

VERIFICATION REPORT

PLOTS 123-126

WOODCROFT FARM, WOODCROFT LANE,

LOVEDEAN, PO8 9QA

on behalf of

VISTRY SOUTHERN

Report:	VERIFICATION REPORT
Site:	PLOTS 123-126, WOODCROFT FARM, WOODCROFT LANE, LOVEDEAN, PO8 9QA
Client:	VISTRY SOUTHERN
Date:	12/04/2022
Reference:	GE19455/VR/PLOTS 123-126/MAR22
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AMENDMENT RECORD

Revision ref.	Date	Reasons for amendment	Author's initials	Reviewed by	Authorised by
1.0	12/04/2022	First issue for compiled report for Plots 123-126	FG	GR	GR

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1.0 INTRODUCTION

1.1 General

The site has been subject to several phases of investigation and assessment for the site, as reported in the Phase I Ground Condition Report, ref 21834, dated MMM 2010 prepared by Peter Brett Associates (PBA), which included a desk study and preliminary risk assessment for the overall Woodcroft Farm site; a Factual Report, ref RML 4750, dated October 2011 prepared by Risk Management Limited, which included ground investigation and laboratory test results; and a Geo-environmental and Geotechnical Ground Investigation Report, ref 21834-030-R02, dated July 2013 prepared by PBA, which presented an interpretative assessment of the overall Woodcroft Farm site.

Further Phase II intrusive investigation was undertaken and reported by Geo-Environmental Services Limited and presented in the Soil Contamination Assessment ref. GE16662-FG02-170929, dated 29th September 2017. An additional phase of investigation was also commissioned in 2018 to support development of the remedial strategies and the findings were presented within the remedial strategies for the site (see below). Subsequently, a Detailed Quantitative Gas Risk Assessment (DQGRA) was commissioned from The Environmental Protection Group Ltd (EPG), ref. EPG/8938/2018/DQGRA/V1 dated October 2018, in relation to the infilled former chalk pit located to the west of the farmyard area.

Subsequently Remediation Strategies and Verification Plans (RSVPs) were prepared for the three separate areas of the site deemed to require remediation, referenced GE16943/RSVP-FY-V6.0/DEC20 for the Farmyard Area, GE16943/RSVP-CP-V6.0/DEC20 for the Chalk Pit Area and GE16943/RSVP-HA-V6.0/FEB21 for the Horse Arena area.

In line with the remedial strategies for the site, Geo-Environmental Services Limited ('Geo-Environmental') was instructed by 'the Client', Vistry Southern, to prepare a Verification Report to compile the relevant information in relation to the residential development for Plots 123-126, Woodcroft Farm, Woodcroft Lane, Lovedean, Hampshire, PO8 9QA, herein referred to as 'the site' (see Figure 1).

Plots 123-126 lie within the area of the site known as the former farmyard area (Figure 2), therefore the Remedial Strategy GE16943/RSVP-FY-V6.0/DEC20 for the former farmyard area is the strategy relevant for the proposed remedial works for this specific plot.

This report relates specifically to the installation and validation of remedial measures within Plots 123-126 in relation to soft landscaping validation. At the time of reporting, private gardens and areas of soft landscaping on further plots on site were not ready for final validation inspections and will be validated within a separate verification (or an updated) report in due course.

Previous phases of validation works on site have already been undertaken and reported for the site under:

- GE19455/VR/PLOTS 79-80/SEP21, which presented the validation of soil cover systems associated with Plots 79-80 only
- GE19455/VR/PLOTS 100-107 and 119-122/DEC21, which presented the validation of soil cover systems associated with Plots 100-107 and 119-122 only
- GE19455/VR/PLOTS 108-112/FEB22, which presents the validation of soil cover systems associated with Plots 108-112 only
- GE19455/VR/PLOTS 113-116 & 139-140/MAR22, which presented the validation of soil cover systems associated with Plots 113-116 and 139-140 only

This report details and compiles all the works independently verified by Geo-Environmental in relation to the installation of a soil cover system in Plots 123-126 completed in March 2022.



This report sets out the works undertaken to date to provide independent verification of the risk mitigation measures incorporated into the development to protect the development and end users thereof. This report provides final validation for works undertaken and independent inspection in relation to Plots 123-126 only. Outstanding validation for other plots will be reported under separate cover (or within an updated report) due course.

1.2 Objectives

A desk study and investigation undertaken by a third party and additional ground investigation undertaken by Geo-Environmental identified the presence of potential hazards and, through a risk assessment process, a series of pollutant linkages were identified which required action to mitigate or otherwise reduce the risk. The Remediation Strategy and Verification Plan (RSVP) for the former chalk pit area and former farmyard area of the site sets out the proposed remedial works to be undertaken within this area of the subject site to support its development for a proposed residential end use.

This Verification Report (VR) presents the details and findings of inspection visits undertaken throughout the construction period by Geo-Environmental and/or to compile data provided by the Client with respect to Plots 113-116 & 139-140 in relation to soils in order to demonstrate that the soil risk mitigation measures were implemented within these specific plots.

1.3 Planning Permission

It is understood that a planning application has been approved for the site by Havant Borough Council under Planning Reference APP/13/00804. The following pre-commencement planning conditions are understood at the time to writing to have been attached to the application which relate to the remediation and validation of land contamination on the site.

11. Prior to the commencement of construction within any specified phase or defined area the development approved by this Planning Permission (as may be agreed in writing by the Local Planning Authority), a scheme to deal with the risks associated with contamination of the site shall be submitted to and approved in writing by the Local Planning Authority. That scheme shall include all of the following elements unless specifically excluded in writing by the Local Planning Authority.

- 1. A scheme of further investigation, based on the previously submitted Geo-Environmental & Geotechnical report. The scope of the investigation shall be sufficient to:*
 - confirm the preliminary assessment of the nature and extent of contamination at the site,*
 - inform an appropriate assessment of the risks to all receptors that may be affected, including controlled waters, and;*
 - enable the appropriate design of remediation and/or risk mitigation measures (if required).*
- 2. The results of the further investigation and risk assessment (1) and if appropriate, a method statement based on these results giving full details of the remediation and/or risk mitigation measures required, and how they are to be undertaken.*
- 3. A verification report or statement (as appropriate) upon completion of the works set out in (2) [if any], confirming that measures undertaken have been implemented in accordance with the method statement, and have achieved the required performance standards. The verification report/statement shall provide details of any measures necessary for maintenance, further monitoring and reporting.*

All elements shall be adhered to unless agreed in writing by the Local Planning Authority.

