

Phase 2 Geo-Environmental Investigation & Assessment

For a site at

Hilltop Cottage, Glossop

Undertaken for

Mrs P Sykes

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Executive Summary

Site Location	The site comprises land at Hilltop Cottage Stables, located on Hilltop Road in Glossop. It is centred on approximate Ordnance Survey National Grid Reference 402692E, 395162N with an indicative postcode of SK13 7QJ.
Development Proposals	The proposed development includes the demolition of a stable and construction of a new bungalow, with external hardstanding for access and parking together with private garden areas.
Ground Conditions	Ground conditions encountered during the intrusive investigation generally comprised made ground to depths of between 0.15m and 0.30mbgl, underlain by strata considered to represent the weathered Marsden Formation to a maximum proven depth of 1.70mbgl.
Site Preparation and Earthworks	Site development will include the demolition of existing structures which should not proceed until an appropriate Asbestos survey of the existing building has been undertaken and any Asbestos Containing Materials (ACM) removed by an appropriately licensed contractor. Historical/existing foundations, ground floor slabs and other buried concrete/brick obstructions removed as part of the clearance work, subject to appropriate screening and crushing, will be suitable for re-use as bulk fill beneath hard cover areas. Taking into consideration the proposed development footprint, it is anticipated that only localised earthworks could be required across the development area. Earthworks should be carried out in accordance with recommendations and guidance provided in BS6031:2009, Code of Practice for Earthworks.
Slopes and Retaining Walls	Any new / modified slopes will need to ensure their stability in both short and long-term situations, taking account of local ground and groundwater conditions. In this respect, slopes with angles of up to about 1 vertical in 3 horizontal (i.e. about 18 degrees) will be stable in both short and long term conditions. Should steeper slopes be necessary, more detailed slope stability analysis is recommended to determine the stability in the long and short term. New retaining walls could be supported by foundations in natural strata where a net allowable bearing pressure of no more than 100kN/m² increasing to 150kN/m² in the solid mudstone could be utilised.
Foundations	The new structure could be supported on traditional spread foundations constructed within the solid Marsden Formation strata, designed on a presumed net allowable bearing pressure of no more than 150kN/m². Foundations would ideally need to be reinforced to accommodate changes in ground conditions across the site. Assessment as to the soil heave or shrinkage potential should then be undertaken in consideration of a medium volume change potential for the clay with foundations designed to appropriate depths where such effects are envisaged. Floor slabs for the new structures could be ground bearing where underlain by natural strata, alternatively floor slabs could be suspended.
New Pavements	New road pavement design should be based on a California Bearing Ratio (CBR) value of no more than 3% in untreated made ground and natural cohesive strata or 5% in unsaturated granular strata.
Soakaways	Soakaways are not considered a feasible drainage option for the site.
Concrete Classification	The typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site are DS-1 and AC-1 respectively.
Ground Contamination	The test results indicate that the localised made ground beneath the site contains mercury concentrations that are elevated above the SL's. In addition, chrysotile asbestos in the form of loose fibres has been detected in one of the samples of shallow made ground. As such, it cannot be wholly discounted that ACM and/or free fibres, could occur within the made ground beneath other areas of the site. However, made ground is noted to be relatively thin across the site with the majority likely removed as part of the initial site strip.

	However, a residual exposure scenario is possible should any remnant made ground remain in proposed garden areas. Therefore, it is recommended that the existing made ground is removed to expose the underlying natural soils prior to placement of a suitable thickness of clean imported sub-soil/topsoil. Though not indicated to be significant or widespread it may be prudent to allow for encountering unrecorded ACM during the groundwork operations. The risk to controlled waters from the site is considered low with no further environmental remediation considered necessary.
Ground Gas	No specific ground gas protection measures are required.
Waste Soils	For preliminary guidance based on the current information, it is likely that made ground, would be classified as 'Non-hazardous' with natural soils classified as 'Inert' for landfill disposal. However, any soils containing ACM or significant asbestos fibres or significantly elevated mercury may also classify as 'Hazardous' following further quantification analysis. It will be the responsibility of the waste producer to undertake further testing and classification of any waste soils for disposal to an appropriately licenced landfill in accordance with current guidelines and Duty of Care requirements.

CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Proposed Development	1
	Objective.....	1
	Scope	1
2.0	SITE LOCATION AND DESCRIPTION	2
	Site Location	2
	Site Description	2
	Topography.....	2
3.0	SUMMARY OF ENVIRONMENTAL AND HISTORICAL SETTING	3
	Geology	3
	Radon.....	3
	Mining and Subsidence	3
	Environmental Setting	3
	Site History	3
	Preliminary Contamination Risk Assessment	3
4.0	SITE INVESTIGATION	5
	Rationale.....	5
	Intrusive Works	5
	Geotechnical and Chemical Testing	5
5.0	GROUND CONDITIONS	6
	General.....	6
	Made Ground	6
	Weathered Marsden Formation.....	6
	Geotechnical Testing.....	6
	Visual/Olfactory Evidence of Contamination	6
	Groundwater	6
	General.....	7
6.0	GEOTECHNICAL APPRAISAL	8
	Site Preparation.....	8
	Modified Slopes and New Retaining Walls.....	8
	Foundations	8
	Floor Slabs	9
	Excavations and Groundwater	9
	External Pavements	9
	Concrete Design	9
	Drainage and Soakaways	10
7.0	GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)	11
	General.....	11
	Human Health	11
	Soil Test Results	12
	Discussion and Conclusions	12
8.0	GROUND GAS RISK ASSESSMENT	14
	Ground Gas Conceptual Model.....	14
9.0	OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS.....	15
	Excavated Soils.....	15

Imported Fill.....	15
Water Supply Pipes.....	15

APPENDICES

Appendix 01 -	Drawings
Appendix 02 -	Exploratory Hole Records
Appendix 03 -	Geotechnical Testing Results
Appendix 04 -	Chemical Analytical Results
Appendix 05 -	Site Specific Assessment Criteria

1.0 INTRODUCTION

Appointment

- 1.1 WML Consulting has been commissioned by Mrs P Sykes, to undertake a Geo-environmental Investigation and Assessment of a site at Hilltop Cottage Stables, Hilltop Road, Glossop, SK13 7QJ.

Proposed Development

- 1.2 The proposed development includes the demolition of the existing stable and construction of a new residential bungalow, with external hardstanding for access and parking together with private garden areas.
- 1.3 The proposed development plan by Creative Architecture, referenced 22-005-1005-A, is presented in Appendix 01.

Objective

- 1.4 The objective of the ground investigation and assessment was to provide geotechnical recommendations for construction design purposes together with a geo-environmental risk assessment in terms of possible ground contamination.
- 1.5 To achieve the objective, the following tasks were undertaken:
- Review the existing desk study report for the site and design a Phase 2 Ground Investigation.
 - Characterise the ground conditions in terms of geology, soil geotechnical parameters and ground contamination from information provided by the ground investigation.
 - Provide recommendations regarding suitable foundations together with any other geotechnical considerations that could affect possible future development.
 - Determine a ground conceptual model for the site so as to undertake a ground contamination Generic Quantitative Risk Assessment (GQRA).

