boulder or solid bedrock. Unable to excavate.		
		End of trial hole at 1.70m - refusal. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.

Engineer: J.Brock

Site Works Date: 19.11.2024

Plant: Tracked 360 Excavator

Log Notes:

HSV = Hand Shear Vane (kN/m²)

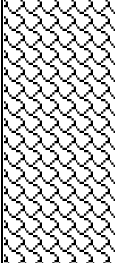
LP = Limited Penetration (HSV/CBR)

B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub



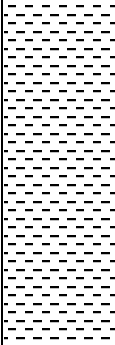
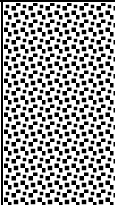
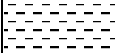
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GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP14

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.33	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.33	1.20	Dark red brown very clayey fine to coarse angular GRAVEL, COBBLES and BOULDERS of sandstone.		
1.20		Possible bedrock? – unable to excavate – scraping only.		
		End of trial hole at 1.20m - refusal. Trial pit stable. Trial hole dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

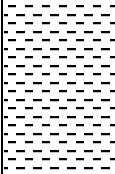
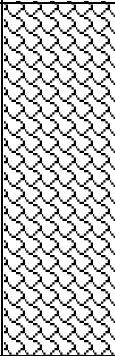


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP15

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.26	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.26	1.50	Firm to stiff orangey brown sandy gravelly CLAY with occasional cobbles and boulders. 0.70 – Field drain at c.0.70m bgl.		0.70 - T
1.50	2.20	Dark grey brown very clayey/silty sandy GRAVEL and COBBLES with occasional boulders. Clay is soft to firm very sandy and gravelly. Locally unstable with running sand noted.		
2.20	2.40	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders (clay bound gravel, cobbles and boulders).		
		End of trial hole at 2.40m. Trial pit stable. Localised perched water ingress and running sand. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests. Dynamic probe completed next to trial pit – see separate results sheet.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

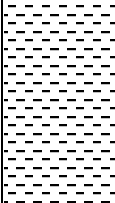


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP16

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.28	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.28	0.90	Firm to stiff grey brown mottled brown sandy gravelly CLAY with occasional sub-rounded cobbles.		0.60 - T 0.70 HSV = 75
0.90	2.10	Suspected weathered/weak bedrock recovered as: Grey brown slightly silty angular GRAVEL of siltstone. 1.50 – Becoming dense – excavation slowing significantly.		1.20 - T
		End of trial hole at 2.10m. Trial pit stable. Trial pit dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

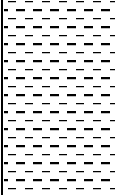
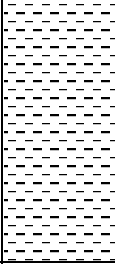


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP17

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.33	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		0.10 – J&T
0.33	1.00	Firm to stiff grey brown mottled brown sandy gravelly CLAY with occasional sub-rounded cobbles.		0.80 HSV = 80
1.00	1.30	Possible weathered bedrock recovered as: Dark red brown silty sandy fine to coarse angular GRAVEL and COBBLES.		
1.30		Possible solid strata – scraping only. Unable to excavate.		
		End of trial hole at 1.30m - refusal. Trial pit stable. Trial pit dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

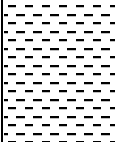
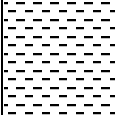
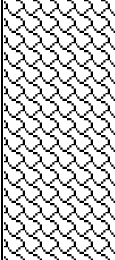


GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP18

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.29	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.29	0.50	Firm orangey brown very sandy gravelly CLAY with lenses of very silty/clayey SAND.		
0.50	1.20	Firm to stiff grey brown sandy very gravelly CLAY with lenses of clayey sandy angular GRAVEL.		1.00 - T
1.20	2.10	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders.		
		End of trial hole at 2.10m. Trial pit stable. Trial pit dry on completion. Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests.
Engineer: J.Brock Site Works Date: 19.11.2024 Plant: Tracked 360 Excavator			Log Notes: HSV = Hand Shear Vane (kN/m ²) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	



GEO2024-6221: Parkside, Cleator Moor, Cumbria – TP19

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.32	TOPSOIL: Dark brown very silty sandy gravelly LOAM.		
0.32	0.80	Firm brown very sandy gravelly CLAY with many sub-rounded cobbles and boulders. Becoming firm to stiff with depth.		
0.80	1.20	Stiff dark grey brown very gravelly CLAY with many cobbles and boulders.		
1.20	2.10	Suspected weathered/weak bedrock recovered as: Grey brown slightly silty angular GRAVEL of siltstone. 1.60 – Becoming dense – excavation slowing significantly. Slight groundwater seep from base of trial pit.		
		End of trial hole at 2.10m. Trial pit stable. Slight groundwater seep from base of trial pit Trial hole backfilled with arisings on completion.		Clay too gravelly for HSV tests.

Engineer: J.Brock

Site Works Date: 19.11.2024

Plant: Tracked 360 Excavator

Log Notes:

HSV = Hand Shear Vane (kN/m²)

LP = Limited Penetration (HSV/CBR)

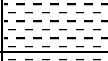
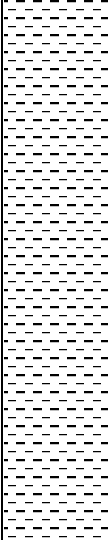
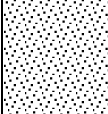
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub



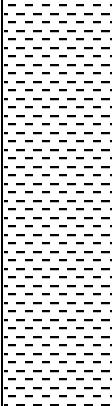
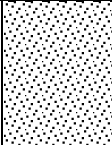
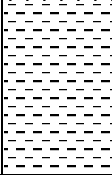
GEO

Engineer: GE Site Works Date: 18/11/2024 Plant: Archway Lightweight DART Superheavy	Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub
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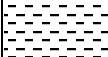
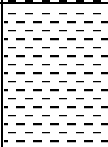
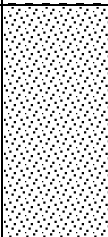
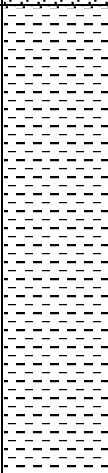
2024-6221: Parkside, Cleator Moor, Cumbria - BH02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.23	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Some sandstone cobbles noted.		0.15 JT
0.23	0.45	Grey and brown sandy CLAY with much fine to coarse sub-rounded sandstone and limestone gravel.		
0.45	2.30	Stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		0.80 T 1.10 SPT: N20 1.70 T 2.00 SPT: N29
2.30	2.65	Very dense reddish-brown silty fine to coarse SAND with some fine to medium, angular sandstone and limestone gravel.		2.40 T 2.65 SPTc: N50/195mm
		End of borehole due to sample tube and SPT refusal. Borehole remained open and dry on completion. Borehole installed: GL to 1.0m plain pipe and bentonite 1.0 to 2.65m slotted pipe and gravel.		Hand dug before drilling. Cased to 2.00m.
Engineer: GE Site Works Date: 18/11/2024 Plant: Archway Lightweight DART Superheavy			Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

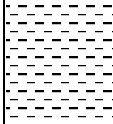
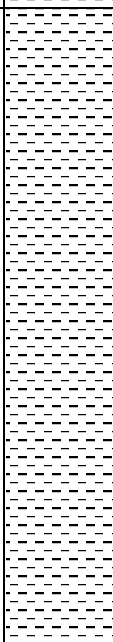
2024-6221: Parkside, Cleator Moor, Cumbria - BH03

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.30	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Rare glass noted. Some sandstone cobbles noted.		0.15 JT
0.30	1.70	Firm becoming stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		0.70 T 1.10 SPT: N9
1.70	2.20	Reddish brown fine to coarse SAND with much fine to coarse sub-angular gravel of sandstone and limestone.		1.70 T 2.00 SPT: N16
2.20	2.80	stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		2.40 T 2.80 SPTc: N50/295mm
		End of borehole due to sample tube and SPT refusal. Water strike and SWL at 1.80m on completion. Borehole installed: GL to 0.5m plain pipe and bentonite 0.5 to 2.5m slotted pipe and gravel.		Hand dug before drilling. Cased to 2.00m.
Engineer: GE Site Works Date: 18/11/2024 Plant: Archway Lightweight DART Superheavy			Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

