Land Adjacent to 24 Jupps Lane
Worthing
West Sussex

Verification Report

Report Beneficiary:
Seaview Building Company
28 Penhill Road
Lancing
West Sussex
BN15 8HJ

Project Reference: C16517

Report Reference: R16139

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Limitations

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All wastes arising from the site works are deemed to have been in the possession of the main contractor, who was responsible for managing and disposing of waste in accordance with Section 34 of the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) Regulations 1991. A full waste audit of the development was beyond the scope of the verification works undertaken by Ashdown Site Investigation Ltd.

TABLE OF CONTENTS

1.	**INTRODUCTION**	**1**
2.	**SITE LOCATION**	**2**
3.	**RISK ASSESSMENT**	**2**
4.	**REMEDIATION STRATEGY**	**2**
5.	**VERIFICATION OF REMEDIATION WORKS**	**3**
6.	**CONCLUSIONS**	**4**
7.	**POST REMEDIATION RISK ASSESSMENT**	**5**
7.1	Basis of Risk Assessment	5
7.2	Post Remediation Conceptual Model	5
8.	**REGULATORY APPROVAL**	**5**

FIGURES AND APPENDICES

FIGURES

Figure 1 Site Location Plan

APPENDIX A

Local Authority Comments

APPENDIX B

Laboratory Test Results

1. INTRODUCTION

This report has been prepared by Ashdown Site Investigation Ltd. following completion of the remediation works at the land to the west of 24 Jupps Lane, Worthing, West Sussex. The works have been carried out as part of the construction of a two-storey detached dwelling with front driveway and rear garden.

Ashdown Site Investigation Ltd. has prepared the following reports for the site:

- Preliminary Ground Contamination Risk Assessment Report[1];
- Quantitative Ground Contamination Risk Assessment Report[2]; and
- Geotechnical Assessment Report[3].

The contamination risk assessments were prepared to support the discharge of planning conditions imposed with respect to contaminated land for the development[4].

Following commencement of construction works, Ashdown Site Investigation Ltd. was commissioned to verify the successful completion of the remedial works set out within the remediation strategy that was included within the quantitative ground contamination risk assessment report.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q12389Rev1, dated 23rd February 2024. The instruction to proceed was received from the client, Seaview Building Company.

This report provides a summary of the investigation and assessment works undertaken at the site, a summary of the agreed remediation strategy, details of the remediation works carried out and records of the verification inspections and testing undertaken.

[1] Project No. P15637, Report No. R15293, dated 27th May 2022.
[2] Project No. P15637, Report No. R15294, dated 5th July 2022.
[3] Project No. P15835, Report No. R15497, dated 1st December 2022.
[4] Worthing Borough Council Planning Application No. AWDM/0099/22, Condition 7

2. SITE LOCATION

The site comprises a rectangular shaped plot of land located to the west of No. 24 Jupps Lane, Worthing, West Sussex, and is centred on the approximate Ordnance Survey national grid reference 511050, 103056. A site location plan is presented as Figure 1.

3. RISK ASSESSMENT

The preliminary ground contamination risk assessment identified the potential for contamination to be present due to historical demolition works on site, and the presence of an electrical substation adjacent to the west of the site. The assessment included a proposal for a ground investigation to assess the identified potential pollutant linkages.

A ground investigation was undertaken in accordance with the proposal, comprising the excavation of a series of hand augered boreholes across the site with associated laboratory testing.

Testing of shallow soils (made ground and topsoil) recorded concentrations of lead and PAH compounds above their respective soil screening values, which were considered to pose an unacceptable risk to end users of the site where the soils may be present in areas of garden or soft landscaping.

4. REMEDIATION STRATEGY

The objective of the remediation works was to sever the pollutant linkages identified by the assessments and thereby reduce the risk to end users of the site to an acceptable level.

To protect end users from shallow soils, either of the following was recommended within the proposed garden area to the rear of the house:

- The removal of all shallow soils (topsoil and made ground); or
- The provision of 600mm of verified "clean" cover soils overlying a high visibility geotextile marker.

Elsewhere on site, it was considered that building cover and hardstanding would act to sever the contaminant pathway and mitigate the risk to end users.

The previous assessments were submitted to the Local Authority in relation to the discharge of Condition 7.

