GEO Environmental Engineering

PHASE 2: GROUND INVESTIGATION REPORT

PROPOSED COMMERCIAL DEVELOPMENT OF

LAND AT CLEATOR MILLS, CUMBRIA

FOR:

GENR8 NORTH LTD

GEO Environmental Engineering

Web: www.geoenvironmentalengineering.com **Email:** info@geoenvironmentalengineering.com **Telephone:** 07883 440 186

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Prepared By:	James Brock *BSc. MSc.* – Geo Environmental Engineer/Associate
Author Signature:	[redacted]
Checked By:	Curtis Evans *B.Sc. (Hons), FGS* – Geo Environmental Engineer/Director
Client Title:	GenR8 North Ltd
Consultant:	Eskdale Environmental Services Ltd

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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 at 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 lease the site for commercial use (plant depot). 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.0.5ha 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: 301966, 513702
- Post Code: CA23 3FA (approximate only)

The majority of the site is covered by a large concrete slab (former factory floor) which was noted to be in a good condition. Discussions with the current land owner indicate that the mill was redeveloped as a factory and the current floor slab was constructed during the 1960s/70s.

The land around the edge of the concrete, comprises asphalt, granular hardstand and soft landscaping (grass). The concrete slab was being used to store mounds of concrete and brick rubble, soil and stone cornicing from nearby buildings.

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.60m OD.

1.3 Proposed Development

It is understood that the Client will lease the land to a plant and equipment rental company and that the existing concrete hardstand will be retained. This report will form a base line survey prior to the lease.

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: 2023-5775, dated: 26.05.2023.

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

Historical data indicates that the site has been developed as a textile mill prior to the 1860s. The mill was converted to a textile factory during the 1960s. It is understood that the factory was demolished around 2015. Surrounding industrial land uses included a gasometer, factories and a mill race.

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 underlaying 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 east 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 underlaying 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.

The report also provides a base line survey prior to lease.

2.2 Guidelines, Codes of Practice and Third-Party Accreditations

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

The 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) – 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, 2nd Edition. Site Investigation Steering Group, 2011.
- Effective Site Investigation. Site Investigation Steering Group, 2013.
- SP1010 Development of Category 4 Screening Levels Main Report, 2014.
- The LQM/CIEH S4UL's for Human Health Risk Assessment, 2015.

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 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

3.1 Intrusive Investigation Fieldworks Summary

The ground investigation works were completed on the 24th May 2023. As the Client intends to lease the existing concrete slab, most of the exploratory holes were located around the perimeter of the site taking into consideration the locations of buried utilities and surface obstructions (mounds and storage containers). Borehole BH01 penetrated the slab in the north east part to determine the underlying ground conditions. The concrete was reinstated afterwards.

The exploratory hole location plan is provided in Appendix I.

The ground investigation works comprised:

- 4 No. Dynamic Sampling Boreholes (BH01 to BH04) to depths of between c.1.20m and c.2.00m bgl.
- 5 No. Mechanically Excavated Trial Pits (TP01 to TP05) to depths of between c.1.00m and c.1.60m 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 geotechnical and chemical laboratory tests results are provided in Appendix III.

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

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

Made ground was encountered to depths of between c.0.45m and c.0.80m bgl during the ground investigation. However, trial pit TP05 was terminated in the made ground due to encountering a suspected electrical cable running parallel to the concrete slab (not recorded on plans).

The site was mostly surfaced with concrete. Borehole BH01 penetrated the concrete and confirmed that the concrete was c.0.09m thick and included reinforcement. Other surfaces included screed/paving slabs (0.06m thick) and asphalt (0.13m thick) with occasional granular hardstand elsewhere. The asphalt in the southern part of the site was occasionally underlain by fused slag.

The made ground was typically granular, comprising silty sandy gravel of aggregate with occasional brick, glass, metal, plastic, clinker, timber, asphalt and ash with pockets of reworked gravelly clay.

Minor olfactory evidence of hydrocarbon contamination was noted within the made ground in trial pit TP04 in the north western part. This included a slight odour which was limited to the made ground. No evidence of contamination was noted in the underling natural drift and the contamination appeared localised. No visual or olfactory evidence of fuel/oil type contamination was encountered elsewhere on site.

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

4.1.2 Natural Drift Deposits

The natural drift deposits comprised red brown slightly silty sandy fine to coarse sub-rounded gravel and cobbles of mixed lithology. Occasional firm silty sandy gravelly clay and silty gravelly sand was also noted at shallow depth.

The underlying gravel and cobble layer appeared dense. The boreholes were terminated within this layer at depths of between c.1.20m and c.2.00m bgl due to refusal (further penetration not possible). Excavation rates were also noted as very slow within this material due to the high density.

The gravel and cobble layer are likely suitable for conventional strip and/or pad foundations for lightly loaded portal-framed commercial buildings. This is discussed further in Section 8.

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 Determination of pH and Water-Soluble Sulphate

In order to determine the correct concrete classification for buried structures (foundations), the following samples were scheduled for laboratory pH and water-soluble sulphate (SO_4) screening:

- 13 No. samples of made ground (c.0.20m to c.0.60m bgl)
- 2 No. samples of the natural drift deposits (c.0.50m to c.1.00m bgl)

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

- Chemtech Environmental Testing of Stanley, County Durham.

The results of the testing are summarised in Section 6 and presented in the Chemtech report (ref: 123194) contained in Appendix III.

5.1.2 Contamination Testing for Human Health

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

- 13 No. samples of made ground (c.0.20m to c.0.60m bgl)
- 3 No. samples of natural drift deposits (c.0.50m to c.1.40m bgl)

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

- Chemtech Environmental Testing of Stanley, 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, MTBE and BTEX.
- **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 Chemtech report (ref: 123194) contained in Appendix III.

5.1.3 Contamination Testing for Controlled Waters

In order to determine the potential mobility of any contamination present within the soils, leachate screening was completed on 5 No. samples of the made ground recovered from depths of between c.0.30m and c.0.60m bgl.

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

- Chemtech Environmental Testing of Stanley, 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 Chemtech report (ref: 123194) 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 completed using the contamination levels recorded in the soils by comparing the values against published Generic Assessment Criteria (GAC), such as CLEA Soil Guideline Values (SGV's), CL:AIRE/DEFRA Category 4 Screening Levels (C4SLs), Land Quality Management (LQM) and Chartered Institute of Environmental Health (CIEH) S4UL Values and Atkins ATRISK^{SOIL} Soil Screening Values (SSV's). The guidelines are generally based on three main land uses as outlined below:

- *Residential*
- *Allotments*
- *Commercial*

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

It is anticipated that the existing concrete slab will be re-used for storing plant and equipment. Therefore, for the purposes of this basic Human Health ground contamination risk assessment, the maximum site recorded values for the soil samples have been compared to GAC for a CLEA end use classification of: *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:

- Environmental Quality Standards for Freshwater (EQS).
- Water Framework Directive 2014: Standards to Protect the Water Environment UK Drinking Water Standards taken for Water Supply (Water Quality) Regulations 1989 and 2000.
- UK Drinking Water Standards.

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 will be used for storing plant and equipment on the existing concrete hardstanding.

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, BTEX and MTBE) 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 2.5% SOM.

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

6.2.3 Asbestos Containing Materials (ACM's) – Soil

During the investigation, no visual evidence of suspected asbestos was encountered.

12 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, only one sample from borehole BH02 at 0.25m bgl returned a positive result for asbestos. The asbestos comprised Amosite and Chrysotile within a fragment of board (no loose fibres were detected). The made ground at this location comprised dark grey to black angular gravel of aggregate, clinker, concrete and ash. This was overlain by silty sandy gravel of aggregate, brick and concrete.

All of the other samples 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:** ACM board containing Amosite and Chrysotile. No loose fibres.