Scope

- 1.6 A Phase 1 Desk Study for the site has been undertaken by WML and is presented in the following report:
- Phase 1 Desk Study and Preliminary Geoenvironmental Assessment, Reference 10391G-WML-00-XX RP-G-0001, dated February 2022.
- 1.7 This report includes the findings of a Phase 2 Ground Investigation designed on conclusions and recommendations within the Phase 1 Desk Study. For ease of reference, the findings of the Desk Study are summarised in the following sections. However, the two reports are not exclusive and should be read in conjunction.
- 1.8 The ground investigation comprised the formation of window sample probeholes undertaken with reference to BS5930:2015 + A1:2020 Code of Practice for Ground Investigation and BS10175:2011 together with A2:2017, "Investigation of Potentially Contaminated Sites - Code of Practice" except where superseded by EN ISO 22475-1 "Geotechnical Investigation and Assessment – Sampling by Drilling and Excavation and Groundwater Measurements".
- 1.9 Geotechnical soil testing was undertaken in general accordance with guidelines provided in BS1377:1990 – Parts 1-9, "Method of Test for Soils for Civil Engineering Purposes". Samples for chemical analysis were obtained and handled generally in accordance with the current guidelines (BS10175: 2011 and A2:2017).

2.0 SITE LOCATION AND DESCRIPTION

Site Location

- 2.1 The site comprises land at Hilltop Cottage Stables, located on Hilltop Road, Glossop. It is centred on approximate Ordnance Survey National Grid Reference 402692E, 395162N with an indicative postcode of SK13 7QJ.

Site Description

- 2.2 At the time of the site investigation in January 2025, the site comprised single-storey stables of timber and blockwork construction surrounded by concrete yards.
- 2.3 The eastern part of the site formed an area of car parking with a gravel surface accessed from Hilltop Road to the east via a sloping asphalt drive.
- 2.4 The northern and western site boundaries are formed by wooden fences with the southern site boundary formed by a mixture of wooden fencing and a low stone wall. The eastern site boundary is formed by a stone retaining wall.
- 2.5 Stands of semi-mature to mature deciduous trees are located on the eastern and southern site boundaries.

Topography

- 2.6 A topographical survey has been used as the background on drawing by Creative Architecture, referenced 22-005-1005-A, in Appendix 01.
- 2.7 The site generally slopes from the north-west at approximately 248.40m, Above Ordnance Datum (AOD) to 245.40m AOD in the south-east and is commensurate with the surrounding area. The eastern site boundary is formed by a stone retaining wall accommodating a reduction in elevation to the neighbouring Hilltop Road between 245m and 244m AOD along its eastern boundary.
- 2.8 The site is accessed via a steep asphalt ramp increasing in elevation from 243.15m Above Ordnance Datum (AOD) on Hilltop Road, to 245.40m AOD at the top of the ramp.

3.0 SUMMARY OF ENVIRONMENTAL AND HISTORICAL SETTING

3.1 The following paragraphs summarise the most relevant findings of the Phase 1 desk study report.

Geology

3.2 The BGS plans show that the eastern part of the site is underlain by the Huddersfield White Rock indicated to comprise sandstone. The western part of the site is underlain by the Marsden Formation, indicated to comprise mudstone and siltstone.

Radon

3.3 The site is not in a Radon Affected Area as defined by the UK Health Security Agency were less than 1% of properties are above the Action Level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.

Mining and Subsidence

3.4 In consideration of the recorded geology, the risk from shallow coal mining activity at the site is considered low and can be discounted.

3.5 BGS records indicate the site is within an area where sporadic underground mining of restricted extent may have occurred. However, the potential for difficult ground conditions is considered unlikely and localised. The risk from non-coal mining activity at the site is therefore considered low.

Environmental Setting

3.6 The bedrock underlying the site is classified as a 'Secondary A Aquifer'. The site is not within an Environment Agency Source Protection Zone (SPZ). No active groundwater abstraction licenses are located within 500m of the site.

3.7 The nearest surface watercourses are located 166m north-east and 179m south-east.

3.8 There are no active or historic landfills located within 500m of the site. Mouselow Quarry, a Part B IPPC Authorised Activity, is located 221m west.

3.9 Other than being located within an area of Greenbelt, there are no designated environmentally sensitive sites within 250m of the subject site.

Site History

3.10 The earliest map dated 1879 indicates the site to comprise undeveloped land in rural / agricultural use with a field boundary crossing the middle of the site and Hilltop Road forming the eastern site boundary.

3.11 Sometime prior to 1974, the field boundary crossing the site had been modified. Although no structures are shown on historical maps, a stable of unknown age is currently located in the western part of the site.

3.12 The area surrounding the site has historically comprised predominantly undeveloped land in rural / agricultural use.

Preliminary Contamination Risk Assessment

3.13 The approach at the Phase 1 Desk Study stage was precautionary until such time as uncertainties in the conceptual model could be verified by appropriate site investigation.

3.14 However, based on the site history and the proposed development scenario, potential pollution linkages were considered unlikely with associated preliminary risks generally being assessed as very low to low.

- 3.15 Such uncertainties related in the main to the potential for ACM and asbestos fibres to be present within shallow soils resulting from unrecorded historical demolition. The level of historical contamination as a result of the site's brownfield status should also be established.
- 3.16 The risks from ground gas associated with landfills was also considered be low.

4.0 SITE INVESTIGATION

Rationale

- 4.1 Intrusive investigations were undertaken primarily to provide geotechnical parameters for structural design purposes but also to verify the preliminary site conceptual model and clarify the anticipated environmental risk.
- 4.2 Window sample probeholes were undertaken to provide information on near surface deposits and to obtain samples for chemical analysis and geotechnical testing. Due to the small diameter of the probing equipment, the depth of penetration achieved is dependent on favourable ground conditions. As such, ground penetration may be restricted in circumstances where the ground is particularly strong or contains relatively large obstructions such as cobbles and/or boulders.
- 4.3 Hand excavated trial pits were also undertaken in order to provide information on near surface deposits and to obtain samples for chemical analysis away from the proposed structure.
- 4.4 The investigation locations were chosen so as not to impact on the presence of known/suspected services beneath the site. Access to parts of the site was restricted due to the presence of the existing disused structure.
- 4.5 Chemical analysis of a general suite of contaminants was undertaken on selected samples of soil. This was to clarify the expected contamination risk.

Intrusive Works

- 4.6 The ground investigations were undertaken by LOT Geotechnics Ltd on 27th January 2025. This comprised the formation of 3no window sample probeholes to a maximum depth of 1.70 metres below ground level (mbgl) and 2no hand excavated trial pits to a maximum depth of 0.30mbgl.
- 4.7 The exploratory hole records are presented in Appendix 02 whilst the exploratory hole locations are shown on drawing 10391G-SK01 in Appendix 01.

Geotechnical and Chemical Testing

- 4.8 In-situ geotechnical testing was undertaken at regular intervals during the formation of the window samples in the form of Standard Penetration Tests (SPT's). The results for this testing are presented on the descriptive logs in Appendix 02.
- 4.9 Geotechnical soils testing has been scheduled on selected samples for the following:
- Natural moisture content.
 - Liquid and Plastic limits.
- 4.10 The results of the geotechnical testing presented in Appendix 03.
- 4.11 Chemical analysis was undertaken on selected soil samples for the following contaminants of concern:
- Total arsenic, boron, cadmium, chromium VI, copper, lead, mercury, nickel, selenium, vanadium, zinc.
 - Total cyanide, phenols, sulphur, sulphate.
 - Speciated USEPA polyaromatic hydrocarbons (PAH).
 - Asbestos screen and identification.
 - 2:1 water/soil sulphate extract, pH.
- 4.12 The results of the chemical analysis are presented in Appendix 04.

5.0 GROUND CONDITIONS

General

- 5.1 Ground conditions encountered during the intrusive investigation generally comprised made ground to depths of between 0.15m and 0.30mbgl, underlain by strata considered to represent the weathered Marsden Formation to a maximum proven depth of 1.70mbgl.

