



**GEO**

**Environmental Engineering**



## **PHASE 2: GROUND INVESTIGATION REPORT**

**PROPOSED COMMERCIAL USE OF LAND AT:**

**THE FLAXWORKS (MILL BUILDING 1)**

**CLEATOR MILLS, CUMBRIA**

**FOR**

**GENR8 NORTH LTD**

**GEO Environmental Engineering**

## **DOCUMENT CONTROL SHEET**

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## 1.0 Introduction

### 1.1 Brief

GEO Environmental Engineering Ltd (GEO) were commissioned by the Client, GenR8 North Ltd to carry out a ground investigation on land known as The Flaxworks (Mill Building 1), Cleator Mills in Cleator, Cumbria to determine any potential geohazards that may affect future commercial use of the site.

It is understood that the Client plans to convert the existing building into office space and then lease it to a local business. Further details relating to the scope of development are included in Section 2.1.

### 1.2 Site Location and Description

The site, occupying an area of c.0.1ha is located at the former Kangol factory in Cleator Mills, c.300m south of Cleator Moor as indicated on the site location plan included in Appendix I. Access to the site is via an access road from Trumpet Terrace.

- National Grid Reference: 302033, 513660
- Post Code: CA23 3FA (approximate only)

The existing building is currently undergoing renovation and is to be utilised as office space. The external areas are to be utilised as car parking with small areas of soft landscaping to the rear.

During the site works, there was no visual or olfactory evidence of any contamination sources (bulk fuel/oil or chemical storage) was noted on the site.

The site is generally flat and level. Topographical survey has not been provided; however, Ordnance Survey data suggests that the site is at an elevation of c.63m OD.

### 1.3 Proposed Development

It is understood that the Client will lease the building to a local business as office space.

Further details relating to the proposed site use should be obtained from the Consultant.

### 1.4 Other Reports/Studies

GEO 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: 2025-6836, dated: 18.06.2025

A brief summary of the DTS is included below, however, it should be read in conjunction with this report.

Historical information has indicated that the site has been developed since at least the early 1860's and possibly formed part of the much larger Cleator Mill (Flax). The existing structure was then constructed by the late 1890's and recorded as a factory by the early 1960's.

Surrounding industrial land uses included a factories, a gasometer and mill races.

Geological information does not indicate extensive of deep made ground, although some made ground associated with the former land use is anticipated. Superficial drift is recorded as alluvial deposits (clay,

silt, sand and gravel) overlying solid strata of the Buttermere Formation (mudstones and sandstones). The underlying strata are classified as Secondary 'A' and 'B' Aquifers.

The DTS included a review of previous reports for the whole of the former Kangol Factory site. These indicated a potential for contamination associated with over 200 years of industrial development. Potential contaminants included hydrocarbon residues (fuels and oils), dyes, metals, solvents, soaps and detergents associated with the former factory. The report also identified a former gasometer to the north of the former factory and indicated a potential for cyanides, sulphur compounds, phenols, heavy metals and spent oxides.

Previous ground investigations of the whole site identified mostly granular made ground with much anthropogenic materials including sandstone, slate, clinker with occasional brick. The underlying drift comprised sands and gravels with some silts which generally becoming coarser and denser with depth.

Previous chemical screening indicated elevated concentrations of petroleum hydrocarbons and arsenic in the clinker-rich made ground with regards to future residential development. However, the levels were not deemed of concern with regards to commercial end use. Contaminants were not found at levels of concern in the underlying sands and gravels and the levels and types of chemicals remaining in the soils is such that most accessible contaminants are likely to have been leached or migrated away over the years. Asbestos (amosite fibre) was detected in three of the ten samples screened.

The previous reports did not identify significant sources of ground gas within the vicinity of the site. However, the report indicated that ground gases are possible due to possible breakdown of organic (putrescible) wastes. Gas monitoring was completed during the previous investigation, and this identified low concentrations of carbon dioxide and methane. The report indicated that the results *'are considered to reflect the prevailing conditions, as the soil logs do not indicate the presence of potentially putrescible material.'*

The Environmental Risk Assessment indicated a fairly low environmental risk in most locations with no specific hazards identified during the soil screening. However, the report indicated that residual risks remain due to the uncertainties associated with any unidentified relic sub-surface structures.

The ecology survey indicated that the site is in a highly sensitive environmental setting due to the presence of fresh water pearl mussel and Atlantic salmon in the adjoining River Ehen, which is classified as an SAC and SSSI.

A 'Construction And Demolition Environmental Management Plan' was developed for the site which outlines methodologies for development to minimise the impact on the surrounding environment.

## 2.0 Ground Investigation Reporting

### 2.1 Ground Investigation Aims and Objectives

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

### 2.2 Guidelines, Codes of Practice and Third-Party Accreditations

The report incorporates a Level 1 Ground Contamination for Human Health (Generic Quantitative Risk Assessment – GQRA) as well as a Controlled Waters Risk Assessment.

The chemical laboratory testing was completed by UKAS and MCERTS accredited laboratories with details given in Sections 5, with copies of the test reports contained within Appendix III.

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

- Land Contamination Risk Management Stages 1 to 4 (LCRM – [www.gov.uk](http://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.
- Eurocode 7 – Geotechnical Design (Part 1: General Rules and; Part 2: Ground Investigation and Testing).
- UK Specification for Ground Investigation, 2<sup>nd</sup> 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.

### 2.3 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.

## 2.4 Consideration for Commercial End Use

It is understood that the site will be developed for Commercial end use with the existing building being converted for offices along with 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 staff 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 *Commercial* has been considered most appropriate.

## 3.0 Ground Investigation Fieldwork

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### 3.1 Intrusive Investigation Fieldworks Summary

The ground investigation works were completed on the 22<sup>nd</sup> May 2025.

Prior to GEO arriving, the Client excavated 3 no. trial pits, one internally and two externally, one to the front and rear. The Client is to reinstate all positions.

The exploratory hole location plan is provided in Appendix I.

The ground investigation works comprised:

- 3 No. Mechanically Excavated Trial Pits (TP01 to TP03) to depths of at least c.1.10m and c.1.50m bgl.
- Site supervision by a suitably qualified and experienced Geo-Environmental Engineer.
- Laboratory chemical screening of soil samples.

The investigation 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 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.

## **4.0 Ground and Groundwater Conditions**

### **4.1 General**

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

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

#### **4.1.1 Made Ground & Possibly Disturbed Materials**

Made ground and possibly disturbed materials were encountered to depths of between c.1.10m and c.1.50m bgl during the ground investigation.

The Client had excavated a trial pit inside the proposed office building (TP01) which identified concrete (c.0.10m thick) overlying insulation and a DPM to a depth of c.0.30m. The made ground below comprised gravel of concrete and brick on top of former floor tiles at c.0.60m. The remainder of the materials below comprised natural looking gravels to a depth of c.1.20m although “compact” gravels with concrete, lime mortar, brick and sandstone were present to c.1.40m. The base of the trial pit (between c.1.40m and c.1.50m) comprised “possibly disturbed” deposits of firm slightly sandy silty clay with occasional gravels, fine brick and coal were also noted.

Externally, TP02 to the rear of the building recorded “gravel surfacing of concrete, brick and sandstone to c.0.20m before encountering “compact” black / dark grey sandy gravel of ash, coal and clinker to c.0.80m. These materials were underlain by “possibly disturbed” deposits similar to TP01 with firm slightly sandy silty clay with occasional gravels and occasional fine brick were noted to c.1.10m.

The final location (TP03) was undertaken to the front and adjacent to the existing chimney. At this location, surfacing of sandy gravel to c.0.10m was underlain by “compact” gravelly clay with brick, mortar, ash and occasional coal to c.0.30m with “compact” black slightly gravelly sand with ash and soil lenses noted to c.0.40m. The base of the trial pit (between c.0.40m and c.1.25m) comprised sandy gravel and cobbles with bands of firm clay with abundant brick, sandstone cobbles, cloth, ash, clinker and slate.

There was no visual and/or olfactory evidence of fuel/oil type contamination noted within any of the trial pits completed.

Samples of the made ground were recovered in amber glass jars and plastic tubs for chemical laboratory screening.

#### **4.1.2 Natural Drift Deposits**

The superficial drift deposits were not positively encountered during the ground investigation.

#### **4.1.3 Solid Geological Deposits (Bedrock)**

Solid strata/bedrock was not encountered during the ground investigation.

### **4.2 Groundwater**

All of the exploratory holes remained dry during the intrusive ground investigation works.

## 5.0 Laboratory Testing

### 5.1 Chemical Screening

#### 5.1.1 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:

- 4 No. samples of made ground (c.0.30m to c.1.00m bgl)

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

- Normec DETS Limited of Consett, County Durham.

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), Petroleum Hydrocarbons and VOC's/SVOC's.
- **Other:** Asbestos.

The results of the testing are summarised in Section 6. The full catalogue of soil screening results and test detection limits can be seen in the Normec DETS (ref: 25-11756) contained in Appendix III.

#### 5.1.2 Contamination Testing for Controlled Waters

In order to determine the potential mobility of any contamination present within the soils, leachate screening was completed on 3 No. samples of the made ground recovered from depths of between c.0.30m and c.1.00m bgl.

The samples were screened at the following UKAS and MCERTS accredited laboratory:

- Normec DETS Limited of Consett, County Durham.

The soil and groundwater samples were screened for the following range of potential contaminants:

- **Inorganic Soil Suite (Human Health Risk Assessment):** Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc) and Cyanide.
- **Organic Soil Suite (Human Health Risk Assessment):** Speciated Polycyclic Aromatic Hydrocarbons (PAH – USEPA 16), Petroleum Hydrocarbons, BTEX and MTBE.

The full catalogue of soil screening results and test detection limits can be seen in the Normec DETS (ref: 25-11756) contained in Appendix III.