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.

However, a piece of board containing Amosite and Chrysotile was detected within the shallow made ground in borehole BH02 at 0.25m bgl. Loose asbestos fibres were not detected.

The presence of asbestos at or near the surface could pose a risk to human health from inhalation of fibres. However, as the fibres are 'locked-up' within board rather than being loose, the risk is considered very low. Nevertheless, care should be taken to ensure that ACMs are not exposed at the surface or disturbed where they could become airborne and inhaled. Where the ACM materials (board) are buried at depth, the risk is considered negligible. Basic protection measures may be required ensure that the future end users (human health) are not put at risk, especially during any construction works or if earthworks are planned. This is discussed further in Section 8.

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:

- Environmental Quality Standards for Freshwater (EQS)
- Water Framework Directive 2014: Standards to Protect the Water Environment UK Drinking Water Standards taken for Water Supply (Water Quality) Regulations 1989 and 2000.
- UK Drinking Water Standards taken for Water Supply (Water Quality) Regulations 1989 and 2000.

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. Concentrations of sulphide have been recorded in the made ground from trial pits TP01 and TP02, however, GEO are not aware of any current assessment criteria for this determined.

The results suggest that the inorganic contaminants 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 GAC have been derived using the following guidance documents:

- UK Drinking Water Standards taken for Water Supply (Water Quality) Regulations 1989 and 2000.
- Environmental Quality Standards for Freshwater (EQS).

The results indicate elevated concentrations of PAH compounds. The elevated PAH compounds include: Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene and Pyrene.

Exceedances were also recorded within the heavy-end aromatic and aliphatic petroleum hydrocarbon compounds (within the C10 to C35 range). MTBE concentrations were typically below the level of detection suggesting that the leachable petroleum contaminants may be an oil, tar or diesel derivative rather than petrol. The highest concentrations were noted in trial pit TP04 where evidence of localised hydrocarbon contamination (hydrocarbon odour) was noted.

The concentrations of organic compounds exceed the stringent UK Drinking Water Standards 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, the risk to these receptors is very low, especially when considering potential dilution, dispersal and natural breakdown of the organic compounds.

This is discussed further in Section 8.

6.4 Determination of pH and Water-Soluble Sulphate

As indicated in Section 5, selected samples of made ground and natural soil have been screened to determine their pH and soluble sulphate potential to aid the design of buried concrete. The results of the chemical screening are presented in the Chemtech report (ref: 123194) contained in Appendix III.

From the results, the following observations can be seen:

- pH values in the soils ranged from 7.8 to 11.2 (slightly alkali).
- Water Soluble Sulphate (SO_4) levels were recorded as ranging from 17mg/l to 1645mg/l.

High concentrations of sulphate were recorded in the soils which exceed the threshold for standard concrete design. Therefore, in accordance with BRE Special Digest 1: 2005 the results recorded equate to a Design Sulphate classification of DS-3 (for brownfield land).

With respect to the pH levels, the results equate to a slightly alkali chemical environment which is not considered aggressive with respect to concrete. In view of this, an ACEC classification of AC-3 should be adopted (for mobile groundwater on brownfield land).

7.0 Construction Related Excavations and Off-Site Disposal

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

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

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

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

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

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

8.0 Discussion and Recommendations

8.1 Ground and Groundwater Conditions Summary

The ground investigation has typically encountered made ground on site to depths of between c.0.45m and c.0.80m bgl but locally exceeding c.1.00m bgl within the vicinity of buried utilities (electric cable). The made ground was typically granular and comprised occasional fused slag, silty sandy gravel of aggregate with occasional brick, glass, metal, plastic, clinker, timber, asphalt and ash with pockets of reworked gravelly clay.

Evidence of minor hydrocarbon contamination (slight odour) was limited to the made ground in trial pit TP04 in the north western part. No evidence of contamination was noted elsewhere.

The natural drift deposits comprised red brown slightly silty sandy gravel and cobbles of mixed lithology with occasional firm silty sandy gravelly clay and silty gravelly sand at shallow depth. Solid strata/bedrock was not encountered. All of the exploratory holes remained dry.

8.2 Future Foundations, Pavements and Buried Structures

The investigation was primarily undertaken to assess possible contamination risks associated with the continued use of the site. However, the information can also aid the design of any proposed foundations. At this stage, GEO are not aware of any proposals to construct buildings on the site.

The underlying gravel and cobble layer appeared dense during the site works. The boreholes were terminated within the natural granular layer at depths of between c.1.20m and c.2.00m bgl due to refusal (further penetration not possible). Excavation rates were also noted as very slow within this material due to the high density.

The gravel and cobble layer is, therefore, considered suitable for conventional strip and/or pad foundations for lightly loaded portal-framed commercial buildings.

The made ground is not considered suitable for foundations due to the potential for excess total and/or differential settlement. The foundations should avoid transitions between different soil types to minimise possible differential settlement, therefore, careful inspection should be undertaken to ensure homogenous ground at formation. Over deepening of the foundations may therefore be required where soft or unsuitable deposits are encountered.

With respect to buried structures (concrete), the pH levels and soluble sulphate concentrations in the soils equate to a Design Sulphate classification of DS-3 and an ACEC classification of AC-3 (BRE Special Digest 1: 2005 – (assuming mobile groundwater).

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

8.3 Ground Contamination

8.3.1 Ground Contamination – Human Health

Following the site works, it can be seen that some minor residual petroleum hydrocarbon contamination is present in the north western part of the site. This appeared to be localised to the made ground in the vicinity of TP04 and is unlikely to pose a significant risk to the wider environment at this stage. The source of the contamination is unclear, however, it is likely to be associated with the former industrial land use or

a localised spillage. It would be prudent to excavate and remove the made ground from this area during re-development works as general good practice to protect the workforce and the wider environment.

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.

However, a piece of board containing Amosite and Chrysotile was detected within the shallow granular made ground in the western part of the site. It is likely that the source of the asbestos board was the former roof materials. Loose asbestos fibres were not detected.

The presence of asbestos at or near the surface could pose a risk to human health from inhalation of fibres. However, as the fibres are 'locked-up' within board rather than being loose, the risk is considered very low at present. Furthermore, the quantity of asbestos within the made ground appears to be very low. Nevertheless, care should be taken to ensure that ACMs are not exposed at the surface or disturbed where they could become airborne and inhaled. Where the ACM materials (board) are buried at depth, the risk is considered negligible to the end user. Basic protection measures may be required ensure that the future end users (human health) are not put at risk, and the Principal Contractor should ensure that their health and Safety Management plan takes into account the present of possible asbestos board in the made ground to maintain the safety of site operatives.

The results of the screening indicate that organic compounds within the made ground are potentially leachable and could become mobile if exposed to groundwater. However, the assessment was made using stringent criteria for UK Drinking Water Standards and the concentrations are unlikely to pose a 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. 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).

8.4 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.'*.