Made Ground

- 5.2 Made ground was encountered within all of the exploratory from ground level to depths of between 0.15m and 0.30mbgl.
- 5.3 Within WS01 and WS02 the made ground comprised a surface horizon of concrete underlain by brown to grey, sandy gravel to depths of between 0.20 and 0.30mbgl. Gravel sized fragments included limestone and sandstone.
- 5.4 Within WS03, HP01 and HP02 the made ground comprised grey, sandy gravel to depths of between 0.15 and 0.25mbgl. Gravel sized fragments included concrete, limestone, sandstone and asphalt.

Weathered Marsden Formation

- 5.5 Strata considered to represent the completely weathered Marsden Formation were encountered within all of the exploratory holes directly underlying the made ground from 0.15m and 0.30mbgl and extending to depth of between 0.90 and 1.70mbgl.
- 5.6 The strata generally comprised highly and completely weathered mudstone recovered as firm, brown mottled, slightly sandy silt/clay and brown slightly clayey, variably gravelly sand. The granular strata may represent the Huddersfield White Rock but for the purposes of this assessment it cannot be confirmed.
- 5.7 Below depths of between 0.90 and 1.20mbgl the weathering grade reduced and the solid strata of the Marsden Formation comprised extremely weak, highly weathered, slightly micaceous mudstone beyond the base of the holes.
- 5.8 SPT 'N' values within the solid strata ranged between 31 and in excess of 50 indicating the equivalent of a dense to very dense state of compaction and an extremely weak rock.

Geotechnical Testing

- 5.9 Geotechnical testing undertaken on selected samples are summarised in the following table:

Test	Weathered Marsden Formation
Natural Moisture Content	34.7 - 35.4%
Liquid Limit	59 - 68%
Plasticity Index	31 - 36% (Modified to 31-36%)
Atterberg Classification	High Plasticity

Visual/Olfactory Evidence of Contamination

- 5.10 No visual and/or olfactory evidence of significant ground contamination was identified within the exploratory holes during the investigation.

Groundwater

- 5.11 No groundwater was encountered during the formation of the exploratory holes.

- 5.12 It should be appreciated that the groundwater observations described above have been undertaken during a very short period of time. Significant variations in the long-term groundwater regime may occur at other times, particularly with prolonged, extreme weather conditions, and that no account can be taken of such in this report.

General

- 5.13 It should also be appreciated that ground conditions may vary between and away from the exploratory hole positions, and that no account can be taken in this report of such variations.

6.0 GEOTECHNICAL APPRAISAL

Site Preparation

- 6.1 Site development will include the demolition of existing structures which should not proceed until an appropriate Asbestos survey of the existing building has been undertaken and any Asbestos Containing Materials (ACM) removed by an appropriately licensed contractor. Similarly, any demolition materials present on site and considered for re-use should be inspected with any ACM removed accordingly prior to crushing.
- 6.2 Historical/existing foundations, ground floor slabs and other buried concrete/brick obstructions associated with current and former structures are envisaged. Where encountered, these will need to be broken out to suitable depths below formation levels where they are to impinge on the proposed buildings. Such materials removed as part of the clearance work, subject to appropriate screening and crushing, will be suitable for re-use as bulk fill beneath hard cover areas.
- 6.3 The locations of all existing services will need to be accurately determine across the full footprint of the development area. It cannot be ruled out that services may need to be diverted to accommodate the proposed new structure.
- 6.4 Taking into consideration the proposed development footprint, it is anticipated that localised earthworks could be required across the development area.
- 6.5 Any excavated natural cohesive soils should not be used beneath structural areas or hard external areas. Such soils would be suitable for direct re-use as subsoil within landscaped areas where required.
- 6.6 Earthworks should be carried out in accordance with recommendations and guidance provided in BS6031:2009, Code of Practice for Earthworks.
- 6.7 It should be noted that the re-use of excavated soils on site should be undertaken in accordance with guidance provided in the CL:AIRE Definition of Waste, Development Industry Code of Practice, Version 2, 2011 so that the activity is removed from Environmental Permitting.

Modified Slopes and New Retaining Walls

- 6.8 Any new / modified slopes will need to ensure their stability in both short and long-term situations, taking account of local ground and groundwater conditions. In this respect, slopes with angles of up to about 1 vertical in 3 horizontal (i.e. about 18 degrees) will be stable in both short and long term conditions. Should steeper slopes be necessary, more detailed slope stability analysis is recommended to determine the stability in the long and short term.
- 6.9 Where changes in elevation need to be accommodated by retaining walls it is anticipated that these could be supported by spread or trench fill foundations in natural strata where a net allowable bearing pressure of no more than 100kN/m² increasing to 150kN/m² in the solid mudstone could be utilised.
- 6.10 Suitable crest, toe and slope drainage will need to be incorporated into any new slopes and/or retaining structures constructed at the site.
- 6.11 Existing retaining walls to be retained should be subject to a dilapidation survey and repaired where necessary.

Foundations

- 6.12 Made ground and any soft / loose natural deposits should be considered unsuitable for the direct support of structural loads as they will be weak and compressible, leading to possibly unacceptable total and differential settlements.

- 6.13 The new structure could be supported on traditional spread foundations constructed within the solid Marsden Formation strata, anticipated at a depths of between 0.90 and 1.20mbgl. In order for total and differential settlements to be kept to tolerable limits, such foundations would need to be designed on a presumed net allowable bearing pressure of no more than 150kN/m².
- 6.14 Foundations would ideally need to be reinforced to accommodate changes in ground conditions across the site and formation levels would need to be thoroughly inspected, with any unsuitable very soft/soft material being removed and replaced with concrete.
- 6.15 Foundation construction will also need to take account any remaining and/or new services, where they are in close proximity, may need to be taken down to beneath the lowest level of the service trench so that their structural integrity is maintained.
- 6.16 If / where foundations are located in cohesive strata further consideration will also need to be given to be constructed in clay soils at shallow depth and close proximity to existing and/or removed trees. Identification of the tree species should be undertaken to determine its water demand as provided in Appendix 4.2-A of NHBC Standards 2010, Foundations, Chapter 4.2, Building Near Trees. Assessment as to the soil heave or shrinkage potential should then be undertaken in consideration of a medium volume change potential for the clay with foundations designed to appropriate depths where such effects are envisaged.

Floor Slabs

- 6.17 Floor slabs for the new structures could be ground bearing where underlain by natural strata, alternatively floor slabs could be suspended.

Excavations and Groundwater

- 6.18 Excavations at the site will be feasible using conventional hydraulic plant. All excavations at the site and specifically requiring man-entry, will need adequate lateral support, or will need to be battering back to a safe angle to ensure their stability.
- 6.19 Conventional 'sump and pump' dewatering measures are likely to be adequate to keep excavations dry.

External Pavements

- 6.20 In consideration of the near surface ground conditions, it is recommended that new road pavement design should be based on a California Bearing Ratio (CBR) value of no more than 3% in untreated made ground and natural cohesive strata or 5% in unsaturated granular strata.
- 6.21 The CBR will need to be reviewed and confirmed by site inspection and possibly suitable in-situ testing at formation levels following any earthwork operations and prior to pavement construction.
- 6.22 In any event, all formations should be proof-rolled with any soft, loose or otherwise unsuitable material being removed and replaced with compacted granular fill.