## 6.0 Generic Quantitative Risk Assessment (GQRA)

### 6.1 Methodology for Assessing Risks

The following sections outline the methodology for assessing the risks to the end user (human health based on Commercial use) and the wider environment, i.e. controlled waters and associated environmental receptors.

#### 6.1.1 Methodology for Assessing Risk to Human Health (Commercial End User)

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<sup>SOIL</sup> Soil Screening Values (SSV's). The guidelines are generally based on three main land uses as outlined below:

■ *Residential*

■ *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<sup>SOIL</sup> 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).

Given that the proposals are for the existing building to be utilised for offices with associated areas of hardstanding (i.e. car parking) 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: Commercial 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.

#### 6.1.2 Methodology for Assessing Risk to Controlled Waters

With respect to controlled waters and the environment (i.e., groundwaters, nearby surface water features, environmental receptors and adjacent sites), some Generic Assessment Criteria (GAC) are available that can be used to determine if groundwater is contaminated or if a risk of contaminating groundwater is present.

Groundwater was not encountered during the investigation and was not available for direct contamination screening. Where groundwater samples are not available, an assessment can be made to determine if the contaminants in the underlying soils are sufficiently mobile (i.e., leachable) and could, therefore pose a risk to controlled waters and the nearby environment. This is determined by soil-leachate screening,

as opposed to direct-water sampling. For this assessment, soil-leachate screening has been carried out to assess the risk to controlled waters.

The results of the soil-leachate screening have been compared to the most relevant generic assessment criteria to determine if a potential risk is present. Where assessment criteria are not available for environmental receptors, the test results have been compared against stringent UK drinking water standards or test detection limits where appropriate. Where exceedances are encountered, they do not necessarily indicate a significant risk to Controlled Waters, drinking water sources or environmental receptors but instead highlight the presence of contamination which may could, in certain circumstances become mobile and may require further assessment.

The GAC have been derived using the following guidance documents:

- UK Drinking Water Standards.
- Environment Quality Standard (EQS) Freshwater Standards including February 2022.
- European Union Environmental Quality Standards.
- World Health Organisation (WHO) Drinking Water Quality.
- Environmental Risk Limits (ERL).

In the absence of appropriate GAC, the Test Detection Limits (TDL) have been adopted to highlight areas where the contaminants are potentially leachable but may not necessarily pose a risk to the receptor.

The results of the analysis and the chosen GAC are presented in the Contamination Assessment Sheet contained in Appendix IV.

## **6.2 Human Health Risk Assessment – Comparison with Guidance Levels**

### **6.2.1 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 (Commercial End Use).
- CL:AIRE/DEFRA Cat 4 Screening Levels C4SL (Commercial End Use).
- Atkins ATRISK Screening Values (Commercial End Use).

As discussed previously, the contaminant concentrations have been assessed against GAC for a Commercial end use as it is anticipated that the site once finished will be utilised as offices and car parking.

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.

### **6.2.2 Organic Contaminants – Soil**

The maximum concentration values for the organic analytes tested for (i.e. Speciated PAH, Petroleum Hydrocarbons, VOC's and SVOC's) have been compared to relevant Generic Assessment Criteria as part of the Maximum Value Test. The GAC have been selected using the following guidance documents:

- LQM/CIEH S4UL 2015 (Commercial End Use).

Taking in to account the average TOC of the soils on the site, this assessment has been completed utilising a 6.0% 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.

### 6.2.3 Asbestos Containing Materials (ACM's) – Soil

During the investigation, there was no visual evidence of any asbestos fragments or fibres within the materials recovered and sampled.

2 No. samples of the made ground 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.

### 6.2.4 Human Health Risk Assessment – Summary

The following is a summary of the Human Health risk assessment based on a *Commercial 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 significant risk to human health with respect to a commercial end use.

## 6.3 Controlled Waters Risk Assessment – Comparison with Guidance Levels

### 6.3.1 Inorganic Contaminants – Leachate

The maximum inorganic leachate concentrations have been compared to Generic Assessment Criteria (GAC) which have been selected using the following guidance documents:

- UK Drinking Water Standards.
- Environment Quality Standard (EQS) Freshwater Standards including February 2022.
- European Union Environmental Quality Standards.
- World Health Organisation (WHO) Drinking Water Quality.
- Environmental Risk Limits (ERL).
- Test Detection Limits.

Based on the results of the contaminant analysis sheet contained in Appendix IV, it can be seen that none of the inorganic contaminant concentrations exceed the relevant assessment criteria and are not sufficiently leachable to pose a significant risk to Controlled Waters.

### 6.3.2 Organic Contaminants – Leachate

The results of the organic leachate screening have been compared to relevant Generic Assessment Criteria.

The results indicate the presence of elevated concentrations of PAH compounds. The elevated PAH compounds include: Acenaphthylene, Fluorene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene

Exceedances were also recorded within the accumulated result TPH Aliphatic (C5-C35) and the accumulation of Aliphatic/Aromatic Total C5-C35 where results of 450ug/l exceed the target concentration of 300ug/l.

However, it should be noted that the value of 450ug/l is limited to the hydrocarbon fraction Aliphatic C5-C6 which in fact does not exceed the target concentration of 15000ug/l for this specific fraction. Therefore, based on the fact that no visual and/or olfactory evidence of any hydrocarbons was noted at any location the recorded results are not considered to represent a significant risk to Controlled Waters and adjacent sites including the River Ehan.

The concentrations of organic compounds exceed the stringent assessment standards utilised for the assessment but are considered low with regards to potential environmental receptors. The results suggest that organic compounds could become mobile if exposed to groundwater and therefore could pose a risk to nearby surface water receptors. However, at the concentrations recorded since the site is to be largely encapsulated by hardstand by way of the office building and car parking facilities with newly constructed drainage facilities this will inhibit the movement of any surface infiltration and therefore the risk to these receptors is very low, especially when considering potential dilution, dispersal and natural breakdown of the organic compounds.

## **6.4 Calorific Values Risk Assessment**

Within TP02, a layer of “compact” ash, coal and clinker was recorded between c.0.20m and c.0.80m. A representative sample of this made ground was tested to determine the calorific value. A calorific value of 12.8MJ/kg was recorded.

It is understood that soils with values above 10MJ/kg are likely to smoulder and those with values below 2MJ/kg are unlikely to smoulder. On this basis, and with consideration to the materials encountered, it should be considered likely that the representative sample collected from TP02 could potentially combust or smoulder if conditions within the ground permit and if a source of ignition is present.

In addition to the above, there may be similar materials elsewhere on site that have not yet been identified and therefore if these materials remain, they may potentially represent a risk due to the potential combustibility when introduced to oxygen (i.e. during earthworks and subsequent construction) as well as future heat sources (i.e. utilities).

Therefore, if high calorific soils are to remain on site, these should be placed at a minimum of c.1.00m below finished ground levels within inert materials especially where they are close to potential heat sources (i.e. electric cables).

## 7.0 Construction Related Excavations and Off-Site Disposal

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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.

## **8.0 Discussion and Recommendations**

### **8.1 Ground and Groundwater Conditions Summary**

The investigation was primarily undertaken to assess possible contamination risks associated with the continued use of the site.

The ground investigation has encountered made ground and possibly disturbed materials to depths of between c.1.10m and c.1.50m bgl. Internally, a concrete floor, insulation and DPM were present to c.0.30m which was then typically underlain by granular materials which included concrete, lime mortar, brick and sandstone. The base of TP01 comprised “possibly disturbed” deposits of firm slightly sandy silty clay with occasional gravels, fine brick and coal were also noted.

TP02 to the rear of the building typically comprised granular made ground which comprised concrete, brick and sandstone with a layer of “compact” ash, coal and clinker to a depth of c.0.80m. As with TP01, the materials at the base comprised firm slightly sandy silty clay with occasional gravels and fine brick which were noted to c.1.10m.

The final trial pit (TP03) completed to the front elevation noted gravel surfacing over “compact” gravelly clay with brick, mortar, ash and occasional coal underlain by “compact” black slightly gravelly sand with ash and soil lenses to c.0.40m. The base of the trial pit (between c.0.40m and c.1.25m) comprised sandy gravel and cobbles with bands of firm clay with abundant brick, sandstone cobbles, cloth, ash, clinker and slate.

There was no visual and/or olfactory evidence of any evidence of fuel/oil type contamination noted within any of the trial pits completed.

The natural drift or solid deposits were not identified at any of the locations completed on site.

All of the exploratory holes remained dry.

### **8.2 Ground Contamination**

#### **8.2.1 Ground Contamination – Human Health**

Following the results of the contamination assessment, none of the organic or inorganic determinands were identified as posing a potential significant risk to human health with respect to a commercial end use and remediation is not considered necessary in this respect.

There was also a lack of any visual evidence of suspected asbestos on site as well as a lack of visual fibres in any of the samples tested.

Therefore, based on the human health risk assessment completed as part of this report, there is no requirement for any specific remedial measures to be included as part of the development.

#### **8.2.2 Ground Contamination (Leachate) – Controlled Waters**

With respect to the potential risk to Controlled Waters, notably the River Ehen, some leachable PAH's and TPH's have been identified within the samples targeted. These results indicate that the organic compounds within the made ground may potentially be leachable and could become mobile if exposed to groundwater.

It should be noted that the leachable TPH value of 450ug/l exceeds the target concentration of 300ug/l is limited to the hydrocarbon fraction Aliphatic C5-C6 which in fact does not exceed the target concentration

of 15000ug/l for this specific fraction. Since no visual and/or olfactory evidence of any hydrocarbons was noted at any location the recorded results are not considered to represent a significant risk to Controlled Waters and adjacent sites including the River Ehan.

Since the assessment has been completed using stringent assessment criteria, although slightly elevated levels have been identified these are unlikely to pose a significant risk to the wider environment at these concentrations. Furthermore, groundwater was not encountered during the investigation and the made ground was noted as dry throughout.

