

Our ref: ML/GML25101/IWL/001

Date: 27th Feb 2025

EMAIL (SCANNED)

Allison Homes East Midlands
The Lockington Suite
The Millhouse
Station Road
Castle Donington
DE74 2NJ

For the attention of Mr C Newbury

Dear Carter

GML25101: Initial Geo-Environmental Investigation Works of Lane at Stanton under Bardon, Markfield, Leicester

Geo-Matters Ltd have been instructed by Allison Homes East Midlands Ltd (hereafter referred to as 'the Client') to complete supplementary ground investigations (geotechnical and geo-environmental issues) as outlined below:

- Initial Window Sampler Boreholes & Strength Testing;
- Geotechnical Sampling & Testing;
- Chemical Sampling & Testing; and
- Provision of Letter Report of Initial Findings.

Report Status

The report has been prepared for the sole use and reliance of the Clients and their appointed agent; Geo-Matters Ltd. No other third party may rely upon or reproduce the content of this report without the written approval of Geo-Matters Ltd. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the authors do not owe them any warranty, duty of care or skill.

The possibility of significant variation in ground conditions existing between sampling locations cannot be discounted. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. There may be other conditions prevailing on site which have not been revealed by this investigation and which have not been taken into account by this report and these initial works are in advance of further investigations planned on a return visit following client purchase of the site.

Responsibility cannot be accepted for any conditions not revealed by this investigation and assessment. It should be noted that groundwater levels and quality may very due to seasonal and other effects.

The findings and recommendations made in this report are based on the findings of our initial intrusive works. Geo-Matters Ltd cannot accept responsibility for the reliability and authenticity of reports prepared by third parties.



Background

The site is located at national grid reference SK 46727, 10010 accessed off Meadow Lane, Stanton under Bardon. The site is situated between Bardon and Markfield approx 12miles to the north west of Leicester City centre, as presented on the Site Location Plan (Drawing 001). It is understood that the proposed plans for the site is to include residential dwellings with private gardens / POS as outlined in the Proposed Layout Plan (Drawing 002)

The developable areas covered by these initial works, currently supports 2no. parcels of grazing fields and menage as presented in the Site Features Plan (Drawing 003), appended. The boundary between each parcel is marked by fencing. The site is surrounded by arable fields with residential areas to the north west.

Geo-Matters Ltd have not been made aware of any previous information relating to the site, although have been passed the following report which relates to the client site adjacent to the south:

- Lithos – Geoenvironmental Appraisal Ref 4252/2 dated Aug 2023

This initial works report should not be read in isolation and was produced to provide initial information prior to ownership, therefore this report should be read in conjunction with the above report (adjacent parcel) as they will contain information not reiterated within this initial letter report relevant to the site.

Initial Works Rationale

- To provide an initial assessment of the site prior to purchase with respect to environmental and geotechnical issues, with a visual assessment of soakaway potential.

Geo-Matters Initial Ground Investigation

All fieldwork and soil descriptions were carried out in general accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil' and / or BS5930:2015. Each of the exploratory locations were positioned on site by Geo-Matters Ltd with reference to previous findings.

The locations of these exploratory holes are shown on the Initial Exploratory Hole Layout Plan (Drawing 003).

A summary of the initial ground investigation undertaken by Geo-Matters Ltd is outlined in Table 1.0 below:

Table 1.0: Method of Investigation

Method of Investigation	No.	Max Depth (m)	Sampling Regime
Window Sampler Boreholes	6	4.5	1

1 – lab approved sample vessels (jars, tubs, vials and bulk bags).

The investigation was carried out under the supervision of suitably qualified Engineers from Geo-Matters Ltd.

Limitations to the Investigation

Footpaths, menage and buried services were noted at the site, although these did not present a significant limitation to the works and all exploratory holes were completed at the site as planned.

Ground Conditions

In the main topsoil is identified across the site in turn underlain by a mixture of granular and cohesive soils followed by weathered bedrock. A small area of made ground was identified around WS2 relating to reworked natural soils placed



during the excavation of the menage for a level platform. Other small areas of made ground were noted within WS3 & WS4 where the topsoil was noted to contain brick fragments, thought added to aid drainage locally.