The P1 DTS indicates 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 Post Investigation Works

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

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

8.6 General Comments

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

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

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

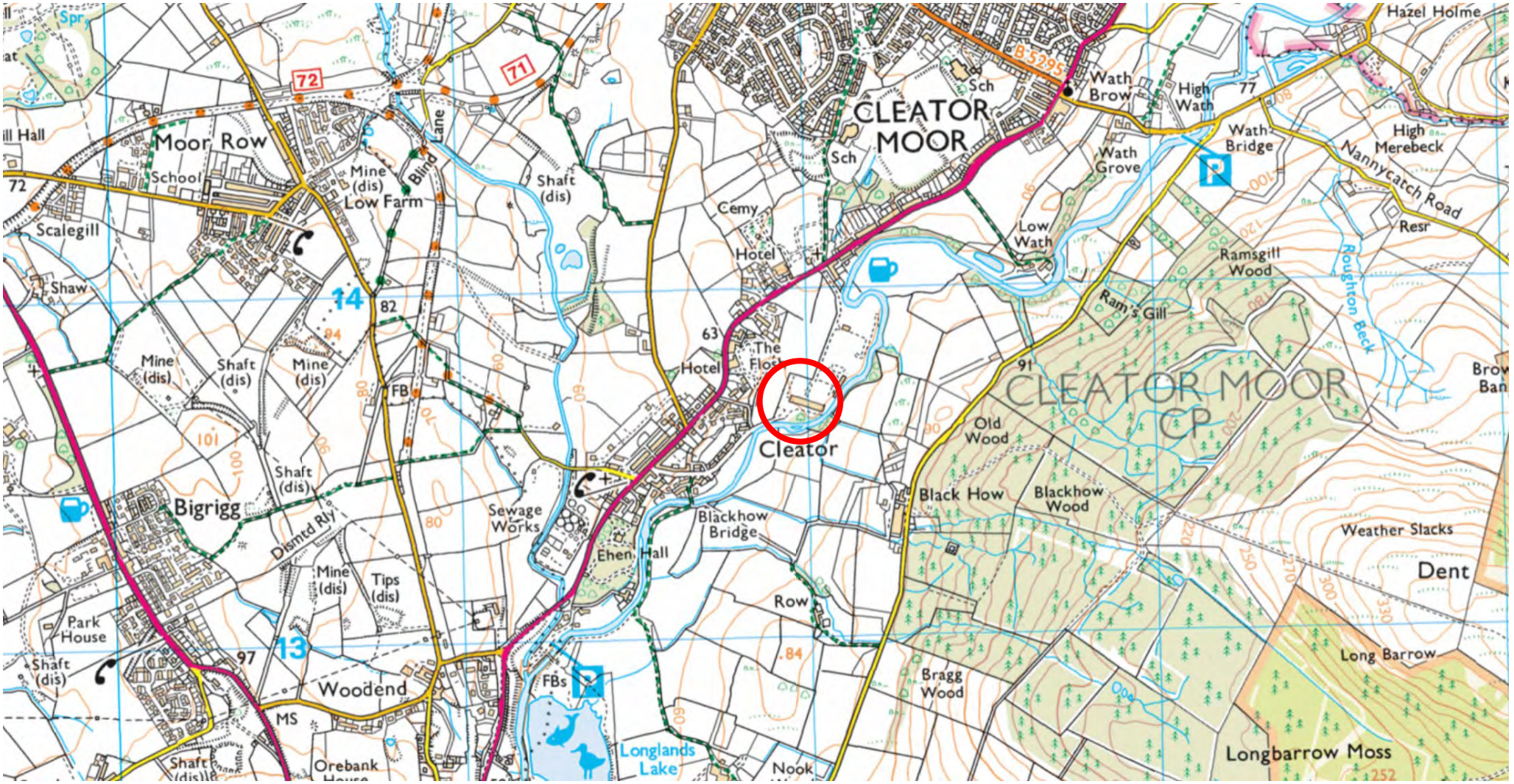
End of Report

Appendix I

- Site Location Plan
- Exploratory Hole Location Plan

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – Site Location



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Email: info@geoenvironmentalengineering.com
Telephone: 07883 440 186

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – Exploratory Hole Location Plan

KEY:

- Borehole Locations
- Trial Pit Locations
- Site Boundary

N

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Email: info@geoenvironmentalengineering.com
Telephone: 07883 440 186

Appendix II

- Exploratory Hole Logs

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – BH01

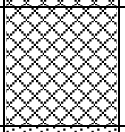
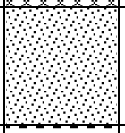
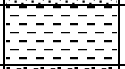
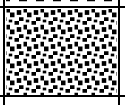
Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.09	MADE GROUND: Reinforced Concrete.		
0.09	0.20	MADE GROUND: Granular Sub-base.		
0.20	0.45	MADE GROUND: Dark brown very silty sandy GRAVEL of mixed lithology/aggregate with occasional concrete.		0.30 - J
0.45	0.60	Red brown slightly silty very sandy fine to coarse GRAVEL of mixed lithology.		0.50 - J
0.60	1.20	Grey brown sandy fine to coarse sub-rounded GRAVEl and COBBLES of mixed lithology.		
		End of borehole at 1.20m due to sample tube refusal. Borehole remained dry on completion. Borehole backfilled with arisings		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – BH02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.20	MADE GROUND: Grey brown silty very sandy angular GRAVEL of aggregate, brick and concrete.		
0.20	0.30	MADE GROUND: Dark grey to black angular GRAVEL of aggregate, clinker, concrete and ash.		0.25 - J
0.30	0.70	MADE GROUND: Red brown silty sandy fine to coarse GRAVEL of aggregate/mixed lithology with occasional brick, sandstone and concrete. Occasional sandstone cobbles at base.		0.50 - J
0.70	1.10	Red brown slightly silty gravelly coarse SAND.		
1.10	1.30	Firm grey brown silty very sandy gravelly CLAY.		
1.30	1.60	Brown very sandy fine to coarse sub-rounded GRAVEL of mixed lithology.		
		End of borehole at 1.60m due to sample tube refusal. Borehole remained dry on completion. Borehole backfilled with arisings		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – BH03

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.06	MADE GROUND: Screed over paving slabs.		
0.06	0.20	MADE GROUND: Red brown very sandy fine to coarse angular GRAVEL of aggregate and brick.		
0.20	0.70	MADE GROUND: Dark grey brown and orangey brown silty sandy GRAVEL of aggregate with occasional brick, concrete, clinker and asphalt.		0.30 - J
0.70	2.00	Orangey brown very sandy fine to coarse sub-rounded GRAVEL of mixed lithology.		
		End of borehole at 2.00m due to sample tube refusal. Borehole remained dry on completion. Borehole backfilled with arisings		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – BH04

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.06	MADE GROUND: Asphalt.		
0.06	0.13	MADE GROUND: Weak Asphalt		
0.13	0.80	MADE GROUND: Light grey brown silty angular GRAVEL of aggregate, slag, sandstone and clinker.		0.40 - J
0.70	1.20	Orangey brown very sandy fine to coarse sub-rounded GRAVEL of mixed lithology.		
		End of borehole at 1.20m due to sample tube refusal. Borehole remained dry on completion. Borehole backfilled with arisings		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – TP01

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.06	MADE GROUND: Asphalt.		
0.06	0.13	MADE GROUND: Weak, broken Asphalt.		
0.13	0.30	MADE GROUND: Light grey fused SLAG.		0.20 – J+T
0.30	0.80	MADE GROUND: Dark brown very silty sandy GRAVEL of aggregate/mixed lithology with occasional brick, clinker, ash. Occasional pockets of sandy gravelly clay.		0.60 - J
0.80	1.60	Brown, locally grey brown very sandy fine to coarse sub-rounded GRAVEL of mixed lithology with occasional cobbles.		1.40 - J
		End of trial hole at 1.60m. Trial hole remained open and dry on completion. Trial hole backfilled with arisings on completion.		

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Tracked 360 Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

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Email: info@geoenvironmentalengineering.com
Telephone: 07883 440 186

GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – TP02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.06	MADE GROUND: Screed over paving slabs.		
0.06	0.20	MADE GROUND: Red brown very sandy fine to coarse angular GRAVEL of aggregate and brick.		0.15 - J
0.20	0.70	MADE GROUND: Dark grey brown silty sandy angular GRAVEL of aggregate with occasional pockets of clinker.		0.40 - J
0.70	1.40	Orangey brown very sandy fine to coarse sub-rounded GRAVEL of mixed lithology.		
		End of trial hole at 1.40m. Trial hole remained open and dry on completion. Trial hole backfilled with arisings on completion.		