As part of the development, the majority of the site is to be encapsulated by hardstand with a building and car parking facilities which will inhibit the movement of any surface infiltration as well as the installation of newly formed drainage runs to manage surface water runoff.

In areas of soft landscaping which appear to be limited, any surface waters infiltrating the made ground during heavy rain events is unlikely to leach contaminants in significant quantities that could pose a risk to the nearby water course. Any contaminants that are leached are likely to be highly diluted and dispersed prior to entering the water course and are unlikely to have an impact on environmental receptors.

As such, the risk to the wider environment (River Ehen) is considered negligible to very low at present and remediation is not considered necessary. However, there is a potential that during any construction works, contaminants could be mobilised when the ground is disturbed. This includes the release of contaminated soils/particles directly into the river in surface waters. Suitable precautions should be put in place such as silt traps and oil-water interceptors as outlined in the Environmental Risk Management Strategy for the site (details are provided in the Desk Top Study).

### 8.2.3 Calorific Values - Risk

The layer of “compact” ash, coal and clinker was recorded within TP02 between c.0.20m and c.0.80m. A representative sample of this made ground recorded a calorific value of 12.8MJ/kg.

Soils with values above 10MJ/kg are likely to smoulder and it should be considered likely that the sample collected from TP02 could potentially combust or smoulder if conditions within the ground permit and if a source of ignition is present.

It should be noted that there may be similar materials elsewhere on site that have not yet been identified and therefore if these materials remain, they may potentially represent a risk due to the potential combustibility when introduced to oxygen (i.e. during earthworks and subsequent construction) as well as future heat sources (i.e. utilities).

Therefore, if high calorific soils are to remain on site, these should be placed at a minimum of c.1.00m below finished ground levels within inert materials especially where they are close to potential heat sources (i.e. electric cables).

## 8.4 Ground Gas

Insitu ground gas monitoring has not been requested or completed as part of this ground investigation.

Ground gas monitoring was completed during the previous ground investigation by EES. This comprised a single visit that recorded low concentrations of carbon dioxide and methane. The report indicated that the results *‘are considered to reflect the prevailing conditions as the soil logs do not indicate the presence of potentially putrescible material.’*

Given a lack of any elevated levels of Naphthalene (vapour risk driver) within the samples tested there is not considered to be risk of vapour accumulation and therefore inhalation within the existing building and therefore no specific protection measures are required.

The updated P1 DTS completed by GEO has indicated that the development site is not located within a Radon Affected Area as defined by the British Geological Survey and UK Health Security Agency, as less than 1% of properties are above the action level. Consequently, in accordance with the British Geological Survey and UK Health Security Agency, radon protection measures are not necessary.

## **8.5 General Comments**

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

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

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

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## **End of Report**

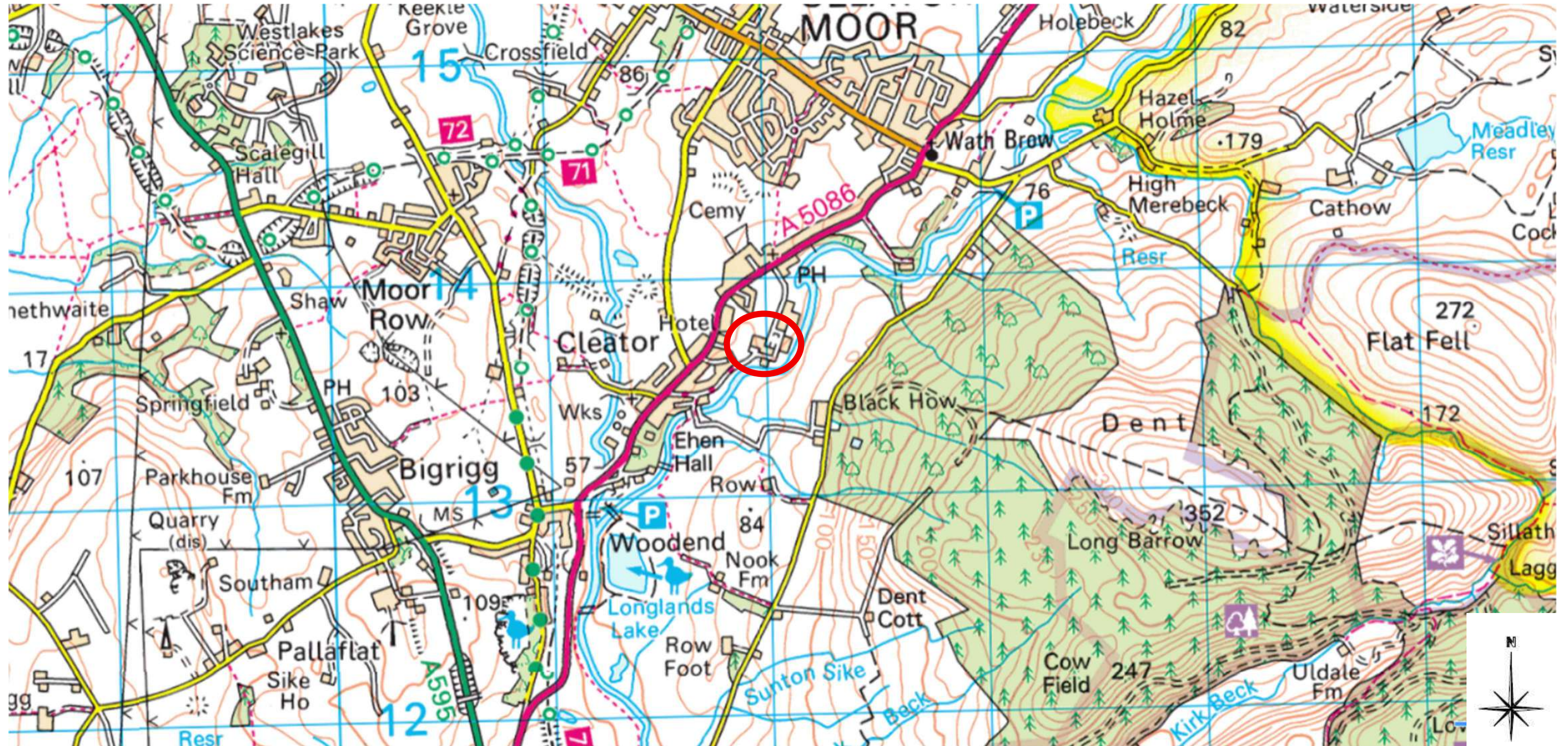
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## Appendix I

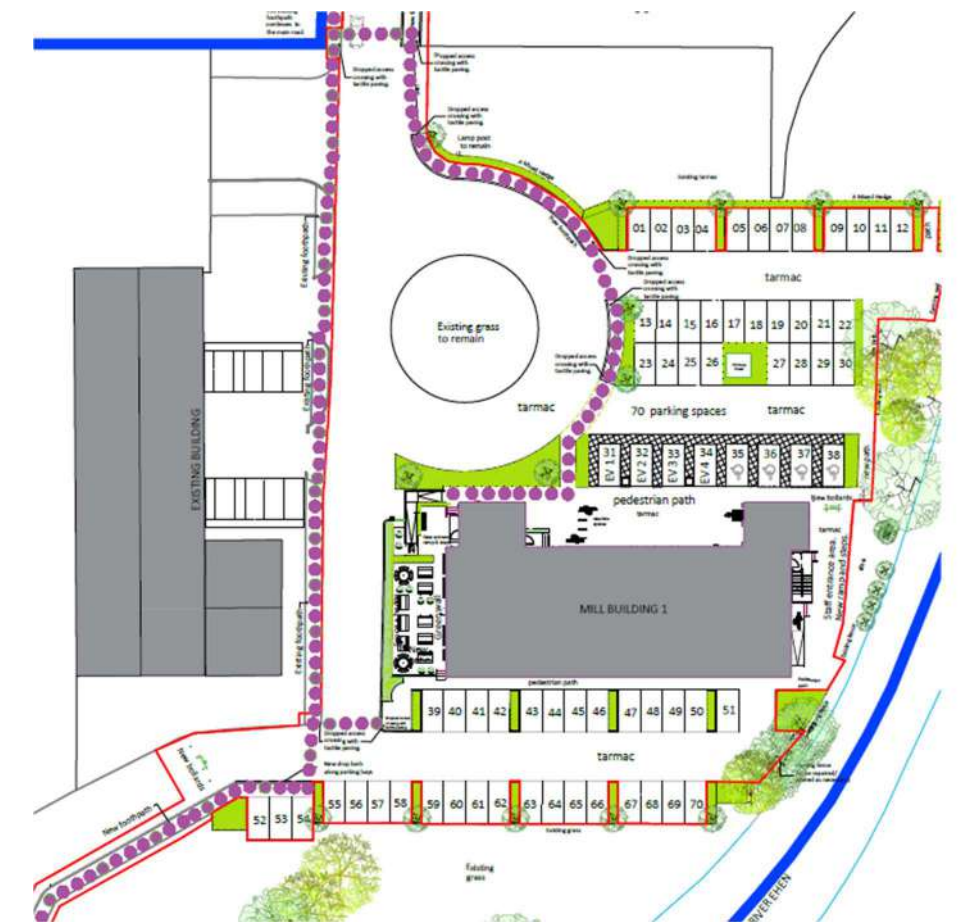
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- Site Location Plan
- Exploratory Hole Location Plan

GEO2025-6836– The Flaxworks (Mill Building 1), Cleator Mills (Site Location Plan) (Exploratory Hole Location Plan)



**GEO2025-6836– The Flaxworks (Mill Building 1), Cleator Mills (Exploratory Hole Location Plan)**



**Key:**  
**Mechanically Excavated Trial Pits**

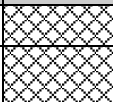
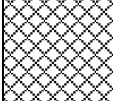