No significant consistent groundwater was encountered during these works although minor seepages were noted within the sand lenses encountered.

Initial Geotechnical Findings

The geotechnical laboratory testing was carried out in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

In order to develop a preliminary understanding of geotechnical properties of the natural material types at the site, samples of the sub-soil were submitted to the laboratory for a range of initial classification tests.

Laboratory test results are appended to this letter report.

Standard Penetration Testing (SPT)

Equivalent *In situ* SPTs were undertaken in the window sampler boreholes throughout the full depths. The SPT results are summarised in tables (below).

Table 2.0: Summary of *In Situ* SPT Results

Strata	Range Reported	Remark
MADE GROUND	N/A	Not thick enough to test
Light Brown sandy CLAY / clayey SAND	8 - 21	Firm to Stiff / Medium Dense
Brown sandy GRAVEL	8 - +50	Medium Dense to Dense
Red brown CLAY	12 - 14	Stiff to Very Stiff
Light brown silty SAND	14	Medium Dense
Weathered Mudstone (recovered as light brown red CLAY)	+50	Very Stiff

Table 3.0: *In Situ* SPT 'N' Value Results v Depth Table

Depth (m)	Range Reported
1.0	8 - +50
2.0	8 - +50
3.0	9 - +50
4.0	+50

Contamination and Performance of Building Materials

Sulphates

The pH concentrations in 6 no. soil samples were analysed as part of the recent investigation along with water soluble sulphate. The results were assessed in accordance with the requirements of BRE Special Digest 1 (2005), 'Concrete in Aggressive Ground'.

Table 4.0: Summary of Soil Analysis for Concrete Specification

Determinand	Units	No. of Samples	Min	Max	Initial BRE Classification
pH	pH	6	5.5	7.3	AC-1s
Water Soluble Sulphate	g/l	6	<0.01	0.02	DS-1

The results were assessed in accordance with the requirements of BRE Special Digest 1 (2005), 'Concrete in Aggressive Ground', assuming static groundwater conditions and brownfield soils.

As only 6no. soil samples were tested, the test results were assessed directly to guidance. Accordingly, **DS1 – AC1s** conditions are present across the site in



accordance with BRE Special Digest 1 'Concrete in Aggressive Ground 2005'. Minimum concrete specification should be in accordance with NHBC Standards, Section 3.1.

Atterberg Limits

Two representative samples of potential cohesive soils were tested from various depths for Atterberg Limits. Additional samples were analysed for Moisture Contents the results are presented in Table 5.0 below:

Table 5.0: Plasticity Index Results

Determinand	No. of Samples	Range %	Remark
Moisture Content	3	15.0 - 24.0	-
% passing 425µm test	2	59 - 94	-
Plasticity Index (unmodified)	2	8 - 22	Non - Medium
Modified Plasticity Index	2	4.48 - 20.68	Non - Medium

From the results outlined in Table 5.0, on-site cohesive soils have been calculated to have maximum modified plasticity index of 20.68%. Therefore, in accordance with NHBC Standards Chapter 4.2, the underlying cohesive strata should have a maximum classification of medium volume change potential subject to regulatory approval.

Any cut and fill activities may have an effect on the classification at formation if materials are moved around the site.

Geotechnical Hazards for the Proposed Development

It is understood that the proposed development at the site is to comprise residential end-use. Table 6.0 overleaf summarises the main geotechnical hazards identified during intrusive works associated with the proposed development.

Table 6.0: Summary of Geotechnical Hazards

Hazard	Comment
Services	Services / utilities are known to cross parts of the site thought to be unused. Foundations / plot layouts may need to compensate for / avoid these features appropriately, or alternatively diversions etc. may be required if still operational
Soft / Loose Soils	Soft / loose soils have been locally encountered at the site, which may need to be taken into account as part of any redevelopment of the site.
Cohesive Soils	Based on the geotechnical test results, soils at the site should have a maximum classification of medium volume change potential. Foundations need to be deepened to terminate within the underlying natural clay soils across the site.
Variable Ground Conditions	Where foundations straddle variable natural soil types (i.e. cohesive / granular), suitable mesh reinforcement should be provided within foundations to prevent the potential for differential settlement.
Trees	Building within the influencing distance of trees will need to be taken into account due to the cohesive nature of the underlying strata.
Slope	As the site slopes down from west to east there may be a need to construct development platforms to aid the redevelopment, if this is the case then further geotechnical sampling will be required in addition to the ones planned as part of the additional works planned at the site.