Concrete Design

- 6.23 Design/mix of buried concrete should be undertaken in accordance with the "Aggressive Chemical Environment for Concrete" (ACEC) classification, of BRE Special Digest 1:2005 (Concrete in Aggressive Ground). With reference to the site history, it is deemed appropriate to classify the site as "Brownfield", with respect to BRE Special Digest, assuming mobile groundwater conditions.
- 6.24 Values of 2:1 water/soil extract for sulphate ranged between less than 10 and 90mg/l. Values of pH range from 7.43 to 11.29 indicating generally alkaline conditions.
- 6.25 On the basis of these results, the typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site are DS-1 and AC-1 respectively.

Drainage and Soakaways

- 6.26 In consideration of the predominantly impermeable strata at very shallow depths soakaways are not considered a feasible drainage option for the site.

7.0 GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

General

- 7.1 A review of the readily available information had concluded that the potential for exposure to ground contamination is unlikely to low leading to a low preliminary risk.
- 7.2 However, it has been considered prudent to undertake chemical analysis of the sub-surface soils to confirm the low human health risk status of the site.

Human Health

- 7.3 Selected samples have been analysed for a general suite of contaminants of concern and compared against Screening Levels (SL's) for human health to determine the significance of the measured concentrations in relation to the site conceptual model. Thus, a Generic Quantitative Risk Assessment has been undertaken in line with guidelines provided in Land Contamination Risk Management, updated July 2023.
- 7.4 The criteria for a limited number of contaminants have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.
- 7.5 Within the document, Category 4 Screening Levels (C4SL's) are described as being more pragmatic than previous screening criteria and represent concentrations in soil that present an 'acceptable' level of risk within the context of Part 2A.
- 7.6 The National Planning Policy Framework states that 'after development, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990'. Therefore, by inference, the C4SL's are appropriate for use in the planning context.
- 7.7 Although the SP1010 document states that C4SL only apply for a 'sandy loam soil with 6% soil organic matter', it is generally accepted that assessment criteria for metals are not sensitive to changes in soil organic content (SOM). The C4SL's have therefore been adopted as assessment criteria in this report for the listed metals within the SP1010.
- 7.8 Subsequent to SP1010, LQM/CIEH have published a document entitled 'The LQM/CIEH S4ULs for Human Health Risk Assessment' 2015. In brief, the document provides updated assessment criteria which have been derived in accordance with UK legislation, national as well as EA policy and using a modified version of the CLEA software and available guidance. The new screening criteria, or Suitable 4 Use Levels (S4ULs), are intended to provide a complete and updated replacement to the previous LQM/CIEH GAC of 2009. As such they are considered appropriate for use in this assessment for other contaminants not covered by C4SL's and/or for organic contaminants assuming a worst-case Soil Organic Matter (SOM) of 1% as an initial conservative assessment.
- 7.9 For each contaminant, S4UL's and C4SL's have been calculated for six land use scenarios, namely:
- Residential with homegrown produce.
 - Residential without homegrown produce.
 - Allotments.
 - Commercial.
 - Public Open Space, near residential housing.
 - Public Parks, remote from residential housing.
- 7.10 In light of the proposed development, the SL's for a "Residential with homegrown produce" end-use are considered appropriate for the assessment at this stage. A table of relevant SL's are provided in Appendix 05.

Soil Test Results

- 7.11 No soil samples were analysed for a suite of Contaminants of Concern (CoC). The majority of the concentrations were measured below the SL's for a "Residential with home-grown produce" end-use with the following exceptions.

Contaminant	Number of Exceedances	SL (mg/kg)	Recorded Concentrations (mg/kg)	Samples
Mercury	5	1.2	1.5 – 3.45	WS01 – 0.20m WS02 – 0.15m WS03 – 0.10m HP01 – 0.10m HP02 – 0.10m

- 7.12 Asbestos was detected within one of the samples analysed (WS03 – 0.10m) in the form of loose fibres of chrysotile. Subsequent quantification analysis recorded a concentration of <0.001% weight by weight.

Discussion and Conclusions

Human Health

- 7.13 The test results indicate that the localised made ground beneath the site contains mercury concentrations that are elevated above the SL's. The source of the elevated mercury is not known, although given the sites rural setting it may be as a result of the historic use of fertiliser and/or wood preservative/fungicide.
- 7.14 In addition, chrysotile asbestos in the form of loose fibres has been detected in one of the samples of shallow made ground. As such, it cannot be wholly discounted that ACM and/or free fibres, could occur within the made ground beneath other areas of the site.
- 7.15 However, made ground is noted to be relatively thin across the site with the majority likely removed as part of the initial site strip.
- 7.16 Following site development, where surfaced with buildings and hardstanding, there will be no mechanism for a direct contact pollution linkage with any unidentified contaminants or for any asbestos fibres to become airborne. Therefore, the risk to end-users and to the general public will be negligible in such areas.
- 7.17 However, an exposure scenario is possible should existing made ground remain in proposed garden areas. Therefore, it is recommended that the existing made ground is removed to expose the underlying natural soils prior to placement of a suitable thickness of clean imported sub-soil/topsoil.
- 7.18 Though not indicated to be significant or widespread it may be prudent to allow for encountering unrecorded ACM during the groundwork operations.
- 7.19 Notwithstanding the above, as there is a low possibility of asbestos fibres becoming airborne during site enabling and ground works, there is a perceived risk to construction workers and the general public of exposure, particularly during dry weather conditions.
- 7.20 Therefore, groundworks within made ground soils would need to be undertaken under a watching brief by an asbestos specialist with any ACM so encountered being segregated for removal to landfill. Such operations may need to incorporate specific control measures such as dust suppression, perimeter air monitoring and appropriate Personal Protective Equipment (PPE).

Controlled Waters

- 7.21 Exceedances of mercury have been recorded within the shallow made ground soils beneath the site. However, the made ground was very thin and the majority would be removed from the development area during the site strip.
- 7.22 The bedrock underlying the site is classified as a 'Secondary A Aquifer' and not of significant utilisation. The upper horizons are also generally weathered to a cohesive soil which will limit lateral and vertical migration of any undetected mobile contamination towards the underlying solid strata.
- 7.23 The site is not within an Environment Agency Source Protection Zone (SPZ). No active groundwater abstraction licenses are located within 500m of the site and the nearest surface watercourses are located 166m north-east and 179m south-east.
- 7.24 Following development, much of the site will include new buildings and hardstanding with a contained drainage system. This will limit downward movement of surface water and therefore the potential for leachate generation will be reduced, thus reducing the potential for mobilisation of contaminants.
- 7.25 In addition, within garden areas the thin surface horizon of made ground will need to be removed to expose the underlying natural soils prior to placement of a suitable thickness of clean imported sub-soil/topsoil. This will remove the potential for mobilisation of any contaminants from these areas.
- 7.26 Therefore, the risk to controlled waters from the site is considered low with no further environmental remediation considered necessary beyond the clean capping required to address the risk to human health within garden areas.

8.0 GROUND GAS RISK ASSESSMENT

Ground Gas Conceptual Model

- 8.1 The site is not in Radon Affected Area, defined by the UK Health Security Agency as less than 1% of properties are above the Action Level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.
- 8.2 There are no active or historic landfills located within 500m of the site.
- 8.3 The presence of ground gas resulting from shallow unrecorded mine workings can be discounted.
- 8.4 No appreciable thickness of made ground or other soil with significant organic content have been encountered beneath the site.
- 8.5 In consideration of the above, the risk to the development from ground gas is considered low with no specific remedial measures required.
- 8.6 This should be confirmed with the local authority Environmental Health / Building Control Officer prior to any building design being finalised.