## Appendix II

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- Exploratory Hole Logs

## GEO2025-6836: The Flaxworks (Mill Building 1), Cleator Mills, Cumbria – TP01 (Internal)

| Depth From (m) | Depth To (m) | Strata Description                                                                                                                                                    | Legend                                                                              | Testing / Samples                                          |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------|
| 0.00           | 0.10         | MADE GROUND: Concrete.                                                                                                                                                |  |                                                            |
| 0.10           | 0.30         | MADE GROUND: Insulation and DPM at base.                                                                                                                              |                                                                                     |                                                            |
| 0.30           | 0.60         | MADE GROUND: Brown / grey sandy GRAVEL of concrete and brick.                                                                                                         |                                                                                     |                                                            |
| 0.60           | 0.63         | MADE GROUND: Former floor tiles.                                                                                                                                      |                                                                                     |                                                            |
| 0.63           | 1.20         | MADE GROUND: Orange brown subangular to subrounded fine to medium GRAVEL.                                                                                             |  | 0.75 JT                                                    |
| 1.20           | 1.40         | MADE GROUND: "Compact" grey sandy subangular to subrounded fine to medium GRAVEL with concrete, lime mortar, brick and sandstone.                                     |                                                                                     | 1.20 – 1.30 JT                                             |
| 1.40           | 1.50         | POSSIBLY DISTURBED: Firm brown / red brown slightly sandy silty CLAY with occasional subangular to subrounded fine to medium gravels. Occasional fine brick and coal. |                                                                                     | 1.40 – 1.50 JT                                             |
|                |              | Trial pit excavated prior to GEO arrival.<br>End of trial hole at 1.50m.<br>Trial hole remained open and dry on completion.<br>Trial hole to be backfilled by client. |                                                                                     | Trial Pit Dimensions:<br>1.27m (L) x 0.48m (W) x 1.50m (D) |

**Engineer:** A. Hampson  
**Site Works Date:** 22/05/2025  
**Plant:** Mini Excavator

**Log Notes:**  
 B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub



## GEO2025-6836: The Flaxworks (Mill Building 1), Cleator Mills, Cumbria – TP02 (External)

| Depth From (m) | Depth To (m) | Strata Description                                                                                                                                                    | Legend | Testing / Samples                                          |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------|
| 0.00           | 0.20         | MADE GROUND: "Uncompact" grey sandy fine to medium GRAVEL of concrete, brick and sandstone.                                                                           |        | 0.10 – 0.20 JT                                             |
| 0.20           | 0.80         | MADE GROUND: "Compact" black / dark grey sandy fine GRAVEL of ash, coal and clinker.<br><br>Roots noted to c.0.80m.                                                   |        | 0.60 JT                                                    |
| 0.80           | 1.10         | POSSIBLY DISTURBED: Firm brown / red brown slightly sandy silty CLAY with occasional subangular to subrounded fine to medium gravels. Occasional fine brick noted.    |        | 1.00 JT                                                    |
|                |              | Trial pit excavated prior to GEO arrival.<br>End of trial hole at 1.10m.<br>Trial hole remained open and dry on completion.<br>Trial hole to be backfilled by client. |        | Trial Pit Dimensions:<br>1.95m (L) x 0.50m (W) x 1.10m (D) |

**Engineer:** A. Hampson

**Site Works Date:** 22/05/2025

**Plant:** Mini Excavator

**Log Notes:**

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



**GEO2025-6836: The Flaxworks (Mill Building 1), Cleator Mills, Cumbria – TP03 (External)**

| Depth From (m) | Depth To (m) | Strata Description                                                                                                                                                          | Legend | Testing / Samples                                          |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------|
| 0.00           | 0.10         | MADE GROUND: "Uncompact" grey / brown sandy angular and subangular fine to medium GRAVEL.                                                                                   |        |                                                            |
| 0.10           | 0.30         | MNADE GROUND: "Compact" brown gravelly CLAY with brick, mortar, ash and occasional coal.                                                                                    |        | 0.10 – 0.30 JT                                             |
| 0.30           | 0.40         | MADE GROUND: "Compact" black slightly gravelly fine to medium SAND with ash and soil lenses.                                                                                |        | 0.30 – 0.40 JT                                             |
| 0.40           | 1.25         | MADE GROUND: Dark brown sandy medium to coarse GRAVEL and COBBLES with bands of firm sandy gravelly clay. Abundant brick, sandstone cobbles, cloth, ash, clinker and slate. |        | 0.90 – 1.00 JT                                             |
|                |              | Trial pit excavated prior to GEO arrival.<br>End of trial hole at 1.25m.<br>Trial hole remained open and dry on completion.<br>Trial hole to be backfilled by client.       |        | Trial Pit Dimensions:<br>1.65m (L) x 0.56m (W) x 1.25m (D) |

**Engineer:** A. Hampson  
**Site Works Date:** 22/05/2025  
**Plant:** Mini Excavator

**Log Notes:**  
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub



## Appendix III

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- Laboratory Test Results

## Certificate of Analysis

*Certificate Number* 25-11756

*Issued:* 10-Jun-25

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

*Our Reference* 25-11756

*Client Reference ~* GEO-2025-6836

*Order No ~* (not supplied)

*Contract Title ~* Cleator Mills

*Description* 4 Soil samples, 3 Leachate prepared by DETS samples.

*Date Received* 27-May-25

*Date Started* 27-May-25

*Date Completed* 10-Jun-25

*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*



Louise Cook  
Contracts Manager



# Summary of Chemical Analysis

## Soil Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |            |            |            |
|-----------------|------------|------------|------------|------------|
| Lab No          | 2514456    | 2514457    | 2514458    | 2514459    |
| Sample ID ~     | TP01       | TP02       | TP03       | TP03       |
| Depth ~         | 0.75       | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | INTERNAL   | EXTERNAL   | EXTERNAL   | EXTERNAL   |
| Sample Type ~   | SOIL       | SOIL       | SOIL       | SOIL       |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        | n/s        |

| Test                                  | Method      | LOD  | Units |         |        |       |         |
|---------------------------------------|-------------|------|-------|---------|--------|-------|---------|
| <b>Metals</b>                         |             |      |       |         |        |       |         |
| Arsenic                               | DETSC 2301# | 0.2  | mg/kg |         | 35     | 24    | 25      |
| Cadmium                               | DETSC 2301# | 0.1  | mg/kg |         | < 0.1  | < 0.1 | 0.2     |
| Chromium III                          | DETSC 2301* | 0.15 | mg/kg |         | 11     | 12    | 22      |
| Chromium, Hexavalent                  | DETSC 2204* | 1    | mg/kg |         | < 1.0  | < 1.0 | < 1.0   |
| Copper                                | DETSC 2301# | 0.2  | mg/kg |         | 71     | 91    | 210     |
| Lead                                  | DETSC 2301# | 0.3  | mg/kg |         | 110    | 110   | 2100    |
| Mercury                               | DETSC 2325# | 0.05 | mg/kg |         | 0.12   | 0.18  | 0.50    |
| Nickel                                | DETSC 2301# | 1    | mg/kg |         | 99     | 79    | 43      |
| Selenium                              | DETSC 2301# | 0.5  | mg/kg |         | < 0.5  | < 0.5 | < 0.5   |
| Zinc                                  | DETSC 2301# | 1    | mg/kg |         | 42     | 51    | 120     |
| <b>Inorganics</b>                     |             |      |       |         |        |       |         |
| pH                                    | DETSC 2008# |      | pH    |         | 7.4    | 9.3   | 8.7     |
| Calorific Value                       | DETSC 5008  | 1    | MJ/kg |         | 12.8   |       |         |
| Cyanide, Total                        | DETSC 2130# | 0.1  | mg/kg |         | 0.2    | 0.3   | 0.2     |
| Total Organic Carbon                  | DETSC 2084# | 0.5  | %     |         | 33     | 13    | 3.0     |
| Sulphate Aqueous Extract as SO4 (2:1) | DETSC 2076# | 10   | mg/l  |         | 39     | 120   | 43      |
| <b>Petroleum Hydrocarbons</b>         |             |      |       |         |        |       |         |
| Aliphatic C5-C6                       | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aliphatic C6-C8                       | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aliphatic C8-C10                      | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aliphatic >EC10-EC12                  | DETSC 3521# | 1.5  | mg/kg | < 1.50  | < 1.50 |       | < 1.50  |
| Aliphatic >EC12-EC16                  | DETSC 3521# | 1.2  | mg/kg | < 1.20  | 1.75   |       | < 1.20  |
| Aliphatic >EC16-EC21                  | DETSC 3521# | 1.5  | mg/kg | 1.77    | 8.30   |       | < 1.50  |
| Aliphatic >EC21-EC35                  | DETSC 3521# | 3.4  | mg/kg | 4.06    | 10.41  |       | < 3.40  |
| Aliphatic >EC35-EC40                  | DETSC 3521* | 3.4  | mg/kg | < 3.40  | < 3.40 |       | < 3.40  |
| Aliphatic >EC40-EC44                  | DETSC 3521* | 3.4  | mg/kg | < 3.40  | < 3.40 |       | < 3.40  |
| Aliphatic C5-C44                      | DETSC 3521* | 10   | mg/kg | < 10.00 | 20.47  |       | < 10.00 |
| Aromatic C5-C7                        | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aromatic C7-C8                        | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aromatic C8-C10                       | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 |       | < 0.01  |
| Aromatic >EC10-EC12                   | DETSC 3521# | 0.9  | mg/kg | < 0.90  | 3.24   |       | < 0.90  |
| Aromatic >EC12-EC16                   | DETSC 3521# | 0.5  | mg/kg | 0.80    | 33.63  |       | < 0.50  |
| Aromatic >EC16-EC21                   | DETSC 3521# | 0.6  | mg/kg | 30.93   | 217.5  |       | 16.85   |
| Aromatic >EC21-EC35                   | DETSC 3521# | 1.4  | mg/kg | 58.37   | 848.8  |       | 38.75   |
| Aromatic >EC35-EC40                   | DETSC 3521* | 1.4  | mg/kg | 2.35    | 76.83  |       | < 1.40  |
| Aromatic >EC40-EC44                   | DETSC 3521* | 1.4  | mg/kg | 9.05    | 5.13   |       | 2.89    |
| Aromatic C5-C44                       | DETSC 3521* | 10   | mg/kg | 101.5   | 1185   |       | 58.49   |
| TPH Ali/Aro C5-C44                    | DETSC 3521* | 10   | mg/kg | 101.5   | 1206   |       | 58.49   |
| <b>PAHs</b>                           |             |      |       |         |        |       |         |
| Naphthalene                           | DETSC 3301  | 0.1  | mg/kg | < 0.1   | < 0.1  | 0.2   | < 0.1   |
| Acenaphthylene                        | DETSC 3301  | 0.1  | mg/kg | 0.4     | 0.6    | 0.6   | 0.1     |