Advice should be sought where foundations straddle variable soil types (i.e. cohesive / granular) as an adjustment of the foundation depths or a suitable mesh reinforcement may be sufficient to mitigate against differential settlement.

All foundation recommendations should be considered as indicative at this stage pending confirmation of ground conditions following the planned additional works.. In general, the made ground / topsoil at the site was underlain by cohesive / granular soils. Traditional strip foundations terminating within the natural soils should be suitable for the proposed residential end use. A nett allowable bearing pressure of 75kN/m² should be achievable at founding depth in the underlying natural soils at this time, which should also be confirmed by your structural engineer.

Foundations will need to be deepened through topsoil / made ground soils to bear on the underlying undisturbed natural soils at a minimum depth of 0.90m begl. Sand lenses were encountered during the intrusive works at some locations therefore we would recommend the installation of light mesh reinforcement to prevent differential settlement as a general rule.

Laboratory Chemical Analysis

Representative soil samples from the exploratory locations were analysed for the range of contaminants outlined in Section 2.1. Representative samples of the near surface and underlying natural strata were analysed. The environmental analysis was scheduled by Geo-Matters Limited and carried out by a UKAS / MCERTS Accredited Laboratory.

A combined set of currently available authoritative and 'best practice' soil screening values has been used to initially determine risks to future site users. This includes DEFRA 'Category 4 Screening Levels' (C4SLs) and similar screening values from third parties (e.g. LQM, CIEH etc.).

With reference to the development, the standard CLEA residential with plant-uptake end-use scenario is considered to be appropriate at this stage. Due to ongoing revisions to the contaminated land assessment framework (including the derivation and release of authoritative screening values), the following assessment (and related conclusions / recommendations) may be revised by Geo-Matters Ltd should replacement screening values etc. be released in the near future.

The full details of the chemical test results are appended and summarised in Table 7.0 overleaf.

**Table 7.0: Laboratory Analysis of Soil Samples**

Determinand	No. of Samples Analysed	Maximum Concentration (mg/kg)	Tier 1 Screening Values (mg/kg)	No. Exceeding Threshold
Metals				
Arsenic	5	20	37.0 ^b	0
Cadmium	5	0.4	26.0 ^b	0
Chromium (Total)	5	17	910.0 ^b	0
Chromium VI	5	<2	6.0 ^b	0
Lead	5	150	200.0 ^a	0
Selenium	5	<2	250.0 ^b	0
Nickel	5	32	180.0 ^b	0
Copper	5	100	2400.0 ^b	0
Zinc	5	126	3700.0 ^b	0
Mercury	5	<1	40 ^b	0
Organics and Inorganics				
Benzo(a)pyrene	5	0.77	2.2 ^b	0
pH	6	5.5 – 7.3	27.0 ^b	0
Water Soluble Sulphate	6	0.02	130.0 ^b	0
Phenols	6	<2	280.0 ^b	0
Asbestos	5	Not Detected	ND	0

^a DEFRA C4SL values for a 'residential with produce' end use;^b LQM 'S4UL' values (at 1% SOM for organics) for a residential with produce end use (Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL3676 All Rights Reserved);

*Geo-Matters Ltd general screening level; * Contaminants all recorded below laboratory limits of detection; and N/A = Not Applicable, ND = Not Detected, D = Detected.

Summary of Chemical Analysis

The results were compared with the referenced Tier 1 Screening Values (T1SVs) which are an initial and conservative set of values which are considered most appropriate (overall) to the proposed predominantly residential with produce end use.

Metals

No exceedance of heavy metals was recorded after analysis of selected representative soil samples from the site. On this basis no risks from metals have been identified on this site at this stage in relation to a proposed residential with produce end use.

Inorganics and Organics

The significance of the PAH laboratory results have been assessed using the T1SV for benzo(a)pyrene. This is considered, in terms of toxicity, to present the greatest hazard to human health. The T1SV of 2.2mg/kg (residential end use with plant uptake) was not exceeded within any of the samples tested. On this basis, no risks have been identified from PAHs at the subject site based on the proposed residential with produce end use.