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Tracked 360 Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

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GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – TP03

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.40	MADE GROUND: Red brown and dark grey very silty sandy GRAVEL of mixed aggregate/lithology with occasional brick, concrete, clinker and plastic.		0.20 - J
0.40	0.60	MADE GROUND: Firm reworked red brown silty very sandy gravelly CLAY with many angular sandstone cobbles at base.		0.50 - J
0.60	1.00	Firm red brown silty very sandy gravelly CLAY with many roots.		
1.00	1.60	Dark brown silty sandy fine to coarse sub-rounded GRAVEL of mixed lithology. Many cobbles.		
		End of trial hole at 1.60m. Trial hole remained open and dry on completion. Trial hole backfilled with arisings on completion.		

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Tracked 360 Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

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GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – TP04

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.80	MADE GROUND: Dark grey brown silty sandy fine to coarse angular GRAVEL of aggregate, brick and concrete with occasional glass, timber and asphalt. Slight hydrocarbon odour.		0.30 - J
0.80	1.40	Red brown slightly silty sandy fine to coarse sub-rounded GRAVEL and COBBLES of mixed lithology. No hydrocarbon odour noted.		1.00 - J
		End of trial hole at 1.40m. Trial hole remained open and dry on completion. Trial hole backfilled with arisings on completion.		

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Tracked 360 Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

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GEO Environmental Engineering

GEO2023-5775: Land at Cleator Mills, Cumbria – TP05

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	1.00	MADE GROUND: Dark brown silty sandy angular GRAVEL of aggregate/mixed lithology, concrete, brick, sandstone, asphalt, clinker ans occasional metal, plastic and tile. 1.00 – Suspected cable (unrecorded) running parallel to former building. Trial pit terminated to avoid damage.		0.30 - J
		End of trial hole at 1.00m. Trial hole remained open and dry on completion. Trial hole backfilled with arisings on completion.		

Engineer: J.Brock
Site Works Date: 24/05/2023
Plant: Tracked 360 Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

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Telephone: 07883 440 186

Appendix III

- Laboratory Test Results

ANALYTICAL TEST REPORT

Contract no:	123194
Contract name:	Cleator Mills, Cumbria
Client reference:	GEO2023-5775
Clients name:	Geo Environmental Engineering
Clients address:	4 Culgarth Avenue Cockermouth Cumbria CA13 9PL
Samples received:	26 May 2023
Analysis started:	26 May 2023
Analysis completed:	09 June 2023
Report issued:	09 June 2023

Key		
	U	UKAS accredited test
	M	MCERTS & UKAS accredited test
	$	Test carried out by an approved subcontractor
	I/S	Insufficient sample to carry out test
	N/S	Sample not suitable for testing
	NAD	No Asbestos Detected

Approved by: [redacted]

Abbie Neasham-Bourn

Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

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

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
123194-1	TP01	0.20	Gravel	-	-	16.0
123194-2	TP01	0.60	Sandy Clayey Loam with Gravel	-	-	17.8
123194-3	TP01	1.40	Sandy Clayey Loam with Gravel	-	-	12.1
123194-4	TP02	0.15	Sandy Clayey Loam with Gravel	-	-	10.1
123194-5	TP02	0.40	Sandy Clayey Loam with Gravel	-	-	16.7
123194-6	TP03	0.20	Sandy Clayey Loam with Gravel	-	-	17.7
123194-7	TP03	0.50	Sandy Clay	-	-	20.0
123194-8	TP04	0.30	Sandy Clay with Gravel	-	-	7.9
123194-9	TP04	1.00	Sandy Clay with Gravel	-	-	7.2
123194-10	TP05	0.30	Sandy Clayey Loam with Gravel	-	-	9.5
123194-11	BH01	0.30	Sand with Gravel	-	-	6.5
123194-12	BH01	0.50	Sand with Gravel	-	-	4.8
123194-13	BH02	0.25	Sand with Gravel	-	-	9
123194-14	BH02	0.50	Sandy Clay with Gravel	-	-	13.6
123194-15	BH03	0.30	Sand with Gravel	-	-	10.6
123194-16	BH04	0.40	Sand with Gravel	-	-	10.6

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SOILS

Lab number			123194-1	123194-2	123194-3	123194-4	123194-5	123194-6
Sample id			TP01	TP01	TP01	TP02	TP02	TP03
Depth (m)			0.20	0.60	1.40	0.15	0.40	0.20
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units						
Chromium (III)	CE208	mg/kg CrIII	16.0	17.8	-	10.1	16.7	17.7
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	-	<1	<1	<1
Arsenic	$ [M]	mg/kg	14.7	17.1	-	6.1	17.7	34.6
Cadmium	$ [M]	mg/kg	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2
Chromium	$ [M]	mg/kg	12.2	23.2	-	28.2	37.3	30.0
Copper	$ [M]	mg/kg	6.7	95.3	-	15.5	77.5	56.7
Lead	$ [M]	mg/kg	11.7	266.0	-	26.2	40.5	84.0
Mercury	$ [M]	mg/kg	< 0.1	2.9	-	< 0.1	0.3	0.6
Nickel	$ [M]	mg/kg	8.0	53.6	-	17.3	80.5	34.8
Selenium	$ [M]	mg/kg	6.0	< 1.0	-	< 1.0	< 1.0	1.0
Zinc	$ [M]	mg/kg	14.2	89.0	-	17.0	33.7	48.7
pH	CE004 [M]	units	10.8	9.2	-	10.5	8.6	8.0
Sulphate (2:1 water soluble)	CE061 [U]	mg/l SO_4	1645	457	-	225	425	76
Cyanide (total)	CE077	mg/kg CN	<1	<1	-	<1	<1	<1
Total Organic Carbon (TOC)	CE197	% w/w C	0.5	6.4	-	1.0	5.9	15.2
PAH								
Naphthalene	CE087 [M]	mg/kg	0.06	0.23	-	0.06	0.04	0.21
Acenaphthylene	CE087 [M]	mg/kg	0.05	0.08	-	<0.02	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	0.47	0.46	-	0.03	<0.02	0.02
Fluorene	CE087 [U]	mg/kg	0.31	0.31	-	0.03	<0.02	0.04
Phenanthrene	CE087 [M]	mg/kg	2.54	2.98	-	0.30	0.16	0.85
Anthracene	CE087 [U]	mg/kg	1.20	0.98	-	0.07	0.02	0.07
Fluoranthene	CE087 [M]	mg/kg	11.62	9.92	-	0.51	0.12	0.27
Pyrene	CE087 [M]	mg/kg	9.20	7.88	-	0.44	0.10	0.19
Benzo(a)anthracene	CE087 [U]	mg/kg	5.94	5.00	-	0.31	0.08	0.13
Chrysene	CE087 [M]	mg/kg	5.36	4.76	-	0.35	0.10	0.23
Benzo(b)fluoranthene	CE087 [M]	mg/kg	5.64	4.72	-	0.36	0.08	0.12
Benzo(k)fluoranthene	CE087 [M]	mg/kg	2.61	2.40	-	0.14	0.03	0.04
Benzo(a)pyrene	CE087 [U]	mg/kg	5.56	4.71	-	0.34	0.07	0.10
Indeno(123cd)pyrene	CE087 [M]	mg/kg	2.88	2.50	-	0.17	0.03	0.04
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.86	0.64	-	0.05	<0.02	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	2.76	2.38	-	0.21	0.04	0.07
PAH (total of USEPA 16)	CE087	mg/kg	57.0	50.0	-	3.39	0.88	2.40
BTEX & TPH								
MTBE	CE192 [U]	mg/kg	-	<0.02	<0.02	-	<0.02	-
Benzene	CE192 [U]	mg/kg	-	<0.01	<0.01	-	<0.01	-
Toluene	CE192 [U]	mg/kg	-	<0.01	<0.01	-	<0.01	-
Ethylbenzene	CE192 [U]	mg/kg	-	<0.01	<0.01	-	<0.01	-
m & p-Xylene	CE192 [U]	mg/kg	-	<0.02	<0.02	-	<0.02	-
o-Xylene	CE192 [U]	mg/kg	-	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-