Reason: To prevent future occupants of proposed residential properties being exposed to unacceptable risks from identified contamination & soil gas associated with automotive repair and landfill activity previously undertaken



at the site, and to ensure that the site does not pose an unacceptable risk to the groundwater Source Protection Zone 1; having due regard to policies and proposals E1 of the Hampshire County Structure plan 1996-2011 (Review), and DM10 of the Havant Borough Adopted Core Strategy (2011), and DM17 of the Draft Local Plan (Allocations) 2012.

12. Prior to the commencement of construction of any part of the development approved by this Planning Permission, a protocol for the identification & assessment of any unforeseen ground conditions shall be submitted to and approved in writing by the Local Planning Authority. The provisions of the approved protocol shall be observed throughout the undertaking of all relevant construction activities.

Reason: For the protection of workers and the general public during the development of potentially contaminated land, and to prevent future occupants of proposed residential properties being exposed to unacceptable risks from unidentified &/or unexpected contamination that may be associated with previous activities undertaken at the site; having due regard to policies and proposals E1 of the Hampshire County Structure plan 1996-2011 (Review), and DM10 of the Havant Borough Adopted Core Strategy (2011), and DM17 of the Draft Local Plan(Allocations) 2012.

13. If, during development, contamination not previously identified at the site is found to be present, then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until the developer has submitted and obtained written approval from the Local Planning Authority for an addendum to the Method Statement required under Condition 1, (2). This addendum shall detail how this unexpected contamination shall be dealt with, and the development shall not be carried out other than in accordance with the approved details.

Reason: For the protection of workers and the general public during the development of potentially contaminated land, and to prevent future occupants of proposed residential properties being exposed to unacceptable risks from unidentified &/or unexpected contamination that may be associated with previous activities undertaken at the site; having due regard to policies and proposals E1 of the Hampshire County Structure plan 1996-2011 (Review), and DM10 of the Havant Borough Adopted Core Strategy (2011), and DM17 of the Draft Local Plan (Allocations) 2012.



2.0 BACKGROUND

This Validation Report has been produced in order to demonstrate that the works required and presented within the Remediation Strategy and Verification Plan (RSVP) for the former farmyard area have been carried out. The RSVP for the former farmyard area of the site was developed following several phases of investigation works at the site, including a Phase I Ground Condition Report, ref 21834, dated 2010 prepared by Peter Brett Associates (PBA), a Factual Report, ref RML 4750, dated October 2011 prepared by Risk Management Limited, and a Geo-environmental and Geotechnical Ground Investigation Report, ref 21834-030-R02, dated July 2013 prepared by PBA.

Further investigations were undertaken by Geo-Environmental comprising a Soil Contamination Assessment ref. GE16662-FG02-170929, dated 29th September 2017. An additional phase of investigation was also commissioned in 2018 to support development of the remedial strategy and the findings were incorporated within this report. Subsequently, a Detailed Quantitative Gas Risk Assessment (DQGRA) was commissioned from The Environmental Protection Group Ltd (EPG), ref. EPG/8938/2018/DQGRA/V1 dated October 2018, in relation to the infilled former chalk pit located to the west of the farmyard area. Whilst a summary of these reports is presented below, reference should be made to the full reports for further details.

2.1 Proposed Site Use

The proposed wider development is understood to comprise the construction of 288No. residential units, associated car parking, open space and landscaping. The former chalk pit area covers c. 30-40No. plots (houses and flats) as does the former farmyard area, including associated gardens/areas of soft landscaping.

2.2 Investigation and Assessment

The wider site's previous uses included use as a farm with associated barns and buildings, scrapyard, horse arena and a former chalk pit which was subsequently infilled as an inert landfill. The portion of the site considered specifically herein comprised the former chalk pit infilled with inert landfill and the former farmyard area, as shown in Figure 2.

The ground conditions encountered within the farmyard comprised Made Ground and/or, in isolated locations, a mantle of Topsoil, overlying sandy clay and clay with occasional bands of sand. Chalk was encountered within two locations, TP215 and TP312. Made Ground was encountered within the majority of investigation locations to depths between 0.25m bgl and 2.20m bgl, and comprised, gravelly clay with brick, concrete, flint cobbles, tarmac and chalk fragments, ash and charcoal; clayey fine to coarse flint and chalk gravel with brick, concrete, tarmac and pieces of tree; sandy clay with plastic, decaying roots, flint gravel and glass. Cement tile and cement sheet fragments were observed to be present sporadically across the farmyard area following demolition and clearance.

The Made Ground and/or Topsoil was underlain by soft to firm clay and sandy clay in the majority of locations with occasional bands of sand overlying the Chalk. The Chalk was only encountered within two locations, TP215 and TP312, within the farmyard area from a depth of between 1.70m bgl and 2.30m bgl.

Previous investigation and testing by third parties identified exceedances of metals and PAH along with the presence of asbestos within the Made Ground in the former farmyard area of the site. The investigation and testing of soils on site undertaken as part of the development of the RSVP identified contaminant concentrations of concern within the Made Ground in relation to Arsenic, Beryllium, Lead, Nickel, PAH and Asbestos. Following further assessment and statistical analysis it was considered that remedial action would be warranted to protect end users of a residential development in this area of the site in relation to the identified PAH and Asbestos (ACMs).

Groundwater was not encountered within any of the investigation locations and was anticipated to be present at



depths in excess of 25.00m bgl.

Subsequent to several phases of intrusive investigation and ground gas monitoring, and a surface emissions survey, a Detailed Quantitative Gas Risk Assessment was undertaken by EPG in relation to the infilled chalk pit. The DQGRA concluded that ground gas protection measures were not required for the proposed residential development.

2.3 Conceptual Site Model

The conceptual site model (CSM) developed as part of the various phases of intrusive investigation and risk assessment undertaken for the site identified particular hazards, or potential hazards which were considered to require intervention (remediation) to mitigate the risk of harm.