Environmental Health agreed that the remedial measures would protect human health, but that the remedial measures would need to be completed prior to the condition being discharged. A copy of the comments from the Environmental Health officer is included as Appendix A.

5. VERIFICATION OF REMEDIATION WORKS

A site inspection was undertaken on 21st March 2024. The inspection confirmed that all shallow soils (topsoil and made ground) had been removed from the rear garden area to expose the undisturbed River Terrace Deposits beneath.

Photographs of the garden areas taken during the site visit are presented below:



During an earlier site visit on 14th March 2024, a bulk bag of topsoil for use as surface dressing in the rear garden was inspected and sampled. The sample was tested for concentrations of heavy metals, PAH compounds and petroleum hydrocarbons. It was also screened for asbestos. A copy of the laboratory test results is included as Appendix B.

The sample did not record concentrations of any of the heavy metals or PAH compounds above the screening values set out in the remediation strategy.

No visual or olfactory evidence of suspected petroleum hydrocarbon contamination was observed and no detectable concentrations of petroleum hydrocarbons were recorded by the testing.

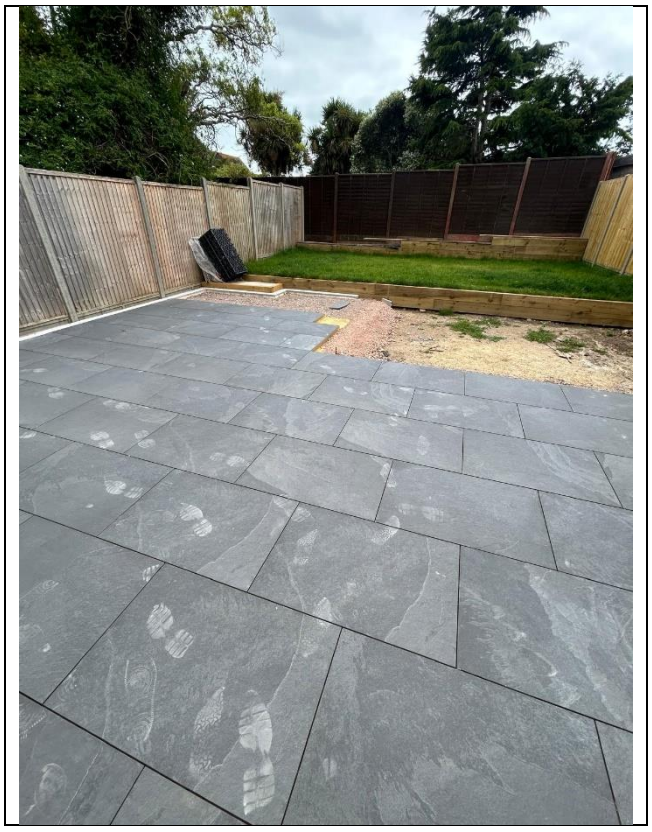
No visual evidence of any asbestos containing materials were noted within the topsoil, and laboratory screening did not record the presence of any asbestos materials.

A photograph of the bulk bag of topsoil is presented below:



6. CONCLUSIONS

A photograph of the completed rear garden, provided by the client is shown below:



The remedial works undertaken within the garden area are in accordance with the recommendations set out in the remediation strategy and are considered to have severed the previously identified pollutant linkages and thereby reduced the level of risk to end users to an acceptable level.

No further contamination investigation, risk assessment or long-term monitoring of the site is considered to be necessary.

7. POST REMEDIATION RISK ASSESSMENT

7.1 Basis of Risk Assessment

The risk assessment considers the potential sources of contamination, the potential receptors, and the pathways by which these may be linked. A complete pollutant linkage is only deemed to exist where all three are present.

A site is considered suitable for use where no complete pollutant linkages are present in relation to the proposed development.

7.2 Post Remediation Conceptual Model

A post remediation conceptual model for the development is presented in the following table.

Table 1. Post Remediation Conceptual Model – Potential Pollutant Linkages and Assessment of Risk

Contaminant Source	Mitigation Measures	Potential Pathway(s)	Assessment of Risk to Human Health
Shallow soils containing elevated concentrations of lead and PAH compounds against their respective soil screening values.	Removal of all topsoil and made ground soils from the rear garden area. Provision of verified "clean" topsoil within soft landscaped areas.	N/A - Source Removed	No significant pollutant linkages identified.
	Provision of building cover, roadways, car parking, patios and hardstanding.	Pathway severed by construction works.	No significant pollutant linkages identified.