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SOILS

Lab number			123194-1	123194-2	123194-3	123194-4	123194-5	123194-6
Sample id			TP01	TP01	TP01	TP02	TP02	TP03
Depth (m)			0.20	0.60	1.40	0.15	0.40	0.20
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units						
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	<10	<10	-	<10	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	20	18	-	<10	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	33	26	-	<1	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	106	48	-	<1	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	23	11	-	<1	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	<6	<6	-	<6	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	<6	<6	-	<6	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	<15	<15	-	<15	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	<10	<10	-	<10	-
Subcontracted Analysis								
Asbestos (qualitative)	$	-	NAD	NAD	-	-	NAD	NAD
Form of Asbestos	$	-	-	-	-	-	-	-

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SOILS

Lab number			123194-7	123194-8	123194-9	123194-10	123194-11	123194-12
Sample id			TP03	TP04	TP04	TP05	BH01	BH01
Depth (m)			0.50	0.30	1.00	0.30	0.30	0.50
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units						
Chromium (III)	CE208	mg/kg CrIII	20.0	7.9	7.2	9.5	6.5	4.8
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Arsenic	$ [M]	mg/kg	15.8	12.5	16.3	14.3	8.5	20.5
Cadmium	$ [M]	mg/kg	< 0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	$ [M]	mg/kg	34.6	30.9	46.0	29.2	18.8	35.8
Copper	$ [M]	mg/kg	18.2	23.2	23.4	28.5	11.0	18.8
Lead	$ [M]	mg/kg	26.5	90.5	29.3	31.5	90.8	35.8
Mercury	$ [M]	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	$ [M]	mg/kg	21.3	24.7	29.4	28.6	12.6	30.6
Selenium	$ [M]	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	$ [M]	mg/kg	41.8	58.6	45.8	38.8	18.7	54.7
pH	CE004 [M]	units	7.8	7.8	7.9	8.2	10.8	8.8
Sulphate (2:1 water soluble)	CE061 [U]	mg/l SO_4	49	65	36	50	180	33
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Total Organic Carbon (TOC)	CE197	% w/w C	0.8	0.8	0.3	3.5	0.6	0.3
PAH								
Naphthalene	CE087 [M]	mg/kg	<0.02	0.06	<0.02	0.09	<0.02	<0.02
Acenaphthylene	CE087 [M]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	<0.02	0.03	<0.02	<0.02	0.02	<0.02
Fluorene	CE087 [U]	mg/kg	<0.02	0.03	<0.02	0.02	0.02	<0.02
Phenanthrene	CE087 [M]	mg/kg	0.09	0.39	0.08	0.42	0.56	0.13
Anthracene	CE087 [U]	mg/kg	0.03	0.12	<0.02	0.09	0.14	0.03
Fluoranthene	CE087 [M]	mg/kg	0.16	1.18	0.08	1.09	1.23	0.14
Pyrene	CE087 [M]	mg/kg	0.13	1.00	0.09	0.96	0.91	0.10
Benzo(a)anthracene	CE087 [U]	mg/kg	0.08	0.57	0.04	0.66	0.58	0.05
Chrysene	CE087 [M]	mg/kg	0.09	0.60	0.05	0.72	0.55	0.04
Benzo(b)fluoranthene	CE087 [M]	mg/kg	0.10	0.63	0.04	0.85	0.47	0.04
Benzo(k)fluoranthene	CE087 [M]	mg/kg	0.04	0.27	<0.03	0.39	0.24	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	0.09	0.59	0.03	0.81	0.44	0.03
Indeno(123cd)pyrene	CE087 [M]	mg/kg	0.05	0.34	0.02	0.52	0.23	<0.02
Dibenz(ah)anthracene	CE087 [M]	mg/kg	<0.02	0.08	<0.02	0.11	0.06	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	0.05	0.37	0.04	0.52	0.23	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	0.90	6.26	0.46	7.26	5.68	0.57
BTEX & TPH								
MTBE	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	-	<0.02
Benzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
Toluene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
Ethylbenzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
m & p-Xylene	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	-	<0.02
o-Xylene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01

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SOILS

Lab number			123194-7	123194-8	123194-9	123194-10	123194-11	123194-12
Sample id			TP03	TP04	TP04	TP05	BH01	BH01
Depth (m)			0.50	0.30	1.00	0.30	0.30	0.50
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units						
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	-	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10	<10	-	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10	14	<10	20	-	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	<1	<1	23	-	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<1	<1	<1	57	-	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	<1	<1	14	-	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	-	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	-	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	-	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	<6	-	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	11	<6	<6	-	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	<15	<15	<15	-	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10	<10	<10	-	<10
Subcontracted Analysis								
Asbestos (qualitative)	$	-	-	NAD	-	NAD	NAD	NAD
Form of Asbestos	$	-	-	-	-	-	-	-

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SOILS

Lab number			123194-13	123194-14	123194-15	123194-16
Sample id			BH02	BH02	BH03	BH04
Depth (m)			0.25	0.50	0.30	0.40
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units				
Chromium (III)	CE208	mg/kg CrIII	9.0	13.6	10.6	10.6
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1
Arsenic	$ [M]	mg/kg	18.1	21.0	18.8	8.9
Cadmium	$ [M]	mg/kg	< 0.2	0.3	0.2	< 0.2
Chromium	$ [M]	mg/kg	19.9	25.7	31.7	25.0
Copper	$ [M]	mg/kg	159.0	91.9	332.0	15.9
Lead	$ [M]	mg/kg	84.0	148.0	294.0	12.2
Mercury	$ [M]	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Nickel	$ [M]	mg/kg	52.1	36.8	32.7	8.9
Selenium	$ [M]	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	$ [M]	mg/kg	98.1	91.6	206.0	14.0
pH	CE004 [M]	units	8.0	8.1	8.2	11.2
Sulphate (2:1 water soluble)	CE061 [U]	mg/l SO_4	895	1028	281	17
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1
Total Organic Carbon (TOC)	CE197	% w/w C	4.6	3.5	4.1	0.4
PAH						
Naphthalene	CE087 [M]	mg/kg	0.26	0.09	0.11	<0.02
Acenaphthylene	CE087 [M]	mg/kg	0.26	0.15	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	0.04	0.03	<0.02	<0.02
Fluorene	CE087 [U]	mg/kg	0.07	0.05	<0.02	<0.02
Phenanthrene	CE087 [M]	mg/kg	0.97	0.59	0.41	0.04
Anthracene	CE087 [U]	mg/kg	0.43	0.30	<0.02	<0.02
Fluoranthene	CE087 [M]	mg/kg	2.98	2.10	0.08	0.03
Pyrene	CE087 [M]	mg/kg	3.48	2.53	0.07	0.03
Benzo(a)anthracene	CE087 [U]	mg/kg	2.90	1.97	0.06	0.03
Chrysene	CE087 [M]	mg/kg	2.44	1.46	0.09	0.03
Benzo(b)fluoranthene	CE087 [M]	mg/kg	3.16	1.85	0.06	0.07
Benzo(k)fluoranthene	CE087 [M]	mg/kg	1.22	0.75	<0.03	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	3.67	2.23	0.05	0.07
Indeno(123cd)pyrene	CE087 [M]	mg/kg	1.63	0.94	<0.02	0.05
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.50	0.32	<0.02	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	2.29	1.32	0.04	0.06
PAH (total of USEPA 16)	CE087	mg/kg	26.3	16.7	0.96	0.40
BTEX & TPH						
MTBE	CE192 [U]	mg/kg	-	<0.02	-	<0.02
Benzene	CE192 [U]	mg/kg	-	<0.01	-	<0.01
Toluene	CE192 [U]	mg/kg	-	<0.01	-	<0.01
Ethylbenzene	CE192 [U]	mg/kg	-	<0.01	-	<0.01
m & p-Xylene	CE192 [U]	mg/kg	-	<0.02	-	<0.02
o-Xylene	CE192 [U]	mg/kg	-	<0.01	-	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	-	<0.01