9.0 OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS

Excavated Soils

- 9.1 Excavation works undertaken during the development are likely to produce waste soils for which appropriate waste management will be required. In line with current sustainability principals, any waste soils should firstly be considered for re-use where possible by incorporation into the development.
- 9.2 However, due to the extent of the proposed redevelopment, it is envisaged that such excavated soil may need to be removed from site under appropriate duty of care.
- 9.3 It should be noted that the chemical analysis results for disposal classification are assessed against different assessment criteria to those relating to contamination risk assessment. Soils that are deemed suitable for use in terms of risk to human health and the environment may not necessary be un-contaminated and could be classified as Non-Hazardous or even Hazardous for disposal purposes.
- 9.4 However, for preliminary guidance based on the current information, it is likely that made ground, would be classified as 'Non-hazardous' with natural soils classified as 'Inert' for landfill disposal.
- 9.5 However, any soils containing ACM or significant asbestos fibres or significantly elevated mercury may also classify as 'Hazardous' following further quantification analysis.
- 9.6 In addition, for Inert and Hazardous waste disposal, allowance will need to be made for adequate Waste Acceptance Criteria (WAC) testing with appropriate consideration of the additional time and cost associated with this.
- 9.7 It will be the responsibility of the waste producer to undertake further testing and classification of any waste soils for disposal to an appropriately licenced landfill in accordance with current guidelines and Duty of Care requirements.

Imported Fill

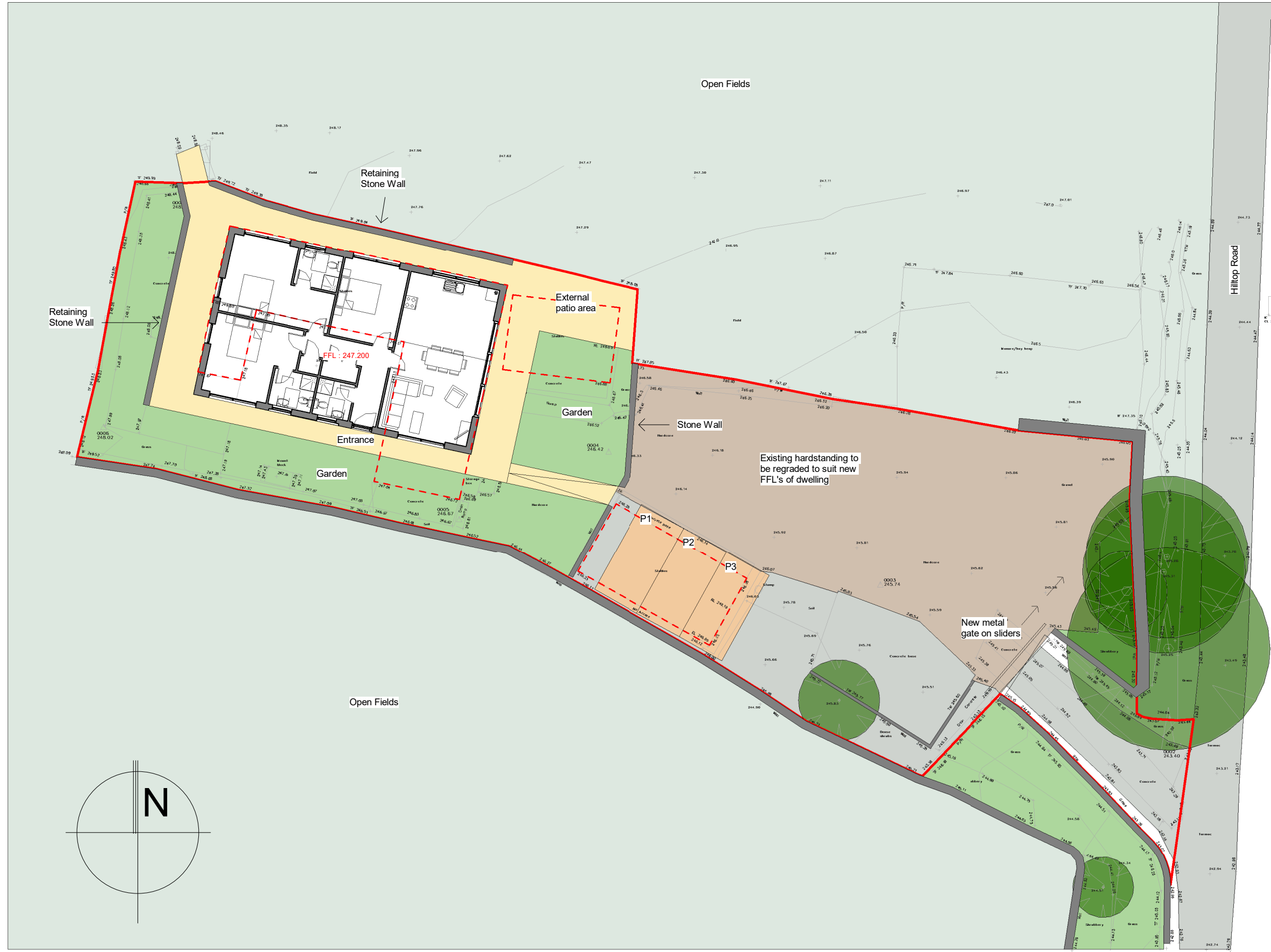
- 9.8 Imported fill, such as granular sub base to highways etc. will be subject to specific quality requirements and should be accompanied by appropriate certification to confirm its suitability. Allowance should also be made for testing imported fill materials prior to placement to ensure suitability.

Water Supply Pipes

- 9.9 The relevant water supply provider will need to be consulted with regards the selection of suitable water supply pipe materials for the development, should these be required. In light of the ground conditions encountered, the requirement for specific materials and measures to protect the water supply from ground contamination are not anticipated.

APPENDIX 01

Drawings



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CHECK ALL DIMENSIONS ON SITE

DRAWING TO BE READ IN CONJUNCTION WITH THE HEALTH AND SAFETY PLAN AND ALL RELEVANT RISK ASSESSMENTS

A 21.03.22 AH Title block amended CA

REV.	DATE	DRN.	CHKD.
------	------	------	-------

PROJECT

Hill Top Cottage Stables

CLIENT

Mrs P Sykes

DRAWING

Proposed Site Plan

SCALE	SHEET SIZE	DRAWN	CHECKED	DATE
1 : 200	@ A3	AH	CA	02.03.22

CREATIVE ARCHITECTURE

A: 1 The Long Stables, Rochdale Rd, Denshaw, OL3 5UE

T: 07788 200 255

E: adam@creativearchitectureltd.co.uk

W: www.creativearchitectureltd.co.uk

JOB No	DRAWING No	REVISION
22-005	1005	A
STATUS		
Planning		

Proposed Site Plan

1 : 200



CREATIVE ARCHITECTURE LIMITED

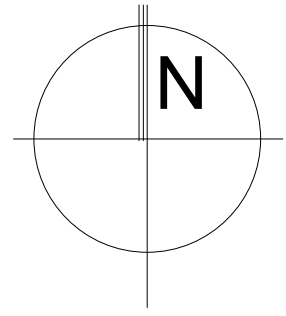
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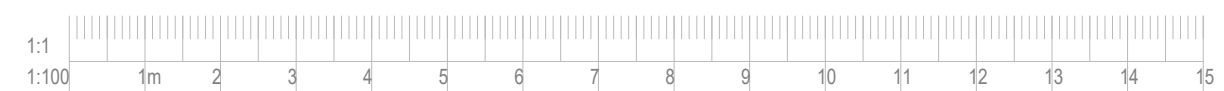
CHECK ALL DIMENSIONS ON SITE

DRAWING TO BE READ IN CONJUNCTION WITH THE HEALTH AND SAFETY PLAN AND ALL RELEVANT RISK ASSESSMENTS



Topographical Survey

1 : 200



A 21.03.22 AH Title block amended CA

REV. DATE DRN. CHKD.