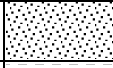
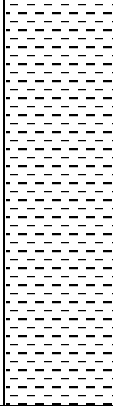
2024-6221: Parkside, Cleator Moor, Cumbria - BH04

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.25	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Some sandstone cobbles noted.		0.13 JT
0.25	0.48	Grey-brown very sandy CLAY with many sandstone cobbles.		
0.48	1.05	Firm becoming stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		0.60 T 1.00 SPT: N18
1.05	1.80	Medium dense reddish brown, very clayey fine to coarse SAND with much fine to coarse sub-angular gravel of sandstone and limestone.		1.50 T
1.80	3.40	Stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		2.00 SPT: N18 3.00 SPT: N50/250mm
		End of borehole due to sample tube and SPT refusal. Water strike and SWL at 1.80m on completion. Borehole installed: GL to 0.9m plain pipe and bentonite 0.9 to 2.9m slotted pipe and gravel.		Hand dug before drilling. Cased to 1.20m.
Engineer: GE Site Works Date: 18/11/2024 Plant: Archway Lightweight DART Superheavy			Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

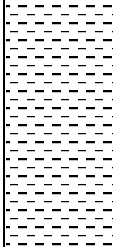
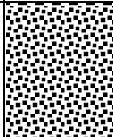
2024-6221: Parkside, Cleator Moor, Cumbria - BH05

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.19	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Some sandstone cobbles noted.		0.10 JT
0.19	0.70	Reddish-brown very sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone. Some sandstone cobbles.		
0.70	2.90	Stiff reddish brown slightly sandy CLAY with much fine to coarse, sub-rounded to sub-angular gravel of sandstone and limestone.		0.80 T 1.00 SPT: N19 1.50 T 2.00 SPT: N16 2.50 T 2.90 SPTc: N50/220mm
		End of borehole due to sample tube and SPT refusal. Borehole remained open and dry on completion. Borehole installed: GL to 0.8m plain pipe and bentonite 0.8 to 2.8m slotted pipe and gravel.		Hand dug before drilling. Cased to 1.50m.
Engineer: GE Site Works Date: 18/11/2024 Plant: Archway Lightweight DART Superheavy		Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub		

2024-6221: Parkside, Cleator Moor, Cumbria - BH06

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.25	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Some sandstone cobbles noted.		
0.25	0.40	Dark brown very clayey fine to coarse SAND. Many sandstone and limestone cobbles.		0.30 JT
0.40	1.80	Soft becoming firm light brown and grey sandy CLAY with much fine to coarse, sub-angular sandstone gravel.		1.00 T 1.00 SPT: N14 1.70 T 1.80 SPTc: N50/290mm
		End of borehole due to sample tube and SPT refusal. Water strike and SWL at 0.50m on completion. Borehole installed: GL to 0.6m plain pipe and bentonite 0.6 to 1.6m slotted pipe and gravel.		Hand dug before drilling. Cased to 1.00m.
Engineer: GE Site Works Date: 19/11/2024 Plant: Archway Lightweight DART Superheavy			Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

2024-6221: Parkside, Cleator Moor, Cumbria - BH07

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.23	TOPSOIL: Dark brown sandy, slightly gravelly LOAM. Some sandstone cobbles noted.		0.10 JT
0.23	1.10	Grey-brown sandy CLAY with many sandstone and limestone cobbles.		0.60 T 1.00 SPT: N46
1.10	1.60	Very dense brown and grey clayey, slightly sandy fine to coarse sub-angular sandstone GRAVEL.		1.20 T 1.60 SPTc: N50/280mm
		End of borehole due to sample tube and SPT refusal. Borehole remained open and dry on completion. Borehole installed: GL to 0.6m plain pipe and bentonite 0.6 to 1.6m slotted pipe and gravel.		Hand dug before drilling. Cased to 1.00m.
Engineer: GE Site Works Date: 19/11/2024 Plant: Archway Lightweight DART Superheavy			Log Notes: SPT = Standard Penetration test (blows per 300mm n300) LP = Limited Penetration (HSV/CBR) NP = No penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub	

Ground Gas & Groundwater Monitoring Record Sheet 01

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 27/11/2024

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1014 R	0	0	0.7	0.7	16.4	16.2	0.2 (p 1.8)	0.95	3.00	-
BH02	nm	nm	nm	nm	nm	nm	nm	nm	0.10	2.65	-
BH03	1014 R	0	0	5.5	5.7	15.5	14.9	<0.1	0.30	2.50	-
BH04	1014 R	0	0	1.2	1.2	16.3	16.3	<0.1	0.60	2.90	-
BH05	1014 R	0	0	1.7	1.7	15.3	14.7	<0.1	0.55	2.80	-
BH06	1014 R	0	0	2.8	3.5	16.1	15.8	<0.1	0.20	1.60	-
BH07	1014 R	0	0	5.2	5.8	15.5	12.1	<0.1	DRY	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Overcast

Temperature: 6.0°C

Notes: Water level in BH02 too shallow to monitor.

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Ground Gas & Groundwater Monitoring Record Sheet 02

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 05/12/2024

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1005 F	0	0	1.0	0.8	16.0	16.0	<0.1	0.70	3.00	-
BH02	nm	nm	nm	nm	nm	nm	nm	nm	0.00	2.65	-
BH03	nm	nm	nm	nm	nm	nm	nm	nm	0.10	2.50	-
BH04	1005 F	0	0	1.9	0.9	16.0	16.0	<0.1	0.50	2.90	-
BH05	nm	nm	nm	nm	nm	nm	nm	nm	0.05	2.80	-
BH06	nm	nm	nm	nm	nm	nm	nm	nm	0.05	1.60	-
BH07	1005 F	0	0	0.5	0.6	15.6	15.2	<0.1	0.65	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Overcast (recent very heavy rainfall)

Temperature: 10.0°C

Notes: Wells flooded in BH02, BH03, BH05 and BH06. Wells bailed out by hand to base.

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Ground Gas & Groundwater Monitoring Record Sheet 03

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 13/12/2024

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1015 F	0	0	0.1	0.1	16.1	16.2	<0.1	0.70	3.00	-
BH02	1015 F	0	0	0.4	0.2	15.3	16.4	<0.1	1.20*	2.65	-
BH03	1015 F	0	0	4.3	4.6	15.2	15.2	<0.1	0.55*	2.50	-
BH04	1015 F	0	0	0.8	0.8	16.0	16.0	<0.1	0.60	2.90	-
BH05	1015 F	0	0	3.4	3.5	15.0	15.0	<0.1	1.80*	2.80	-
BH06	1015 F	0	0	0.4	0.3	16.4	16.3	<0.1	0.85*	1.60	-
BH07	1015 F	0	0	0.1	0.1	17.0	17.0	<0.1	DRY	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Overcast

Temperature: 9.0°C

Notes: * = Wells in boreholes BH02, BH03, BH05 and BH06 bailed out by hand on 05/12/2024

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Ground Gas & Groundwater Monitoring Record Sheet 04

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 03.01.2025

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1006 F	0	0	2.1	2.2	17.4	17.1	<0.1	0.6	3.00	-
BH02	1006 F	0	0	2.6	2.8	17.4	17.2	<0.1	1.1	2.65	-
BH03	1006 F	0	0	4.8	5.4	12.5	9.4	<0.1	0.6	2.50	-
BH04	1006 F	0	0	2.3	2.3	17.2	16.8	<0.1	0.5	2.90	-
BH05	1006 F	0	0	5.9	7.5	14.9	13.4	<0.1	0.7	2.80	-
BH06	nm	nm	nm	nm	nm	nm	Nm	nm	0.05	1.60	-
BH07	1006 F	0	0	6.3	7.4	9.1	5.9	<0.1	DRY	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Overcast

Temperature: 4.0°C

Notes: BH06 Flooded – Unable to monitor

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Ground Gas & Groundwater Monitoring Record Sheet 05