8. REGULATORY APPROVAL

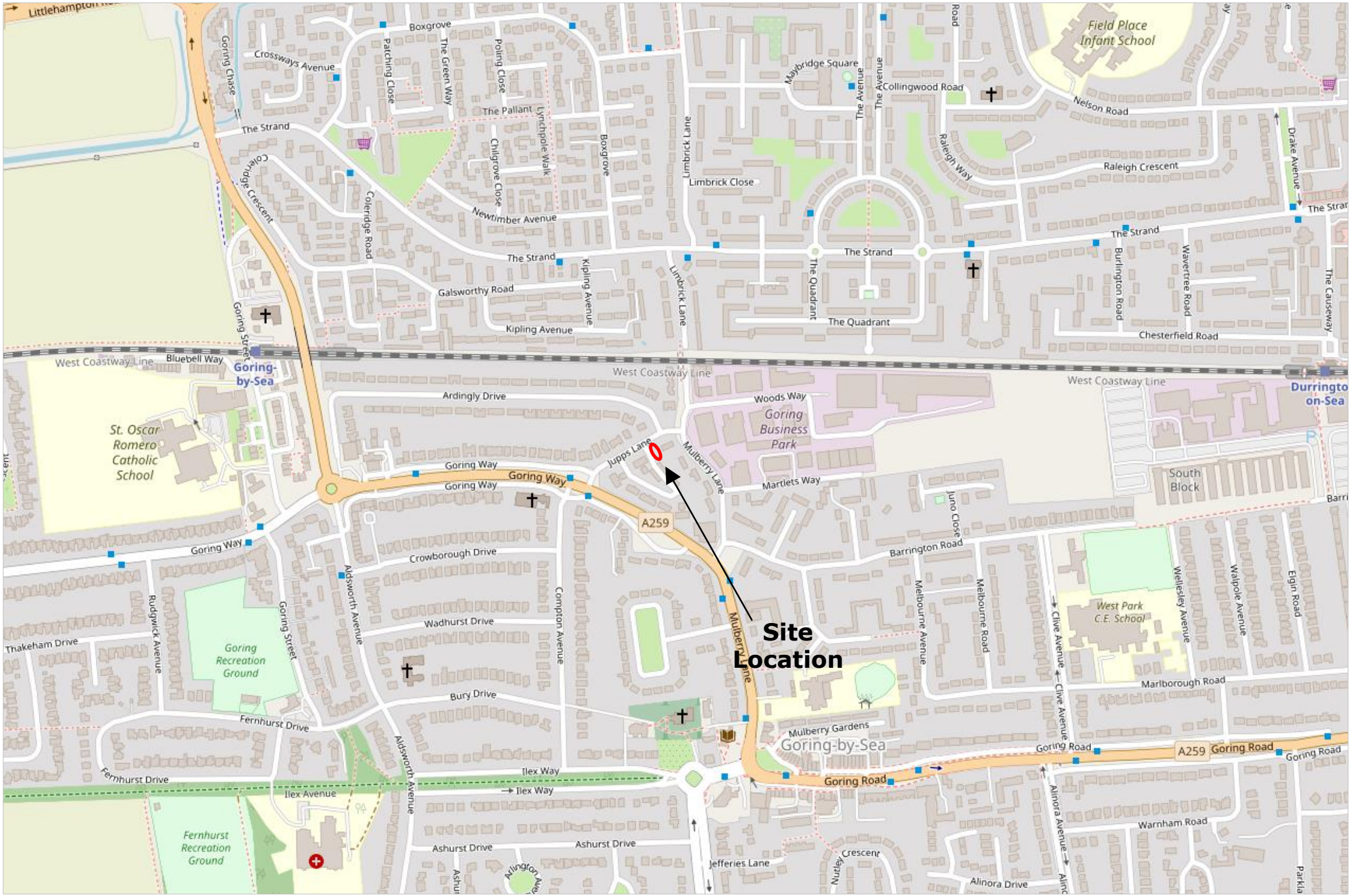
It is recommended that this report is submitted to the Local Authority in relation to the discharge of Condition 7.

The report should be considered as provisional until such time as the report has been approved and the condition discharged.