# Summary of Chemical Analysis Soil Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |            |            |            |
|-----------------|------------|------------|------------|------------|
| Lab No          | 2514456    | 2514457    | 2514458    | 2514459    |
| Sample ID ~     | TP01       | TP02       | TP03       | TP03       |
| Depth ~         | 0.75       | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | INTERNAL   | EXTERNAL   | EXTERNAL   | EXTERNAL   |
| Sample Type ~   | SOIL       | SOIL       | SOIL       | SOIL       |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        | n/s        |

| Test                    | Method     | LOD | Units |       |       |     |       |
|-------------------------|------------|-----|-------|-------|-------|-----|-------|
| Acenaphthene            | DETSC 3301 | 0.1 | mg/kg | < 0.1 | < 0.1 | 0.1 | < 0.1 |
| Fluorene                | DETSC 3301 | 0.1 | mg/kg | < 0.1 | 0.2   | 0.3 | < 0.1 |
| Phenanthrene            | DETSC 3301 | 0.1 | mg/kg | 0.6   | 0.3   | 2.5 | 0.3   |
| Anthracene              | DETSC 3301 | 0.1 | mg/kg | 0.5   | 0.6   | 1.0 | 0.3   |
| Fluoranthene            | DETSC 3301 | 0.1 | mg/kg | 0.9   | 2.1   | 2.6 | 0.5   |
| Pyrene                  | DETSC 3301 | 0.1 | mg/kg | 1.3   | 3.4   | 3.3 | 0.8   |
| Benzo(a)anthracene      | DETSC 3301 | 0.1 | mg/kg | 1.1   | 3.0   | 2.7 | 0.7   |
| Chrysene                | DETSC 3301 | 0.1 | mg/kg | 1.2   | 2.6   | 2.5 | 0.6   |
| Benzo(b)fluoranthene    | DETSC 3301 | 0.1 | mg/kg | 1.0   | 2.2   | 1.4 | 0.3   |
| Benzo(k)fluoranthene    | DETSC 3301 | 0.1 | mg/kg | 0.4   | 1.4   | 0.8 | 0.2   |
| Benzo(a)pyrene          | DETSC 3301 | 0.1 | mg/kg | 1.8   | 3.6   | 2.3 | 0.5   |
| Indeno(1,2,3-c,d)pyrene | DETSC 3301 | 0.1 | mg/kg | 1.1   | 2.0   | 1.3 | 0.3   |
| Dibenzo(a,h)anthracene  | DETSC 3301 | 0.1 | mg/kg | 0.5   | 0.6   | 0.5 | 0.2   |
| Benzo(g,h,i)perylene    | DETSC 3301 | 0.1 | mg/kg | 1.6   | 1.7   | 1.1 | 0.3   |
| PAH 16 Total            | DETSC 3301 | 1.6 | mg/kg | 12    | 24    | 23  | 5.2   |

# Summary of Chemical Analysis

## Soil VOC/SVOC Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |
|-----------------|------------|
| Lab No          | 2514456    |
| Sample ID ~     | TP01       |
| Depth ~         | 0.75       |
| Other ID ~      | INTERNAL   |
| Sample Type ~   | SOIL       |
| Sampling Date ~ | 22/05/2025 |
| Sampling Time ~ | n/s        |

| Test                       | Method      | LOD  | Units |        |
|----------------------------|-------------|------|-------|--------|
| <b>VOCs</b>                |             |      |       |        |
| Vinyl Chloride             | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| 1,1 Dichloroethylene       | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Trans-1,2-dichloroethylene | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,1-dichloroethane         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Cis-1,2-dichloroethylene   | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 2,2-dichloropropane        | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Bromochloromethane         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Chloroform                 | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,1,1-trichloroethane      | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,1-dichloropropene        | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Carbon tetrachloride       | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Benzene                    | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2-dichloroethane         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Trichloroethylene          | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2-dichloropropane        | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Dibromomethane             | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Bromodichloromethane       | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| cis-1,3-dichloropropene    | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Toluene                    | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| trans-1,3-dichloropropene  | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,1,2-trichloroethane      | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Tetrachloroethylene        | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,3-dichloropropane        | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Dibromochloromethane       | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2-dibromoethane          | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Chlorobenzene              | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,1,1,2-tetrachloroethane  | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Ethylbenzene               | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| m+p-Xylene                 | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| o-Xylene                   | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Styrene                    | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| Bromoform                  | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Isopropylbenzene           | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Bromobenzene               | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2,3-trichloropropane     | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| n-propylbenzene            | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 2-chlorotoluene            | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,3,5-trimethylbenzene     | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 4-chlorotoluene            | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Tert-butylbenzene          | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2,4-trimethylbenzene     | DETSC 3431  | 0.01 | mg/kg | < 0.01 |

# Summary of Chemical Analysis

## Soil VOC/SVOC Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |
|-----------------|------------|
| Lab No          | 2514456    |
| Sample ID ~     | TP01       |
| Depth ~         | 0.75       |
| Other ID ~      | INTERNAL   |
| Sample Type ~   | SOIL       |
| Sampling Date ~ | 22/05/2025 |
| Sampling Time ~ | n/s        |

| Test                        | Method      | LOD  | Units |        |
|-----------------------------|-------------|------|-------|--------|
| sec-butylbenzene            | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| p-isopropyltoluene          | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,3-dichlorobenzene         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,4-dichlorobenzene         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| n-butylbenzene              | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2-dichlorobenzene         | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2-dibromo-3-chloropropane | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| 1,2,4-trichlorobenzene      | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| Hexachlorobutadiene         | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| 1,2,3-trichlorobenzene      | DETSC 3431  | 0.01 | mg/kg | < 0.01 |
| MTBE                        | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| <b>SVOCs</b>                |             |      |       |        |
| Phenol                      | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| Aniline                     | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 2-Chlorophenol              | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| Benzyl Alcohol              | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2-Methylphenol              | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| Bis(2-chloroisopropyl)ether | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 3&4-Methylphenol            | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2,4-Dimethylphenol          | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| Bis-(dichloroethoxy)methane | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2,4-Dichlorophenol          | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 1,2,4-Trichlorobenzene      | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 4-Chloro-3-methylphenol     | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2-Methylnaphthalene         | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| Hexachlorocyclopentadiene   | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 2,4,6-Trichlorophenol       | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2,4,5-Trichlorophenol       | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 2-Chloronaphthalene         | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2-Nitroaniline              | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 2,4-Dinitrotoluene          | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 3-Nitroaniline              | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 4-Nitrophenol               | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| Dibenzofuran                | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2,6-Dinitrotoluene          | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 2,3,4,6-Tetrachlorophenol   | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| Diethylphthalate            | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 4-Chlorophenylphenylether   | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 4-Nitroaniline              | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| 2-Methyl-4,6-Dinitrophenol  | DETSC 3433* | 0.1  | mg/kg | < 0.1  |
| Diphenylamine               | DETSC 3433  | 0.1  | mg/kg | < 0.1  |
| 4-Bromophenylphenylether    | DETSC 3433  | 0.1  | mg/kg | < 0.1  |

# Summary of Chemical Analysis

## Soil VOC/SVOC Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |
|-----------------|------------|
| Lab No          | 2514456    |
| Sample ID ~     | TP01       |
| Depth ~         | 0.75       |
| Other ID ~      | INTERNAL   |
| Sample Type ~   | SOIL       |
| Sampling Date ~ | 22/05/2025 |
| Sampling Time ~ | n/s        |

| Test                       | Method      | LOD | Units |       |
|----------------------------|-------------|-----|-------|-------|
| Hexachlorobenzene          | DETSC 3433  | 0.1 | mg/kg | < 0.1 |
| Pentachlorophenol          | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Di-n-butylphthalate        | DETSC 3433  | 0.1 | mg/kg | < 0.1 |
| Butylbenzylphthalate       | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Bis(2-ethylhexyl)phthalate | DETSC 3433  | 0.1 | mg/kg | < 0.1 |
| Di-n-octylphthalate        | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 1,4-Dinitrobenzene         | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Dimethylphthalate          | DETSC 3433  | 0.1 | mg/kg | < 0.1 |
| 1,3-Dinitrobenzene         | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 1,2-Dinitrobenzene         | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2,3,5,6-Tetrachlorophenol  | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Azobenzene                 | DETSC 3433  | 0.1 | mg/kg | < 0.1 |
| Carbazole                  | DETSC 3433* | 0.1 | mg/kg | < 0.1 |