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 07.02.2025

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1017 R	0	0	2.3	2.4	13.3	12.4	<0.1	0.45	3.00	-
BH02	1017 R	0	0	2.9	3.0	10.6	9.9	<0.1	0.25	2.65	-
BH03	1017 R	0	0	5.1	5.3	10.9	10.2	<0.1	0.38	2.50	-
BH04	1017 R	0	0	2.8	2.9	16.9	16.5	<0.1	0.60	2.90	-
BH05	1017 R	0	0	5.4	5.9	11.2	10.4	<0.1	0.85	2.80	-
BH06	nm	nm	nm	nm	Nm	nm	Nm	nm	0.10	1.60	-
BH07	1017 R	0	0	5.9	6.3	10.2	9.6	<0.1	DRY	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Overcast

Temperature: 8.0°C

Notes: BH06 Flooded – Unable to monitor

Website: www.geoenvironmentalengineering.com

Email: info@geoenvironmentalengineering.com

Telephone: 07883 440 186

Ground Gas & Groundwater Monitoring Record Sheet 06

Site: Parkside Road, Cleator Moor, Cumbria

Project No: 2023-6221

Date: 25.02.2025

Borehole	Pressure (mb)	Methane Initial (% v/v)	Methane Residual (% v/v)	Carbon Dioxide Initial (% v/v)	Carbon Dioxide Residual (% v/v)	Oxygen Initial (% v/v)	Oxygen Residual (% v/v)	Flow Rate (l/h)	Water Level (m)	Depth of base (m)	Water Sample Recovered?
BB01	1001 F	0	0	1.8	1.9	15.7	15.4	<0.1	0.40	3.00	-
BH02	1001 F	0	0	2.7	2.8	16.7	16.2	<0.1	0.20	2.65	-
BH03	1001 F	0	0	4.6	4.9	15.2	14.9	<0.1	0.30	2.50	-
BH04	1001 F	0	0	2.5	2.6	16.9	16.7	<0.1	0.60	2.90	-
BH05	1001 F	0	0	4.3	4.5	14.2	13.9	<0.1	0.60	2.80	-
BH06	nm	nm	nm	nm	Nm	nm	Nm	nm	0.0	1.60	-
BH07	1001 F	0	0	4.7	5.2	12.6	12.2	<0.1	1.40	1.60	-

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.

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

nm – Not Monitored

Monitoring Completed By: JB

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

Weather Conditions: Dry, Partial Sunshine

Temperature: 9.0°C

Notes: BH06 Flooded – Unable to monitor

Website: www.geoenvironmentalengineering.com

Email: info@geoenvironmentalengineering.com

Telephone: 07883 440 186

Appendix III

■ Laboratory Test Results



Certificate of Analysis

Certificate Number 24-25669

Issued: 03-Dec-24

Client GEO Environmental Engineering
NW Office
31 Casshow Way
Cockermouth
Cumbria
CA13 9FY

Our Reference 24-25669

Client Reference ~ GEO2024-6221

Order No ~ (not supplied)

Contract Title ~ Parkside, Cleator

Description 13 Soil samples.

Date Received 26-Nov-24

Date Started 26-Nov-24

Date Completed 03-Dec-24

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

Kirk Bridgewood
General Manager



Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY

Symbol key at end of report Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

Page 1 of 5

Summary of Chemical Analysis

Soil Samples

Our Ref 24-25669

Client Ref ~ GEO2024-6221

Contract Title ~ Parkside, Cleator

Lab No	2430157	2430158	2430159	2430160	2430161	2430162	2430163
Sample ID ~	TP01	TP02	TP04	TP07	TP09	TP12	TP13
Depth ~	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Other ID ~							
Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date ~	25/11/2024	25/11/2024	25/11/2024	25/11/2024	25/11/2024	25/11/2024	25/11/2024
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	14	11	13	14	20	20	37
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.2	0.3	0.3	0.1	0.4
Chromium III	DETSC 2301*	0.15	mg/kg	24	23	20	25	20	18	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	16	19	18	21	210	16	110
Lead	DETSC 2301#	0.3	mg/kg	34	44	41	52	68	29	74
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.09	0.10	0.11	0.11	0.12	0.10
Nickel	DETSC 2301#	1	mg/kg	12	12	11	14	19	9.6	23
Selenium	DETSC 2301#	0.5	mg/kg	1.0	< 0.5	0.9	0.5	0.8	1.2	0.8
Zinc	DETSC 2301#	1	mg/kg	41	39	41	42	65	46	65
Inorganics										
pH	DETSC 2008#		pH	6.3	6.0	6.0	6.0	6.0	6.4	5.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.4	0.4	0.4	0.5	0.3	0.3	0.4
Total Organic Carbon	DETSC 2084#	0.5	%	3.5	4.1	4.5	4.4	7.2	2.1	6.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10	< 10	< 10	< 10	20	160
PAHs										
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

Summary of Chemical Analysis

Soil Samples

Our Ref 24-25669

Client Ref ~ GEO2024-6221

Contract Title ~ Parkside, Cleator

Lab No	2430164	2430165	2430166	2430167	2430168	2430169
Sample ID ~	TP15	TP17	BH03	TP04	TP11	TP16
Depth ~	0.10	0.10	0.15	1.50	0.60	1.20
Other ID ~						
Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date ~	25/11/2024	25/11/2024	25/11/2024	25/11/2024	25/11/2024	25/11/2024
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	14	31	20			
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.3	0.2			
Chromium III	DETSC 2301*	0.15	mg/kg	15	15	27			
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0			
Copper	DETSC 2301#	0.2	mg/kg	17	28	34			
Lead	DETSC 2301#	0.3	mg/kg	160	65	88			
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.10	0.09			
Nickel	DETSC 2301#	1	mg/kg	12	17	16			
Selenium	DETSC 2301#	0.5	mg/kg	0.6	0.7	0.5			
Zinc	DETSC 2301#	1	mg/kg	35	45	47			
Inorganics									
pH	DETSC 2008#		pH	5.9	6.0	6.3	6.7	6.7	7.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3	0.4	0.2			
Total Organic Carbon	DETSC 2084#	0.5	%	3.8	6.6	3.2			
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10	43	< 10	< 10	38
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	< 0.1			
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	< 0.1			
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1			
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6			

Summary of Asbestos Analysis

Soil Samples

Our Ref 24-25669

Client Ref ~ GEO2024-6221

Contract Title ~ Parkside, Cleator

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2430157	TP01 0.10	SOIL	NAD	none	Ben Rose
2430158	TP02 0.10	SOIL	NAD	none	Ben Rose
2430159	TP04 0.10	SOIL	NAD	none	Ben Rose
2430160	TP07 0.10	SOIL	NAD	none	Ben Rose
2430161	TP09 0.10	SOIL	NAD	none	Ben Rose
2430162	TP12 0.10	SOIL	NAD	none	Ben Rose
2430163	TP13 0.10	SOIL	NAD	none	Ben Rose
2430164	TP15 0.10	SOIL	NAD	none	Ben Rose
2430165	TP17 0.10	SOIL	NAD	none	Ben Rose
2430166	BH03 0.15	SOIL	NAD	none	Ben Rose

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 24-25669
 Client Ref ~ GEO2024-6221
 Contract ~ Parkside, Cleator

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2430157	TP01 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430158	TP02 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430159	TP04 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430160	TP07 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430161	TP09 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430162	TP12 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430163	TP13 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430164	TP15 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430165	TP17 0.10 SOIL	25/11/24	GJ 250ml, PT 1L		
2430166	BH03 0.15 SOIL	25/11/24	GJ 250ml, PT 500ml		
2430167	TP04 1.50 SOIL	25/11/24	PT 1L		
2430168	TP11 0.60 SOIL	25/11/24	PT 1L		
2430169	TP16 1.20 SOIL	25/11/24	PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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 425µm sieve, in accordance with BS1377.

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



Certificate of Analysis

Certificate Number 24-25941

Issued: 03-Dec-24

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

Our Reference 24-25941

Client Reference ~ S1940

Order No ~ NCC6238227

Contract Title ~ PARKSIDE, CLEATOR - GEO Enviromental

Description 11 Soil samples.

Date Received 29-Nov-24

Date Started 29-Nov-24

Date Completed 03-Dec-24

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 "K. Bridgewood".