2.4 Approach for Remediation, Monitoring and Validation

Remediation works were proposed to break the pathways of identified sources of contamination to receptors. The aim of the remediation was not necessarily to remove all contamination from the site but to provide betterment and to reduce the identified risk to an acceptable level with respect to relevant receptors, e.g. human health, the built environment and controlled waters.



3.0 SOILS

3.1 End Users (Shallow Soils)

With reference to the Soil Contamination Assessment undertaken by Geo-Environmental ref. GE16662-FG02-170929, dated 29th September 2017 for the entire site and the Remediation Strategy and Verification Plan for the former farmyard area of the site, ref GE16943/RSVP-FY-V6.0/DEC21, through a process of statistical analyses on the results of chemical analyses on both natural and Made Ground soil samples, it was demonstrated that the Made Ground materials in the farmyard were impacted by PAH and ACMs. Therefore, remedial measures were deemed necessary to protect end users of the proposed properties from soil contamination within private garden and soft landscaped areas within the former farmyard area of the site. ACMs and asbestos fibres have been identified (both visually and within laboratory chemical analysis) to be present within the Made Ground.

In areas remote from those designated for tree root protection it was required that a combination of a reduced dig to accommodate the soil cover system in the finished level, or complete removal of the Made Ground where Made Ground was found to be shallower, and the installation of a clean cover system within private gardens and areas of communal soft landscaping was required within the former chalk pit and former farmyard areas.

Table 3.1 below presents the minimum reduced dig depths required to accommodate the soil cover system and achieve the development levels for specific plots within the former farmyard area.

Plot Number	Minimum Depth of Reduced Dig (m bgl)
79 -80	0.68 or full extent of Made Ground if Made Ground shallower than reduced dig depth
Former Farmhouse (289)	0.75 or full extent of Made Ground if Made Ground shallower than reduced dig depth
116	0.48 or full extent of Made Ground if Made Ground shallower than reduced dig depth
117 - 118	0.60 or full extent of Made Ground if Made Ground shallower than reduced dig depth
119 - 122	0.44 in areas of proposed soft landscaping
123 - 124	0.52 or full extent of Made Ground if Made Ground shallower than reduced dig depth
125	0.21
126	0.17

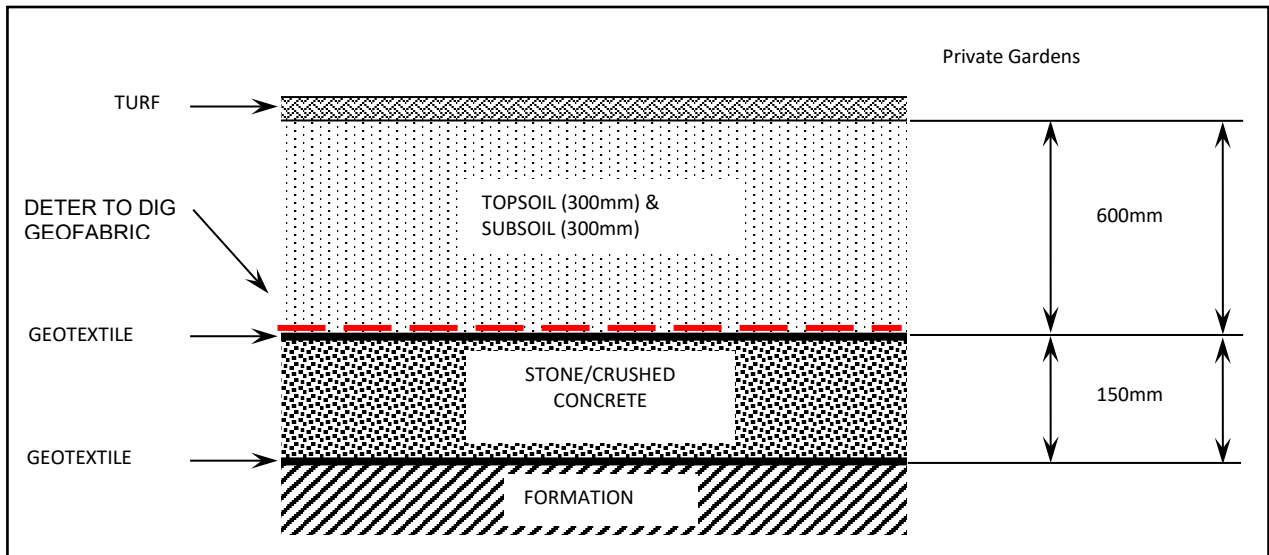
Table 3.1 Specific plots in former farmyard area requiring reduced dig

Where the full extent of the Made Ground soils was removed, validation inspections were to be undertaken at the base and sides of the excavation to demonstrate the full extent of the Made Ground had been suitably removed.