# Summary of Chemical Analysis

## Leachate Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |            |            |
|-----------------|------------|------------|------------|
| Lab No          | 2514460    | 2514461    | 2514462    |
| Sample ID ~     | TP02       | TP03       | TP03       |
| Depth ~         | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | EXTERNAL   | EXTERNAL   | EXTERNAL   |
| Sample Type ~   | LEACHATE   | LEACHATE   | LEACHATE   |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        |

| Test                          | Method      | LOD  | Units |        |        |       |
|-------------------------------|-------------|------|-------|--------|--------|-------|
| <b>Preparation</b>            |             |      |       |        |        |       |
| BS EN 12457 10:1              | DETSC 1009* |      |       | Y      | Y      | Y     |
| <b>Metals</b>                 |             |      |       |        |        |       |
| Arsenic, Dissolved            | DETSC 2306  | 0.16 | ug/l  | 1.7    | 4.9    |       |
| Boron, Dissolved              | DETSC 2306* | 12   | ug/l  | < 12.0 | < 12.0 |       |
| Cadmium, Dissolved            | DETSC 2306  | 0.03 | ug/l  | < 0.03 | < 0.03 |       |
| Chromium, Dissolved           | DETSC 2306  | 0.25 | ug/l  | < 0.25 | < 0.25 |       |
| Copper, Dissolved             | DETSC 2306  | 0.4  | ug/l  | 1.0    | 1.4    |       |
| Lead, Dissolved               | DETSC 2306  | 0.09 | ug/l  | 1.9    | 2.6    |       |
| Mercury, Dissolved            | DETSC 2306  | 0.01 | ug/l  | < 0.01 | 0.02   |       |
| Nickel, Dissolved             | DETSC 2306  | 0.5  | ug/l  | < 0.5  | < 0.5  |       |
| Selenium, Dissolved           | DETSC 2306  | 0.25 | ug/l  | < 0.25 | 0.37   |       |
| Zinc, Dissolved               | DETSC 2306  | 1.3  | ug/l  | 1.7    | < 1.3  |       |
| <b>Inorganics</b>             |             |      |       |        |        |       |
| pH                            | DETSC 2008  |      | pH    | 7.6    | 8.3    |       |
| Cyanide, Total                | DETSC 2130  | 40   | ug/l  | < 40   | < 40   |       |
| Total Hardness as CaCO3       | DETSC 2303  | 0.1  | mg/l  | 15.2   | 35.6   |       |
| Sulphate as SO4               | DETSC 2055  | 0.1  | mg/l  | 1.9    | 4.5    |       |
| Sulphide                      | DETSC 2208  | 10   | ug/l  | < 10   | < 10   |       |
| <b>Petroleum Hydrocarbons</b> |             |      |       |        |        |       |
| Aliphatic C5-C6               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | 450   |
| Aliphatic C6-C8               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aliphatic C8-C10              | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aliphatic C10-C12             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C12-C16             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C16-C21             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C21-C35             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C5-C35              | DETSC 3072* | 10   | ug/l  | < 10   |        | 450   |
| Aromatic C5-C7                | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C7-C8                | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C8-C10               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C10-C12              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C12-C16              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C16-C21              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C21-C35              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C5-C35               | DETSC 3072* | 10   | ug/l  | < 10   |        | < 10  |
| TPH Ali/Aro Total C5-C35      | DETSC 3072* | 10   | ug/l  | < 10   |        | 450   |
| Benzene                       | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Toluene                       | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Ethylbenzene                  | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Xylene                        | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| MTBE                          | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |

## Summary of Chemical Analysis

### Leachate Samples

Our Ref 25-11756

Client Ref ~ GEO-2025-6836

Contract Title ~ Cleator Mills

|                 |            |            |            |
|-----------------|------------|------------|------------|
| Lab No          | 2514460    | 2514461    | 2514462    |
| Sample ID ~     | TP02       | TP03       | TP03       |
| Depth ~         | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | EXTERNAL   | EXTERNAL   | EXTERNAL   |
| Sample Type ~   | LEACHATE   | LEACHATE   | LEACHATE   |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        |

| Test                    | Method     | LOD  | Units |        |        |  |
|-------------------------|------------|------|-------|--------|--------|--|
| <b>PAHs</b>             |            |      |       |        |        |  |
| Naphthalene             | DETSC 3304 | 0.05 | ug/l  | 6.0    | < 0.05 |  |
| Acenaphthylene          | DETSC 3304 | 0.01 | ug/l  | 1.4    | 0.02   |  |
| Acenaphthene            | DETSC 3304 | 0.01 | ug/l  | < 0.10 | < 0.01 |  |
| Fluorene                | DETSC 3304 | 0.01 | ug/l  | 0.12   | < 0.01 |  |
| Phenanthrene            | DETSC 3304 | 0.01 | ug/l  | 0.26   | 0.02   |  |
| Anthracene              | DETSC 3304 | 0.01 | ug/l  | 0.70   | 0.02   |  |
| Fluoranthene            | DETSC 3304 | 0.01 | ug/l  | 2.2    | 0.11   |  |
| Pyrene                  | DETSC 3304 | 0.01 | ug/l  | 3.8    | 0.15   |  |
| Benzo(a)anthracene      | DETSC 3304 | 0.01 | ug/l  | 2.5    | 0.11   |  |
| Chrysene                | DETSC 3304 | 0.01 | ug/l  | 2.4    | 0.10   |  |
| Benzo(b)fluoranthene    | DETSC 3304 | 0.01 | ug/l  | 4.3    | 0.19   |  |
| Benzo(k)fluoranthene    | DETSC 3304 | 0.01 | ug/l  | 1.3    | 0.08   |  |
| Benzo(a)pyrene          | DETSC 3304 | 0.01 | ug/l  | 4.3    | 0.19   |  |
| Indeno(1,2,3-c,d)pyrene | DETSC 3304 | 0.01 | ug/l  | 2.2    | 0.10   |  |
| Dibenzo(a,h)anthracene  | DETSC 3304 | 0.01 | ug/l  | 0.66   | 0.02   |  |
| Benzo(g,h,i)perylene    | DETSC 3304 | 0.01 | ug/l  | 1.6    | 0.08   |  |
| PAH Total               | DETSC 3304 | 0.2  | ug/l  | 34     | 1.2    |  |

## Summary of Asbestos Analysis Soil Samples

*Our Ref* 25-11756

*Client Ref* ~ GEO-2025-6836

*Contract Title* ~ Cleator Mills

| Lab No  | Sample ID               | Material Type | Result | Comment* | Analyst      |
|---------|-------------------------|---------------|--------|----------|--------------|
| 2514457 | TP02 EXTERNAL 0.60      | SOIL          | NAD    | none     | Pierce Booth |
| 2514458 | TP03 EXTERNAL 0.30-0.40 | SOIL          | NAD    | none     | Pierce Booth |

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 25-11756  
 Client Ref ~ GEO-2025-6836  
 Contract ~ Cleator Mills

### Containers Received & Deviating Samples

| Lab No  | Sample ID ~                | Date<br>Sampled ~ | Containers Received | Holding time<br>exceeded for tests | Incorrect container for tests |
|---------|----------------------------|-------------------|---------------------|------------------------------------|-------------------------------|
| 2514456 | TP01 0.75 SOIL             | 22/05/25          | GJ 250ml x2, PT 1L  |                                    | BTEX / C5-C10, VOC            |
| 2514457 | TP02 0.60 SOIL             | 22/05/25          | GJ 250ml x2, PT 1L  |                                    | BTEX / C5-C10                 |
| 2514458 | TP03 0.30-0.40<br>SOIL     | 22/05/25          | GJ 250ml x2, PT 1L  |                                    |                               |
| 2514459 | TP03 0.90-1.00<br>SOIL     | 22/05/25          | GJ 250ml x2, PT 1L  |                                    | BTEX / C5-C10                 |
| 2514460 | TP02 0.60<br>LEACHATE      | 22/05/25          | GJ 250ml x2, PT 1L  |                                    |                               |
| 2514461 | TP03 0.30-0.40<br>LEACHATE | 22/05/25          | GJ 250ml x2, PT 1L  |                                    |                               |
| 2514462 | TP03 0.90-1.00<br>LEACHATE | 22/05/25          | GJ 250ml x2, PT 1L  |                                    |                               |

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

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

### Soil Analysis Notes

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

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

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

### Disposal

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

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

#### Key:

~ Sample details are provided by the client and can affect the validity of the results

\* -not accredited.

# -MCERTS (accreditation only applies if report carries the MCERTS logo).

\$ -subcontracted.

n/s -not supplied.

I/S -insufficient sample.

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

End of Report Ver 25.03.04d

## Appendix IV

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- GEO Chemical Assessment Sheets

**Geo Environmental Engineering Ltd**  
**Chemical Assessment Sheet - Human Health**

Our Ref 25-11756  
 Client Ref ~ GEO-2025-6836  
 Contract Title ~ Cleator Mills



| Lab No          | 2514456    | 2514457    | 2514458    | 2514459    |
|-----------------|------------|------------|------------|------------|
| Sample ID ~     | TP01       | TP02       | TP03       | TP03       |
| Depth ~         | 0.75       | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | INTERNAL   | EXTERNAL   | EXTERNAL   | EXTERNAL   |
| Sample Type ~   | MG         | MG         | MG         | MG         |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        | n/s        |

| Test                 | Method      | LOD  | Units |  |       |       |
|----------------------|-------------|------|-------|--|-------|-------|
| <b>Metals</b>        |             |      |       |  |       |       |
| Arsenic              | DETSC 2301# | 0.2  | mg/kg |  | 35    | 24    |
| Cadmium              | DETSC 2301# | 0.1  | mg/kg |  | < 0.1 | < 0.1 |
| Chromium III         | DETSC 2301# | 0.15 | mg/kg |  | 11    | 12    |
| Chromium, Hexavalent | DETSC 2204* | 1    | mg/kg |  | < 1.0 | < 1.0 |
| Copper               | DETSC 2301# | 0.2  | mg/kg |  | 71    | 91    |
| Lead                 | DETSC 2301# | 0.3  | mg/kg |  | 110   | 110   |
| Mercury              | DETSC 2325# | 0.05 | mg/kg |  | 0.12  | 0.18  |
| Nickel               | DETSC 2301# | 1    | mg/kg |  | 99    | 79    |
| Selenium             | DETSC 2301# | 0.5  | mg/kg |  | < 0.5 | < 0.5 |
| Zinc                 | DETSC 2301# | 1    | mg/kg |  | 42    | 51    |