Kirk Bridgewood
General Manager



Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY

Symbol key at end of report Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

Page 1 of 4

Summary of Chemical Analysis

Soil Samples

Our Ref 24-25941

Client Ref ~ S1940

Contract Title ~ PARKSIDE, CLEATOR - GEO Enviromental

Lab No	2432158	2432159	2432160	2432161	2432162	2432163	2432164	2432165	2432166	2432167	2432168
Sample ID ~	TP01	TP02	TP03	TP06	TP10	TP12	TP15	TP16	TP18	BH01	BH01
Depth ~	0.80	1.80	0.60	0.70	1.00	1.40	0.70	0.60	1.00	2.00	3.00
Other ID ~	S1940/01	S1940/02	S1940/04	S1940/05	S1940/08	S1940/09	S1940/10	S1940/11	S1940/12	S1940/13	S1940/14
Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time ~	n/s	n/s	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	7.9	8.7	7.1	7.6	6.7	7.5	7.1	7.2	6.6	8.6	8.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	29	17	22	15	15	16	11	21	16	12	15

Information in Support of the Analytical Results

Our Ref 24-25941

Client Ref ~ S1940

Contract ~ PARKSIDE, CLEATOR - GEO Environmental

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2432158	TP01 0.80 SOIL		PT 1L		
2432159	TP02 1.80 SOIL		PT 1L		
2432160	TP03 0.60 SOIL		PT 1L		
2432161	TP06 0.70 SOIL		PT 1L		
2432162	TP10 1.00 SOIL		PT 1L		
2432163	TP12 1.40 SOIL		PT 1L		
2432164	TP15 0.70 SOIL		PT 1L		
2432165	TP16 0.60 SOIL		PT 1L		
2432166	TP18 1.00 SOIL		PT 1L		
2432167	BH01 2.00 SOIL		PT 500ml		
2432168	BH01 3.00 SOIL		PT 500ml		

Key: P-Plastic T-Tub

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 425µm sieve, in accordance with BS1377.

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.

Information in Support of the Analytical Results

Our Ref 24-25941

Client Ref ~ S1940

Contract ~ PARKSIDE, CLEATOR - GEO Enviromental

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

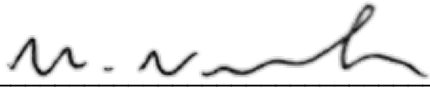
End of Report



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: **James Brock / Curtis Evans**
Project: **GEO2024-6221 - Parkside, Cleator**
Supplier/Source: **Site**
Date Sampled:
Date Received: **26/11/2024**
Sampled By: **Clients Staff**
SampleSpec: **Sampled by Site Staff/Client**
Remarks: **S1940/07 - sample missing**

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

Report/Sample ID No: **S1940/01**

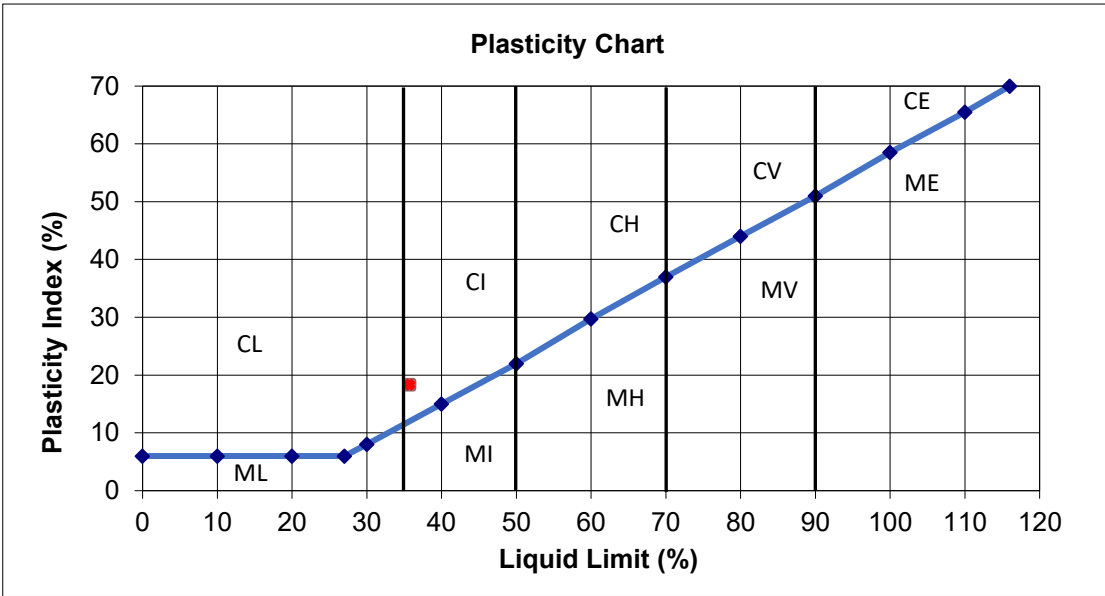
Location: TP01 at 0.80m
Material Type: Reddy brown sandy CLAY with very occasional gravel

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

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	25.1	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	36	Part 2 Clause 4.4
Plastic Limit (%)	17	Part 2 Clause 5.3
Plasticity Index (%)	18	Part 2 Clause 5.4
Passing 425mic (%)	57	
Soil Classification:	CI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/02**

Location: TP01 at 1.80m

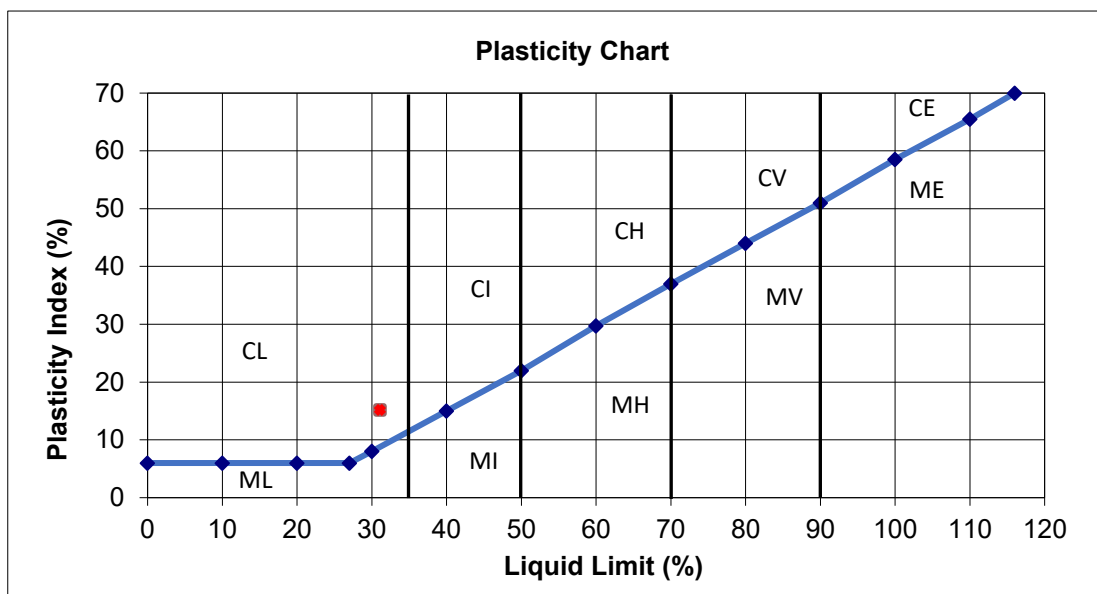
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 9.7

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	13.1	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	31	Part 2 Clause 4.4
Plastic Limit (%)	16	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	68	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/03**