Asbestos

No asbestos containing materials or free fibres were recorded in the 4 no. samples analysed, and therefore on this basis, no risks have been identified from these determinants at the subject site based on the proposed residential end use with private gardens.



General Contaminants

Visual, Olfactory and Field Measurements

No visual or olfactory potential contamination was noted within any exploratory locations advanced at the site.

CLEA Statistical Analysis

In August 2008, the Environment Agency (EA) withdrew the core regulatory guidance documents for the assessment of human health risks from contaminated land (CLR7 to CLR10), including the soil guideline value (SGV) documents. The newly published EA guidance documents (SC050021.TR1, SC050021.SR2 and SC050021.SR3) have been consulted; alongside the CL:AIRE / CIEH guidance note on statistical interpretation of contaminated land data; and the risk assessment for the subject site has been undertaken in broad accordance with these documents.

With reference to the documents listed above, statistical analysis on sample data is not required for determinants where exceedances above the relevant T1SV were not recorded or when there is an insufficient number of test results to make use of statistical analyses. Therefore, further statistical analysis is not considered necessary at this stage.

RECOMMENDATIONS

The conclusions and recommendations presented below are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and therefore copies of this report should be sent to the appropriate Regulatory Authorities and / or other organisations (as appropriate) by the Clients for their comments and approval prior to undertaking any irrecoverable works associated with the subject site.

Sulphate Classification:

DS1 – AC1s conditions are present across the site in accordance with BRE Special Digest 1 'Concrete in Aggressive Ground 2005'. Minimum concrete specification should be in accordance with NHBC Standards, Section 3.1.

Plasticity:

Medium classification should be assumed at this stage pending the planned additional testing.

Foundations:

At this stage, a nett allowable bearing pressure of approx. 75kN/m² should be assigned across the site in the underlying undisturbed natural soils at the specified founding depths (0.90m begl); which should be confirmed by your structural engineer.

Granular soils were noted across the site. Where groundwater is encountered in granular soils / pockets within influencing distance of foundations, bearing capacities of granular soils may be reduced.

Foundations are likely to also need deepening within the influencing distance of trees due to the cohesive nature of the natural soils beneath the site.

Because there is the mix of granular and cohesive soils beneath the site, we would recommend that suitable mesh reinforcement should be provided within foundations to prevent the potential for differential settlement.

Floor Slab:

At this stage ground bearing floor slabs should be appropriate for all areas of the site, where less than 0.60m of unsuitable soils are encountered (e.g. made



ground etc). Where this is not the case a suspended floor would be a viable alternative with a clear void if deepening beyond 1.5m due to trees.

Building Near Trees:

Cohesive soils displaying a maximum medium volume change were recorded at the site; therefore, foundation designs may need to be adjusted locally in accordance with NHBC Standards (Chapter 4.2) where they are within the influence of trees.

Drainage:

It is considered that the cohesive strata across the site are not considered to be suitable for the use of in situ drainage soakaways due to their typically impermeable nature. Where granular soils were encountered, so was seepages of groundwater therefore insufficient unsaturated zone is present within these soils. All drainage proposals are subject to in situ testing and should be agreed with the Local Authority prior to finalising designs.

Contamination:

The initial contamination assessment outlined above indicated no feasible pollutant linkages, therefore the soils should be treated as uncontaminated in the context of the proposed re-development of the site for the most sensitive proposed development (residential land-use with produce).

Remediation:

Remediation works to protect human health are **not** considered necessary subject to the approval of the Local Authority / NHBC.

Further Works:

At this stage the following further works are deemed necessary, subject to comments from the Regulatory Authorities.

- Undertake additional intrusive works and combine the results to form a full Site Investigation including desktop study;
- Slope Stability / Earthworks testing should the planned redevelopment include for a cut and fill exercise to construct development platforms;
- Copies of this report; and all others; should be forwarded onto the appropriate regulatory authorities for their approval / comments.

Should you have any queries or require any further information then please do not hesitate to contact us.