|                                       |             |     |       |  |      |     |
|---------------------------------------|-------------|-----|-------|--|------|-----|
| <b>Inorganics</b>                     |             |     |       |  |      |     |
| pH                                    | DETSC 2008# |     | pH    |  | 7.4  | 9.3 |
| Calorific Value                       | DETSC 5008  | 1   | MJ/kg |  | 12.8 |     |
| Cyanide, Total                        | DETSC 2130# | 0.1 | mg/kg |  | 0.2  | 0.3 |
| Total Organic Carbon                  | DETSC 2084# | 0.5 | %     |  | 33   | 13  |
| Sulphate Aqueous Extract as SO4 (2:1) | DETSC 2076# | 10  | mg/l  |  | 39   | 120 |

|                               |             |      |       |         |        |         |
|-------------------------------|-------------|------|-------|---------|--------|---------|
| <b>Petroleum Hydrocarbons</b> |             |      |       |         |        |         |
| Aliphatic C5-C6               | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aliphatic C6-C8               | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aliphatic C8-C10              | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aliphatic >EC10-EC12          | DETSC 3521# | 1.5  | mg/kg | < 1.50  | < 1.50 | < 1.50  |
| Aliphatic >EC12-EC16          | DETSC 3521# | 1.2  | mg/kg | < 1.20  | 1.75   | < 1.20  |
| Aliphatic >EC16-EC21          | DETSC 3521# | 1.5  | mg/kg | 1.77    | 8.30   | < 1.50  |
| Aliphatic >EC21-EC35          | DETSC 3521# | 3.4  | mg/kg | 4.06    | 10.41  | < 3.40  |
| Aliphatic >EC35-EC40          | DETSC 3521* | 3.4  | mg/kg | < 3.40  | < 3.40 | < 3.40  |
| Aliphatic >EC40-EC44          | DETSC 3521* | 3.4  | mg/kg | < 3.40  | < 3.40 | < 3.40  |
| Aliphatic C5-C44              | DETSC 3521* | 10   | mg/kg | < 10.00 | 20.47  | < 10.00 |
| Aromatic C5-C7                | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aromatic C7-C8                | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aromatic C8-C10               | DETSC 3321* | 0.01 | mg/kg | < 0.01  | < 0.01 | < 0.01  |
| Aromatic >EC10-EC12           | DETSC 3521# | 0.9  | mg/kg | < 0.90  | 3.24   | < 0.90  |
| Aromatic >EC12-EC16           | DETSC 3521# | 0.5  | mg/kg | 0.80    | 33.63  | < 0.50  |
| Aromatic >EC16-EC21           | DETSC 3521# | 0.6  | mg/kg | 30.93   | 217.5  | 16.85   |
| Aromatic >EC21-EC35           | DETSC 3521# | 1.4  | mg/kg | 58.37   | 848.8  | 38.75   |
| Aromatic >EC35-EC40           | DETSC 3521* | 1.4  | mg/kg | 2.35    | 76.83  | < 1.40  |
| Aromatic >EC40-EC44           | DETSC 3521* | 1.4  | mg/kg | 9.05    | 5.13   | 2.89    |
| Aromatic C5-C44               | DETSC 3521* | 10   | mg/kg | 101.5   | 1185   | 58.49   |
| TPH Ali/Aro C5-C44            | DETSC 3521* | 10   | mg/kg | 101.5   | 1206   | 58.49   |

|                         |            |     |       |       |       |     |
|-------------------------|------------|-----|-------|-------|-------|-----|
| <b>PAHs</b>             |            |     |       |       |       |     |
| Naphthalene             | DETSC 3301 | 0.1 | mg/kg | < 0.1 | < 0.1 | 0.2 |
| Acenaphthylene          | DETSC 3301 | 0.1 | mg/kg | 0.4   | 0.6   | 0.1 |
| Acenaphthene            | DETSC 3301 | 0.1 | mg/kg | < 0.1 | < 0.1 | 0.1 |
| Fluorene                | DETSC 3301 | 0.1 | mg/kg | < 0.1 | 0.2   | 0.3 |
| Phenanthrene            | DETSC 3301 | 0.1 | mg/kg | 0.6   | 0.3   | 2.5 |
| Anthracene              | DETSC 3301 | 0.1 | mg/kg | 0.5   | 0.6   | 1.0 |
| Fluoranthene            | DETSC 3301 | 0.1 | mg/kg | 0.9   | 2.1   | 2.6 |
| Pyrene                  | DETSC 3301 | 0.1 | mg/kg | 1.3   | 3.4   | 3.3 |
| Benzo(a)anthracene      | DETSC 3301 | 0.1 | mg/kg | 1.1   | 3.0   | 2.7 |
| Chrysene                | DETSC 3301 | 0.1 | mg/kg | 1.2   | 2.6   | 2.5 |
| Benzo(b)fluoranthene    | DETSC 3301 | 0.1 | mg/kg | 1.0   | 2.2   | 1.4 |
| Benzo(k)fluoranthene    | DETSC 3301 | 0.1 | mg/kg | 0.4   | 1.4   | 0.8 |
| Benzo(a)pyrene          | DETSC 3301 | 0.1 | mg/kg | 1.8   | 3.6   | 2.3 |
| Indeno(1,2,3-c,d)pyrene | DETSC 3301 | 0.1 | mg/kg | 1.1   | 2.0   | 1.3 |
| Dibenzo(a,h)anthracene  | DETSC 3301 | 0.1 | mg/kg | 0.5   | 0.6   | 0.5 |
| Benzo(g,h,i)perylene    | DETSC 3301 | 0.1 | mg/kg | 1.6   | 1.7   | 1.1 |
| PAH 16 Total            | DETSC 3301 | 1.6 | mg/kg | 12    | 24    | 23  |

**Notes:**

GAC = Generic Assessment Criteria

**YES = GAC Exceeded**

LQM S4UL = LQM/CIEH 'Suitable 4 Use Levels' S4ULs (Commercial End Use based on 6.0% SOM)

CL-AIRE GAC (2010) = EIC/AGS/CL-AIRE GAC 2010 (Commercial End Use based on 6.0% SOM)

ATRISK SSV = Atkins Soil Screening Values (Commercial End Use based on 6.0% SOM)

LDL = Laboratory Detection Limit

MG = Made Ground

|                                                              |               |          |
|--------------------------------------------------------------|---------------|----------|
| Generic Assessment Criteria Industrial & Commercial 6.0% SOM |               |          |
| GAC                                                          | GAC Exceeded? | GAC Ref: |

|        |    |          |
|--------|----|----------|
| 640    | No | S4UL     |
| 190    | No | LQM S4UL |
| 8600   | No | LQM S4UL |
| 33     | No | LQM S4UL |
| 68000  | No | LQM S4UL |
| 2300   | No | C4SL     |
| 1100   | No | LQM S4UL |
| 980    | No | LQM S4UL |
| 12000  | No | LQM S4UL |
| 730000 | No | LQM S4UL |

|      |    |            |
|------|----|------------|
| <6.5 | No | BRE        |
| -    | -  | -          |
| 34   | No | ATRISK SSV |
| -    | -  | -          |
| -    | -  | -          |

|         |     |          |
|---------|-----|----------|
| 12000   | No  | LQM S4UL |
| 40000   | No  | LQM S4UL |
| 11000   | No  | LQM S4UL |
| 47000   | No  | LQM S4UL |
| 90000   | No  | LQM S4UL |
| 90000   | No  | LQM S4UL |
| 1800000 | No  | LQM S4UL |
| 1800000 | No  | LQM S4UL |
| 1800000 | No  | LQM S4UL |
| N/A     | N/A | N/A      |
| 86000   | No  | LQM S4UL |
| 180000  | No  | LQM S4UL |
| 17000   | No  | LQM S4UL |
| 34000   | No  | LQM S4UL |
| 38000   | No  | LQM S4UL |
| 28000   | No  | LQM S4UL |
| 28000   | No  | LQM S4UL |
| 28000   | No  | LQM S4UL |
| 28000   | No  | LQM S4UL |
| N/A     | N/A | N/A      |
| N/A     | N/A | N/A      |

|        |    |          |
|--------|----|----------|
| 1100   | No | LQM S4UL |
| 100000 | No | LQM S4UL |
| 100000 | No | LQM S4UL |
| 71000  | No | LQM S4UL |
| 23000  | No | LQM S4UL |
| 540000 | No | LQM S4UL |
| 23000  | No | LQM S4UL |
| 54000  | No | LQM S4UL |
| 180    | No | LQM S4UL |
| 350    | No | LQM S4UL |
| 45     | No | LQM S4UL |
| 1200   | No | LQM S4UL |
| 36.0   | No | LQM S4UL |
| 510    | No | LQM S4UL |
| 3.60   | No | LQM S4UL |
| 4000   | No | LQM S4UL |
| -      | -  | -        |



GEO  
Environmental Engineering

|                 |            |
|-----------------|------------|
| Lab No          | 2514456    |
| Sample ID ~     | TP01       |
| Depth ~         | 0.75       |
| Other ID ~      | INTERNAL   |
| Sample Type ~   | MG         |
| Sampling Date ~ | 22/05/2025 |
| Sampling Time ~ | n/s        |

| Generic Assessment Criteria<br>Industrial & Commercial<br>6.0% SOM |                  |          |
|--------------------------------------------------------------------|------------------|----------|
| GAC                                                                | GAC<br>Exceeded? | GAC Ref: |

[illegible][illegible]