Location: TP01 at 1.20m

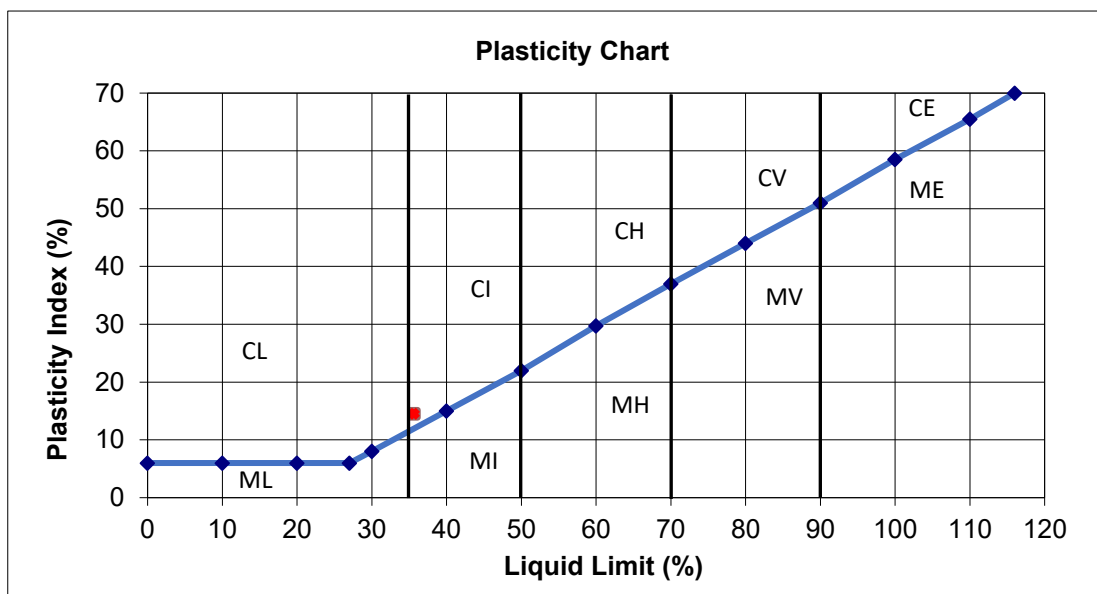
Material Type: Reddy browns/lightly sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 2.9

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	17.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	36	Part 2 Clause 4.4
Plastic Limit (%)	21	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	71	
Soil Classification:	CI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/04**

Location: TP03 at 0.60m

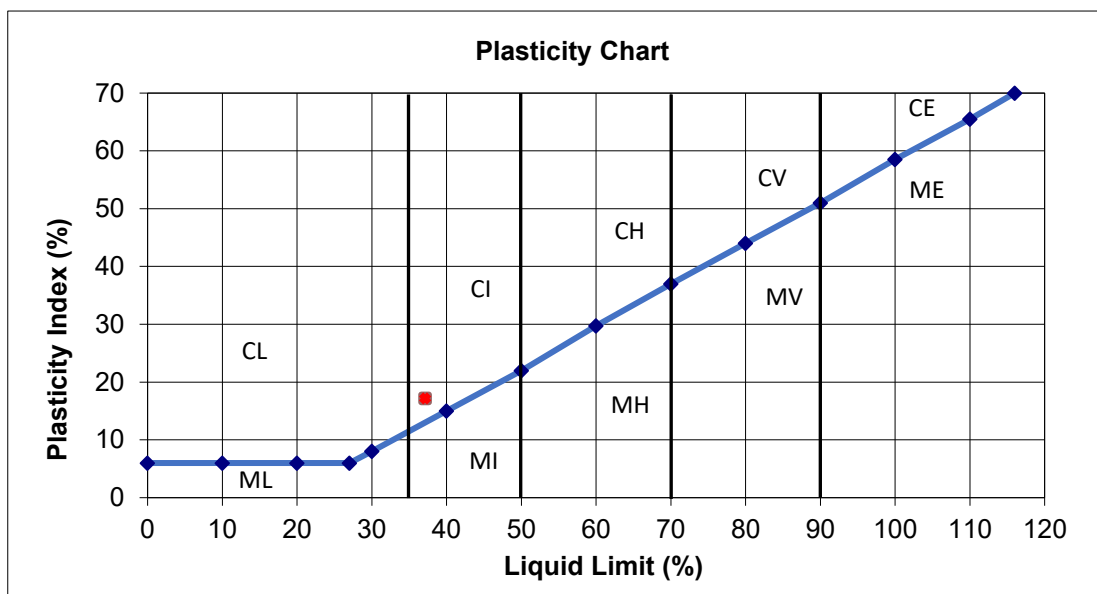
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 7.3

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	19.6	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	37	Part 2 Clause 4.4
Plastic Limit (%)	20	Part 2 Clause 5.3
Plasticity Index (%)	17	Part 2 Clause 5.4
Passing 425mic (%)	66	
Soil Classification:	CI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/05**

Location: TP06 at 0.70m

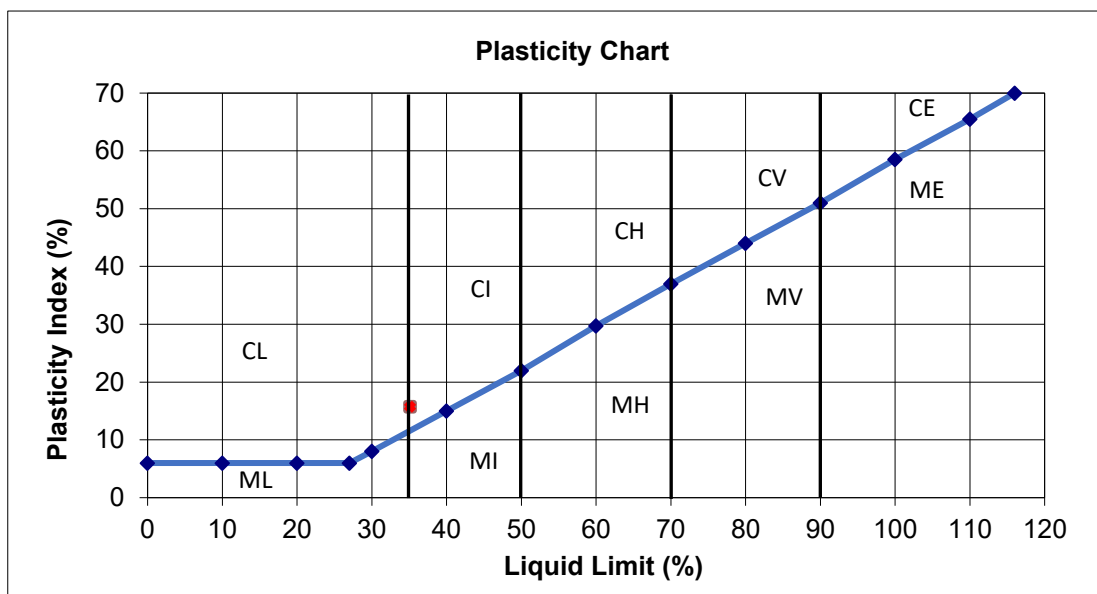
Material Type: Reddy brown sandy CLAY with very occasional gravel

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

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	20.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	35	Part 2 Clause 4.4
Plastic Limit (%)	19	Part 2 Clause 5.3
Plasticity Index (%)	16	Part 2 Clause 5.4
Passing 425mic (%)	67	
Soil Classification:	CL/CI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/06**

Location: TP08 at 0.50m

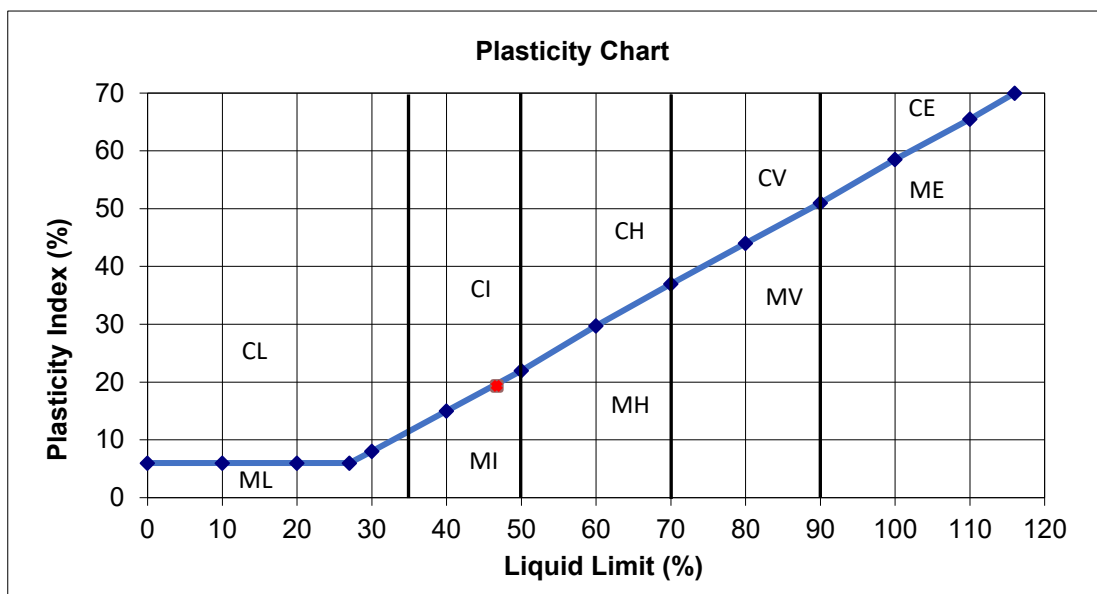
Material Type: Orange brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 4.0