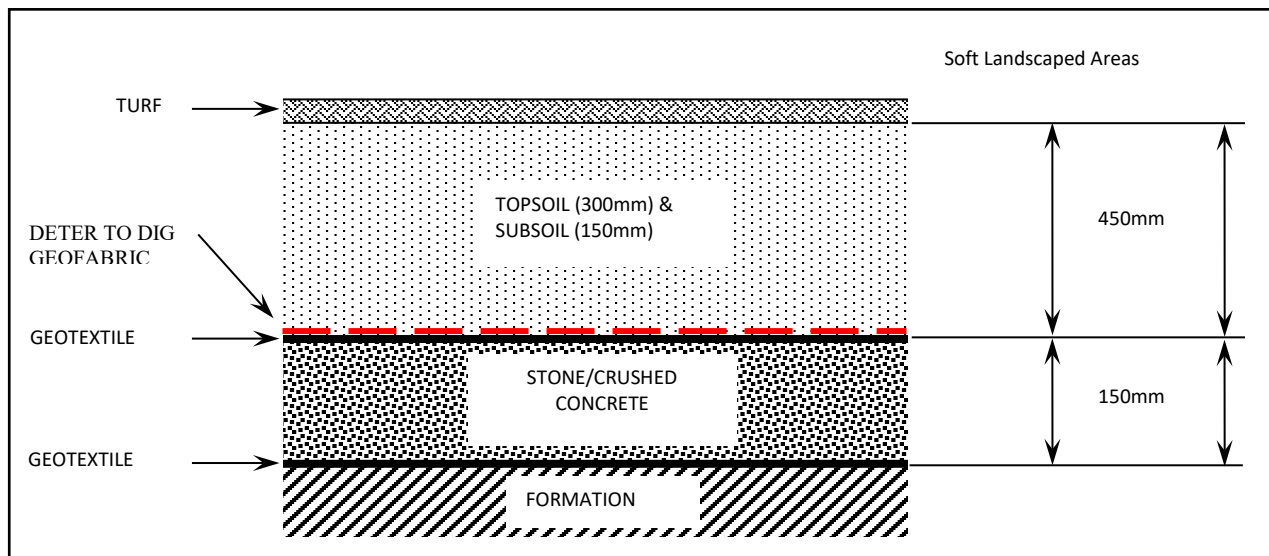
Where Made Ground soils were to remain in private garden areas and areas of soft landscaping, a soil cover system was to be installed. The cover system was required to comprise certifiably 'clean' Topsoil and subsoil. Both aspects of the cover system were required to be both chemically and physically suitable for the proposed end use. A minimum soil cover thickness of 600mm was required in proposed gardens and 450mm in areas of soft landscaping. The upper 300mm of a cover system was required to comprise Topsoil. The cover system was also required to incorporate a capillary break layer comprising 150mm depth of stone or crushed concrete, between two layers of geotextile to be installed beneath the subsoil and Topsoil. A high visibility deterrent to dig geofabric was to be laid over the upper geotextile to provide a visible deterrent to excavation.

Where the reduced dig removed all of the Made Ground, subject to verification inspection and testing, the cover system was required to comprise subsoil and a minimum 300mm thickness of Topsoil.

An example of the recommended cover system for use in private gardens where Made Ground remain in-situ is provided below:



An example of the recommended cover system for use in areas of communal soft landscaping where Made Ground was to remain in-situ is provided below:





4.0 INSPECTION/VALIDATION (SOILS)

An engineer from Geo-Environmental visited the site on several separate occasions prior to, during the remedial works being undertaken and on completion of the works reported herein to check on the progress of the development works.

4.1 Validation inspection of reduced dig (Plots 123-126)

The inspection/validation works to inspect the reduced dig works and the crushed concrete layer of the cover systems installed within the rear garden areas associated with Plots 123-126 was undertaken by a Geo-Environmental Engineer on 11th March 2022. The site diary records and site photographs are presented in Appendix A.

At the time of the visit a reduced dig had been undertaken within the rear garden areas of Plots 123-124, and a layer of crushed concrete with black geotextile and orange high visibility geotextile above, had been installed across the reduced dig area. A reduced dig was in progress within the rear garden areas of Plots 125-126. It should be noted that Geo-Environmental did not supervise the actual reduced dig works but visually inspected upon completion/whilst still in progress. It should be noted that no soft landscaping was evident to the front of these plots, nor is it understood to be proposed. The reduced dig and crushed concrete areas were noted to extend across the entire proposed rear garden of the plots. The crushed concrete layer within Plots 123-124 was found to be 150mm in thickness at the time and points of inspection, and was noted to have been installed across the entire rear garden areas of the plots during the inspection visit.

The materials excavated from these garden areas are understood to have been disposed of off-site under the control of Statom Group. Geo-Environmental understand that the groundworkers (Statom) have copies of waste transfer notes however, Geo-Environmental has not been provided with these to date.

4.2 Validation inspection and sampling of Topsoil and subsoil (cover system) placement (Plots 123-126)

The inspection/validation works of the cover systems installed within the rear garden areas was undertaken by a Geo-Environmental Engineer on 24th March 2022. The visual inspection records including site photographs and logs are presented in Appendix B.

Inspection comprised four locations (Plot 123, Plot 124, Plot 125, and Plot 126). Vertical plastic pipe had been installed by the groundworkers prior to the installation of the Topsoil. This was to confirm the thickness of the soil cover system. The location of all the inspection pits excavated is presented on Figure 4, photographs and site inspection records taken during this inspection visit are presented in Appendix B, which confirm the depth of the installed Topsoil with the cover system installed, along with soil logs of the material encountered. It should be noted that at the point of inspection the turf and the soil likely associated with the turf placement had not been laid within any of the areas of soft landscaping at the time of the inspection.

The inspection confirmed that within the inspection pits, Topsoil was found to be between 500mm and 550mm in thickness within all the inspected areas. It should be noted that the soil cover system only comprised Topsoil, and the Topsoil utilised within Plots 123-126 comprised site-won Topsoil which had previously been deemed suitable for re-use, as reported in the RSVP for the farmyard area (GE16943/RSVP-FY-V6.0/DEC21).

4.3 Topsoil and subsoil analysis of laboratory test results

Notwithstanding the previous testing of site-won Topsoil, three soil samples from Plots 123-126, were submitted for testing for a suite of commonly occurring brownfield contaminants and asbestos screening.



The collected samples were referenced Plot 123 at 0.30m bgl, Plot 124 at 0.20m bgl, and Plot 126 at 0.20m bgl. The laboratory test results are presented within Appendix C.

The results of the analyses were compared to the Suitable for Use Levels (S4ULs) for 'private gardens with home-grown produce' (representative of the proposed development end use), which are summarised in Table 4.1 below:

Determinand	Soil Screening Value (mg/kg)	Sample Max. Conc. (mg/kg)	Below Screening Value?
Arsenic	37	7.8	Yes
Benzo(a)pyrene	2.7	<0.1	Yes
Beryllium	1.7	<1.0	Yes
Boron (Water Soluble)	290	0.9	Yes
Cadmium	11	<0.5	Yes
Chromium (Total)	130	18.4	Yes
Copper	2400	12.1	Yes
Hexavalent Chromium	6	<0.8	Yes
Lead	200	22.0	Yes
Mercury (inorganic)	40	<0.5	Yes
Nickel	180	11.4	Yes
Phenols	110	<6	Yes
Selenium	250	<1.0	Yes
Total Petroleum Hydrocarbons	110	<1.0	Yes
Vanadium	410	28.1	Yes
Zinc	3700	42.7	Yes

Table 4.1 Summary of chemical analyses (Plots 123-126 Inspection Visit 24/03/2022)

The results indicated that all of the determinands tested were below the limiting concentrations set within the Remediation Strategy and Verification Plan (RSVP).