PROJECT
Hill Top Cottage Stables

CLIENT
Mrs P Sykes

DRAWING
Topographical Survey

SCALE
1 : 200

SHEET SIZE
@ A3

DRAWN
AH

CHECKED
CA

DATE
01.03.22

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JOB No
22-005

DRAWING No
1001

REVISION
A

STATUS
Planning

APPENDIX 02

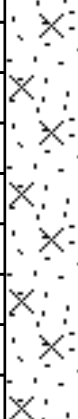
Exploratory Hole Records

WML CONSULTING			Project Title: Hilltop Cottage				HP01				
			Project Number: 10391G		Client: Mrs P Sykes					Sheet 1 Of 1	
			GL (mAOD):		N Coord: 0		E Coord: 0				
Date: 27/01/2025			Method: Hand Dug		Driller: LOT Geotechnics Ltd		Logged By: TPB				
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe			
0.10	E				0.15	Turf over grey, sandy, subangular, fine to coarse gravel of limestone. (MADE GROUND)					
					0.30	Brown mottled, slightly clayey, gravelly SAND. Gravel subangular, fine to coarse, of mudstone. (WEATHERED MARSDEN FORMATION) End Of Borehole At 0.30 m					
					1.00						
					2.00						
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa ▽ - Groundwater Strike ▼ - Groundwater Level 			REMARKS No Groundwater Encountered Scale: 1:15			Water Strikes					
						Date	Strike	Level	Minutes	Casing	Sealed
						Daily Log Of Depths		Chiselling			
						Date	Casing	Water	From	To	Hours

WML CONSULTING			Project Title: Hilltop Cottage				HP02																																														
			Project Number: 10391G		Client: Mrs P Sykes					Sheet 1 Of 1																																											
			GL (mAOD):		N Coord: 0		E Coord: 0																																														
Date: 27/01/2025			Method: Hand Dug		Driller: LOT Geotechnics Ltd		Logged By: TPB																																														
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe																																													
0.10	E				0.15	Turf over dark grey, sandy, subangular, fine to coarse gravel, including sandstone and limestone. (MADE GROUND)																																															
					0.30	Firm, brown mottled, slightly sandy SILT/CLAY. (WEATHERED MARSDEN FORMATION)																																															
						End Of Borehole At 0.30 m																																															
					1.00																																																
					2.00																																																
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa ▽ - Groundwater Strike ▼ - Groundwater Level 			REMARKS No Groundwater Encountered Scale: 1:15			Water Strikes <table><tr><th>Date</th><th>Strike</th><th>Level</th><th>Minutes</th><th>Casing</th><th>Sealed</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Daily Log Of Depths <table><tr><th>Date</th><th>Casing</th><th>Water</th><th>From</th><th>To</th><th>Hours</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>						Date	Strike	Level	Minutes	Casing	Sealed																			Date	Casing	Water	From	To	Hours												
						Date	Strike	Level	Minutes	Casing	Sealed																																										
						Date	Casing	Water	From	To	Hours																																										

Printed By GeoLogs (www.GeoLogs.com)

			Project Title: Hilltop Cottage				WS02																																																													
			Project Number: 10391G		Client: Mrs P Sykes					Sheet 1 Of 1																																																										
			GL (mAOD):		N Coord: 0		E Coord: 0																																																													
Date: 27/01/2025			Method: Window Sample		Driller: LOT Geotechnics Ltd		Logged By: TPB																																																													
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe																																																												
0.15	E	pp 50/255mm			0.10	Concrete. (MADE GROUND)																																																														
					0.20	Grey, sandy, subangular, fine to coarse gravel of limestone. (MADE GROUND)																																																														
						Firm, brown mottled, slightly sandy SILT/CLAY. (WEATHERED MARSDEN FORMATION)																																																														
																																																																				
																																																																				
0.80	D																																																																			
																																																																				
																																																																				
1.00	J				0.90																																																															
					1.00	Extremely weak, highly weathered, slightly micaceous MUDSTONE. (MARSDEN FORMATION)																																																														
					End Of Borehole At 1.00 m																																																															
					2.00																																																															
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level 			REMARKS No Groundwater Encountered Hole refused at 1.00mbgl. Scale: 1:15			Water Strikes <table border="1"> <tr> <th>Date</th> <th>Strike</th> <th>Level</th> <th>Minutes</th> <th>Casing</th> <th>Sealed</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> <table border="1"> <tr> <th colspan="3">Daily Log Of Depths</th> <th colspan="3">Chiselling</th> </tr> <tr> <th>Date</th> <th>Casing</th> <th>Water</th> <th>From</th> <th>To</th> <th>Hours</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>			Date	Strike	Level	Minutes	Casing	Sealed																									Daily Log Of Depths			Chiselling			Date	Casing	Water	From	To	Hours																		
Date	Strike	Level	Minutes	Casing	Sealed																																																															
Daily Log Of Depths			Chiselling																																																																	
Date	Casing	Water	From	To	Hours																																																															

WML CONSULTING			Project Title: Hilltop Cottage				WS03			
			Project Number: 10391G		Client: Mrs P Sykes					
			GL (mAOD):		N Coord: 0		E Coord: 0			
Date: 27/01/2025			Method: Window Sample		Driller: LOT Geotechnics Ltd		Logged By: TPB			
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe		
0.10	E	N=31 (5,6,9,11)			0.25	Grey, sandy, subangular, fine to coarse gravel including concrete, limestone and asphalt. (MADE GROUND)				
					1.00	Brown mottled, slightly clayey, slightly gravelly SAND. Gravel subangular, fine to coarse, of mudstone. (WEATHERED MARSDEN FORMATION)				
0.80	J				1.10	Extremely weak, highly weathered, slightly micaceous MUDSTONE. (MARSDEN FORMATION)				
					1.70	End Of Borehole At 1.70 m				
					2.00					
		pp 50/190mm								
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
 - Groundwater Strike
 - Groundwater Level



REMARKS

No Groundwater Encountered
Hole refused at 1.70mbgl.

Scale: 1:15

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water	From	To	Hours

Chiselling

From	To	Hours

APPENDIX 03

Geotechnical Testing Results



LABORATORY REPORT



Contract Number: PSL25/0706

Report Date: 31 January 2025
Client's Reference: 10391G
Client Name: WML Consulting
Third Floor South
Metropolitan House
Station Road
Cheadle Hulme
SK8 7AZ

For the attention of: Tom Booth

Contract Title: Hilltop Cottage

Date Received: 30/01/2025
Date Commenced: 30/01/2025
Date Completed: 31/01/2025

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Managing Director)

R Berriman
(Associate Director)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

D Nicholson
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road,
Hexthorpe,
Doncaster,
DN4 0AR

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

Hilltop Cottage

Contract No:

PSL25/0706

Client Ref:

10391G

SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377 - Part 2 : 2022 in accordance with BS EN ISO 17892 (as below)

[illegible]

Water Content - BS 1377 - Part 2 : 2022 : Clause 4 in accordance with BS EN ISO 17892 - 1 : 2014 + A1 : 2022

Linear Shrinkage - BS 1377 - Part 2 : 2022 : Clause 7

Particle Density (Gas Jar method) - BS 1377 - Part 2 : 2022 : Clause 9

Liquid, Plastic Limit & Plasticity Index - BS 1377 - Part 2 : 2022 : Clause 5 & 6 in accordance with BS EN ISO 17892 - 12 : 2018 + A2 : 2022