Symbol key at end of report

Geo Environmental Engineering Ltd  
Chemical Assessment Sheet - Leachate

Our Ref 25-11756  
Client Ref ~ GEO-2025-6836  
Contract Title ~ Cleator Mills



|                 |            |            |            |
|-----------------|------------|------------|------------|
| Lab No          | 2514460    | 2514461    | 2514462    |
| Sample ID ~     | TP02       | TP03       | TP03       |
| Depth ~         | 0.60       | 0.30-0.40  | 0.90-1.00  |
| Other ID ~      | MG         | MG         | MG         |
| Sample Type ~   | LEACHATE   | LEACHATE   | LEACHATE   |
| Sampling Date ~ | 22/05/2025 | 22/05/2025 | 22/05/2025 |
| Sampling Time ~ | n/s        | n/s        | n/s        |

| Controlled Waters Risk Assessment<br>(Leachate Screening) |               |          |
|-----------------------------------------------------------|---------------|----------|
| GAC                                                       | GAC Exceeded? | GAC Ref: |

| Test                          | Method      | LOD  | Units |        |        |       |
|-------------------------------|-------------|------|-------|--------|--------|-------|
| <b>Preparation</b>            |             |      |       |        |        |       |
| BS EN 12457 10:1              | DETSC 1009* |      |       | Y      | Y      | Y     |
| <b>Metals</b>                 |             |      |       |        |        |       |
| Arsenic, Dissolved            | DETSC 2306  | 0.16 | ug/l  | 1.7    | 4.9    |       |
| Boron, Dissolved              | DETSC 2306* | 12   | ug/l  | < 12.0 | < 12.0 |       |
| Cadmium, Dissolved            | DETSC 2306  | 0.03 | ug/l  | < 0.03 | < 0.03 |       |
| Chromium, Dissolved           | DETSC 2306  | 0.25 | ug/l  | < 0.25 | < 0.25 |       |
| Copper, Dissolved             | DETSC 2306  | 0.4  | ug/l  | 1.0    | 1.4    |       |
| Lead, Dissolved               | DETSC 2306  | 0.09 | ug/l  | 1.9    | 2.6    |       |
| Mercury, Dissolved            | DETSC 2306  | 0.01 | ug/l  | < 0.01 | 0.02   |       |
| Nickel, Dissolved             | DETSC 2306  | 0.5  | ug/l  | < 0.5  | < 0.5  |       |
| Selenium, Dissolved           | DETSC 2306  | 0.25 | ug/l  | < 0.25 | 0.37   |       |
| Zinc, Dissolved               | DETSC 2306  | 1.3  | ug/l  | 1.7    | < 1.3  |       |
| <b>Inorganics</b>             |             |      |       |        |        |       |
| pH                            | DETSC 2008  |      | pH    | 7.6    | 8.3    |       |
| Cyanide, Total                | DETSC 2130  | 40   | ug/l  | < 40   | < 40   |       |
| Total Hardness as CaCO3       | DETSC 2303  | 0.1  | mg/l  | 15.2   | 35.6   |       |
| Sulphate as SO4               | DETSC 2055  | 1.1  | mg/l  | 1.9    | 4.5    |       |
| Sulphide                      | DETSC 2208  | 10   | ug/l  | < 10   | < 10   |       |
| <b>Petroleum Hydrocarbons</b> |             |      |       |        |        |       |
| Aliphatic C5-C6               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | 450   |
| Aliphatic C6-C8               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aliphatic C8-C10              | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aliphatic C10-C12             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C12-C16             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C16-C21             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C21-C35             | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aliphatic C5-C35              | DETSC 3072* | 10   | ug/l  | < 10   |        | 450   |
| Aromatic C5-C7                | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C7-C8                | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C8-C10               | DETSC 3322  | 0.1  | ug/l  | < 0.1  |        | < 0.1 |
| Aromatic C10-C12              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C12-C16              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C16-C21              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C21-C35              | DETSC 3072* | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Aromatic C5-C35               | DETSC 3072* | 10   | ug/l  | < 10   |        | < 10  |
| TPH Ali/Aro Total C5-C35      | DETSC 3072* | 10   | ug/l  | < 10   |        | 450   |
| Benzene                       | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Toluene                       | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Ethylbenzene                  | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| Xylene                        | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| MTBE                          | DETSC 3322  | 1    | ug/l  | < 1.0  |        | < 1.0 |
| <b>PAHs</b>                   |             |      |       |        |        |       |
| Naphthalene                   | DETSC 3304  | 0.05 | ug/l  | 6.0    | < 0.05 |       |
| Acenaphthylene                | DETSC 3304  | 0.01 | ug/l  | 1.4    | 0.02   |       |
| Acenaphthene                  | DETSC 3304  | 0.01 | ug/l  | < 0.10 | < 0.01 |       |
| Fluorene                      | DETSC 3304  | 0.01 | ug/l  | 0.12   | < 0.01 |       |
| Phenanthrene                  | DETSC 3304  | 0.01 | ug/l  | 0.26   | 0.02   |       |
| Anthracene                    | DETSC 3304  | 0.01 | ug/l  | 0.70   | 0.02   |       |
| Fluoranthene                  | DETSC 3304  | 0.01 | ug/l  | 2.2    | 0.11   |       |
| Pyrene                        | DETSC 3304  | 0.01 | ug/l  | 3.8    | 0.15   |       |
| Benzo(a)anthracene            | DETSC 3304  | 0.01 | ug/l  | 2.5    | 0.11   |       |
| Chrysene                      | DETSC 3304  | 0.01 | ug/l  | 2.4    | 0.10   |       |
| Benzo(b)fluoranthene          | DETSC 3304  | 0.01 | ug/l  | 4.3    | 0.19   |       |
| Benzo(k)fluoranthene          | DETSC 3304  | 0.01 | ug/l  | 1.3    | 0.08   |       |
| Benzo(a)pyrene                | DETSC 3304  | 0.01 | ug/l  | 4.3    | 0.19   |       |
| Indeno(1,2,3-c,d)pyrene       | DETSC 3304  | 0.01 | ug/l  | 2.2    | 0.10   |       |
| Dibenzo(a,h)anthracene        | DETSC 3304  | 0.01 | ug/l  | 0.66   | 0.02   |       |
| Benzo(g,h,i)perylene          | DETSC 3304  | 0.01 | ug/l  | 1.6    | 0.08   |       |
| PAH Total                     | DETSC 3304  | 0.2  | ug/l  | 34     | 1.2    |       |

|      |    |                |
|------|----|----------------|
| 10   | No | UK DWS         |
| 1000 | No | EQS Fresh      |
| 0.45 | No | EQS Fresh 2022 |
| 50   | No | UK DWS         |
| 10   | No | EQS Fresh      |
| 14.0 | No | EQS Fresh 2022 |
| 0.07 | No | EQS Fresh 2022 |
| 34   | No | EQS Fresh 2022 |
| 10   | No | UK DWS         |
| 30   | No | EQS Fresh      |

|      |     |           |
|------|-----|-----------|
| N/A  | N/A | N/A       |
| 40   | No  | TDL       |
| N/A  | N/A | N/A       |
| 250  | No  | UK DWS    |
| 0.25 | No  | EQS Fresh |

|       |     |         |
|-------|-----|---------|
| 15000 | No  | WHO-DWQ |
| 15000 | No  | WHO-DWQ |
| 300   | No  | WHO-DWQ |
| 300   | No  | WHO-DWQ |
| 10    | No  | UK DWS  |
| 10    | No  | UK DWS  |
| 10    | No  | UK DWS  |
| 300   | Yes | WHO-DWQ |
| 10    | No  | UK DWS  |
| 10    | No  | UK DWS  |
| 300   | No  | WHO-DWQ |
| 90    | No  | WHO-DWQ |
| 90    | No  | WHO-DWQ |
| 90    | No  | WHO-DWQ |
| 90    | No  | WHO-DWQ |
| 300   | No  | WHO-DWQ |
| 300   | Yes | WHO-DWQ |
| 1.0   | No  | TDL     |
| 1.0   | No  | TDL     |
| 1.0   | No  | TDL     |
| 1.0   | No  | TDL     |
| 1.0   | No  | TDL     |

|       |     |                |
|-------|-----|----------------|
| 130.0 | No  | EQS Fresh 2022 |
| 0.1   | Yes | UK DWS         |
| 0.1   | No  | UK DWS         |
| 0.1   | Yes | UK DWS         |
| 1.9   | No  | ERL            |
| 0.1   | Yes | EQS Fresh 2022 |
| 0.12  | Yes | EQS Fresh 2022 |
| 0.1   | Yes | UK DWS         |
| 0.1   | Yes | UK DWS         |
| 0.1   | Yes | UK DWS         |
| 170   | No  | EU EQS         |
| 170   | No  | EU EQS         |
| 170   | No  | EU EQS         |
| 0.1   | Yes | UK DWS         |
| 170   | No  | EU EQS         |
| -     | -   | -              |

**Notes:**  
GAC = Generic Assessment Criteria  
**YES = GAC Exceeded**  
WHO-DWQ = World Health Organisation - Drinking Water Quality  
EQS Fresh = Environmental Quality Standards for Freshwater  
EQS Fresh 2022 = Environmental Quality Standards for Freshwater (February 2022)  
EU EQS = European Union Environmental Quality Standards  
UK DWS = UK Drinking Water Standards  
TDL - Test Detection Limits  
ERL - Environmental Risk Limits (Netherlands National Institute for Public Health and the Environment).

MG Made Ground

Geo Environmental Engineering Ltd  
Chemical Assessment Sheet - Human Health (Asvbestos)

Our Ref 25-11756  
Client Ref~ GEO-2025-6836  
Contract Title ~ Cleator Mills



Our Ref

25-11756

Client Ref ~

GEO-2025-6836

Contract Title ~

Cleator Mills

| Lab No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sample ID               | Material Type | Result | Comment* | Analyst      |    | GAC         | GAC Exceeded? | GAC Ref: |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|--------|----------|--------------|----|-------------|---------------|----------|
| 2514457                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP02 EXTERNAL 0.60      | SOIL          | NAD    | none     | Pierce Booth | MG | Presence    | No            | -        |
| 2514458                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TP03 EXTERNAL 0.30-0.40 | SOIL          | NAD    | none     | Pierce Booth | MG | Presence    | No            | -        |
| 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. |                         |               |        |          |              | MG | Made Ground |               |          |



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&  
Consultants

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