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SOILS

Lab number			123194-13	123194-14	123194-15	123194-16
Sample id			BH02	BH02	BH03	BH04
Depth (m)			0.25	0.50	0.30	0.40
Date sampled			24/05/2023	24/05/2023	24/05/2023	24/05/2023
Test	Method	Units				
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	-	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	-	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	<10	-	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	<10	-	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	<1	-	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	33	-	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	19	-	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	-	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	-	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	-	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	<6	-	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	<6	-	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	<15	-	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	<10	-	<10
Subcontracted Analysis						
Asbestos (qualitative)	$	-	Amosite, Chrysotile	NAD	NAD	NAD
Form of Asbestos	$	-	Board in Sample	-	-	-

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PREPARED LEACHATES

Lab number			123194-2L	123194-5L	123194-7L	123194-8L	123194-10L
Sample id			TP01	TP02	TP03	TP04	TP05
Depth (m)			0.60	0.40	0.50	0.30	0.30
Test	Method	Units					
Arsenic (dissolved)	$	µg/l As	9.7	2.2	< 0.5	2.3	0.8
Boron (dissolved)	$	µg/l B	27	35	24	10	11
Cadmium (dissolved)	$	µg/l Cd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium (dissolved)	$	µg/l Cr	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Copper (dissolved)	$	µg/l Cu	5.4	1.0	< 0.5	2.0	1.5
Lead (dissolved)	$	µg/l Pb	4.5	< 0.5	< 0.5	< 0.5	< 0.5
Mercury (dissolved)	$	µg/l Hg	0.64	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	$	µg/l Ni	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium (dissolved)	$	µg/l Se	1	< 1	< 1	< 1	< 1
Zinc (dissolved)	$	µg/l Zn	1.7	2.8	< 1.2	1.3	2.5
Hardness (by calculation)	$	mg/l $CaCO_3$	45	51	31	51	42
pH	CE213 [U]	units	9.2	8.0	7.9	8.3	8.1
Sulphate	CE049 [U]	mg/l SO_4	14.1	24.4	4.3	6.0	2.4
Sulphide	CE249	µg/l S^{2-}	2004	3721	<100	<100	<100
Cyanide (total)	CE147	µg/l CN	<5	<5	<5	<5	<5
PAH							
Naphthalene	CE051	µg/l	<0.1	<0.1	0.1	2.0	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	0.2	0.2	0.9	<0.1
Fluorene	CE051	µg/l	0.2	0.3	0.3	3.3	0.2
Phenanthrene	CE051	µg/l	0.6	0.5	0.6	2.6	0.4
Anthracene	CE051	µg/l	<0.1	0.1	<0.1	0.8	<0.1
Fluoranthene	CE051	µg/l	0.3	0.2	0.3	0.6	0.2
Pyrene	CE051	µg/l	0.2	0.1	0.2	0.3	0.2
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	1.7	10.5	<1.6
BTEX & TPH							
MTBE	CE057 [U]	µg/l	<2	<2	<2	<2	<2
Benzene	CE057 [U]	µg/l	<1	<1	<1	<1	<1
Toluene	CE057 [U]	µg/l	<1	<1	<1	<1	<1
Ethylbenzene	CE057 [U]	µg/l	<1	<1	<1	<1	<1
m & p-Xylene	CE057 [U]	µg/l	<2	<2	<2	<2	<2
o-Xylene	CE057 [U]	µg/l	<1	<1	<1	<1	<1
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1	<1	<1	<1

PREPARED LEACHATES

Lab number			123194-2L	123194-5L	123194-7L	123194-8L	123194-10L
Sample id			TP01	TP02	TP03	TP04	TP05
Depth (m)			0.60	0.40	0.50	0.30	0.30
Test	Method	Units					
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE251	µg/l	<1	1	<1	3	2
EPH Aromatic (>EC12-EC16)	CE251	µg/l	<1	6	<1	10	15
EPH Aromatic (>EC16-EC21)	CE251	µg/l	6	15	14	30	20
EPH Aromatic (>EC21-EC35)	CE251	µg/l	6	19	<1	6	6
EPH Aromatic (>EC35-EC44)	CE251	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE175	µg/l	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE251	µg/l	9	27	10	27	10
EPH Aliphatic (>C12-C16)	CE251	µg/l	6	14	8	13	62
EPH Aliphatic (>C16-C35)	CE251	µg/l	39	102	16	117	78
EPH Aliphatic (>C35-C44)	CE251	µg/l	<1	<1	<1	<1	<1

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
$^{M}	Arsenic	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
$^{M}	Cadmium	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg
$^{M}	Chromium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Copper	Aqua regia digest, ICP-MS	Dry	M	4	mg/kg
$^{M}	Lead	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Mercury	Aqua regia digest, ICP-MS	Dry	M	0.1	mg/kg
$^{M}	Nickel	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Selenium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Zinc	Aqua regia digest, ICP-MS	Dry	M	4.5	mg/kg
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO_4
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE192	MTBE	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	Benzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Toluene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Ethylbenzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	m & p-Xylene	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	o-Xylene	Headspace GC-FID	As received	U	0.01	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE002	Leachate preparation (EA)	L:S 10:1		-	-
$	Arsenic (dissolved)	ICP-MS	U	0.5	µg/l As
$	Boron (dissolved)	ICP-MS		8	µg/l B
$	Cadmium (dissolved)	ICP-MS	U	0.5	µg/l Cd
$	Chromium (dissolved)	ICP-MS	U	0.5	µg/l Cr
$	Copper (dissolved)	ICP-MS	U	0.5	µg/l Cu
$	Lead (dissolved)	ICP-MS	U	0.5	µg/l Pb
$	Mercury (dissolved)	ICP-MS	U	0.05	µg/l Hg
$	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
$	Selenium (dissolved)	ICP-MS	U	50	µg/l Se
$	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
$	Hardness (by calculation)	Calculation from Ca (dissolved) & Mg (dissolved)		0.1	mg/l $CaCO_3$
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO_4
CE249	Sulphide	Distillation, Titration		100	µg/l S^{2-}
CE147	Cyanide (total)	Continuous Flow Colorimetry		5	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE057	MTBE	Headspace GC-FID	U	2	µg/l
CE057	Benzene	Headspace GC-FID	U	1	µg/l
CE057	Toluene	Headspace GC-FID	U	1	µg/l
CE057	Ethylbenzene	Headspace GC-FID	U	1	µg/l
CE057	m & p-Xylene	Headspace GC-FID	U	2	µg/l
CE057	o-Xylene	Headspace GC-FID	U	1	µg/l
CE175	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE251	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID		1	µg/l

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE251	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID		1	µg/l
CE175	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE251	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID		1	µg/l
CE251	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID		1	µg/l

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DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
123194-1	TP01	0.20	N	
123194-2	TP01	0.60	N	
123194-3	TP01	1.40	N	
123194-4	TP02	0.15	N	
123194-5	TP02	0.40	N	
123194-6	TP03	0.20	N	
123194-7	TP03	0.50	N	
123194-8	TP04	0.30	N	
123194-9	TP04	1.00	N	
123194-10	TP05	0.30	N	
123194-11	BH01	0.30	N	
123194-12	BH01	0.50	N	
123194-13	BH02	0.25	N	
123194-14	BH02	0.50	N	
123194-15	BH03	0.30	N	
123194-16	BH04	0.40	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

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

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

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

Methods, procedures and performance data are available on request.