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	25.5	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	47	Part 2 Clause 4.4
Plastic Limit (%)	27	Part 2 Clause 5.3
Plasticity Index (%)	19	Part 2 Clause 5.4
Passing 425mic (%)	76	
Soil Classification:	CI/MI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/08**

Location: TP10 at 1.00m

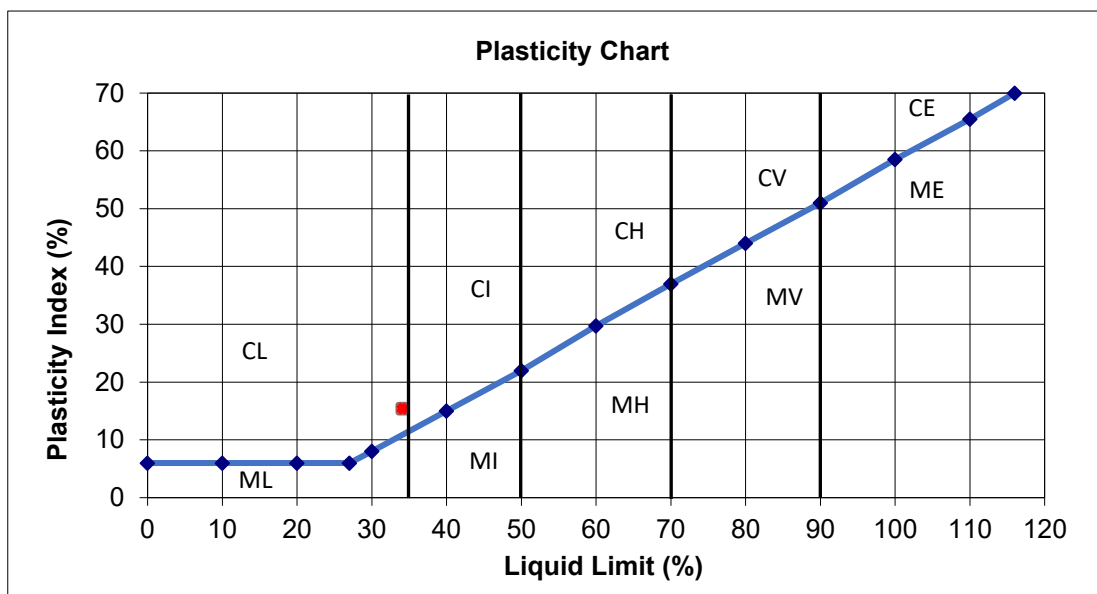
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 34.5

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	15.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	34	Part 2 Clause 4.4
Plastic Limit (%)	19	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	60	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/09**

Location: TP12 at 1.40m

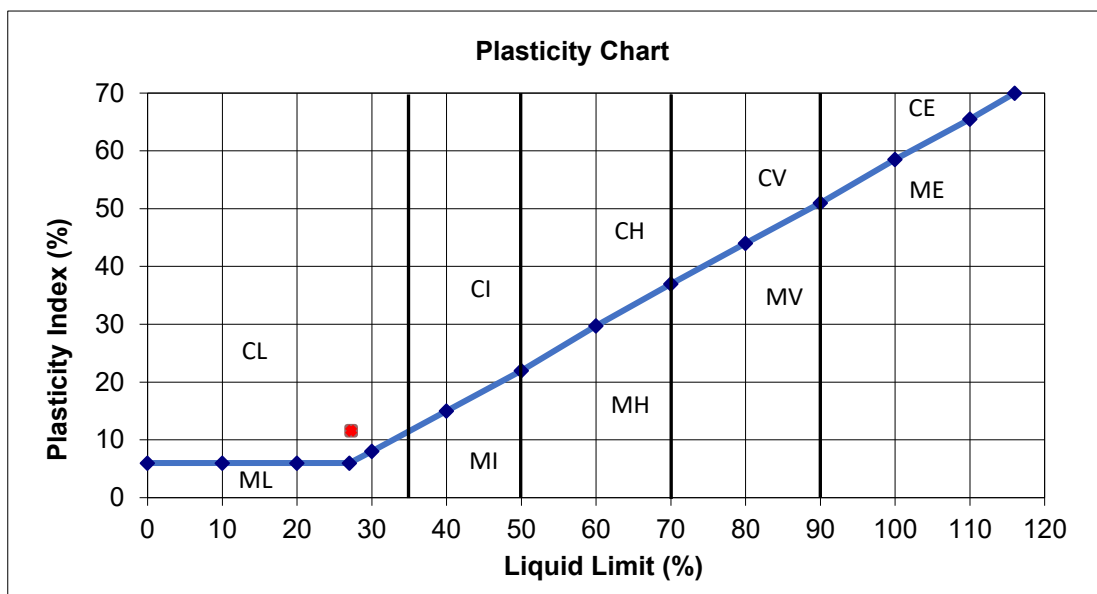
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 18.3

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	13.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	27	Part 2 Clause 4.4
Plastic Limit (%)	16	Part 2 Clause 5.3
Plasticity Index (%)	12	Part 2 Clause 5.4
Passing 425mic (%)	66	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/10**

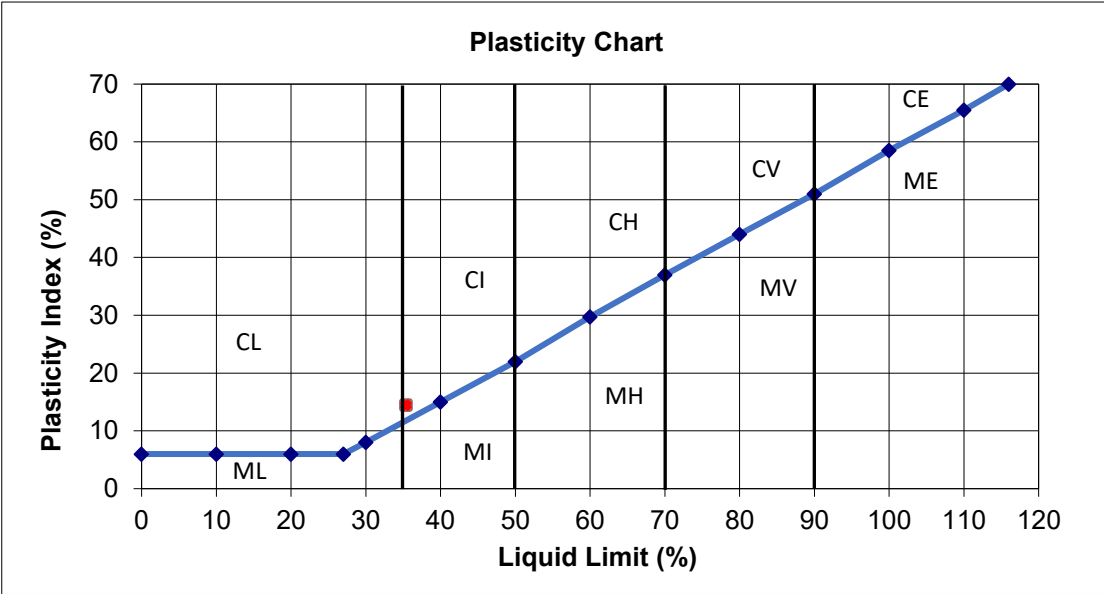
Location: TP15 at 0.70m
Material Type: Reddy brown sandy CLAY with very occasional gravel