Ashdown Site Investigation Ltd.

FIGURES

Figure 1 Site Location Plan



ASHDOWN SITE INVESTIGATION LIMITED	Site Location Plan	Site Name	Figure No.	Project Reference
		Land adjacent to 24 Jupps Lane, Worthing, West Sussex	1	C16517

APPENDIX A

Local Authority Comments

From: planning@adur-worthing.gov.uk
Sent: 23 August 2023 12:55
To: planning@adur-worthing.gov.uk
Subject: Consultee Comments for Planning Application AWDM/0974/22

Consultee comments

Dear Sir/Madam,

A consultee has commented on a Planning Application. A summary of the comments is provided below.

Comments were submitted at 23/08/2023 12:55 PM from Mr Oliver Rochford ([redacted]) on behalf of Environmental Health Public Health.

Application Summary

Reference:	AWDM/0974/22
Address:	24 Jupps Lane Worthing West Sussex BN12 4TT
Proposal:	Application for Approval of Details Reserved by Condition 03 (Details of Surface Water Drainage), Condition 07 (Contamination Risk Assessment); Condition 10 (Noise Protection Measures) and Condition 11 (Schedule of Materials and Finishes) of previously approved AWDM/0099/22.|cr||cr|
Case Officer:	Gary Peck

Click for further information

Comments Details

Comments:	With reference to the above application a Quantitative Ground Contaminated Land Risk Assessment Report (ref. R15294 dated 05.07.22) has been submitted under AWDM/0974/22. This investigation identified the presence of both lead and PAH compounds within the shallow soils of the site, both of which exceed the screening values for the intended land use. This report recommended remedial measures are to be undertaken in order to ensure that the site poses no threat to human health. The proposed remedial strategy outlined in the above report appears suitable in protecting human health (Section 6.3). As remedial work has been recommended we are not in a position to recommend the discharge of the relevant planning condition. We await the formal remediation strategy of the works to be undertaken. The reports submitted with this application and any further reports should be forwarded to the Environment Agency for comment.

Kind regards

APPENDIX B

Laboratory Test Results

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Analytical Report Number : 24-009260

Project / Site name:	Jupps Lane, Goring	**Samples received on:**	15/03/2024
Your job number:	C16517_2111	**Samples instructed on/ Analysis started on:**	15/03/2024
Your order number:	11564	**Analysis completed by:**	27/03/2024
Report Issue Number:	1	**Report issued on:**	27/03/2024
Samples Analysed:	1 soil sample		

Signed: Izabela Wójcik

Izabela Wójcik
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-009260
Project / Site name: Jupps Lane, Goring
Your Order No: 11564

Lab Sample Number				146027
Sample Reference				TS101
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				14/03/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	14
Total mass of sample received	kg	0.1	NONE	1.6
Asbestos				
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	JBH
General Inorganics				
pH (L099)	pH Units	N/A	MCERTS	8.9
Organic Matter (automated)	%	0.1	MCERTS	1.9
Speciated PAHs				
Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.13
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.14
Pyrene	mg/kg	0.05	MCERTS	0.12
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.06
Chrysene	mg/kg	0.05	MCERTS	0.07
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.06
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05
Total PAH				
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11
Boron (water soluble)	mg/kg	0.2	MCERTS	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.1
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.6
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	3.4
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	28

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-009260
Project / Site name: Jupps Lane, Goring
Your Order No: 11564

Lab Sample Number				146027
Sample Reference				TS101
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				14/03/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Petroleum Hydrocarbons				
TPH (>C6 - C8) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0
TPH (>C8 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0
TPH (>C10 - C12) EH_CU_1D_TOTAL	mg/kg	2	MCERTS	< 2.0
TPH (>C12 - C16) EH_CU_1D_TOTAL	mg/kg	4	MCERTS	< 4.0
TPH (>C16 - C21) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10
TPH (>C21 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10
TPH Total >C6 - C40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	< 10
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0
TPH (C10 - C40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 24-009260
Project / Site name: Jupps Lane, Goring

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
146027	TS101	None Supplied	None Supplied	Brown sand with vegetation

Analytical Report Number : 24-009260
Project / Site name: Jupps Lane, Goring

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

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

Analytical Report Number : 24-009260
Project / Site name: Jupps Lane, Goring

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total