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

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

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

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

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

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

Moisture Content Calculated on a Wet Weight basis

Appendix IV

- GEO Chemical Assessment Sheet

Geo Environmental Engineering Ltd

Chemical Assessment Sheet - Leachates

Lab number			123194-2L	123194-5L	123194-7L	123194-8L	123194-10L	GAC Value	GAC Exceeded?	GAC Ref
Sample id			TP01	TP02	TP03	TP04	TP05			
Depth (m)			0.60	0.40	0.50	0.30	0.30			
Test	Method	Units	***MG***	***MG***	***MG***	***MG***	***MG***			
Arsenic (dissolved)	$	µg/l As	9.70	2.20	< 0.5	2.30	0.80	50.0	No	WFD
Boron (dissolved)	$	µg/l B	27	35	24	10	11	1000	No	EQS Fresh
Cadmium (dissolved)	$	µg/l Cd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5	No	EQS Fresh
Chromium (dissolved)	$	µg/l Cr	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50	No	UK DWS
Copper (dissolved)	$	µg/l Cu	5.4	1.0	< 0.5	2.0	1.5	10	No	EQS Fresh
Lead (dissolved)	$	µg/l Pb	4.5	< 0.5	< 0.5	< 0.5	< 0.5	25	No	UK DWS
Mercury (dissolved)	$	µg/l Hg	0.640	< 0.05	< 0.05	< 0.05	< 0.05	1	No	EQS Fresh
Nickel (dissolved)	$	µg/l Ni	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	20	No	UK DWS
Selenium (dissolved)	$	µg/l Se	1.00	< 1	< 1	< 1	< 1	10	No	UK DWS
Zinc (dissolved)	$	µg/l Zn	2	3	< 1.2	1	3	30	No	EQS Fresh
Hardness (by calculation)	$	mg/l CaCO3	45	51	31	51	42	-	-	-
pH	CE213 U	units	9.2	8.0	7.9	8.3	8.1	N/A	N/A	N/A
Sulphate	CE049 U	mg/l SO4	14.1	24.4	4.3	6.0	2.4	250	No	UK DWS
Sulphide	CE249	µg/l S2-	2004	3721	<100	<100	<100	100	YES	TDL
Cyanide (total)	CE147	µg/l CN	<5	<5	<5	<5	<5	20	No	TDL
PAH										
Naphthalene	CE051	µg/l	<0.1	<0.1	0.1	2.0	<0.1	10.0	No	EQS Fresh
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Acenaphthene	CE051	µg/l	<0.1	0.2	0.2	0.9	<0.1	0.1	YES	UK DWS
Fluorene	CE051	µg/l	0.2	0.3	0.3	3.3	0.2	0.1	YES	UK DWS
Phenanthrene	CE051	µg/l	0.6	0.5	0.6	2.6	0.4	0.1	YES	UK DWS
Anthracene	CE051	µg/l	<0.1	0.1	<0.1	0.8	<0.1	0.1	YES	UK DWS
Fluoranthene	CE051	µg/l	0.3	0.2	0.3	0.6	0.2	0.1	YES	UK DWS
Pyrene	CE051	µg/l	0.2	0.1	0.2	0.3	0.2	0.1	YES	UK DWS
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	No	UK DWS
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	1.7	10.5	<1.6	-	-	-
BTEX & TPH										
MTBE	CE057 U	µg/l	<2	<2	<2	<2	<2	2	No	TDL
Benzene	CE057 U	µg/l	<1	<1	<1	<1	<1	1	No	TDL
Toluene	CE057 U	µg/l	<1	<1	<1	<1	<1	1	No	TDL
Ethylbenzene	CE057 U	µg/l	<1	<1	<1	<1	<1	1	No	TDL
m & p-Xylene	CE057 U	µg/l	<2	<2	<2	<2	<2	2	No	TDL
o-Xylene	CE057 U	µg/l	<1	<1	<1	<1	<1	1	No	TDL
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
EPH Aromatic (>EC10-EC12)	CE251	µg/l	<1	1	<1	3	2	10	No	UK DWS
EPH Aromatic (>EC12-EC16)	CE251	µg/l	<1	6	<1	10	15	10	YES	UK DWS
EPH Aromatic (>EC16-EC21)	CE251	µg/l	6	15	14	30	20	10	YES	UK DWS
EPH Aromatic (>EC21-EC35)	CE251	µg/l	6	19	<1	6	6	10	No	UK DWS
EPH Aromatic (>EC35-EC44)	CE251	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
VPH Aliphatic (>C8-C10)	CE175	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS
EPH Aliphatic (>C10-C12)	CE251	µg/l	9	27	10	27	10	10	YES	UK DWS
EPH Aliphatic (>C12-C16)	CE251	µg/l	6	14	8	13	62	10	YES	UK DWS
EPH Aliphatic (>C16-C35)	CE251	µg/l	39	102	16	117	78	10	YES	UK DWS
EPH Aliphatic (>C35-C44)	CE251	µg/l	<1	<1	<1	<1	<1	10	No	UK DWS