All samples were submitted for asbestos screening and returned with no asbestos fibres identified.

In addition, the results of the speciated hydrocarbon analyses were all returned as either below the laboratory detection limits or below their respective human health screening values for the proposed end use.

A further single validation sample was submitted for a physical and nutrient testing suite. The sample was referenced Plot 124 at 0.20m bgl. The results of the soils tested were compared to the Table 1 from BS3882:2015 entitled 'Specification for Topsoil'. The results are summarised in Table 4.2 below:



Parameters	Limits for Multipurpose Topsoil	Sample Range	Within acceptable Limits?
Maximum Coarse Fragment Content (%) Stones >2mm Stones > 20mm Stones >50mm	30 10 0	To follow	TBC
Mass loss on ignition % Clay 5% to 20%	3 to 20	4.17	Yes
Soil pH	5.5 to 8.5	6.7	Yes
Plant nutrient content Total nitrogen % Extractable phosphate mg/l Extractable potassium mg/l Extractable magnesium mg/l	>0.15 16 to 140 121 to 1500 51 to 600	0.16 58 142 80	Yes
Carbon:nitrogen ratio	<20:1	15:0	Yes
Electrical conductivity $\mu\text{S}/\text{cm}$	<3300	2570	Yes
Potentially Phytotoxic Elements Zn mg/kg Cu mg/kg Ni mg/kg	<200 <135 <110	42.7 12.1 11.4	Yes
Visible contaminants % m/m ...of which plastics % Sharps n/kg	<0.5 <0.25 0	<0.01 <0.01 0	Yes

Table 4.2 Summary of BS8332 Topsoil Analysis (Plots 123-126 Inspection Visit 24/03/2022)

Whilst the results of grading analyses are still awaited, the sample description was a silty loam. The results to date demonstrate that the soils analysed are in accordance with BS3882:2015 Multipurpose Topsoil.



5.0 DISCOVERY STRATEGY

A discovery strategy remains in place throughout the development works on this site. Geo-Environmental has not been made aware of any discoveries having been made to date and thus the strategy, as set out in the RSVP did not require enacting (to the best of our knowledge). However, the strategy remains in place for the remainder of the development works.



6.0 VERIFICATION

In accordance with the Client's instruction, Geo-Environmental undertook routine and independent inspection during key stages of the construction process. The risk mitigation measures in relation to remedial measures for Plots 123-126, have been inspected and were considered to comply with the requirements of the Remediation Strategy and Verification Plan at the point of inspection or defects otherwise noted and subsequently rectified and plots re-inspected. Further plots and validation work for the site will be reported via an updated report or under separate cover in due course.

The inspection of the installed soil cover system was undertaken by Geo-Environmental via the inspection of pre-installed plastic pipes in number of selected locations. There was no visual evidence on the site to indicate that the areas remote from these inspection areas were likely to differ significantly from the inspected areas. However, the confirmation of the presence of a geo-textile membrane, the confirmation of depth and composition Topsoil has only been independently verified by Geo-Environmental within these inspection locations. It has been assumed that these inspection locations are representative of the reused site-won soils within the rear garden areas of Plots 123-126.

Geo-Environmental can only verify the installation of a cover system at the locations and depths inspected at the point and time of inspections. Geo-Environmental accepts no liability for areas that have not been directly inspected or works that have subsequently been undertaken on the site following our inspection visit(s) that may in any way alter or affect the validation works inspected and reported herein.

The report relates solely to the validation of the soil cover system remedial measures installed within Plots 123-126. Validation with respect to the soil cover systems to be installed within remaining plots will be presented under separate cover (or an updated report) in due course.

This report remains the property of Geo-Environmental and the Client has no rights to, or reliance upon this document or supporting documents until such time as payment has been received in full for all invoices for works undertaken in connection with this report.