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

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	18.4	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	35	Part 2 Clause 4.4
Plastic Limit (%)	21	Part 2 Clause 5.3
Plasticity Index (%)	14	Part 2 Clause 5.4
Passing 425mic (%)	76	
Soil Classification:	CL/CI	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/11**

Location: TP16 at 0.60m

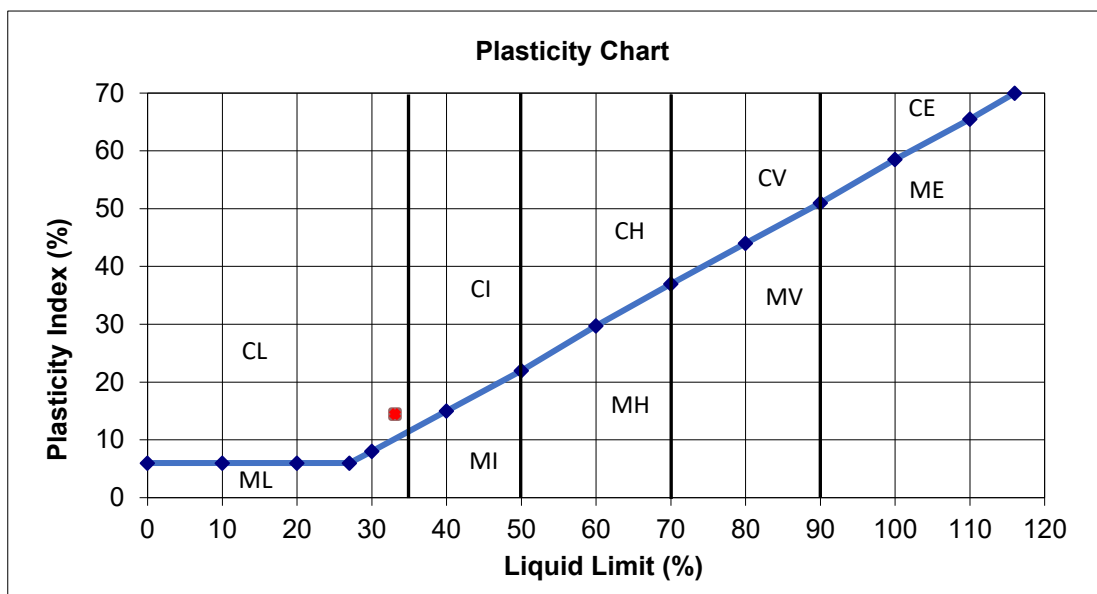
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 5.0

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	19.8	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	33	Part 2 Clause 4.4
Plastic Limit (%)	19	Part 2 Clause 5.3
Plasticity Index (%)	14	Part 2 Clause 5.4
Passing 425mic (%)	70	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/12**

Location: TP18 at 1.00m

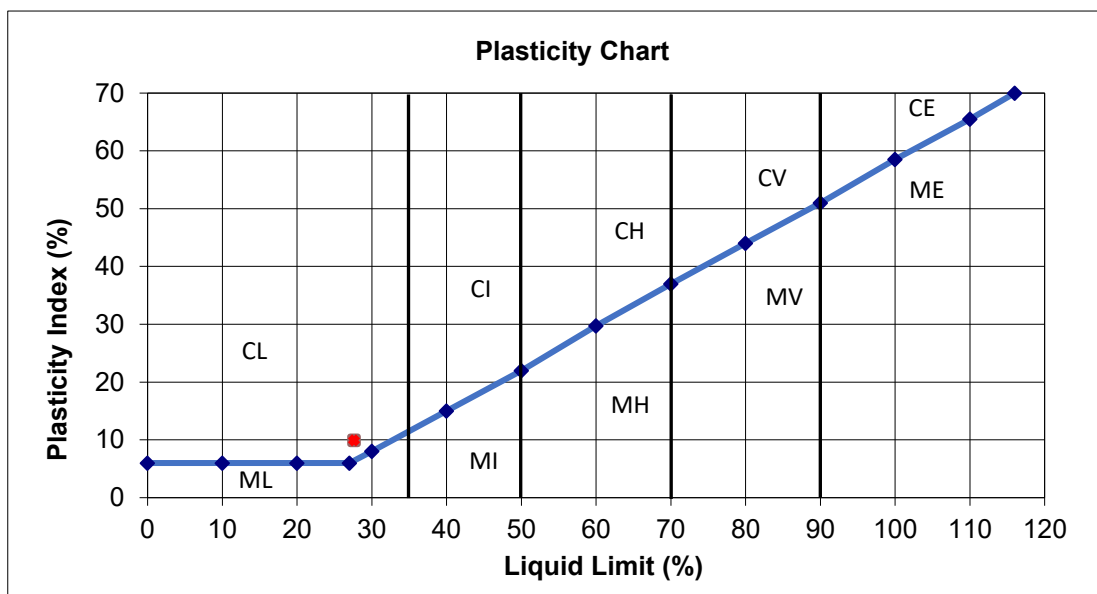
Material Type: Reddy brown sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 35.1

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	18.7	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	28	Part 2 Clause 4.4
Plastic Limit (%)	18	Part 2 Clause 5.3
Plasticity Index (%)	10	Part 2 Clause 5.4
Passing 425mic (%)	63	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/13**

Location: BH01 at 2.00m

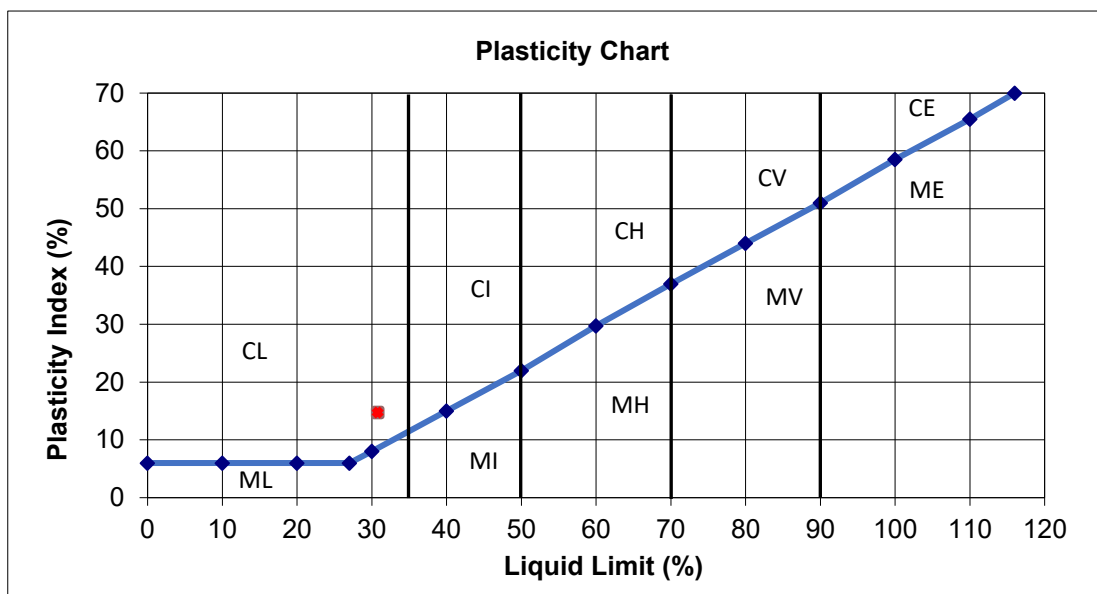
Material Type: Brown CLAY with very occasional gravel

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

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	13.1	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	31	Part 2 Clause 4.4
Plastic Limit (%)	16	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	65	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/14**

