

PHASE 2 INTRUSIVE SITE INVESTIGATION

QUANTITATIVE CONTAMINATION REPORT

REPORT REFERENCE: GA1894.25

SITE: Old Hall Stables
Timothy Lane
Batley
WF17 0BA

CLIENT: Debbie Gaskin

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Site Location



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SITE INVESTIGATION: OLD HALL STABLES, TIMOTHY LANE, BATLEY, WF17 0BA

1 INTRODUCTION

Following the issue of a Phase 1 Qualitative Contaminated Land Desk Study for the site, GA Site Investigations Ltd was instructed on behalf of Ms Debbie Gaskin to carry out a Phase 2 Quantitative Contamination Assessment, along with investigation into potential shallow Coal Workings and or Coal Seams of a site known as Old Hall Stables, Timothy Lane, Batley, WF17 0BA, hereinafter referred to as 'the site'.

The development proposal is to convert stable 1 and 2 of an existing stable block into a Keeper/Grooms Quarter Accommodation under Kirklees Council Planning Application 2024/62/92723/F. A copy of the proposed development plan is presented in Appendix A.

The purpose of the Phase 2 Intrusive Site Investigation is to provide a quantitative site-specific contamination assessment to confirm the findings of the Desk Study by direct sampling and analysis of soil, water and potential ground gas to allow production of a refined Site-specific Contaminated Land Risk Assessment of the extent of any soil and or groundwater or surface water contamination at the site leading to initial remediation requirements to rectify such issues.

This report assumes that the site will be developed with two storey extension/dwelling with conversion of the existing stables using conventional construction techniques and materials and that existing ground levels will not alter significantly. If this is not the case, further advice may be required.

The investigation was also requested to confirm the presence of possible historic coal mining activities beneath the area of the extension.

Where assessments of areas of the site affected in particular ways are given, these are initial comments and may be refined following additional recommended intrusive works and subsequent sample analysis as needed.

All information, comments and opinions given in this report are based on the ground conditions encountered at the points of excavation during the intrusive investigation process and on the results of laboratory testing carried out as part of the investigation. However,

there may be conditions at the site that have not been taken into account, such as unpredictable soil strata and water conditions between or below investigation points.

The limitation of this investigation and report are contained in Appendix F.

2 SITE DESCRIPTION

The location of the proposed extension can be found at approximate Nation Grid Reference 424604E, 425372N.



Onsite are a number of timber stables, the northern two, referenced 1 and 2 on the location plan provided by the client being the area of the proposed redevelopment.

A timber stable covers the area of the proposed development.

To the north end and to rear east of the development area there are mounds of used bedding straw which limited the available areas for setting-up the drilling rig.

Full site descriptions can be found in the original Rogers Geotechnical Services Limited Phase 1 Report C4308/24/E/6602.

3 UK CONTAMINATED LAND LEGISLATIVE FRAMEWORK

3.1 Legislation on Contaminated Land

Part IIA of the Environmental Protection Act, 1990, enacted by Section 57 of the Environment Act 1995 and the associated Contaminated Land (England) Regulations 2000 (SI 2000/227) was introduced on 1 April 2000. The guidance was subject to a review by DEFRA in 2012 and a revision was published.

Part IIA provides a statutory definition of contaminated land:

“any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is a significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused”.

Controlled waters are considered to be all groundwaters, inland surface waters and estuarine and coastal waters.

To determine whether land falls under the Part IIA definition of contaminated land the site should be evaluated in the context of a risk-based framework. The assessment of contaminated land is typically a two-phase process which is initially based on a qualitative assessment of the likelihood of complete pollution linkages, with a quantitative element which seeks to determine the degree and the significance of the harm. Land is only defined as ‘Contaminated Land’ if a “significant pollutant linkage” is present.

A pollutant linkage must comprise of the following:

Source - a contaminant or substance which is located in, on or under the land and has potential to cause harm to human health, water resources or the wider environment.

Pathway - the means or route by which a source can migrate.

Receptor - something which could come to harm, including human health, water resources, surface water courses or the wider environment.

The responsible authority then needs to consider whether the identified pollution linkage:

- is resulting in significant harm being caused to the receptor in the pollutant linkage.

- presents a significant possibility of significant harm being caused to that receptor.
- is resulting in the pollution of controlled waters, which constitute the receptor; or is likely to result in such pollution.

If a pollutant linkage is demonstrated, then the Part IIA legislation provides powers for remedial action to be enforced by the Local Authority in whose area the contaminated land is situated.

4 CONCEPTUAL MODEL

4.1 General

The conceptual contamination risk assessment model was prepared by Rogers Geotechnical Specialist and is presented in their Phase 1 Desk Study report and is summarised as follows.

The conceptual model has been developed assuming that the site will be redeveloped for a residential end use without gardens.

4.2 Conceptual Site Model

Table 1: Source-Pathway-Receptor Link and Risk Rating

Source	Pathway	Receptor	Linkage Present?	Risk Rating
Made Ground	Direct contact Dermal absorption/soil ingestion	Operatives End User Neighbours	Yes Yes Yes	Low-Moderate Low-Moderate Low-Moderate
Inhalation of dust/vapours	Construction Enclosed spaces	Operatives End User Neighbours	Yes Yes Yes	Low-Moderate Low-Moderate Low-Moderate
Site grown fruit and vegetables	Ingestion of fruit/vegetables or water	Operatives End User Neighbours	No No Yes	N/A N/A N/A
Potential mine gases	Migration of hazardous gas via permeable strata	Operatives End User Neighbours	Yes Yes Yes	Moderate Moderate Moderate
On and off-site Sources of contamination	Spillage/loss/run off to receiving sources	Controlled waters	Yes	Low-Moderate
On and off-site Sources of contamination	Migration through ground	Controlled waters	Yes	Low-Moderate
On and off-site Sources of contamination	Run-off via drainage/sewers	Controlled waters	Yes	Low-Moderate
Direct contact with contaminated soil/Uptake via root system	No soft landscaping proposed	Plants	No	N/A
Made Ground	Direct contact with contaminated soil	Building materials	Yes	Moderate
Mine workings	Migration of mine gas via permeable strata	Operatives End-user	Yes	Moderate
Mine workings	Mining instability	End-user	Yes	Moderate

5 FIELDWORK

The intrusive fieldwork was carried out between the 9th to 11th April 2025 and was limited to accessible areas around the existing stable buildings which covered the footprint of the proposed development at the time of the site visit.

The site work was undertaken in accordance with the ground investigation procedures and sample descriptions based on BS 5930 'Code of Practice for Site Investigations' and BS 10175 "Investigation of potentially contaminated sites - code of practice".

The initial investigation comprised 2no sampling holes with 1no borehole, RC1, being extended by water-flush rotary coring under Mining Remediation Authority Permit Reference: 29585. The rotary hole was drilled to determine the depth of any coal or mine workings present beneath the footprint of the proposed extension.

The presence of a coal working in the rotary borehole confirmed that additional drilling to determine the lateral extent of the void/working encountered would be required and this would be more beneficial to do after the existing stables had been demolished to allow access to the area of and within the footprint of the proposed building.

Any additional drilling should be done on a 'drill and grout' approach with additional boreholes being taken over a close spaced grid pattern across the building area by an approved drilling and grouting contractor conversant with this type of work who would advise on and undertake the grouting remediation of any void/workings encountered. The contractor should also be requested to provide details of the drilling, amount of grout used and to undertake any post remediation verification as to the effectiveness of the ground works.

The indicative locations of the exploratory holes are shown on the Drawing included in Appendix B.

The exploratory hole records are presented in Appendix C.

The full details of the fieldwork undertaken are summarised in the following sections.

5.1 Dynamic Sampler Boreholes

The boreholes, designated RC1 and WS2, were initially hand dug to ~1.00m in order to avoid buried services. The boreholes were then driven to depths of between 2.21m (RC1) and 2.30m

(WS2) at which depth the dynamic sampling was terminated at 'refusal', a stratum with a standard penetration test blow count >50 producing less than 0.30m penetration.

The dynamic sampling technique uses a lightweight tracked rig to advance a borehole by 1.0m intervals using 1.0m long steel sampler tubes, containing plastic liners into which the substrata deposits are driven, at diameters of 102mm reducing to 50mm (SPT). The soils are then recovered from each sampler tube as continuous core samples, which are then logged and sub-sampled on site.

In situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS EN ISO 22476-3:2005+A1:2011 at 1.0m intervals in order to provide strength parameters for geotechnical design.

5.2 Rotary Water-flush Coring

Borehole RC1 was extended from the base of the dynamic sampling borehole utilising water-flush Geobore-S drilling techniques. The drilling system comprises an outer drill rod fitted with a nominal 148mm diameter cutting shoe, an inner steel rod/sampler which contains a removable plastic liner in which the cored strata sample is taken and recovered. The inner rod and liner are rotated onto the ground until reaching the required sampling depth, nominally in 1.5m increments, after which the inner rod/sampler is recovered via a 'wireline' rope system, leaving the outer rod or casing in place to keep the hole from collapsing. The plastic liner is then recovered from the inner rod sampler, capped and labelled for transportation to our unit where it is subsequently opened, the core logged and any sub-sampling such as for laboratory compressive strength testing are taken.

Ground gas monitoring was undertaken at the top of the borehole during excavations works with Oxygen concentrations of 19.8-20.9% with a maximum Carbon Dioxide reading of 0.3% and no elevated Methane or Hydrogen Sulphide being recorded.

5.3 Groundwater and Gas Monitoring Points

Combined groundwater and ground gas monitoring points were installed in the boreholes.

Prior to installing the monitoring pipe into RC2 the borehole was backfilled using Bentonite cement pellets to ~10.50m bgl and a plastic sleeve was inserted into the hole to a depth of ~9.00m bgl, before additional Bentonite pellets were poured into and around the sleeve and

then above it to ~9.00m begl forming a seal in, around and above the liner pipe The monitoring point was then installed in the borehole to c6.00m begl .

The gas/water monitoring points comprises a lower section of perforate HDPE pipework with a gravel surround and an upper c.1.0m section of plain HDPE pipework with a Bentonite Cement surround forming a seal against surface water ingress and ground gas egress.

The top of the installation is sealed with a rubber bung fitted with a gas valve, and a lockable cover placed over the installation to protect it and prevent unauthorised access.

Following installation of the gas monitoring points they were tested for ground gases and no elevated levels were recorded.

Additional groundwater and gas monitoring were undertaken over 3no visits between the 16th of April and 8th of May 2025. The results of the monitoring are presented in Appendix D.

6 GROUND AND GROUNDWATER CONDITIONS

6.1 Strata Encountered

The ground conditions encountered during the intrusive investigation were consistent with the published geological map.

A thickness of between 0.80m of Made Ground or possibly Made Ground overlies the Pennine Coal Measures.

A summary of the strata encountered during the investigation is described in the following sections, but for full details and descriptions, reference should be made to the exploratory hole records presented in Appendix C.

6.2 Made Ground

The boreholes were taken in open land towards the front (northeast) corner of the stable block, with WS2 being located to the rear (east) of it.

The holes encountered 0.20m to 0.30m of sand and stone hardcore over disturbed clayey Gravel of Mudstone (RC1) and Sandstone (WS2) which extend to 0.80m below existing ground level (begl)

6.3 Superficial Deposits

In WS2 the Made Ground is underlain by 0.60m of silty, sandy Clay, with no superficial deposits being encountered in RC1.

6.4 Solid Geology (Bedrock Formation)

Underlying the Made Ground and from 1.40m begl in WS2, the boreholes encountered Mudstone and Siltstone of the Pennine Lower Coal Measure Formation which extends to in excess of 19.00m begl (RC1).

RC1 indicates a former mine working, as a void, between 9.50m to 9.90m begl with a single thin coal seam between 11.60m to 11.70m begl.

6.5 Groundwater

Groundwater was not encountered in the dynamic sampling boreholes, and any deeper groundwater strikes in RC1 would tend to be masked by the water-flush drilling technique used in the investigation.

6.6 Evidence of Potential Contamination Sources

Visual and olfactory evidence of hydrocarbons was not recorded.

6.7 In-situ Testing

6.7.1 Standard Penetration Tests (SPT)

Standard penetration tests were taken in the sampling boreholes with SPT N-values of 10 to 33 at 1.00m begl being recorded, with deeper tests in the underlying Mudstone and Siltstone Formations recording blow counts >60 for less than 0.30m penetration.

6.7.2 Uniaxial Compressive strength testing

Laboratory uniaxial compressive strength testing was undertaken on 2no rock core samples, with UCS values of 0.4-31.9 MPa being recorded at 8.00m and 12.60m respectively.

6.8 Ground Gas:

Basic Radon gas protection measures have been identified as being required in the original Phase 1 Desk Study Report.

To determine potential ground gas concentration a series of 3no ground gas monitoring visits were undertaken between the 16th of April and 8th of May 2025. The results of the monitoring are presented in Appendix D.

Concentrations of methane, carbon dioxide and oxygen as well as borehole flow rates were recorded using an infra-red gas analyser.

Methane and Hydrogen Sulphide were not recorded during any of the monitoring visits.

Low concentrations of carbon dioxide between 0.6% to 1.4% were recorded.

The current guidance on protecting buildings with enclosed spaces, i.e., underfloor voids, basements, etc., from ground gas hazards is contained in the document: CIRIA C665 with updated risk assessment guidance contained within BS8485 (2015).

In this case it is intended that the proposed new build will be a residential extension to the existing dwelling, Type A – Private – BS8485 (2015).

The level of gas protection is determined by comparing the following parameters to cut-off values prescribed within BS8485 (2015):

- “Typical Maximum Concentrations” for initial screening purposes.
- Risk based “Gas Screening Values” (GSV) for consideration where the typical maximum concentrations are exceeded.

The GSV is calculated using the following equation and the resulting GSV are compared to the Site Characteristic GSV given in Table 2 of BS8485 (2015).

Summary of Building Types (taken from BS 8485:2015)

- Type A Buildings Examples include private housing and some retail premises.
- Type B Buildings Examples include managed apartments, multiple occupancy offices, some retail premises, and parts of some public buildings, such as schools, hospitals, leisure centers, and parts of hotels.
- Type C Buildings Examples include offices, some retail premises, and parts of some public buildings, such as schools, hospitals, leisure centers, and parts of hotels.
- Type D Buildings Examples are retail park sales buildings, factory shop floor areas, warehouses. Small rooms within these style buildings should be separately categorized as Type B or Type C.

The GSV has been calculated for both methane and carbon dioxide to determine a site-specific Characteristic Situation for each gas. The higher the calculated GSV, the greater the risk posed by the presence of ground gas. The CIRIA guidance document notes that ‘...the GSV is a guideline value and not an absolute threshold’.

$$\text{GSV} = \text{Maximum gas concentration (\%)} \times \text{worst case borehole flow rate (l/h)}$$

The maximum CO₂ and Methane concentrations, the maximum flow rate and the screening values for the borehole during the fieldwork period are summarised in the following table:

Table 2 Calculated GSV

Location	Maximum CO ₂ Concentration (% v/v)	Maximum Methane Concentration (% v/v)	Maximum Flow Rate (l/hr)	Max Gas Screening Value (l/hr)
RC1	1.4	0.0	0.2	<0.0028
WS2	1.0	0.0	0.1	<0.0010

The maximum recorded Carbon Dioxide concentration is 1.4% (BH1) and a worst-case flow rate of 0.2l/hr, giving a GSV for Methane of 0.0028.

6.8.1 Interpretation

The results of the direct gas monitoring have been reviewed with reference to the following documentation:

Table 2 of BS 8485:2015 (reproduced below) presents a total of six Characteristic Situations (CS) to assist in classification of the site, based on the calculated GSVs for methane and carbon dioxide.

Table 2 CS by site characteristic GSV

CS	Hazard potential	Site characteristic GSV ^{A)} L/h	Additional factors
CS1	Very low	<0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	0.07 to <0.7	Typical measured flow rate <70 L/h (otherwise consider an increase to CS3)
CS3	Moderate	0.7 to <3.5	–
CS4	Moderate to high	3.5 to <15	–
CS5	High	15 to <70	–
CS6	Very high	>70	–

^{A)} The figures used in this column are empirical.

NOTE The CS is equivalent to the characteristic GSV in CIRIA C665 [6].

In accordance with BS 8485:2015, the CS classification for the site should be considered in conjunction with the proposed Building Type to determine the appropriate level of ground gas protection measures that should be installed to mitigate the risk posed by ground gases, based on the gas protection score for the site.

BS 8485:2015 notes *'The Building Type is determined based the proposed construction and use of the building, together with the control of future structural changes to the building and its maintenance (the building's management) should be assessed, since potential risks posed by ground gases are strongly influenced by these factors'*. Subject to the development proposals, each building may be categorised as a whole, or for each different part of the building.

The Building Types are presented in Table 3 of BS 8485:2015, reproduced below.

The level of gas protection applicable to the Building Type A, based on the CS1 classification determined from the calculated GSV.

Table 4 Gas protection score by CS and type of building

CS	Minimum gas protection score (points)			
	High risk	Medium risk		Low risk
	Type A building	Type B building	Type C building	Type D building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 ^{A)}	5.5 ^{A)}	4.5	3.5
5	— ^{B)}	6.5 ^{A)}	5.5	4.5
6	— ^{B)}	— ^{B)}	7.5	6.5

^{A)} Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

^{B)} The gas hazard is too high for this empirical method to be used to define the gas protection measures.

The appropriate level of precautions, to be designed in accordance with the point scoring system of BS 8485:2015 should therefore be applied for the proposed development. These should include a combination of the following three types of protection measures, which should be used to achieve the required score of 0 and no additional ground gas protection measures are therefore required for the development.

7 HUMAN HEALTH QUANTITATIVE RISK ASSESSMENT

Qualitative assessment of risks may be sufficient in many cases to eliminate the possibility of significant pollutant linkages. However, quantitative risk assessment is formally required to determine whether there is a 'significant possibility of significant harm being caused'. Part IIA of the Environmental Protection Act 1990 recommends that 'authoritative and scientifically based guideline values for concentrations of the potential pollutants in or under the land' be used to quantify the risk posed by contamination.

Under the Planning Regime a quantitative risk assessment can be used to decide whether the site is suitable for the proposed use. In addition, the National Planning Policy Framework (March 2012) also indicates that after remediation as a minimum land should not be capable of being determined as contaminated land under Part IIA.

7.1 Current UK Screening Values

The UK technical guidance for assessing risks to human health is issued from various UK bodies including the Environment Agency (EA), the DEFRA, Contaminated Land: Applications in Real Environment (CL:AIRE), Chartered Institute of Environmental Health (CIEH) and Land Quality Management (LQM) Ltd (part of the University of Nottingham).

New and updated screening values in the form of provisional Category four Screening Levels (C4SL) (published in 2014) and Suitable for Use Levels (S4UL) (published 2015) have been produced by DEFRA and CIEH / LQM respectively using modified versions of the EA's Contaminated Land Exposure Assessment (CLEA) software.

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7.3 C4SL

Provisional C4SL have been derived by CL:AIRE following guidance and as a tool to assist in applying the Part IIA Category 1- 4 classifications to a site. The purpose of the C4SL is to provide

a simple test for deciding that land is suitable for use and 'definitely not' contaminated land under Part IIA. They describe a level of risk that is above minimal but is still low.

Six contaminants have been assigned provisional C4SL: arsenic; benzene; benzo[a]pyrene; cadmium; chromium VI and lead for the standard land uses (residential with and without plant uptake, allotments, commercial and public open space (parks and residential)).

The C4SL are also considered suitable to be used under the planning regime.

7.4 S4UL

The LQM / CIEH S4UL represent generic assessment criteria based on minimal or tolerable risk that are intended to be protective of human health. They represent values above which further assessment of the risks or remedial actions may be needed.

S4UL have been derived for a comprehensive list of organic and inorganic determinants.

8 SOIL CHEMISTRY

8.1 Results

The results of chemical testing of 15No. samples of near surface soils are compared with the C4SL and the LQM S4UL for a residential with plant uptake end use.

Table 3 Comparison of Chemical Test Results with Guideline Values (Metals and PAH)

Determinant	Maximum Measured Concentration (mg/kg)	LQM/CIEH S4UL Residential Without Plant Uptake (TOC of 1%) (mg/kg)	No. of tests carried out	No. of exceedances
Metals				
Arsenic	4	40	2	0
Boron	0.4	11000	2	0
Cadmium	0.3	85	2	0
Chromium (trivalent or total)*	24	910	2	0
Copper	25	7100	2	0
Lead	22	330**	2	0
Mercury	<0.3	1.2	2	0
Nickel	35	180	2	0
Selenium	<1.0	430	2	0
Zinc	98	40000	2	0
BTEX				
Benzene	<0.005	0.38	2	0
Toluene	<0.005	880	2	0
Ethylbenzene	<0.005	83	2	0
Xylene	<0.008	79	2	0
PAHs Speciated				
Naphthalene	<0.05	2.3	2	0
Acenaphthylene	<0.05	170	2	0
Acenaphthene	<0.05	210	2	0
Fluorene	<0.05	170	2	0
Phenanthrene	<0.05	95	2	0
Anthracene	<0.05	2400	2	0
Fluoranthene	<0.05	280	2	0
Pyrene	<0.05	620	2	0
Benzo(a)anthracene	<0.05	7.2	2	0
Chrysene	<0.05	15	2	0
Benzo(b)fluoranthene	<0.05	2.6	2	0
Benzo(k)fluoranthene	<0.05	77	2	0
Benzo(a)pyrene	<0.05	2.2	2	0
Indeno(1,2,3-c,d)pyrene	<0.05	27	2	0
Dibenzo(a,h)anthracene	<0.05	0.24	2	0
Benzo(g,h,i)perylene	<0.05	320	2	0
Aliphatic TPH				
TPH Aliphatic C ₅ – C ₆	<0.010	3200	2	0
TPH Aliphatic C ₆ – C ₈	<0.010	7800	2	0
TPH Aliphatic C ₈ – C ₁₀	<0.010	2000	2	0
TPH Aliphatic C ₁₀ – C ₁₂	<1.0	97000	2	0

Determinant	Maximum Measured Concentration (mg/kg)	LQM/CIEH S4UL Residential Without Plant Uptake (TOC of 1%) (mg/kg)	No. of tests carried out	No. of exceedances
TPH Aliphatic C ₁₂ – C ₁₆	<2.0	59000	2	0
TPH Aliphatic C ₁₆ – C ₂₁	<8.0	160000	2	0
TPH Aliphatic C ₂₁ – C ₃₅	<8.0	160000	2	0
Aromatic TPH				
TPH Aromatic C ₅ – C ₇	<0.010	26000	2	0
TPH Aromatic C ₇ – C ₈	<0.010	56000	2	0
TPH Aromatic C ₈ – C ₁₀	<0.010	3500	2	0
TPH Aromatic C ₁₀ – C ₁₂	<1.0	16000	2	0
TPH Aromatic C ₁₂ – C ₁₆	<2.0	36000	2	0
TPH Aromatic C ₁₆ – C ₂₁	<10	28000	2	0
TPH Aromatic C ₂₁ – C ₃₅	<10	28000	2	0
General				
Asbestos	Not-detected	Presence	2	0
Water Soluble Sulphate as SO ₄	56	500	2	0
Total Sulphate as SO ₄	0.017	0.24	2	0

8.2 Interpretation

No exceedances of the guideline value for any of the contaminants tested were recorded.

2no samples of Made Ground and Sub-base materials were submitted for an asbestos screen and asbestos was not recorded.

Given the absence of elevated metal and hydrocarbon contaminants in near-surface soils, no remediation of the site is required should the site proceed to a residential development.

8.3 Controlled Waters

Groundwater was not encountered in the boreholes and with the absence of metals or hydrocarbon contamination in the samples tested there is no proven risk to groundwater stored in the Pennine Lower Coal Measure Formation.

8.4 Waste Classification and Site Waste Management

Based upon the results of WAC testing and air dried analysis of Made Ground we consider that Made Ground soils will be classified as 'Stable Non-reactive Hazardous waste in non-hazardous Landfill.'

We would recommend that this report is forwarded to groundworkers for their consultation on waste acceptability prior to budget costs being assigned to waste disposal.

Any excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal consequently; details of the materials required for disposal, together with certificates of chemical analysis, should be sent to a suitably licensed waste disposal contractor for classification and to confirm compliance with their license conditions.

9 GEOTECHNICAL ENGINEERING ASSESSMENT

9.1 Summary of Ground Conditions

The ground conditions encountered during the intrusive investigation were consistent with the published geological map.

A thickness of 0.80m of probable Made Ground overlies Mudstone and Siltstone of the Pennine Lower Coal Measures Formations.

A worked coal seam/void of 0.40m thickness is present between 9.50m to 9.90m begl. Further investigation and grouting of the working/void has already been discussed with the client and they are going to approach a suitably qualified 'drilling and grouting' specialist to seek advice and have lateral extent of the void/works within influencing distance of the proposed development establish and remediated.

Remediation was undertaken in May 2025, and a verification of the works was provided by Groundsmiths Geotechnical Engineers, Project Ref: GUK-0525-03 and we are informed this report has been submitted to the Local Authority Planning Department.

9.2 Foundation Options

Once the working/void has been remediated then a suitable reinforced foundation can be designed, with the final design being in accordance with best practice when building in a known area where historic shallow mining legacy has been proven. Your consulting engineer/architect will be able to advice what foundations is suitable with the upper Coal Measures Mudstone having an allowable bearing capacity of 100kN/m² for initial foundation design, once the working/void has been remediated and infilled

9.3 Chemical Considerations for Buried Concrete

In accordance with BRE SD1 (2005) "Concrete in aggressive ground" a Design Sulphate Class of DS1 with an ACEC of AC-1s would apply for buried concrete and the use of concrete containing ordinary Portland cement admix will be suitable for buried concrete

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Land Quality

GA Site Investigation Limited have determined through site investigation, chemical testing and quantitative risk assessment that no risk to groundworkers or residential end-users has been established from elevated concentrations of metals, asbestos or hydrocarbon contaminants recorded in Made Ground and natural soils.

It is recognised however that the site investigation was limited to external areas only and further investigations may be required once the existing stables have been removed. Should potential sources of as yet unrecorded potential contamination source be uncovered during the site works then further advice on how to deal with such should be sought before continuing with the works.

As there are no identified sources for soil or water contamination there is no requirement for contaminated land remediation of the development area.

10.2 Buried Services

Plastic water supply pipes are permeable to hydrocarbons such as petrol, diesel, heating fuel and white spirits. It has been proven by chemical analysis that the site does not have areas of elevated concentrations of hydrocarbons and that standard plastic water pipes are suitable for use in the development.

10.3 Soil Disposal

Based upon the results of WAC testing and air dried analysis of Made Ground we consider that Made Ground soils will be classified as 'Stable Non-reactive Hazardous Waste in non-hazardous Landfill.'

We would recommend that this report is forwarded to groundworkers for their consultation on waste acceptability prior to budget costs being assigned to waste disposal.

Prepared and approved by

G M Anderson
Director

REFERENCES

ASTM : 1992 : Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Designation D1586-84 (reapproved 1992). American Society for Testing and Materials, West Conshohocken, USA.

BRE : 2005 : Special Digest 1 : Concrete in Aggressive Ground. Building Research Establishment.

BS 1377 : 1990 : Methods of Test for soils for civil engineering purposes. British Standards Institution, London.

BS 5930 : 1999 : Code of practice for site investigations. British Standards Institution, London.

BS 8485 : 2007 : Code of practice for the characterization and remediation from ground gas in affected developments. British Standards Institution, London.

BS 10175 : 2001 : Investigation of potentially contaminated sites - code of practice. British Standards Institution, London.

Burland J B and M C Burbidge : 1985 : Settlement of foundations on sand and gravel. Proc. ICE, Part 1, Vol 78.

CL:AIRE and Chartered Institute of Environmental Health (CIEH). 2008. Guidance on Comparing Soil Contamination Data with a Critical Concentration. CL:AIRE / CIEH. London.

CL:AIRE. 2013. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. CL:AIRE. London.

Clayton C R I : 1990 : SPT energy transmission : theory, measurement and significance. Ground Engineering, December.

Chengini A and N A Trenter : 1995 : The shear strength and deformation behaviour of a glacial till. Proceedings of International Conference on Advances in site investigation practice. ICE, London.

Clayton C R I : 1995 : The Standard Penetration Test (SPT) : Methods and use. CIRIA Report 143. Construction Industry Research Information Association, London.

Croney D and J C Jacobs : 1967 : The frost susceptibility of soils and road materials. RRL Report LR90. Transport Research Laboratory (formerly Road Research Laboratory), Crowthorne

CIRIA C665 : 2007 Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA, London

DEFRA and EA (2002). S4UL 10. Soil Guideline Values for Lead Contamination. Environment Agency, Bristol.

DEFRA and EA (2004). Model Procedures for the Management of Land Contamination. CLR11. Environment Agency. Bristol.

DEFRA. 2014. SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. DEFRA. London.

de Mello V F B : 1971 : The Standard penetration Test. State of the Art Report. 4th Pan American Conference on Soil Mechanics and Foundation Engineering. Puerto Rico. Vol 1.

Drinking Water Inspectorate : 2010 : What are the Drinking Water Standards?

Driscoll R : (1983) The influence of vegetation on swelling and shrinking of clay soils in Britain. Geotechnique 23 (2): 93-105

Environment Agency. 2005. The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils. P5-080/TR3.

Environment Agency. 2006. Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination.

Environment Agency. 2008. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values. Science Report SC050021/SR7.

Environment Agency. 2009. Human Health Toxicological Assessment of Contaminants in Soil. Science Report SC050021/SR2. Bristol.

Environment Agency. 2009. Updated technical background to the CLEA model. Science Report SC050021/SR3. Bristol.

Environment Agency. 2009. CLEA Software (Version 1.06) - Science Report SC050021/SR4. Bristol.

Environment Agency. 2010. Guiding Principles for Land Contamination. GPLC1. Bristol.

Environment Agency. 2010. Guiding Principles for Land Contamination - FAQs, technical information, detailed advice and references. GPLC2. Bristol.

Environment Agency. 2010. Guiding Principles for Land Contamination – Reporting checklists. GPLC3. Bristol.

Environment Agency : 2013. Chemical Standards Database

Eurocode 7 : 1997 : Geotechnical Design - Part 3, Design assisted by field testing Prestandard ENV 1997-3. British Standards Institution, London.

Gibbs H J and W G Holtz : 1957 : Research on determining the density of sands by spoon penetration testing. Proceedings of 4th International Conference on Soil Mechanics and Foundation Engineering, London.

HD25/94 : 1994 : Design Manual for Roads and Bridges Volume 7. The Department of Transport.

IAN 73/06 : 2009 : design Guidance for Road Pavement Foundations (Draft HD25).

Land Quality Management & Chartered Institute of Environmental Health (2015) The LQM/CIEH S4UL for Human Health Risk Assessment - LQM CIEH. Land Quality Press, Nottingham.

Nixon I K : 1982 : Standard penetration test. State of the art report. Proceedings of the Second European Symposium on Penetration Testing, Amsterdam.

Peck R B, W E Hanson and T H Thornburn : 1953 : Foundation Engineering, 1st Edition. Wiley, New York.

Peck R B, W E Hanson and T H Thornburn : 1974 : Foundation Engineering, 2nd Edition. Wiley, New York.

Rodin S, B O Corbett, D E Sherwood and S Thorburn : 1974 : Penetration testing in the UK, State of the art report. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.

Skempton A W : 1986 : Standard Penetration Test procedures and the effects in sands of overburden pressure, relative density, particle size, ageing and overconsolidation. Geotechnique 36, No 3.

Sowers G F : 1979 : Introductory Soil Mechanics and Foundations. Macmillan.

Stroud M A : 1974 : The standard penetration test in insensitive clays and soft rocks. Proceedings of European Symposium on Penetration Testing, Stockholm.

Stroud M A and F G Butler : 1975 : The standard penetration test and the engineering properties of glacial materials. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.

Stroud M A : 1988 : The standard penetration test - its application and interpretation on Penetration Testing in the UK, Birmingham. Thomas Telford, London.

Terzaghi K and R B Peck : 1948 : Soil Mechanics in Engineering Practice, 1st Edition. John Wiley, London.

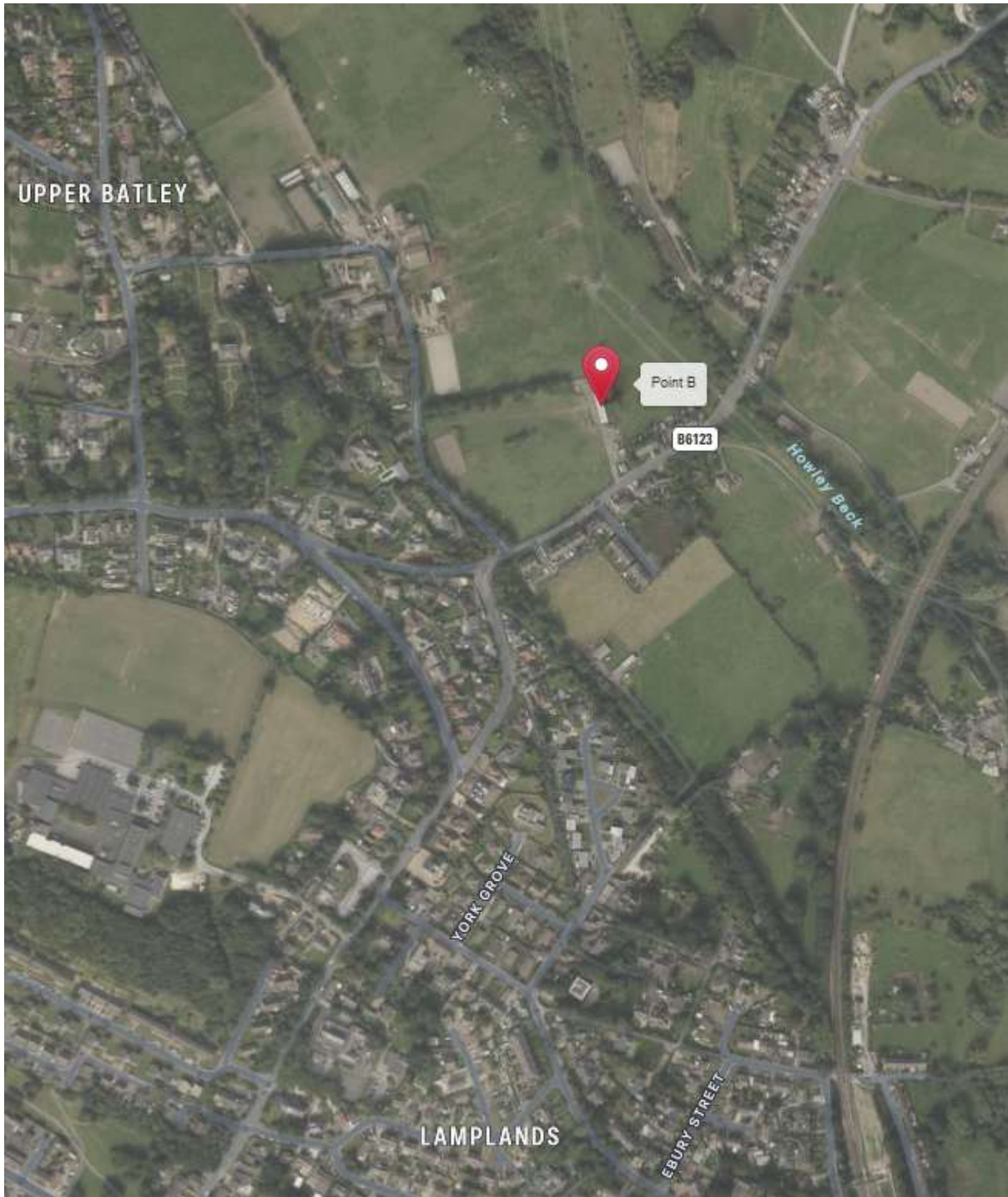
Terzaghi K and R B Peck : 1967 : Soil Mechanics in Engineering Practice, 2nd Edition. John Wiley, London.

Tokimatsu K : 1988 : Penetration testing for dynamic problems. Proceedings of First International Symposium on Penetration Testing.

TPH Criteria Working Group : 1997 : . Total Petroleum Hydrocarbon Group Series. Volume 3. Selection of Representative TPH Fractions Based on Fate and Transport Considerations.

APPENDIX A

SITE LOCATION AND PROPOSED DEVELOPMENT PLANS

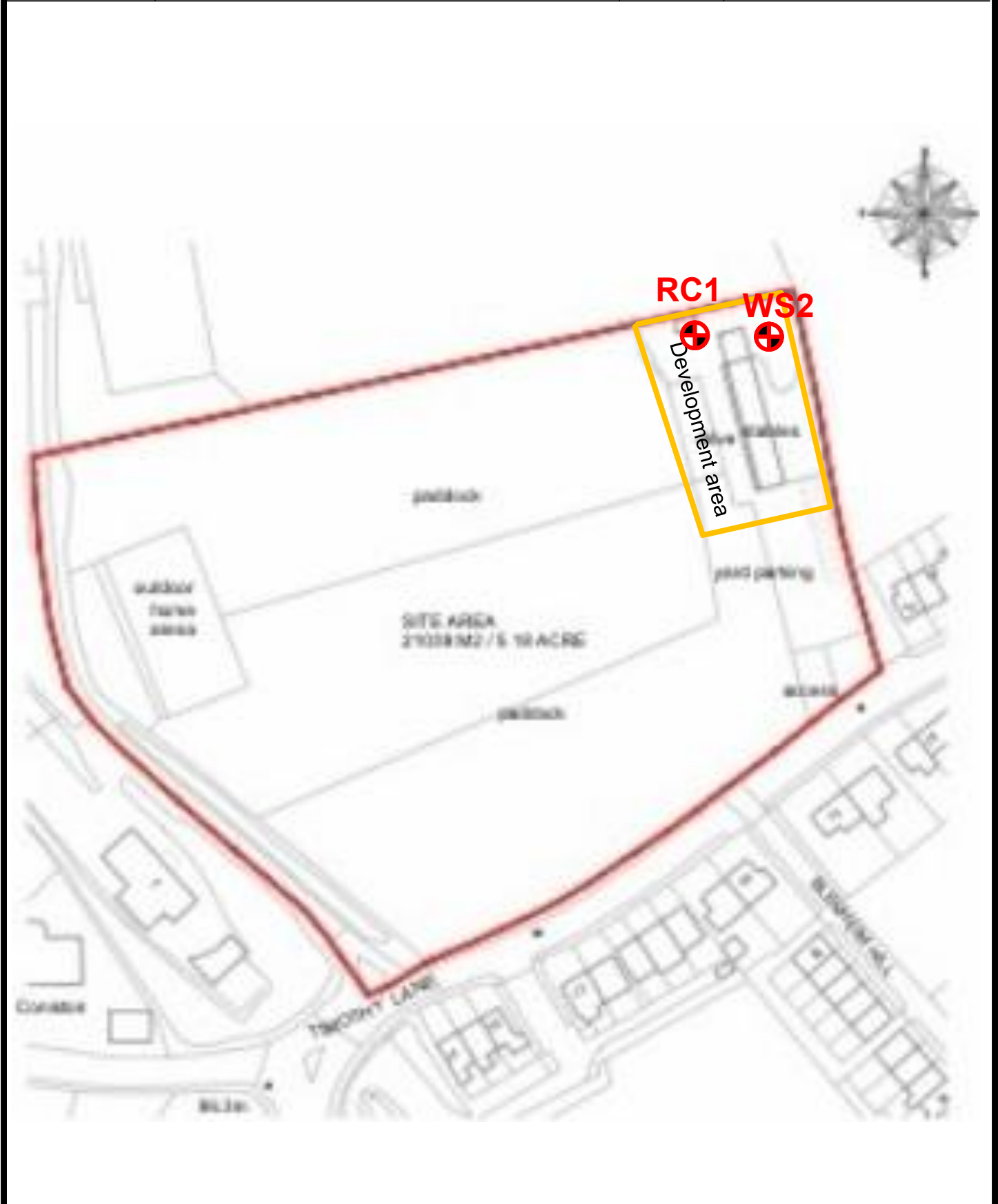


Old Hall Stables, Timothy Lane, Batley, WF19 0BA – SITE LOCATION

APPENDIX B

EXPLORATORY HOLE LOCATIONS

SITE ADDRESS	Old Hall Stable, Timothy Lane, Batley, WF17 0BA	CONTRACT No.	GA1894.25
CLIENT	Mrs D Gaskin	TITLE	Indicative Test Locations



DRAWN BY		DATE		GA Site Investigation Limited 76 Thames Avenue Guisborough North Yorkshire TS14 8JR Tel: 07875 761 729
GMA		May 2025		
SCALE	Not to scale	SHEET	1/1	

APPENDIX C

EXPLORATORY HOLE RECORDS

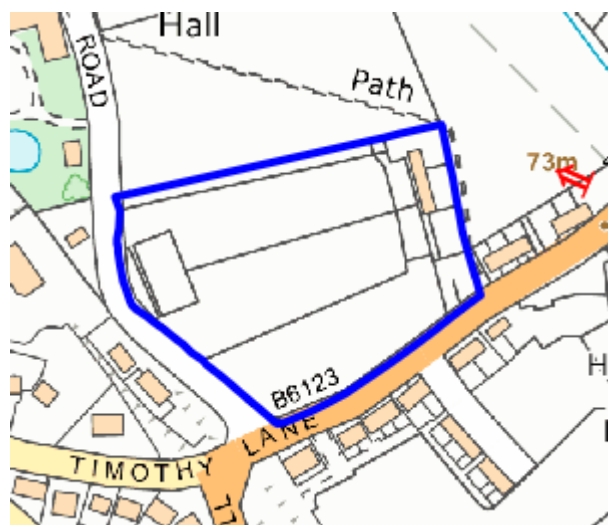


Mining
Remediation
Authority

Granted Permit Boundary

Permit Ref: 29585

Permit Boundary:



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The Mining Remediation Authority is the trading name of the Coal Authority ('TCA') established pursuant to Section 1 of the Coal Industry Act 1994, of 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG. The Coal Authority remains the legal name of the Authority

GA Site Investigation Ltd

76 Thames Avenue
Guisborough
TS14 8AR
Tel: 07875 761 729

Site
Old Hall Stables, Timothy Lane, Batley, WF17 0BA

Borehole Number
RC1

Boring Method Dynamic windowless sampling borehole extended by rotary coring and open hole drilling	Casing Diameter 146mm cased to 19.50m	Ground Level (mOD)	Client D A Gaskin	Job Number GA1894.25
	Location	Dates 09/04/2025-10/04/2025	Project Contractor GA Site Investigation Limited	Sheet 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45					2,2/3,2,2,3 SPT N=10		0.20 0.20 0.60 0.80 1.45	Loose dark brown sand and stone: (MADE GROUND) Extremely weak weathered clay bound fine to coarse tabular MUDSTONE gravel: (Possible MADE GROUND) Weak highly weathered brown with orange mottling MUDSTONE		
2.00-2.21					5, 12/50 SPT 50/60		2.25 0.75 3.00 1.50	Extremely weak highly weathered and fractured MUDSTONE Extremely weak highly weathered clay and silt bound fractured MUDSTONE		
4.50-4.55					50/ SPT 50*/50		4.50 3.50 8.00 1.50 9.50 0.40 9.90	Extremely weak dark grey with black banding clay/silt bound carboniferous SILTSTONE with soft silt/clay infilling Weak grey weathered SILTSTONE VOID/WORKING		

Remarks	Scale (approx)	Logged By
	1:50	SH+GMA
	Figure No. GA1894.25.RC1	

GA Site Investigation Ltd

76 Thames Avenue
Guisborough
TS14 8AR
Tel: 07875 761 729

Site
Old Hall Stables, Timothy Lane, Batley, WF17 0BA

Borehole Number
RC1

Boring Method
Dynamic windowless sampling borehole extended by rotary coring and open hole drilling

Casing Diameter
146mm cased to 19.50m

Ground Level (mOD)

Client
D A Gaskin

Job Number
GA1894.25

Location

Dates
09/04/2025-10/04/2025

Project Contractor
GA Site Investigation Limited

Sheet
2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							0.60	Extremely weak grey clayey/silty SILTSTONE with coal gravel content	XXXXXX	
							10.50	Weak weathered SILTSTONE recovered as silt bound tabular siltstone gravel	XXXXXX	
							11.60	COAL	XXXXXX	
							11.70		XXXXXX	
							0.30	Weak weathered and fractured SILTSTONE/MUDSTONE	XXXXXX	
							12.00	Weak dark grey MUDSTONE	XXXXXX	
							(7.50)		XXXXXX	
							19.50	Complete at 19.50m	XXXXXX	

Remarks

Scale (approx)
1:50

Logged By
SH+GMA

Figure No.
GA1894.25.RC1

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TS14 8AR
Tel: 07875 761 729

Site
Old Hall Stables, Timothy Lane, Batley, WF17 0BA

Borehole Number
RC1

Boring Method Dynamic windowless sampling borehole extended by rotary coring and open hole drilling	Casing Diameter 146mm cased to 19.50m	Ground Level (mOD)	Client D A Gaskin	Job Number GA1894.25
	Location	Dates 09/04/2025-10/04/2025	Project Contractor GA Site Investigation Limited	Sheet 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-0.30					ES1		0.20	Loose dark brown sand and stone: (MADE GROUND)		
0.50-0.60					ES2		0.60	Extremely weak weathered clay bound fine to coarse tabular MUDSTONE gravel: (Possible MADE GROUND)		
0.80-0.90					ES3		0.80	Weak highly weathered brown with orange mottling MUDSTONE		
1.00-1.45	N/A	N/A	N/A		2,2/3,2,2,3 SPT N=10 D1					
1.50-1.60					D2		1.45	Extremely weak highly weathered and fractured MUDSTONE		
2.00-2.21					5, 12/50 SPT 50/60 D3		2.25			
2.50	26	0	0				0.75	Extremely weak highly weathered clay and silt bound fractured MUDSTONE		
3.00	82	15	0				3.00			
4.50					50/ SPT 50*/50		4.50	Extremely weak dark grey with black banding clay/silt bound carboniferous SILTSTONE with soft clay/silt infilling		
4.50-4.55	90	10	0							
6.00							(3.50)	Weak grey weathered SILTSTONE		
7.50	91	26	0							
9.00	65	58	40				8.00	VOID/WORKING		
							(1.50)			
	62	50	36				9.50			
							(0.40)			
							9.90			

Remarks	Scale (approx)	Logged By
	1:50	SH+GMA
	Figure No. GA1894.25.RC1	

GA Site Investigation Ltd

76 Thames Avenue
Guisborough
TS14 8AR
Tel: 07875 761 729

Site
Old Hall Stables, Timothy Lane, Batley, WF17 0BA

Borehole Number
RC1

Boring Method Dynamic windowless sampling borehole extended by rotary coring and open hole drilling	Casing Diameter 146mm cased to 19.50m	Ground Level (mOD)	Client D A Gaskin	Job Number GA1894.25
	Location	Dates 09/04/2025-10/04/2025	Project Contractor GA Site Investigation Limited	Sheet 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50	67	20	0				(0.60)	Extremely weak grey clayey/silty SILTSTONE with coal gravel content	XXXXXX	
							10.50	Weak weathered SILTSTONE recovered as silt bound tabular siltstone gravel	XXXXXX	
12.00	93	78	66				(1.10)		XXXXXX	
							11.60	COAL	XXXXXX	
							11.70 (0.30) 12.00	Weak weathered and fractured SILTSTONE/MUDSTONE	XXXXXX	
13.50	100	90	82				12.00	Weak dark grey MUDSTONE	XXXXXX	
									XXXXXX	
15.00	95	86	71				(7.50)		XXXXXX	
									XXXXXX	
16.50	97	90	82						XXXXXX	
									XXXXXX	
18.00	100	92	85						XXXXXX	
									XXXXXX	
19.50							19.50	Complete at 19.50m	XXXXXX	

Remarks	Scale (approx)	Logged By
	1:50	SH+GMA
	Figure No. GA1894.25.RC1	

GA Site Investigations
 76 Thames Avenue,
 Guisborough
 TS14 8AR


F.A.O.

Final Test Report - 2282470 / 1

Site: Old Hall Stable, Batley
 Job Number: 2282470
 Originating Client: GA Site Investigations
 Originating Reference: GA1894.25/UCS
 Date Sampled: Not Given
 Date Scheduled: 23/04/2025
 Date Testing Started: 25/04/2025
 Date Testing Finished: 29/04/2025

Previous Reports	Amendments	Date Issued

Amendments:

Authorised By: 

Tim Robinson
 Quality Supervisor

Report Issue Date: 30/04/2025

Site: Old Hall Stable, Batley

Job Number: 2282470

Client: GA Site Investigations

Page: 2

UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Hole No.	Depth m	Sample	Rock Type	Specimen Dimensions ²			Bulk Density ² Mg/m ³	Water Content ¹ %	Uniaxial Compression ³				Remarks
				Dia. mm	Length mm	H/D			Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
BH1	8.00	C	Brown/Grey SILT/MUDSTONE	97.9	266.3	2.7	2.33	10.6	as received	0.5008	AC	0.4	
BH1	12.60	C	Grey SILTSTONE	101.1	154.5	*1.5	2.66	2.1	as received	0.5094	AC	31.9	

Notes 1 ISRM p87 test 1, water content at 105 ± 3 °C, specimen as tested for UCS

*Denotes length diameter ratio outside ISRM specification

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

Mode of failure :

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

S - Single shear MS - multiple shear

above notes apply unless annotated otherwise in the remarks

AC - Axial cleavage F - Fragmented

Method of Preparation: International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

Method of Test: International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

Results reported relate only to the samples tested.



Final Test Report - 2282470 / 1

Site: Old Hall Stable, Batley

Job Number: 2282470

Originating Client: GA Site Investigations

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report End

Report Issue Date: 30/04/2025

APPENDIX D

GROUNDWATER AND GROUND GAS MONITORING RESULTS

APPENDIX E

CHEMICAL LABORATORY RESULTS



GA Site Investigation Limited
76 Thames Avenue
Guisborough
TS14 8AR

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 07875761729

t: 01923 225404

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f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 25-019627

Project / Site name:	Old Hall Stables, Batley	Samples received on:	15/04/2025
Your job number:	GA1894	Samples instructed on/ Analysis started on:	15/04/2025
Your order number:		Analysis completed by:	29/04/2025
Report Issue Number:	1	Report issued on:	29/04/2025
Samples Analysed:	2 soil samples		

Signed: 

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-019627
Project / Site name: Old Hall Stables, Batley

Lab Sample Number				516985	516986
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.50	0.80
Date Sampled				09/04/2025	09/04/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	12
Total mass of sample received	kg	0.1	NONE	0.8	0.9

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MUA	MUA
Analysis completed	N/A	N/A	N/A	24/04/2025	24/04/2025

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	170	120
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	42	56
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0211	0.0279
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	21.1	27.9
Sulphide	mg/kg	1	MCERTS	1.1	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.2	0.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80
-----------------------------	-------	-----	-----------	--------	--------

Analytical Report Number: 25-019627
Project / Site name: Old Hall Stables, Batley

Lab Sample Number				516985	516986
Sample Reference				BH1	BH2
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.50	0.80
Date Sampled				09/04/2025	09/04/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.3	4
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	35	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	98	75

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10

TPH (EC10 - EC40) _{EH_CU_1D_TOTAL}	mg/kg	10	MCERTS	< 10	< 10
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VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 25-019627

Project / Site name: Old Hall Stables, Batley

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
516985	BH1	None Supplied	0.5	Brown clay and sand with gravel
516986	BH2	None Supplied	0.8	Brown clay and sand with gravel

Analytical Report Number : 25-019627

Project / Site name: Old Hall Stables, Batley

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 25-019627

Project / Site name: Old Hall Stables, Batley

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Sample Deviation Report



Analytical Report Number : 25-019627

Project / Site name: Old Hall Stables, Batley

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	N/A	S	516985	c	Sulphide in soil	L010-PL	c
BH2	N/A	S	516986	c	Sulphide in soil	L010-PL	c

GA Site Investigation Limited
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Analytical Report Number : 25-019628

Project / Site name:	Old Hall Stables, Batley	Samples received on:	15/04/2025
Your job number:	GA1894	Samples instructed on/ Analysis started on:	15/04/2025
Your order number:		Analysis completed by:	28/04/2025
Report Issue Number:	1	Report issued on:	28/04/2025
Samples Analysed:	10:1 WAC sample		



Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting
air - once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-019628

Project / Site name: Old Hall Stables, Batley

Lab Sample Number	516987			
Sample Reference	BH2			
Sample Number	None Supplied			
Water Matrix	N/A			
Depth (m)	0.30			
Date Sampled	09/04/2025			
Time Taken	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	43.6
Moisture Content	%	0.01	NONE	6.8
Total mass of sample received	kg	0.1	NONE	1.2

General Inorganics

pH (L005B)	pH Units	N/A	MCERTS	7.8
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3.3
Loss on Ignition @ 450°C	%	0.2	MCERTS	7
Acid Neutralisation Capacity	mmol/kg	-9999	NONE	4.9

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.36
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.44
Fluorene	mg/kg	0.05	MCERTS	0.32
Phenanthrene	mg/kg	0.05	MCERTS	3.1
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	5
Pyrene	mg/kg	0.05	MCERTS	4.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.5
Chrysene	mg/kg	0.05	MCERTS	3
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	3.4
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.36
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.6
Coronene	mg/kg	0.05	NONE	0.67

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	31.5
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Petroleum Hydrocarbons

Mineral Oil (EC10 - EC40) <small>EH, CU, ID, AL</small>	mg/kg	10	NONE	100
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VOCs

Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Total BTEX	µg/kg	10	MCERTS	< 10

Analytical Report Number: 25-019628

Project / Site name: Old Hall Stables, Batley

Lab Sample Number	516987
Sample Reference	BH2
Sample Number	None Supplied
Water Matrix	N/A
Depth (m)	0.30
Date Sampled	09/04/2025
Time Taken	None Supplied

Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
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PCBs by GC-MS

PCB Congener	Units	Test Limit of detection	Test Accreditation Status	Result
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001

Total PCBs	mg/kg	0.007	MCERTS	< 0.007
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



4041



Environmental Science

i2 Analytical7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YSTelephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com**Waste Acceptance Criteria Analytical Results**

Report No:	25-019628					
				Client: GASLTD		
Location	Old Hall Stables, Batley					
Lab Reference (Sample Number)	516987			Landfill Waste Acceptance Criteria		
Sampling Date	09/04/2025			Limits		
Sample ID	BH2			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Depth (m)	0.30					
Solid Waste Analysis						
TOC (%)**	3.3			3%	5%	6%
Loss on Ignition (%) **	7.0			--	--	10%
BTEX (µg/kg) **	< 10			6000	--	--
Sum of PCBs (mg/kg) **	< 0.007			1	--	--
Mineral Oil (mg/kg) _{EH, ID, CU, AL}	100			500	--	--
Total PAH (WAC-17) (mg/kg)	31.5			100	--	--
pH (units)**	7.8			--	>6	--
Acid Neutralisation Capacity (mmol / kg)	4.9			--	To be evaluated	To be evaluated
Eluate Analysis						
	10:1			10:1	Limit values for compliance leaching test	
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)					using BS EN 12457-2 at L/S 10 l/kg (mg/kg)	
	mg/l			mg/kg		
Arsenic *	< 0.00100			< 0.0100	0.5	2
Barium *	0.0203			0.203	20	100
Cadmium *	< 0.000100			< 0.00100	0.04	1
Chromium *	0.0011			0.011	0.5	10
Copper *	0.0084			0.084	2	50
Mercury *	< 0.000500			< 0.00500	0.01	0.2
Molybdenum *	< 0.000400			< 0.00400	0.5	10
Nickel *	0.0017			0.017	0.4	10
Lead *	< 0.0010			< 0.010	0.5	10
Antimony *	< 0.0017			< 0.017	0.06	0.7
Selenium *	< 0.0040			< 0.040	0.1	0.5
Zinc *	0.0087			0.087	4	50
Chloride *	5.0			50	800	15000
Fluoride*	0.35			3.5	10	150
Sulphate *	3.0			30	1000	20000
TDS*	58			580	4000	60000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-
DOC	7.51			75.1	500	800
Leach Test Information						
Stone Content (%)	43.6					
Sample Mass (kg)	1.2					
Dry Matter (%)	93					
Moisture (%)	6.8					
Results are expressed on a dry weight basis, after correction for moisture content where applicable. * = UKAS accredited (liquid eluate analysis only)						
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = MCERTS accredited						

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3. This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Where colour coding is used on this report, this is for guidance purposes only. This does not constitute a statement of conformity of pass or fail. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



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Analytical Report Number : 25-019628

Project / Site name: Old Hall Stables, Batley

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
516987	BH2	None Supplied	0.3	Brown loam and sand with vegetation and stones

Analytical Report Number : 25-019628

Project / Site name: Old Hall Stables, Batley

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE

Analytical Report Number : 25-019628
 Project / Site name: Old Hall Stables, Batley

Water matrix abbreviations:
 Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
 Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
 For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
 For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
 Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
 Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
 The result for sum should be interpreted with caution

APPENDIX F
LIMITATIONS

NOTES ON LIMITATIONS

This report has been prepared by GA Site Investigation Limited with all reasonable skill, care and diligence. This report is confidential and has been prepared solely for the benefit of the client as stated at the front of the report in relation to a specific development or scheme; and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from GA Site Investigation Limited; a charge may be levied against such approval. We accept no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, and: this document to any third party with whom an agreement has not been executed.

Any comments given are based on the understanding that the proposed development will be as detailed. GA Site Investigation Ltd warrants the accuracy of this report up to and including the published date. Additional information, improved practice or changes in legislation may necessitate this report having to be reviewed in whole or in part after that date.

This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report. Whilst this report and the opinion made herein are correct to the best of our belief we cannot guarantee the accuracy or completeness of any information provided by third parties.

The opinions and recommendations expressed in this report are based on statute, guidance, and appropriate practice current at the date of its preparation. GA Site Investigation Limited does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and we will be pleased to advise if any report requires revision due to changing circumstances. Following delivery of a report we have no obligation to advise the Client or any other party of such changes or their repercussions.

Phase 1 Reports

The work undertaken to provide the basis of a Phase I report comprised a study of available documented information from a variety of sources, together with (where appropriate) a brief walk over inspection of the site. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Historical maps and aerial photographs provide a “snap shot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

GA Site Investigation Limited

Phase II Intrusive Investigations

The investigation of the site has been carried out to provide sufficient information concerning the potential types of foundations suitable for the proposed development and, where specifically undertaken, the degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made.

The conclusions and recommendations made in this site appraisal report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

Some of the conclusions in this site appraisal report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used.

The evaluation and conclusions do not preclude the existence of variable ground conditions or ground contamination, which could not reasonably have been revealed by the current work. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised 'poor ground' or "hotspots" of contamination where concentrations may be significantly higher than those actually encountered. Hence this report should be used for information purposes only and should not be construed as a comprehensive characterisation of all site conditions.

It should be noted for potentially 'Brownfield' sites that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and man-made effects.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

The objectives of the investigation have been linked to establishing the likely foundations requirements for the development or the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and ground water. The amount of exploratory work and geotechnical soil and or chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to areas unoccupied by the building(s) on the site and by buried services.