Geo Environmental Engineering Ltd

Chemical Assessment Sheet - Soils

Lab number			123194-1	123194-2	123194-3	123194-4	123194-5	123194-6	123194-7	123194-8	123194-9	123194-10	123194-11	123194-12	123194-13	123194-14	123194-15	123194-16	Generic Assessment Criteria Industrial & Commercial 2.5% SOM		
Sample id			TP01	TP01	TP01	TP02	TP02	TP03	TP03	TP04	TP04	TP05	BH01	BH01	BH02	BH02	BH03	BH04			
Depth (m)			0.20	0.60	1.40	0.15	0.40	0.20	0.50	0.30	1.00	0.30	0.30	0.50	0.25	0.50	0.30	0.40	GAC	GAC Exceeded?	GAC Ref:
Date sampled			#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######			
Test	Method	Units	***MG***	***MG***	***GRAVEL***	***MG***	***MG***	***MG***	***MG***	***MG***	***GRAVEL***	***MG***	***MG***	***GRAVEL***	***MG***	***MG***	***MG***	***MG***			
Arsenic	$ M	mg/kg	14.7	17.1	-	6.1	17.7	34.6	15.8	12.5	16.3	14.3	8.5	20.5	18.1	21.0	18.8	8.9	640	No	S4UL
Cadmium	$ M	mg/kg	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	0.2	< 0.2	190	No	LQM S4UL
Chromium	$ M	mg/kg	12.2	23.2	-	28.2	37.3	30.0	34.6	30.9	46.0	29.2	18.8	35.8	19.9	25.7	31.7	25.0	8600	No	LQM S4UL
Copper	$ M	mg/kg	6.7	95.3	-	15.5	77.5	56.7	18.2	23.2	23.4	28.5	11.0	18.8	159.0	91.9	332.0	15.9	68000	No	LQM S4UL
Lead	$ M	mg/kg	11.7	266.0	-	26.2	40.5	84.0	26.5	90.5	29.3	31.5	90.8	35.8	84.0	148.0	294.0	12.2	2300	No	C4SL
Mercury	$ M	mg/kg	< 0.1	2.9	-	< 0.1	0.3	0.6	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	1100	No	LQM S4UL
Nickel	$ M	mg/kg	8.0	53.6	-	17.3	80.5	34.8	21.3	24.7	29.4	28.6	12.6	30.6	52.1	36.8	32.7	8.9	980	No	LQM S4UL
Selenium	$ M	mg/kg	6.0	< 1.0	-	< 1.0	< 1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	12000	No	LQM S4UL
Zinc	$ M	mg/kg	14.2	89.0	-	17.0	33.7	48.7	41.8	58.6	45.8	38.8	18.7	54.7	98.1	91.6	206.0	14.0	730000	No	LQM S4UL
pH	CE004 M	units	10.8	9.2	-	10.5	8.6	8.0	7.8	7.8	7.9	8.2	10.8	8.8	8.0	8.1	8.2	11.2	N/A	N/A	N/A
Sulphate (2:1 water soluble)	CE061 U	mg/l SO4	1645	457	-	225	425	76	49	65	36	50	180	33	895	1028	281	17	N/A	N/A	N/A
Cyanide (total)	CE077	mg/kg CN	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	34	No	ATRISK SSV
Total Organic Carbon (TOC)	CE197	% w/w C	0.5	6.4	-	1.0	5.9	15.2	0.8	0.8	0.3	3.5	0.6	0.3	4.6	3.5	4.1	0.4	-	-	-
PAH																					
Naphthalene	CE087 M	mg/kg	0.06	0.23	-	0.06	0.04	0.21	<0.02	0.06	<0.02	0.09	<0.02	<0.02	0.26	0.09	0.11	<0.02	460	No	LQM S4UL
Acenaphthylene	CE087 M	mg/kg	0.05	0.08	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.26	0.15	<0.02	<0.02	97000	No	LQM S4UL
Acenaphthene	CE087 M	mg/kg	0.47	0.46	-	0.03	<0.02	0.02	<0.02	0.03	<0.02	<0.02	0.02	<0.02	0.04	0.03	<0.02	<0.02	97000	No	LQM S4UL
Fluorene	CE087 U	mg/kg	0.31	0.31	-	0.03	<0.02	0.04	<0.02	0.03	<0.02	0.02	0.02	<0.02	0.07	0.05	<0.02	<0.02	68000	No	LQM S4UL
Phenanthrene	CE087 M	mg/kg	2.54	2.98	-	0.30	0.16	0.85	0.09	0.39	0.08	0.42	0.56	0.13	0.97	0.59	0.41	0.04	22000	No	LQM S4UL
Anthracene	CE087 U	mg/kg	1.20	0.98	-	0.07	0.02	0.07	0.03	0.12	<0.02	0.09	0.14	0.03	0.43	0.30	<0.02	<0.02	540000	No	LQM S4UL
Fluoranthene	CE087 M	mg/kg	11.62	9.92	-	0.51	0.12	0.27	0.16	1.18	0.08	1.09	1.23	0.14	2.98	2.10	0.08	0.03	23000	No	LQM S4UL
Pyrene	CE087 M	mg/kg	9.20	7.88	-	0.44	0.10	0.19	0.13	1.00	0.09	0.96	0.91	0.10	3.48	2.53	0.07	0.03	54000	No	LQM S4UL
Benzo(a)anthracene	CE087 U	mg/kg	5.94	5.00	-	0.31	0.08	0.13	0.08	0.57	0.04	0.66	0.58	0.05	2.90	1.97	0.06	0.03	170	No	LQM S4UL
Chrysene	CE087 M	mg/kg	5.36	4.76	-	0.35	0.10	0.23	0.09	0.60	0.05	0.72	0.55	0.04	2.44	1.46	0.09	0.03	350	No	LQM S4UL
Benzo(b)fluoranthene	CE087 M	mg/kg	5.64	4.72	-	0.36	0.08	0.12	0.10	0.63	0.04	0.85	0.47	0.04	3.16	1.85	0.06	0.07	44.0	No	LQM S4UL
Benzo(k)fluoranthene	CE087 M	mg/kg	2.61	2.40	-	0.14	0.03	0.04	0.04	0.27	<0.03	0.39	0.24	<0.03	1.22	0.75	<0.03	<0.03	1200	No	LQM S4UL
Benzo(a)pyrene	CE087 U	mg/kg	5.56	4.71	-	0.34	0.07	0.10	0.09	0.59	0.03	0.81	0.44	0.03	3.67	2.23	0.05	0.07	35.0	No	LQM S4UL
Indeno(123cd)pyrene	CE087 M	mg/kg	2.88	2.50	-	0.17	0.03	0.04	0.05	0.34	0.02	0.52	0.23	<0.02	1.63	0.94	<0.02	0.05	510	No	LQM S4UL
Dibenz(ah)anthracene	CE087 M	mg/kg	0.86	0.64	-	0.05	<0.02	<0.02	<0.02	0.08	<0.02	0.11	0.06	<0.02	0.50	0.32	<0.02	<0.02	3.60	No	LQM S4UL
Benzo(ghi)perylene	CE087 M	mg/kg	2.76	2.38	-	0.21	0.04	0.07	0.05	0.37	0.04	0.52	0.23	<0.02	2.29	1.32	0.04	0.06	4000	No	LQM S4UL
PAH (total of USEPA 16)	CE087	mg/kg	57.0	50.0	-	3.39	0.88	2.40	0.90	6.26	0.46	7.26	5.68	0.57	26.3	16.7	0.96	0.40	-	-	-
BTEX & TPH																					
MTBE	CE192 U	mg/kg	-	<0.02	<0.02	-	<0.02	-	<0.02	<0.02	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02	13000	No	CL:AIRE GAC (2010)
Benzene	CE192 U	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	47.00	No	LQM S4UL
Toluene	CE192 U	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	110000	No	LQM S4UL
Ethylbenzene	CE192 U	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	13000	No	LQM S4UL
m & p-Xylene	CE192 U	mg/kg	-	<0.02	<0.02	-	<0.02	-	<0.02	<0.02	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02	14000	No	LQM S4UL
o-Xylene	CE192 U	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	14000	No	LQM S4UL
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	46000	No	LQM S4UL
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	110000	No	LQM S4UL
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01	8100	No	LQM S4UL
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	<10	<10	-	<10	-	<10	<10	<10	<10	-	<10	-	<10	-	<10	28000	No	LQM S4UL
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	20	18	-	<10	-	<10	14	<10	20	-	<10	-	<10	-	<10	37000	No	LQM S4UL
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	33	26	-	<1	-	<1	<1	<1	23	-	<1	-	<1	-	<1	28000	No	LQM S4UL
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	106	48	-	<1	-	<1	<1	<1	57	-	<1	-	33	-	<1	28000	No	LQM S4UL
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	23	11	-	<1	-	<1	<1	<1	14	-	<1	-	19	-	<1	28000	No	LQM S4UL
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	5900	No	LQM S4UL
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	17000	No	LQM S4UL
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	4800	No	LQM S4UL
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	<6	<6	-	<6	-	<6	<6	<6	<6	-	<6	-	<6	-	<6	23000	No	LQM S4UL
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	<6	<6	-	<6	-	<6	11	<6	<6	-	<6	-	<6	-	<6	82000	No	LQM S4UL
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	<15	<15	-	<15	-	<15	<15	<15	<15	-	<15	-	<15	-	<15	1700000	No	LQM S4UL
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	<10	<10	-	<10	-	<10	<10	<10	<10	-	<10	-	<10	-	<10	1700000	No	LQM S4UL
Subcontracted Analysis																					
Asbestos (qualitative)	$	-	NAD	NAD	-	-	NAD	NAD	-	NAD	-	NAD	NAD	NAD	Amosite, Chrysotile	NAD	NAD	NAD	Present	YES	Presence
Form of Asbestos	$	-	-	-	-	-	-	-	-	-	-	-	-	-	Board in Sample	-	-	-			

GEO Environmental Engineering Ltd

Geotechnical and Environmental
Consultants
&
Drilling Experts

Website: www.geoenvironmentalengineering.com
Email: info@geoenvironmentalengineering.com
Telephone: 07883 440 186