Location: BH01 at 3.00m

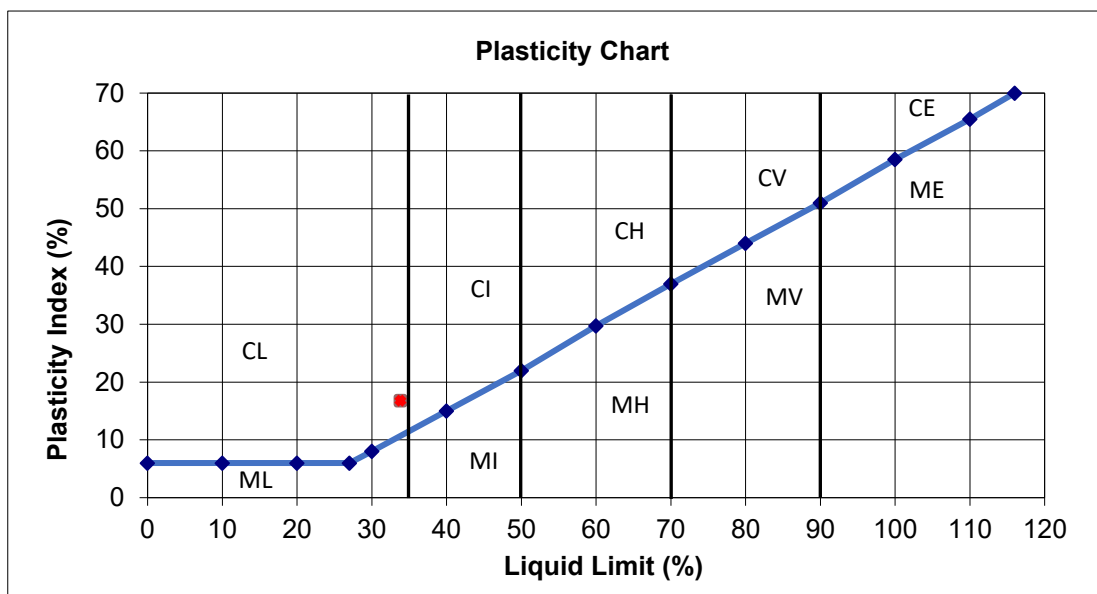
Material Type: Reddy brown slightly sandy CLAY with very occasional gravel

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

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	10.9	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	34	Part 2 Clause 4.4
Plastic Limit (%)	17	Part 2 Clause 5.3
Plasticity Index (%)	17	Part 2 Clause 5.4
Passing 425mic (%)	69	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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Report/Sample ID No: **S1940/15**

Location: BH04 at 2.5m

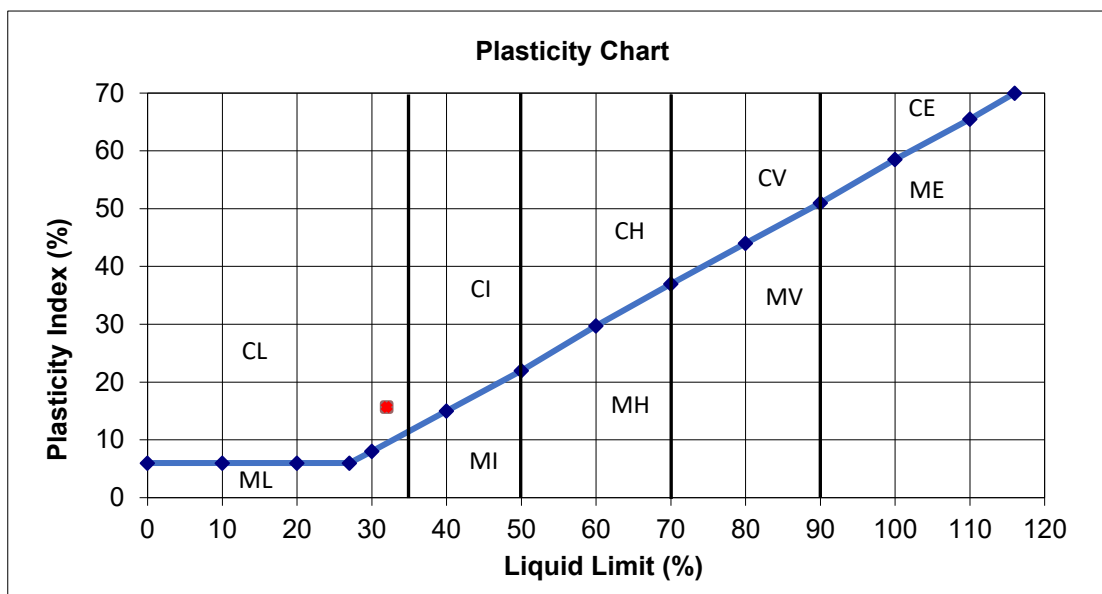
Material Type: Reddy brown slightly sandy CLAY with very occasional gravel

Material greater than 20mm, removed prior to test (%): 9.3

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	11.4	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Liquid Limit (%)	32	Part 2 Clause 4.4
Plastic Limit (%)	16	Part 2 Clause 5.3
Plasticity Index (%)	16	Part 2 Clause 5.4
Passing 425mic (%)	69	
Soil Classification:	CL	



Remarks: None

Start of test date: 27/11/2024 **End of test date:** 05/12/2024 **Report Date:** 05/12/2024



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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.

Appendix IV

- GEO Chemical Assessment Sheet

Geo Environmental Engineering Ltd
Chemical Assessment Sheet - Soils

DETS Ref 24-25669
GEO Ref ~ GEO2024-6221
Contract Title ~ Parkside, Cleator



Generic Assessment Criteria Residential With Plant Uptake 2.5% SOM		
GAC	GAC Exceeded?	GAC Ref:

				2430157	2430158	2430159	2430160	2430161	2430162	2430163	2430164	2430165	2430166	2430167	2430168	2430169			
Lab No				TP01	TP02	TP04	TP07	TP09	TP12	TP13	TP15	TP17	BH03	TP04	TP11	TP16			
Sample ID ~				0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.15	1.50	0.60	1.20			
Depth ~				TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	TOPSOIL	SAND	CLAY	ROCK			
Sample Type ~																			
Metals	Method	LOD	Units																
Arsenic	DETSC 2301#	0.2	mg/kg	14	11	13	14	20	20	37	14	31	20				37	No	LQM S4UL
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.2	0.3	0.3	0.1	0.4	0.2	0.3	0.2				11	No	LQM S4UL
Chromium III	DETSC 2301*	0.15	mg/kg	24	23	20	25	20	18	22	15	15	27				910	No	LQM S4UL
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0				6	No	LQM S4UL
Copper	DETSC 2301#	0.2	mg/kg	16	19	18	21	210	16	110	17	28	34				2400	No	LQM S4UL
Lead	DETSC 2301#	0.3	mg/kg	34	44	41	52	68	29	74	160	65	88				200	No	CL:AIRE C4SL
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.09	0.10	0.11	0.11	0.12	0.10	0.09	0.10	0.09				40	No	LQM S4UL
Nickel	DETSC 2301#	1	mg/kg	12	12	11	14	19	9.6	23	12	17	16				130	No	LQM S4UL
Selenium	DETSC 2301#	0.5	mg/kg	1.0	< 0.5	0.9	0.5	0.8	1.2	0.8	0.6	0.7	0.5				250	No	LQM S4UL
Zinc	DETSC 2301#	1	mg/kg	41	39	41	42	65	46	65	35	45	47				3700	No	LQM S4UL
Inorganics																			
pH	DETSC 2008#		pH	6.3	6.0	6.0	6.0	6.0	6.4	5.6	5.9	6.0	6.3	6.7	6.7	7.4	N/A	N/A	N/A
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.3	0.4	0.2				34	No	ATRISK SSV
Total Organic Carbon	DETSC 2084#	0.5	%	3.5	4.1	4.5	4.4	7.2	2.1	6.0	3.8	6.6	3.2				N/A	N/A	N/A
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10	< 10	< 10	< 10	20	160	< 10	< 10	43	< 10	< 10	38	N/A	N/A	N/A
PAHs																			
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				5.6	No	LQM S4UL
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				420	No	LQM S4UL
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				510	No	LQM S4UL
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				400	No	LQM S4UL
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1				220	No	LQM S4UL
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				5400	No	LQM S4UL
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	0.2	< 0.1				560	No	LQM S4UL
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	0.3	< 0.1				1200	No	LQM S4UL
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				11	No	LQM S4UL
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				22	No	LQM S4UL
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				3.3	No	LQM S4UL
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				93	No	LQM S4UL
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				2.7	No	LQM S4UL
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				36	No	LQM S4UL
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				0.28	No	LQM S4UL
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				340	No	LQM S4UL
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6				-	-	-
Asbestos	N/A	N/A	N/A	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD				Presence	No	-



GEO Environmental Engineering Ltd

Geotechnical and Environmental
Consultants
&
Drilling Experts

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