Yours faithfully
for Geo-Matters Ltd

Mark Lewis BEng(Hons) CEnv MSOE MEnvSc FFB
Managing Director

Encs. Site Plans
Exploratory Hole Logs
Laboratory Test Results

Contractor: Dynamic Sampling		Project No: GML25101	Sheet: 1 of 1			
Equipment: Window Sampler Rig		Logged by: GML	Date: 14th January 2025			
Field Monitoring and Sampling		Strata	Legend	Well		
Depth (m)	Type	Result (SPT)	depth (m)	Description		
0.20	JTV	N = 21 B N = 8 N = +50	0.30	TOPSOIL comprising brown sandy silt		
0.90	B		1m	Firm orange brown very sandy CLAY / slightly clayey SAND		
1.40			1.20	Medium dense red brown clayey fine to coarse SAND & GRAVEL		
			2m			
			2.80	Stiff - very stiff red CLAY		
			3m			
			4m	Exploratory location completed at 3.20m depth.		
			5m			
Sheet 1 of 1		Groundwater: Seepage noted from 1.4m begl	Date : 14/01/25			
EXPLORATORY RECORD						
Remarks: 1) Little recovery from 1.00-2.00m						
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)						



Site: Stanton Under Bardon, Markfield

Client: Allison Homes East Midlands

WS02

Contractor: Dynamic Sampling

Project No: GML25101

Sheet: 1 of 1

Equipment: Window Sampler Rig

Logged by: GML

Date: 14th January 2025

Field Monitoring and Sampling

Strata

Legend | Well

Monitoring and Sampling		Strata		Geology	
Depth (m)	Type	Result (SPT)	depth (m)	Description	
1.00	JV	N = 12	1m	MADE GROUND comprising reworked red brown clay	
				0.20	
				TOPSOIL comprising brown sandy silt	
				0.50	
				Firm light brown very sandy CLAY / slightly clayey SAND	
			2m	1.30	
				Firm red brown CLAY	
				N = 14	
				2.90	
				3.00	
3.00	▼	N = 14	3m	Medium dense light brown silty SAND	
				3.20	
			5m	Stiff to very stiff red CLAY	
				N = +50	
				Exploratory location completed at 4.00m depth.	

Sheet 1 of 1

Groundwater:
seepage noted from 3.0m begl

Date : 14/01/25

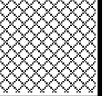
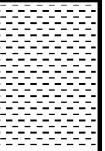
EXPLORATORY RECORD

Remarks:



HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm²)

Contractor: Dynamic Sampling		Project No: GML25101	Sheet: 1 of 1				
Equipment: Window Sampler Rig		Logged by: GML	Date: 14th January 2025				
Field Monitoring and Sampling		Strata	Legend	Well			
Depth (m)	Type	Result (SPT)	depth (m)	Description			
0.20 1.50	JTV	N = 8	0.30	MADE GROUND comprising topsoil in the main with occasional brick fragments			
			0.90	Firm orange brown very sandy CLAY / slightly clayey SAND			
			1.50	Medium dense light brown red silty clayey SAND			
			2.60	Firm to stiff red CLAY			
		N = 12	2m				
			3m				
			4m				
		N = +50	5m	Medium dense brown slightly silty gravelly SAND			
				Exploratory location completed at 4.50m depth.			
Sheet 1 of 1		Groundwater: slight seepage from 1.50m	Date : 14/01/25				
EXPLORATORY RECORD							
Remarks: 1) Hole stable for the time it remained open							
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)							

Contractor: Dynamic Sampling		Project No: GML25101		Sheet: 1 of 1					
Equipment: Window Sampler Rig		Logged by: GML		Date: 14th January 2025					
Field Monitoring and Sampling		Strata		Legend	Well				
Depth (m)	Type	Result (SPT)	depth (m)	Description					
0.30	JTV	N = +50	0.40	MADE GROUND comprising topsoil in the main with occasional brick fragments					
				Stiff to very stiff light brown red CLAY					
				Exploratory location completed at 1.00m depth.					
			2m						
			3m						
			4m						
			5m						
Sheet 1 of 1		Groundwater: No groundwater encountered during excavation.		Date : 14/01/25					
EXPLORATORY RECORD									
GEOATTERS consulting engineers									
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)									