FIGURES

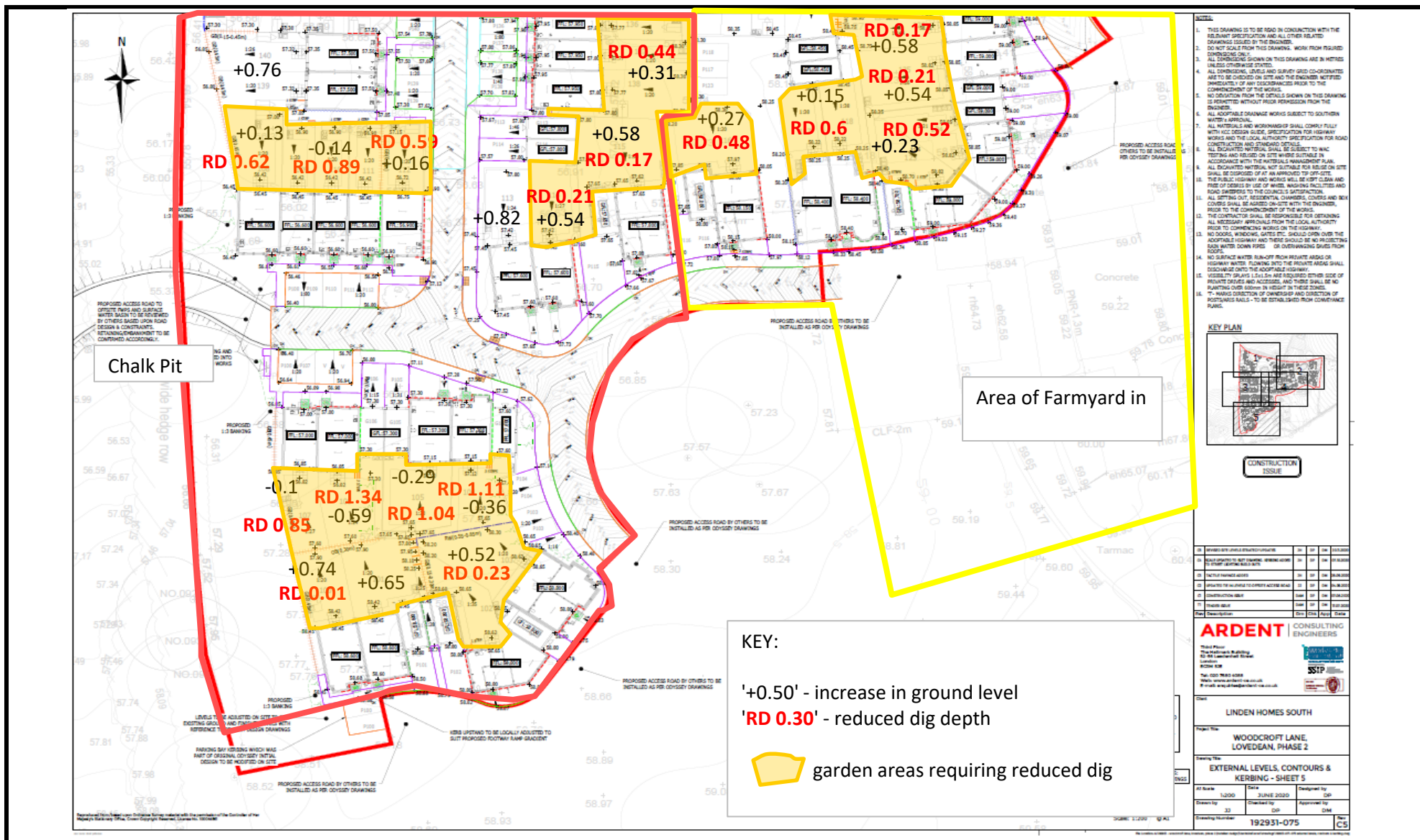




Project:	Woodcroft Farm, Lovedean, PO8 9QA			Title	Site Location Plan	
Client:	Vistry Homes Southern			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE19455	Revision:	0			
Drawn:	FG	Date:	16/06/2021			
Figure:	1	Scale:	Not To Scale			

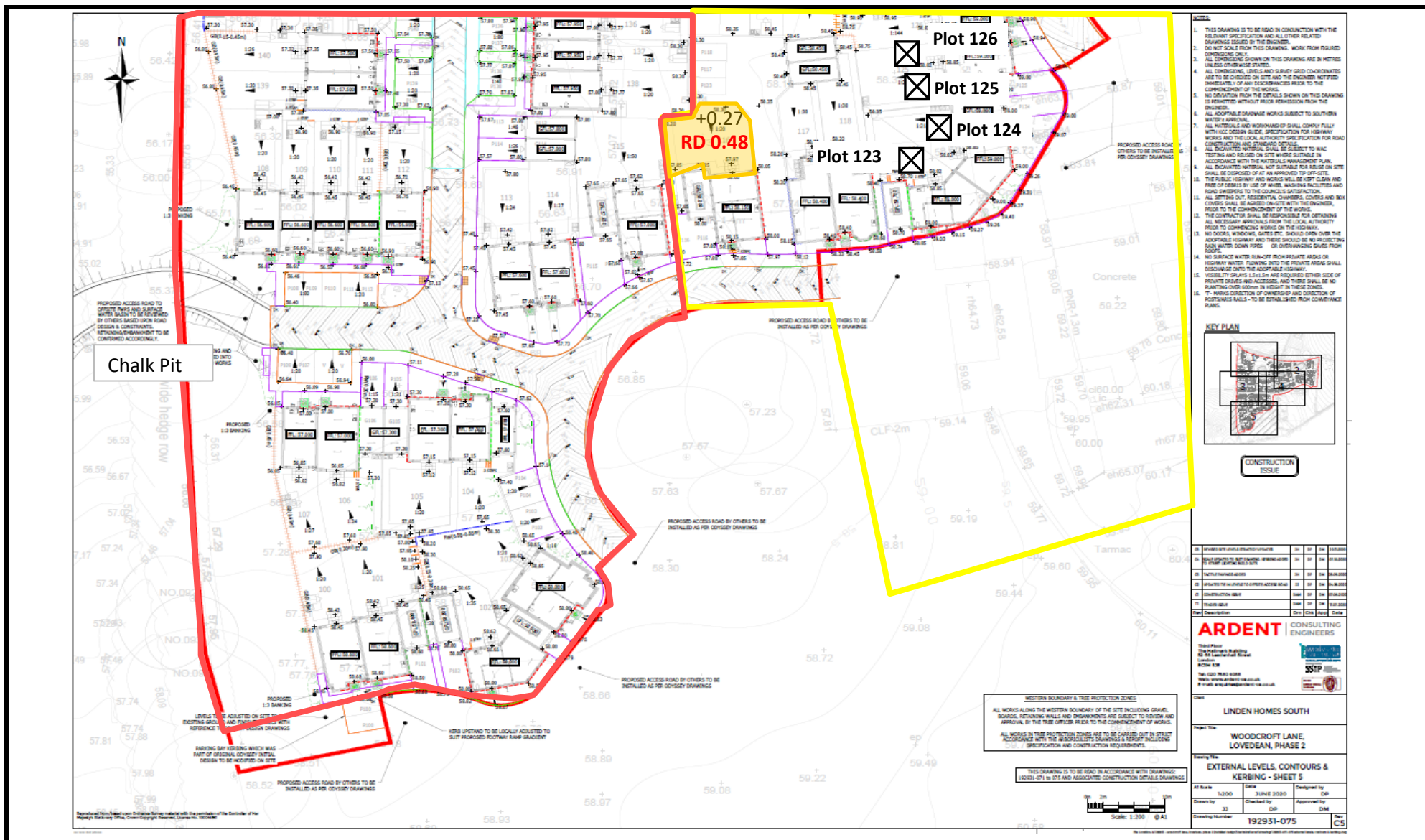


Project:	Woodcroft Farm, Lovedean, PO8 9QA			Title	Areas Requiring Remediation	
Client:	Vistry Homes Southern			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE19455	Revision:	0			
Drawn:	FG	Date:	16/06/2021			
Figure:	2	Scale:	Not To Scale			