SYMBOLS : NP = Non Plastic



Hilltop Cottage

Contract No:

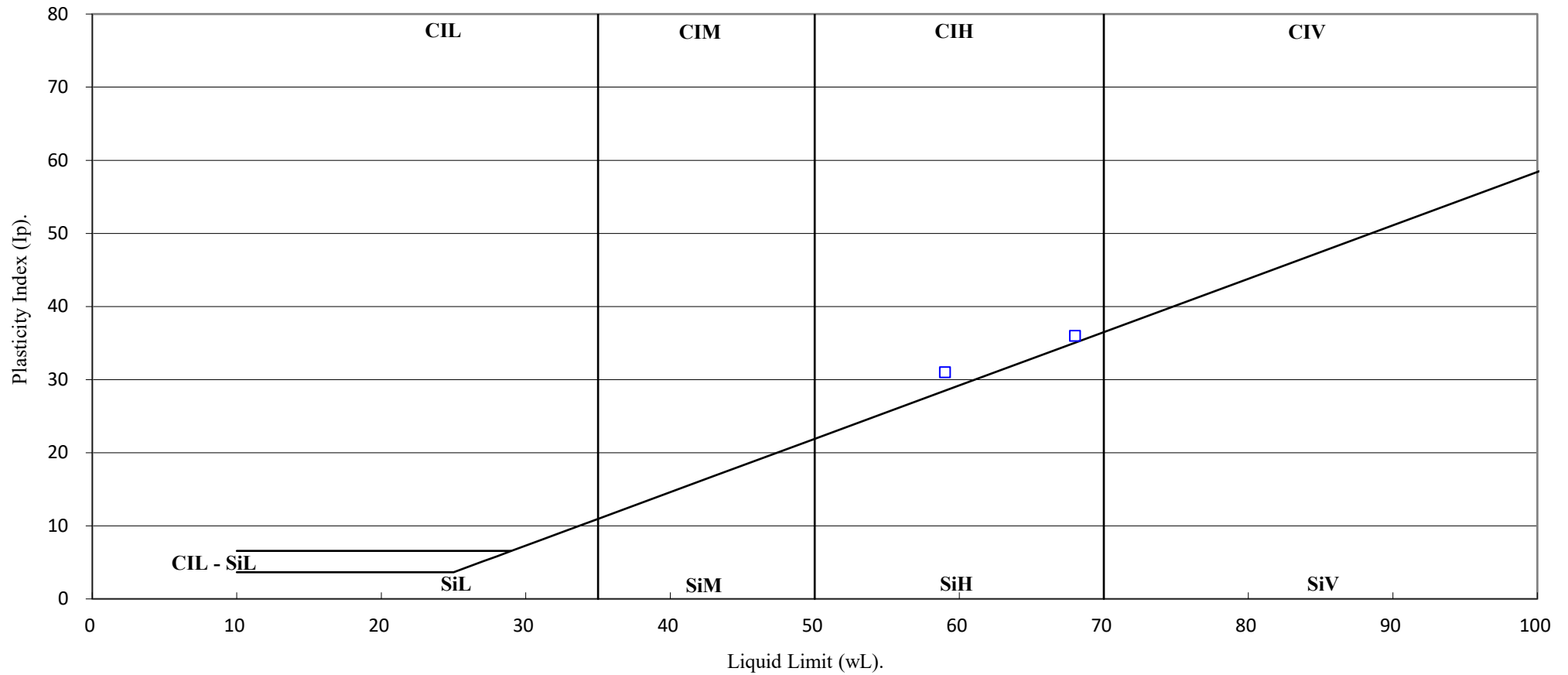
PSL25/0706

Client Ref:

10391G

PLASTICITY CHART

BS EN ISO 14688-2:2017 Clause 4.4



4043



Hilltop Cottage

Contract No:

PSL25/0706

Client Ref:

10391G

APPENDIX 04

Chemical Analytical Results

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 25/00699
Issue Number: 1

Date: 04 February, 2025

Client: WML Consulting Ltd
Third Floor South
Metropolitan House
Station Rd
Cheadle Hulme
Cheshire
SK8 7AZ

Project Manager: Tom Booth
Project Name: Hilltop Cottage
Project Ref: 10391G
Order No: 10391G
Date Samples Received: 28/01/25
Date Instructions Received: 29/01/25
Date Analysis Completed: 04/02/25

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 25/00699

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/1	25/00699/2	25/00699/3	25/00699/4	25/00699/5	25/00699/6	25/00699/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS02	WS02	WS03	WS03	HP01			
Depth to Top	0.20	1.10	0.15	1.00	0.10	0.80	0.10			
Depth To Bottom										
Date Sampled	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4A	3	6A	6A	6A	6A	4AE			
% Stones >10mm _A	11.2	<0.1	16.1	<0.1	<0.1	<0.1	22.3	% w/w	0.1	A-T-044
pH _D ^{M#}	11.29	8.31	9.34	7.88	8.04	7.43	7.92	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.04	0.06	0.09	0.02	<0.01	0.01	<0.01	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	1100	-	930	-	620	-	430	mg/kg	200	A-T-028s
Sulphur (total) _D	728	139	322	133	397	610	296	mg/kg	50	A-T-024s
Cyanide (total) _A ^{M#}	<1	-	<1	-	<1	-	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	-	<0.2	-	<0.2	-	<0.2	mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	10.2	-	1.99	-	11.6	-	7.53	% w/w	0.14	A-T-032s
Arsenic _D ^{M#}	<1	-	3	-	4	-	2	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	-	<1.0	-	<1.0	-	<1.0	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.8	-	0.9	-	1.5	-	0.5	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	15	-	17	-	11	-	12	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	-	<1	-	<1	-	<1	mg/kg	1	A-T-040s
Lead _D ^{M#}	28	-	33	-	105	-	23	mg/kg	1	A-T-024s
Mercury _D	2.88	-	1.68	-	3.45	-	2.95	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	16	-	15	-	9	-	9	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	-	<1	-	<1	-	<1	mg/kg	1	A-T-024s
Vanadium _D ^{M#}	27	-	22	-	11	-	11	mg/kg	1	A-T-024s
Zinc _D ^{M#}	41	-	57	-	116	-	40	mg/kg	1	A-T-024s

Envirolab Job Number: 25/00699

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/1	25/00699/2	25/00699/3	25/00699/4	25/00699/5	25/00699/6	25/00699/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS02	WS02	WS03	WS03	HP01			
Depth to Top	0.20	1.10	0.15	1.00	0.10	0.80	0.10			
Depth To Bottom										
Date Sampled	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4A	3	6A	6A	6A	6A	4AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD	-	NAD	-	Chrysotile	-	NAD			A-T-045
Asbestos Matrix (visual) _D	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-	Loose Fibres	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	-	N/A	-	N/A	-	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	-	-	-	-	<0.001	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 25/00699

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/1	25/00699/2	25/00699/3	25/00699/4	25/00699/5	25/00699/6	25/00699/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS02	WS02	WS03	WS03	HP01			
Depth to Top	0.20	1.10	0.15	1.00	0.10	0.80	0.10			
Depth To Bottom										
Date Sampled	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25	27-Jan-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	4A	3	6A	6A	6A	6A	4AE			
PAH-16MS										
Acenaphthene _A ^{M#}	<0.10	-	<0.01	-	<0.10	-	<0.10	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.10	-	<0.01	-	<0.10	-	<0.10	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.20	-	<0.02	-	<0.20	-	<0.20	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.40	-	<0.04	-	<0.40	-	<0.40	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.40	-	<0.04	-	0.70	-	<0.40	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.50	-	<0.05	-	0.62	-	<0.50	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.96	-	<0.05	-	<0.50	-	<0.50	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.70	-	<0.07	-	<0.70	-	<0.70	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.60	-	<0.06	-	<0.60	-	<0.60	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.40	-	<0.04	-	<0.40	-	<0.40	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.80	-	<0.08	-	<0.80	-	<0.80	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.10	-	<0.01	-	<0.10	-	<0.10	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.48	-	<0.03	-	0.56	-	<0.30	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.30	-	<0.03	-	<0.30	-	<0.30	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.30	-	<0.03	-	<0.30	-	<0.30	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.70	-	<0.07	-	<0.70	-	<0.70	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	1.44	-	<0.08	-	1.88	-	<0.80	mg/kg	0.01	A-T-019s

Envirolab Job Number: 25/00699/8

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/8									
Client Sample No										
Client Sample ID	HP02									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	27-Jan-25									
Sample Type	SOIL									
Sample Matrix Code	4AE									
								Units	Limit of Detection	Method ref
% Stones >10mm _A	23.0							% w/w	0.1	A-T-044
pH _D ^{M#}	8.64							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01							g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	400							mg/kg	200	A-T-028s
Sulphur (total) _D	427							mg/kg	50	A-T-024s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	13.2							% w/w	0.14	A-T-032s
Arsenic _D ^{M#}	<1							mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	13							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Lead _D ^{M#}	35							mg/kg	1	A-T-024s
Mercury _D	1.50							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	15							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Vanadium _D ^{M#}	22							mg/kg	1	A-T-024s
Zinc _D ^{M#}	53							mg/kg	1	A-T-024s

Envirolab Job Number: 25/00699/8

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	HP02									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	27-Jan-25									
Sample Type	SOIL									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD									A-T-045
Asbestos Matrix (visual) _D	-									A-T-045
Asbestos Matrix (microscope) _D	-									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 25/00699/8

Client Project Name: Hilltop Cottage

Client Project Ref: 10391G

Lab Sample ID	25/00699/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	HP02									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	27-Jan-25									
Sample Type	SOIL									
Sample Matrix Code	4AE									
PAH-16MS										
Acenaphthene _A ^{M#}	0.11							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.10							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.45							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.40							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	1.60							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.70							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	1.17							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.70							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.82							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.40							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	3.09							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.11							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	1.14							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.30							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	1.71							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	2.58							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	16.9							mg/kg	0.01	A-T-019s

Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript “#”	Accredited to ISO 17025
Superscript “M”	Accredited to MCertS
Superscript “U”	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript “A”	Analysis performed on as-received Sample
Subscript “D”	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript “D” on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript “A”	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

“Trace Asbestos Identified” will be reported if there is not enough present to verify the type.

Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to ‘HSG264, Asbestos: The survey guide’ and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). “TRACE” will be reported as a quantification result.

PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as ‘% stones >10mm’.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any “D” subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only. Results “with Clean up” indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from “TPH CWG with clean up” please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: WML Consulting Ltd, Third Floor South, Metropolitan House, Station Rd,
Cheadle Hulme, Cheshire, SK8 7AZ

Project: Hilltop Cottage

Clients Project No: 10391G

Project No: 25/00699

Date Received: 29/01/2025 (am)

Cool Box Temperatures (°C): 8.6

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/00699/1	25/00699/2	25/00699/3	25/00699/4	25/00699/5	25/00699/6	25/00699/7	25/00699/8
Client Sample No								
Client Sample ID/Depth	WS01 0.20m	WS01 1.10m	WS02 0.15m	WS02 1.00m	WS03 0.10m	WS03 0.80m	HP01 0.10m	HP02 0.10m
Date Sampled	27/01/25	27/01/25	27/01/25	27/01/25	27/01/25	27/01/25	27/01/25	27/01/25
A-T-019s	31/01/2025		31/01/2025		31/01/2025		31/01/2025	31/01/2025
A-T-024s	04/02/2025	04/02/2025	04/02/2025	04/02/2025	04/02/2025	04/02/2025	04/02/2025	04/02/2025
A-T-026s	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
A-T-027s	03/02/2025		03/02/2025		03/02/2025		03/02/2025	03/02/2025
A-T-028s	03/02/2025		03/02/2025		03/02/2025		03/02/2025	03/02/2025
A-T-031s	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
A-T-032s	03/02/2025		03/02/2025		04/02/2025		03/02/2025	03/02/2025
A-T-040s	03/02/2025		03/02/2025		03/02/2025		03/02/2025	03/02/2025
A-T-042sTCN	31/01/2025		31/01/2025		31/01/2025		31/01/2025	31/01/2025
A-T-044	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025
A-T-045	30/01/2025		30/01/2025		30/01/2025		30/01/2025	30/01/2025
A-T-050s	03/02/2025		03/02/2025		03/02/2025		03/02/2025	03/02/2025
A-T-054					03/02/2025			

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

APPENDIX 05

Site Specific Acceptance Criteria

Site Specific Assessment Criteria for Residential (with homegrown produce) assuming a 1% SOM for Hydrocarbons

Contaminant	Assessment Criteria for Residential (mg/kg)
Metals	
Arsenic	37
Boron	290
Cadmium	26
Chromium III	910
Chromium VI	6
Copper	2,400
Lead*	200
Mercury	1.2
Nickel	130
Selenium	250
Vanadium	410
Zinc	3,700
Non – Metals	
Phenol	120
Polyaromatic Hydrocarbons (PAH)	
Benz[a]anthracene	7.2
Benzo[a]pyrene	2.2
Benzo[b]fluoranthene	2.6
Benzo[ghi]perylene	320
Benzo[k]fluoranthene	77
Chrysene	15
Dibenz[ah]anthracene	0.24
Fluoranthene	280
Indeno[123-cd]pyrene	27
Naphthalene	2.3
Pyrene	620

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* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Criteria for Residential End Use (mg/kg)
Volatile Organic Compounds (VOCs)	
Benzene	0.087
Ethylbenzene	47
Toluene	130
Xylene	56
1,2-Dichloroethane	0.0071
1,1,1-Trichloroethane	8.8
Tetrachloroethane	1.6
Tetrachloroethene (PCE)	0.18
Tetrachloromethane	0.026
Trichloroethene (TCE)	0.016
Trichloromethane	0.91
Vinyl Chloride	0.00064
Semi-Volatile Organic Compounds (SVOCs)	
1,2-Dichlorobenzene	23
1,4-Dichlorobenzene	61 ^f
1,2,4-Trichlorobenzene	2.6
Hexachlorobenzene	1.8 (0.2) ^{vap}
Total Petroleum Hydrocarbons (TPH)	
Aliphatic C5-6	42
Aliphatic C6-8	100
Aliphatic C8-10	27
Aliphatic C10-12	130(48) ^{vap}
Aliphatic C12-16	1,100(24) ^{sol}
Aliphatic C16-35	65,000(8.48) ^{f, sol}
Aliphatic C35 - 44	65,000(8.84) ^{f, sol}
Aromatic C5 – 7 (benzene)	70
Aromatic C7 – 8 (toluene)	130
Aromatic C8-10	34
Aromatic C10-12	74
Aromatic C12-16	140
Aromatic C16-21	260 ^f
Aromatic C21-35	1,100 ^f
Aromatic C35 - 44	1,100 ^f

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