Contractor: Dynamic Sampling		Project No: GML25101		Sheet: 1 of 1					
Equipment: Window Sampler Rig		Logged by: GML		Date: 14th January 2025					
Field Monitoring and Sampling		Strata		Legend	Well				
Depth (m)	Type	Result (SPT)	depth (m)	Description					
0.25	JTV	N = 20	0.35	TOPSOIL comprising brown sandy silt					
1.70	B		1m	Stiff to very stiff brown slightly silty gravelly CLAY					
			3m						
			4m						
			5m	Exploratory location completed at 2.00m depth.					
Sheet 1 of 1		Groundwater: No groundwater encountered during excavation.		Date : 14/01/25					
EXPLORATORY RECORD									
GEOATTERS consulting engineers									
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)									

Contractor: Dynamic Sampling		Project No: GML25101	Sheet: 1 of 1				
Equipment: Window Sampler Rig		Logged by: GML	Date: 14th January 2025				
Field Monitoring and Sampling		Strata	Legend	Well			
Depth (m)	Type	Result (SPT)	depth (m)	Description			
0.80	JTVB	N = 31	0.25	TOPSOIL comprising brown sandy silt			
			1.00	Firm orange brown very sandy CLAY / slightly clayey SAND			
		N = 46	1.60	Dense brown slightly silty sandy GRAVEL			
			2m	Stiff to very stiff brown slightly silty gravelly CLAY			
			3m				
1.50		N = 16	4m				
			5m	Exploratory location completed at 3.50m depth.			
		N = +50					
Sheet 1 of 1		Groundwater: seepage noted from 1.5m begl	Date : 14/01/25				
EXPLORATORY RECORD							
GEOATTERS consulting engineers							
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)							



GEO MATTERS
consulting engineers

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CLIENT:

ALLISON
HOMES

PROJECT:

Stanton Under Bardon

TITLE:

Proposed Site Layout Plan

SCALE@SIZE : NTS	ISSUE: Final
DESIGN/DRAWN : AT	DATE: Feb 2025
PROJECT No: GML25101	DRAWING No: 001

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The proposed layout plan shown is an extract taken from Drawing SUB/PL/001 'Option Land' dated November 2024 by Allison Homes East Midlands.



DO NOT SCALE
NOTES:
● Approx. Site Location
◆ Approx. Site Boundary



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CLIENT:



ALLISON
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PROJECT:

Stanton Under Bardon

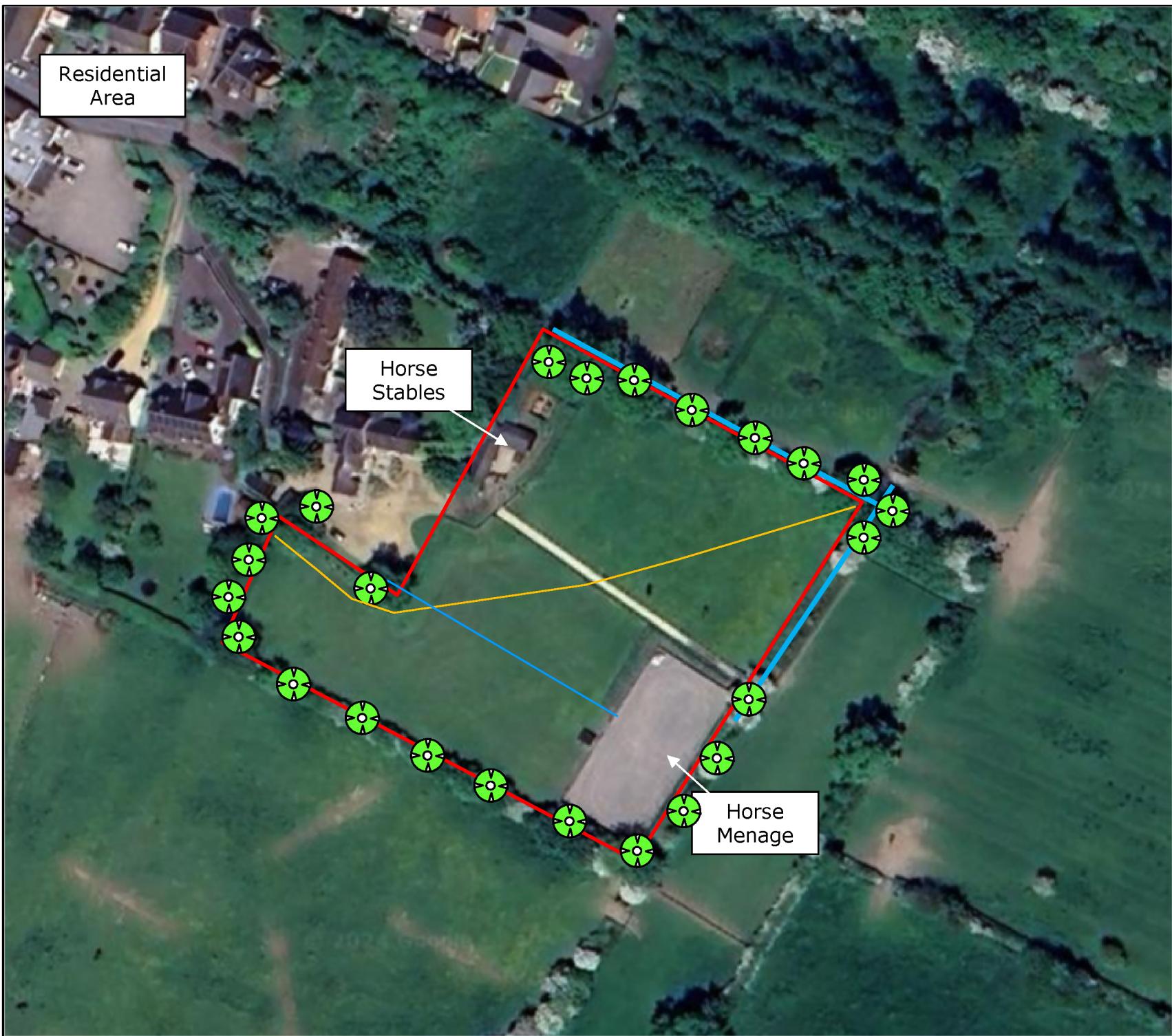
TITLE:

Site Location Plan

SCALE@SIZE : NTS ISSUE: Final

DESIGN/DRAWN: AT DATE: Feb 2025

PROJECT No: GML25101 DRAWING No: 002



DO NOT SCALE	
NOTES:	
	Approx. Site Boundary
	Public Footpath
	Land Drain
	Ditch
GEO MATTERS consulting engineers	
www.geo-matters.com info@geo-matters.com	
CLIENT:	
PROJECT:	Stanton Under Bardon
TITLE:	Site Features Plan
SCALE@SIZE :	ISSUE:
NTS	Final
DESIGN/DRAWN :	DATE:
AT	Feb 2025
PROJECT No:	DRAWING No:
GML25101	003
© Geo-Matters Ltd	

DO NOT SCALE

NOTES:



Approx. Site Boundary



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CLIENT:


ALLISON
HOMES

PROJECT:

Stanton Under Bardon

TITLE:

General Photographic Record

SCALE@SIZE :
NTS

ISSUE:
Final

DESIGN/DRAWN :
AT

DATE:
Feb 2025

PROJECT No:
GML25101

DRAWING No:
004

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DO NOT SCALE

NOTES:



Approx. Site
Boundary



Approx. Location of
Boreholes



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CLIENT:



ALLISON
HOMES

PROJECT:

Stanton Under Bardon

TITLE:

Exploratory Hole Layout Plan

SCALE@SIZE :	ISSUE:
NTS	Final

DESIGN/DRAWN :	DATE:
AT	Feb 2025

PROJECT No:	DRAWING No:
GML25101	005

Summary of Classification Test Results

Project No.

J297947

Project Name

Stanton Under Bardon, Markfield

All tests performed in accordance with BS1377:1990 unless specified otherwise

Date Printed

22/01/2025

Key

Density test

Linear measurement unless :

wd - water displacement

wi - immersion in water

Liquid Limit

4pt cone unless :

cas - Casagrande method

1pt - single point test

Particle density

sp - small pyknometer

gi - gas jar



INDEX



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Derby
DE74 2NR

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 25-00375

Site Reference: Stanton Under Bardon, Markfield

Project / Job Ref: GML25101

Order No: ML/GML25101/002

Sample Receipt Date: 17/01/2025

Sample Scheduled Date: 17/01/2025

Report Issue Number: 1

Reporting Date: 23/01/2025

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate

DETS Report No: 25-00375	~Date Sampled	14/01/25	14/01/25	14/01/25	14/01/25	14/01/25
Geo-Matters Limited	~Time Sampled	None Supplied				
~Site Reference: Stanton Under Bardon, Markfield	~TP / BH No	WS1	WS2	WS3	WS4	WS5
~Project / Job Ref: GML25101	~Additional Refs	None Supplied				
~Order No: ML/GML25101/002	~Depth (m)	0.20	1.00	0.20	0.30	0.25
Reporting Date: 23/01/2025	DETS Sample No	759595	759596	759597	759598	759599

Determinand	Unit	RL	Accreditation				
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	5.5	6.7	6.7	7.3
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	252	< 200	363	300
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.03	< 0.02	0.04	0.03
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	< 10	19	< 10	< 10
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.02	< 0.01	< 0.01
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.8	0.6	8.6	2.3
Arsenic (As)	mg/kg	< 2	MCERTS	6	8	20	6
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.4	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	11	17	15	13
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	13	13	100	15
Lead (Pb)	mg/kg	< 3	MCERTS	36	20	150	31
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	14	32	10
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	57	45	126	56
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

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

Subcontracted analysis (S)



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Soil Analysis Certificate

DETS Report No: 25-00375	~Date Sampled	14/01/25				
Geo-Matters Limited	~Time Sampled	None Supplied				
~Site Reference: Stanton Under Bardon, Markfield	~TP / BH No	WS6				
~Project / Job Ref: GML25101	~Additional Refs	None Supplied				
~Order No: ML/GML25101/002	~Depth (m)	0.80				
Reporting Date: 23/01/2025	DETS Sample No	759600				

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	MCERTS	7.1				
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	< 200				
Total Sulphate as SO ₄	%	< 0.02	MCERTS	< 0.02				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	23				
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02				
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.6				
Arsenic (As)	mg/kg	< 2	MCERTS	10				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2				
Chromium (Cr)	mg/kg	< 2	MCERTS	16				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	20				
Lead (Pb)	mg/kg	< 3	MCERTS	18				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	17				
Selenium (Se)	mg/kg	< 2	MCERTS	< 2				
Zinc (Zn)	mg/kg	< 3	MCERTS	69				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs

DETS Report No: 25-00375	~Date Sampled	14/01/25	14/01/25	14/01/25	14/01/25	14/01/25	14/01/25
Geo-Matters Limited	~Time Sampled	None Supplied					
~Site Reference: Stanton Under Bardon, Markfield	~TP / BH No	WS1	WS2	WS3	WS5	WS6	
~Project / Job Ref: GML25101	~Additional Refs	None Supplied					
~Order No: ML/GML25101/002	~Depth (m)	0.20	1.00	0.20	0.25	0.80	
Reporting Date: 23/01/2025	DETS Sample No	759595	759596	759597	759599	759600	

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.76	0.31
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.16	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	2.04	0.46
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.84	0.39
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.83	0.18
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.95	0.22
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.81	0.17
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.31	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.77	0.17
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.42	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.34	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	9.2	1.9

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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-00375	
Geo-Matters Limited	
~Site Reference: Stanton Under Bardon, Markfield	
~Project / Job Ref: GML25101	
~Order No: ML/GML25101/002	
Reporting Date: 23/01/2025	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
759595	WS1	None Supplied	0.20	17.8	Brown sandy clay with vegetation
759596	WS2	None Supplied	1.00	13	Light brown sandy clay with stones
759597	WS3	None Supplied	0.20	23.3	Black loamy sand with stones and vegetation
759598	WS4	None Supplied	0.30	17	Brown sandy loam with stones and vegetation
759599	WS5	None Supplied	0.25	15.3	Brown sandy clay with stones and vegetation
759600	WS6	None Supplied	0.80	12.3	Light brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{4/5}

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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 25-00375

Geo-Matters Limited

~Site Reference: Stanton Under Bardon, Markfield

~Project / Job Ref: GML25101

~Order No: ML/GML25101/002

Reporting Date: 23/01/2025

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received

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