Project:	Woodcroft Farm Lovedean PO8 9QA			Title	Development Levels Plan - Phase 3 Farmyard and Chalk Pit		
Client:	Vistry Homes Southern			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net		 Geo-Environmental	
Ref No:	GE19455	Revision:	0				
Drawn:	FG	Date:	10/12/2021				
Figure:	3	Scale:	Not To Scale				





Project:	Woodcroft Farm Lovedean PO8 9QA			Title	Validation Location Plan - Plots 123-126		
Client:	Vistry Homes Southern			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net		 Geo-Environmental	
Ref No:	GE19455	Revision:	0				
Drawn:	FG	Date:	24/03/2022				
Figure:	4	Scale:	Not To Scale				



APPENDIX A

Site Photographs and Site Diary Records



Project No. GE19455

Project Name Woodcroft

Client Vistry

Engineers

 Fiona Goode fiona.goode@gesl.net

Location Lovedean

Date 11/03/2022

(2 records)

Site Diary

<i>Date & Time</i>	<i>Location</i>	<i>Remarks</i>	<i>Weather</i>	<i>Photograph(s)</i>
11/03/2022, 10:07	50° 54' 11.571" N 1° 1' 58.338" W	Reduced dig and crushed concrete in Plots 123-124	Breezy, cool, overcast, damp	
11/03/2022, 10:11	50° 54' 12.483" N 1° 1' 57.973" W	Reduced dig in progress, Plots 125-126	Breezy, cool, overcast, damp	

Time (0 records)



11th March 2022



Plate 1 – Orange geotextile laid over crushed concrete layer on Plot 123



Plate 2 – Orange geotextile laid over crushed concrete layer on Plot 124



Plate 3 – Orange membrane rolled back to reveal crushed layer



Plate 4 – Orange geotextile laid across plots



APPENDIX B

Visual Inspection Records of Soil Cover System Installation



ID	GE19455
Project Name	Woodcroft
Client	Vistry
Engineers	
 Fiona Goode	fiona.goode@gesl.net
Project Manager	
 Fiona Goode	fiona.goode@gesl.net
Location	Lovedean
Date	24/03/2022

Details of Hole

(4 records)

Hole ID	Plot 123
Plot No./Position	Plot 123
Date of Hole	24/03/2022, 15:53
Hole Type	HP
Final Depth	0.5

Ground Conditions

(1 record)

Top Depth	Base Depth	General description of stratum
0	0.5	Brown slightly gravelly CLAY with frequent roots and rootlets Taram beneath

Samples

(1 record)

Top Depth	Base Depth	Sample type	Sample reference
0.3		ES	1

Pass/Fail (X) Pass
() Fail

Photo of Spoil



Photo of hole with tape in place



Photographs

(1 record)

Photograph



Description

Plot 123

Hole ID	Plot 124
Plot No./Position	Plot 124
Date of Hole	24/03/2022, 15:58
Hole Type	HP
Final Depth	0.5

Ground Conditions

(1 record)

Top Depth	Base Depth	General description of stratum
0	0.5	Brown slightly gravelly CLAY with frequent roots and rootlets Taram beneath

Samples

(1 record)

Top Depth	Base Depth	Sample type	Sample reference
0.2		ES	1

Pass/Fail

(X) Pass
() Fail

Photo of Spoil



Photo of hole with tape in place



Photographs

(1 record)

Photograph



Description		Plot 124
Hole ID	Plot 125	
Plot No./Position	Plot 125	
Date of Hole	24/03/2022, 16:02	
Hole Type	HP	
Final Depth	0.5	
Ground Conditions		
(1 record)		
Top Depth	Base Depth	General description of stratum
0	0.5	Brown slightly gravelly CLAY with frequent roots and rootlets Taram beneath

Samples

(1 record)

Top Depth	Base Depth	Sample type	Sample reference
0.15		ES	1

Pass/Fail

(X) Pass

() Fail

Photo of Spoil



Photo of hole with tape in place



Photographs

(1 record)

Photograph



Description

Plot 125

Hole ID	Plot 126
Plot No./Position	Plot 126
Date of Hole	24/03/2022, 16:07
Hole Type	HP
Final Depth	0.55

Ground Conditions

(1 record)

Top Depth	Base Depth	General description of stratum
0	0.55	Brown slightly gravelly CLAY with frequent roots and rootlets Taram beneath

Samples

(1 record)

Top Depth	Base Depth	Sample type	Sample reference
0.2		ES	1

Pass/Fail

(X) Pass

() Fail

Photo of Spoil



Photo of hole with tape in place



Photographs

(1 record)

Photograph



Description

Plot 126

Approved By

 Fiona Goode

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APPENDIX C

Geochemical Laboratory Results





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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 22-39761

Issue: 1

Date of Issue: 11/04/2022

Contact: Fiona Goode

Customer Details: GESL
Unit 7
Danworth Farm
Hurstpierpoint
West Sussex BN6 9GL

Quotation No: Q22-02720

Order No: PO/5142

Customer Reference: GE19455

Date Received: 04/04/2022

Date Approved: 11/04/2022

Details: Woodcroft

Approved by:

Mike Varley, General Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 22-39761, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
273666	Plot 123 0.30	24/03/2022	04/04/2022	Silty loam	f
273667	Plot 124 0.20	24/03/2022	04/04/2022	Silty loam	f
273668	Plot 126 0.20	24/03/2022	04/04/2022	Silty loam	f
273669	Plot 125 0.15	24/03/2022	04/04/2022		



Results Summary

2683

Report No.: 22-39761, issue number 1

ELAB Reference	273666	273667	273668
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	Plot 123	Plot 124	Plot 126
Sample Depth (m)	0.30	0.20	0.20
Sampling Date	24/03/2022	24/03/2022	24/03/2022

Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	10.5	18.5	12.8
Material removed	N	%	0.1	< 0.1	23.6	< 0.1
Description of Inert material removed	N		0	None	Wood/Stones	None
Metals						
Arsenic	M	mg/kg	1	7.3	7.8	6.6
Beryllium	U	mg/kg	1	< 1.0	< 1.0	< 1.0
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	18.4	16.4	15.5
Copper	M	mg/kg	5	8.0	12.1	10.6
Lead	M	mg/kg	5	21.1	22.0	18.2
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	11.3	11.4	9.6
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Vanadium	M	mg/kg	5	25.8	28.1	24.4
Zinc	M	mg/kg	5	38.4	42.7	32.4
Anions						
Water Soluble Chloride	M	mg/kg	40	41	< 40	< 40
Water Soluble Sulphate	M	g/l	0.02	0.05	0.05	0.03
Inorganics						
Carbonate	N	%	0.1	n/t	1.1	n/t
Elemental Sulphur	M	mg/kg	20	< 20	< 20	< 20
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Acid Soluble Sulphate (SO4)	U	%	0.02	0.04	0.04	0.03
Water Soluble Boron	N	mg/kg	0.5	< 0.5	0.6	0.9
Miscellaneous						
Electrical Conductivity (CaSO4 extract)	N	uS/cm	50	n/t	2570	n/t
Carbon Nitrogen Ratio	N	ratio	0.1	n/t	15.0	n/t
Loss on Ignition	M	%	0.01	n/t	4.17	n/t
pH	M	pH units	0.1	6.3	6.7	6.5
Density	N	g/ml	0	n/t	1.18	n/t
Total Carbon	N	%	0.01	n/t	2.4	n/t
Total Organic Carbon	N	%	0.01	1.2	1.3	1.2
Total Nitrogen	N	%	0.01	n/t	0.16	n/t
Extractable Potassium	N	mg/l	20	n/t	142	n/t
Extractable Magnesium	N	mg/l	20	n/t	80	n/t
Extractable Phosphate	N	mg/l	1	n/t	58	n/t
Sand content	NS	%	1	n/t	to follow	n/t
Silt content	NS	%	1	n/t	to follow	n/t
Clay content	NS	%	1	n/t	to follow	n/t
Stones > 2mm	NS	%	1	n/t	to follow	n/t
Stones > 20mm	NS	%	1	n/t	to follow	n/t
Stones > 50mm	NS	%	1	n/t	to follow	n/t
Total Visible Contaminants	N	%	0.01	n/t	< 0.01	n/t
Plastics	N	%	0.01	n/t	< 0.01	n/t
Sharps	N	n/kg	0	n/t	0	n/t
Phenols						
Total Phenols	N	mg/kg	6	< 6	< 6	< 6

Results Summary

Report No.: 22-39761, issue number 1

ELAB Reference	273666	273667	273668
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	Plot 123	Plot 124	Plot 126
Sample Depth (m)	0.30	0.20	0.20
Sampling Date	24/03/2022	24/03/2022	24/03/2022

Determinand	Codes	Units	LOD			
Polyaromatic hydrocarbons						
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	< 0.4
BTEX						
Benzene	M	ug/kg	10	f < 10.0	f < 10.0	f < 10.0
Toluene	M	ug/kg	10	f < 10.0	f < 10.0	f < 10.0
Ethylbenzene	M	ug/kg	10	f < 10.0	f < 10.0	f < 10.0
Xylenes	M	ug/kg	10	f < 10.0	f < 10.0	f < 10.0
MTBE	U	ug/kg	10	f < 10.0	f < 10.0	f < 10.0
TPH CWG						
>C5-C6 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	f < 0.01	f < 0.01	f < 0.01
>C6-C8 Aliphatic (HS_1D_MS)	N	mg/kg	0.01	f < 0.01	f < 0.01	f < 0.01
>C8-C10 Aliphatic (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C10-C12 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C12-C16 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C16-C21 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C21-C35 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C35-C40 Aliphatic (EH_2D_AL)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
Total aliphatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AL)	N	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C5-C7 Aromatic (HS_1D_MS)	N	mg/kg	0.01	f < 0.01	f < 0.01	f < 0.01
>C7-C8 Aromatic (HS_1D_MS)	N	mg/kg	0.01	f < 0.01	f < 0.01	f < 0.01
>C8-C10 Aromatic (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C10-C12 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C12-C16 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C16-C21 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C21-C35 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
>C35-C40 Aromatic (EH_2D_AR)	M	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
Total aromatic hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_AR)	N	mg/kg	1	f < 1.0	f < 1.0	f < 1.0
Total petroleum hydrocarbons (>C5 - C40) (HS_1D_MS+EH_2D_Total)	N	mg/kg	1	f < 1.0	f < 1.0	f < 1.0



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Results Summary
Report No.: 22-39761, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
273666	0.30	Plot 123	Brown sandy soil, stones, organics	No asbestos detected	n/t	n/t	n/t	n/t
273667	0.20	Plot 124	Brown sandy soil, stones, concrete, organics	No asbestos detected	n/t	n/t	n/t	n/t
273668	0.20	Plot 126	Brown sandy soil, stones, organics	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 22-39761, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Acid neutralisation capacity	N	Air dried sample	07/04/2022		
Extractable cations - BS3882	N	Air dried sample	07/04/2022		ICPMS
Visible Contaminants	N		05/04/2022		
Sulphide	N	As submitted sample	05/04/2022	109	Colorimetry
Hexavalent chromium	N	As submitted sample	05/04/2022	110	Colorimetry
pH	M	Air dried sample	11/04/2022	113	Electromeric
Electrical conductivity of soil	N	Air dried sample.	08/04/2022	114	Electromeric
Acid Soluble Sulphate	U	Air dried sample	07/04/2022	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	05/04/2022	118	ICPMS
Phenols in solids	N	As submitted sample	05/04/2022	121	HPLC
Elemental Sulphur	M	Air dried sample	05/04/2022	122	HPLC
Loss on ignition at 450 deg C	M	Air dried sample	08/04/2022	129	Gravimetry
PAH (GC-FID)	M	As submitted sample	05/04/2022	133	GC-FID
Extr. Phos	N	Air dried sample	07/04/2022	140	ICPMS
Water soluble anions	M	Air dried sample	05/04/2022	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	07/04/2022	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	07/04/2022	181	GC-MS
BTEX in solids	M	As submitted sample	07/04/2022	181A	GC-MS
Water soluble boron	N	Air dried sample	05/04/2022	202	Colorimetry
Total cyanide	M	As submitted sample	05/04/2022	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	07/04/2022	210	IR
TPH CWG soil by gc-gc	M	As submitted sample	04/04/2022	271	
Asbestos identification	U	Air dried sample	08/04/2022	280	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 22-39761, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry