Our Ref GJB/15542VA/JLJ Your Ref

30 June 2023

Redbourne Homes (Creeting) Ltd Flordon Road Creeting St Mary Ipswich Suffolk IP6 8NH

For the attention of Ralph Daff & Lee Read

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Dear Lee.

SAMPLING AND TESTING OF CLEAN COVER SOILS: ALDER MEADOW, FLORDON ROAD, CREETING ST MARY, SUFFOLK, IP6 8NH - PLOTS 11 - 18

1. Introduction

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The proposed scheme comprises the construction of 52 residential properties, with access roads, hardstanding, communal soft landscaping and private gardens, as outlined in Babergh Mid Suffolk planning application 4188/15, dated 22 December 2015.

The condition relating to contaminated land, Condition 18 stated that:

- (iv) Any remediation work, as may be agreed, shall be carried out in its entirety in accordance with the approved Remediation Scheme and its timetable.
- (v) Following remediation, evidence shall be provided to the Local Planning Authority verifying that remediation has been carried out in accordance with the approved Remediation scheme

A previous Phase 1 Desk Study of the site was undertaken by RSA Geotechnics in April 2015 as part of the original planning application submission (Report Number 14173DS, April 2015). The desk study identified several significant potential sources of contamination, such as made ground, fuel and oil storage and adjacent landfill sites (ground gas). An intrusive Phase II Geotechnical and Geoenvironmental Investigation was recommended, comprising a mixture of shallow and deeper boreholes and trial pits. It was recommended that combined groundwater and ground gas monitoring wells were installed within some of the boreholes and that gas monitoring was undertaken to assess the gassing regime for the site from the potential on-site or off-site sources, as identified by the desk study.

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Directors & Consultants: G J T SOUTHGATE BSc CEng MICE G L DAVIS BSc CEng MIMMM CGeol FGS

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Registered No 1494361 VAT No 344 4442 66

An initial phase of intrusive geotechnical ground investigation was carried out by Ground Technology Services in December 2018, based on a scope by Canham Consulting Ltd (Ground Technology Services Report No. GTS-18-095, December 2018). The investigation comprised five cable percussion boreholes, thirteen trial pits and fifteen in-situ CPTs with associated geotechnical testing. Geoenvironmental investigation and analysis were not considered in the investigation, but it was recommended that these were undertaken. Three of the exploratory holes undertaken (TP01, TP06 and BH5) recorded evidence of hydrocarbon contamination/odour but no testing was carried out.

A supplementary scope for further geoenvironmental investigation was outlined in a Site Contamination Investigation Strategy by Canham Consulting Ltd (Reference 212138) dated March 2019. The strategy recommended that the geoenvironmental investigations were undertaken once all works were terminated on the site and it had been cleared of machinery and storage units. It recommended installing gas/groundwater monitoring boreholes, undertaking gas and groundwater monitoring and testing for various suites of contaminants and compiling the results into an interpretative report, including a preliminary remediation strategy.

The supplementary intrusive geoenvironmental investigation, comprising a series of window sample boreholes and ground gas and groundwater monitoring installations was undertaken by RSA Geotechnics Ltd in January 2020, and reported in RSA Geotechnics Report Number 15542SI, dated 24 February 2020. The investigation found localised hydrocarbon and asbestos contamination in the shallow soils and slightly elevated concentrations of carbon dioxide from the gas monitoring and recommended that further investigation was undertaken.

A further phase of supplementary investigation (RSA Geotechnics Report Number 15542SI2, dated May 2020) was therefore undertaken, comprising three further rounds of ground gas monitoring and a 10 m grid of up to 57 shallow (1 -2 m deep) window sample boreholes across the northern part of the site (Area 2B and 2C), to determine the potential extent of the asbestos impact. Three locations were determined to have significant asbestos impact and were recommended to be remediated for the protection of groundworkers and end users of the development.

Following submission of reports to the Local Authority, it was determined by the Client's consulting engineer, Canham Consulting Limited, that their previously agreed drainage strategy, of stormwater discharge linking to an existing private drain (owned by Highways England) running west beneath the site from the A14, and discharging into the River Gipping via a series of drainage ditches at Alder Carr, was not acceptable to Highways England under the Highways Act 1980, and an alternative stormwater attenuation and soakaway drainage scheme under the SUDS hierarchy was going to have to be adopted.

The proposed stormwater attenuation and soakaway scheme involves the construction of two large crated soakaway attenuation chambers, with an overall area of 110 m2 and an invert level of approximately 2.0 to 2.4 m below existing ground levels. The Flood and Water Engineer at Suffolk County Council was unable to accept the revised proposal in principle, as the change to the agreed surface water drainage strategy was significant, and they referred Canham Consulting Ltd back to the District Council Planning team, as the proposed changes could have other implications. Any soakaways deeper than 2.0 m would also need the acceptance of the Environment Agency as the site is located in a SPZ3 and Drinking Water Safeguard Area (Surface Water).

The Senior Environmental Management Officer at Babergh and Mid Suffolk District Councils subsequently had discussions with Canham Consulting Ltd, and expressed concern over any deeper contamination that could be present beneath the area of the proposed soakaway chamber, below the depths currently assessed by the existing investigations, with the potential for mobilisation of contaminants in the soils and groundwater.

Further investigation was therefore required (under Condition 18) as to the effect of the new scheme on the groundwater beneath the site and the suitability of the soils to accept stormwater via soakaways (under Condition 6).

RSA Geotechnics therefore undertook a further phase of supplementary intrusive investigation (RSA Geotechnics Report Number 15542GI, dated July 2020), the scope of which was agreed with Babergh and Mid-Suffolk District Council, comprising four trial pits at the proposed soakaway chamber locations to determine the thickness of the made ground at the locations and the presence of any contamination in the made ground and underlying deeper natural soils and three deep cable percussion boreholes to 20 m depth with full depth groundwater monitoring wells, with screened sections within the Chalk to obtain groundwater samples for laboratory testing and determine the groundwater flow direction.

No contamination considered to pose an unacceptable risk to Controlled Waters was recorded. A letter received from the Environment Agency, dated 23 October 2020 recommended discharge of the relevant part of Condition 18 in relation to Controlled Waters, based on their review of the submitted RSA Geotechnics Report (15542GI).

BRE DG365 soakage testing was also undertaken in three test pits, located at the locations of the proposed soakaway chambers, to determine the soil infiltration rates (RSA Geotechnics Report Number 15666LT, dated September 2020).

A Remediation Method Statement (RMS), comprising a statement of the remedial measures that were recommended for the proposed development, was prepared and submitted to the local authority for approval under Condition 18 Part iii (RSA Geotechnics Report Number 15542RS, dated December 2020).

Following on from the RMS it was recommended that the inspection of the soils beneath a number of above-ground fuel tanks was undertaken once the removal of the tanks permitted access (adjacent to earlier window sample borehole locations WS13, WS16, WS19), and at the location of a below-ground waste oil tank (adjacent to WS28). A potential hydrocarbon 'hot-spot' where marginally significant hydrocarbon impact was recorded in WS6 during the initial investigation was also to be investigated on a precautionary basis. The further inspections, sampling and testing undertaken at these locations was reported in RSA Geotechnics Letter Report 15542VA, dated 3 September 2020.

The recommendations of the RMS also included the inspection/validation of the three areas recording positive screens for asbestos, with quantifiable concentrations above 0.001% (WS1, WS4 and WS5). The further inspections, sampling and testing undertaken at these locations was reported in RSA Geotechnics Letter Report 15542VA, dated 22 February 2021. The hotspot at WS1 was not investigated as it was understood that ground levels were to be raised in this area, providing a break in pathway, prior to the installation of the additional 600 mm clean cover soil system.

This letter report describes validation sampling and testing of imported clean cover soils associated with soft landscaped areas of Plots 11 - 18 at the above site in June 2023.

The agreed remedial strategy for the site included the provision of a minimum clean cover soil thickness of 600 mm in all soft landscaped areas, including private gardens, over a suitable conspicuous, permeable and resilient 'deter to dig' geotextile barrier membrane, to provide a break in pathway between the residual site soils and end users.

This report has been prepared for the sole internal use and reliance of Redbourne Homes (Creeting) Ltd. This report shall not be relied upon by other parties without the express written authority of RSA Geotechnics Limited. If an unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care and skill.

2. Fieldwork

Site visits were made on 9 June 2023 to obtain samples from imported topsoil and subsoil and to inspect the areas where the soils had been placed. An additional visit was undertaken on 13 June 2023 to sample from a stockpile of topsoil, delivered from a new potential source. The approximate locations of validation sampling are illustrated on attached drawing number 15542VA/1 Ver.B. Photographs taken during the sampling exercise have been attached to this letter report.

A total of eight samples of topsoil and eight samples of subsoil were obtained on the first visit from the validation locations on Plots 11-18. A single composite sample was obtained from the new topsoil source stockpile.

3. Laboratory Testing

Eight samples of topsoil and four samples of subsoil from the first visit and the composite sample of new topsoil were scheduled for chemical analysis to determine concentrations of a suite of commonly occurring determinands in soil, including heavy metals, polycyclic aromatic hydrocarbons (PAH), phenol, cyanide, sulphate and pH. The samples were also submitted for screening for the presence of asbestos. PID screening of each sample headspace was undertaken to measure concentrations of volatile organic compounds and the results are attached. The majority of the concentrations were below the detection limit of the meter, of 0.1 ppm, but ranged from <0.1 to a maximum of 0.7 ppm. No samples were therefore subsequently analysed for TPH. The chemical contamination analyses were carried out between 12 and 22 June 2023 by DETS Ltd, which has UKAS, ISO17025 and MCERTS accreditation.

The results of the laboratory testing are presented in the report certificates appended to this report (DETS Report No: 23-07595 and 23-07804).

4. Discussion of Inspection and Test Results

Information relating to the imported topsoil and subsoil was provided by Redbourne Homes (Creeting) Ltd for review:

- Topsoil Source

Handford Homes Site, Downham Boulevard, Ravenswood, Ipswich IP39UX imported under a Environment Agency U1 Waste Exemption Reference WEX359143 (170504 – Soil and Stone, up to 1000 Tonnes)

- New Topsoil Source

SRC Aggregates (SRC Group) – Crown Quarry, Old Ipswich Road, Ardleigh, Colchester, Essex CO7 7QR – 0 to 15 mm Screened BS3882 Topsoil

- Subsoil Source

TARS (Total Aggregate Recycling Solutions Ltd) – Martins Farm, St Osyth, Essex CO16 8HN – Class 1B Quarried Sand Fill.

The topsoil was generally found to comprise dark brown silty very sandy clayey topsoil with occasional fine-cobble size flint gravel and some roots and rootlets.

The subsoil was generally found to comprise orange-brown fine to coarse sand with a little fine to coarse angular to subrounded flint gravel and rare subrounded flint cobbles.

The results of the laboratory analyses from the samples recovered by RSA Geotechnics from the imported clean cover topsoil and subsoil were compared against generic screening values for a 'residential with homegrown produce' end use, as appropriate for the private soft landscaped area under consideration, with reference to current guidance.

The screening values and the source from which each screening value was derived are presented in Table 1, as appended. For the organic determinands, a soil organic matter content of 2.5% for the topsoil and 1% for the subsoil have been adopted in the derivation of the screening values.

4.1 Human Health

All the soil samples analysed recorded concentrations below the derived Tier 1 screening values, and no asbestos was detected during the laboratory screening of recovered samples.

The source of new topsoil was also found to be suitable for use on a residential development with recorded concentrations below the derived Tier 1 screening values, and no asbestos was detected.

Table 4.1 - C	lean Cover	Thickness Re	quirements	and Inspection	Results	
Location	Topsoil	Subsoil	Total	Clean Cover	Membrane	Compliant
(Plot No.)	Thickness	Thickness	Thickness	Requirement	Present	(Y/N)
	(mm)	(mm)	(mm)	(mm)	(Y/N)	
VA17 (11)	230	530	760		Υ	Υ
VA18 (12)	280	460	740		Υ	Υ
VA19 (13)	300	470	770		Υ	Υ
VA20 (14)	300	470	770	600	Υ	Υ
VA21 (15)	250	390	640		Υ	Υ
VA22 (16)	270	430	700		Υ	Υ
VA23 (17)	270	450	720		Υ	Υ
VA24 (18)	250	450	700		Υ	Υ

Based on the initial inspections, there was more than a sufficient thickness of clean cover soil, on all of the plots. The basal membrane was present in all locations. The clean cover system on the above plots was therefore found to be compliant with the Remediation Method Statement (RMS).

4.2 Plant Health

The analysis did not include testing for soil characteristics to BS 3882 or BS 8601, however the phytotoxic determinands zinc, copper and nickel were compared with the screening values given in BS 3882 of 300, 200 and 110 mg/kg respectively (assuming pH value >7). None of the recorded concentrations exceeded these screening values.

5. Conclusions

Sampling and laboratory analysis of the imported soils by RSA Geotechnics Limited recorded concentrations of determinands to be below Tier 1 human health screening values with no asbestos detected, indicating that both the topsoil and subsoil are chemically appropriate for use in the residential development as part of the clean cover soil system.

Further validation sampling for the incomplete areas of soft landscaping will be required prior to completion and the issue of a final Verification Report for the development.

Samples will be retained for a period of three weeks from the date of this report.

We trust the above letter report will fulfil your present requirements, but should you need further advice or investigation, please contact us again.

Yours sincerely RSA Geotechnics Ltd

Gavin Bell, BSc, MSc, CGeol FGS

Principal Engineer

Adrian Phillips, FGS Technical Director

Encs Photographs taken during inspection visits on 9 June 2023

PID Headspace Screening Results

CGeol

Chemical Contamination Analyses Results (DETS Report No: 23-07595 and 23-07804)

Human Health Screening Values - Table 1

Validation Sample Location Plan – Drawing Number 15542VA/1 Ver.B





VA17 VA18





VA19 VA20

Project FLORDON ROAD, CREETING ST MARY, SUFFOLK

Job No. Date 15542VA JUNE 2023





VA21 VA22





VA23 VA24

Project FLORDON ROAD, CREETING ST MARY, SUFFOLK

Job No. Date 15542VA JUNE 2023

HEADSPACE MONITORING RECORD SHEET

Type of Test: Photoionisation Detector (PID)

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
06/02/2023	VA1	D1 D2	0.20 0.45	<0.1 <0.1
	VA2	D1 D2	0.20 0.50	<0.1 <0.1
	VA3	D1 D2	0.10 0.40	<0.1 <0.1
	VA4	D1 D2	0.10 0.35	<0.1 <0.1
	VA5	D1 D2	0.10 0.40	<0.1 <0.1
	VA6	D1 D2	0.10 0.35	<0.1 <0.1
	VA7	D1 D2	0.20 0.50	<0.1 <0.1
	VA8	D1 D2	0.20 0.40	<0.1 <0.1
13/02/2023	VA3A	D1 D2	0.15 0.50	<0.1 <0.1
	VA4	D1	0.15	<0.1
	VA5A	D1 D2	0.15 0.50	<0.1 0.1
	VA6A	D1 D2	0.15 0.50	<0.1 <0.1
	VA8A	D1	0.25	<0.1
	VA9	D1 D2	0.15 0.50	<0.1 <0.1

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FLORDON ROAD, CREETING ST MARY, SUFFOLK

Job No. 15542VA Date JUNE 2023

HEADSPACE MONITORING RECORD SHEET

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
13/02/2023	VA10	D1 D2	0.15 0.50	<0.1 0.1
	VA11	D1 D2	0.15 0.50	0.1 <0.1
	VA12	D1 D2	0.15 0.50	0.1 0.1
	VA13	D1 D2	0.10 0.40	<0.1 <0.1
	VA14	D1	0.25	<0.1
	VA15	D1 D2	0.15 0.50	<0.1 0.1
	VA16	D1 D2	0.15 0.60	<0.1 0.1
12/06/2023	VA17 – Plot 11	D1 D2	0.10 - 0.20 0.30 - 0.50	<0.1 <0.1
	VA18 – Plot 12	D1 D2	0.10 - 0.20 0.40 - 0.60	<0.1 <0.1
	VA19 – Plot 13	D1 D2	0.10 - 0.20 0.30 - 0.50	<0.1 <0.1
	VA20 – Plot 14	D1 D2	0.20 - 0.30 0.40 - 0.60	<0.1 <0.1
	VA21 – Plot 15	D1 D2	0.10 - 0.20 0.30 - 0.50	0.5 0.7
	VA22 – Plot 16	D1 D2	0.10 - 0.20 0.30 - 0.50	<0.1 <0.1

HEADSPACE MONITORING RECORD SHEET

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
12/06/2023	VA23 – Plot 17	D1 D2	0.10 - 0.20 0.40 - 0.60	<0.1 <0.1
	VA24 – Plot 18	D1 D2	0.10 - 0.20 0.30 - 0.50	<0.1 <0.1
14/06/2023	Topsoil Stockpile	New Source	Composite	<0.1





Gavin Bell RSA Geotechnics Ltd Ashburnham House 1 Maitland Road Lion Barn Estate Needham Market Suffolk IP6 8NZ Derwentside Environmental Testing Services Ltd Unit 1 Rose Lane Industrial Estate Rose Lane Lenham Heath Kent ME17 2JN t: 01622 850410

DETS Report No: 23-07595

Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH

Project / Job Ref: 15542VA

Order No: None Supplied

Sample Receipt Date: 13/06/2023

Sample Scheduled Date: 13/06/2023

Report Issue Number: 1

Reporting Date: 21/06/2023

Authorised by:

Kevin Old Operations Director

10 C

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

Opinions and interpretations are outside the laboratory's scope of ISO 1/025 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.





Soil Analysis Certificate						
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	VA17	VA17	VA18	VA19	VA19
St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	D1	D2	D1	D1	D2
Order No: None Supplied	Depth (m)	0.10 - 0.20	0.30 - 0.50	0.10 - 0.20	0.10 - 0.20	0.30 - 0.50
Reporting Date: 21/06/2023	DETS Sample No	656894	656895	656896	656897	656898

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected				
рН	pH Units	N/a	MCERTS	7.9	7.4	7.5	7.5	8.5
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	62	20	24	22	104
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.02	0.02	0.02	0.10
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Organic Matter (SOM)		< 0.1	MCERTS	0.6	2.1	1.9	2.1	0.7
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.4	1.2	1.1	1.2	0.4
Arsenic (As)	mg/kg	< 2	MCERTS	14	9	8	7	7
Barium (Ba)	mg/kg	< 2.5	MCERTS	23	22	22	22	21
Beryllium (Be)		< 0.5	MCERTS	0.7	< 0.5	< 0.5	< 0.5	< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	13	7	7	7	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	21	10	10	9	15
Lead (Pb)	mg/kg	< 3	MCERTS	15	22	21	25	9
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	17	6	5	5	7
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	30	19	17	17	12
Zinc (Zn)	mg/kg	< 3	MCERTS	78	46	38	35	43
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2





Soil Analysis Certificate						
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	VA20	VA21	VA21	VA22	VA23
St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	D1	D1	D2	D1	D1
Order No: None Supplied	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.60	0.10 - 0.20	0.10 - 0.20
Reporting Date: 21/06/2023	DETS Sample No	656899	656900	656901	656902	656903

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a		Not Detected				
рН	pH Units	N/a	MCERTS	7.6	10.6	8.6	7.8	7.7
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	16	323	118	25	84
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02	0.32	0.12	0.03	0.08
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Organic Matter (SOM)	%	< 0.1	MCERTS	2.2	0.9	0.6	1.5	1.9
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.3	0.5	0.3	0.9	1.1
Arsenic (As)	mg/kg	< 2	MCERTS	11	7	18	6	10
Barium (Ba)	mg/kg	< 2.5	MCERTS	23	44	33	15	53
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.8	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	15	10	5	9
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9	93	14	7	13
Lead (Pb)	mg/kg	< 3	MCERTS	22	27	10	15	19
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	5	14	15	4	9
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	18	15	25	13	24
Zinc (Zn)	mg/kg	< 3	MCERTS	41	244	63	31	46
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	2.4	< 2





Soil Analysis Certificate									
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23						
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied						
Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH	TP / BH No	VA23	VA24						
Project / Job Ref: 15542VA	Additional Refs	D2	D1						
Order No: None Supplied	Depth (m)	0.40 - 0.60	0.10 - 0.20						
Reporting Date: 21/06/2023	DETS Sample No	656904	656905						

Determinand	Unit	RL	Accreditation			
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	
рН	pH Units	N/a	MCERTS	7.5	7.5	
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	57	18	
W/S Sulphate as SO ₄ (2:1)		< 0.01	MCERTS	0.06	0.02	
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	
Organic Matter (SOM)		< 0.1	MCERTS	0.6	2.1	
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.4	1.2	
Arsenic (As)	mg/kg	< 2	MCERTS	14	8	
Barium (Ba)	mg/kg	< 2.5	MCERTS	20	21	
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.7	< 0.5	
W/S Boron		< 1	NONE	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	12	7	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	
Copper (Cu)		< 4	MCERTS	11	8	
Lead (Pb)	mg/kg	< 3	MCERTS	10	20	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	
Nickel (Ni)		< 3	MCERTS	17	5	·
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	·
Vanadium (V)	mg/kg	< 1	MCERTS	30	17	
Zinc (Zn)	mg/kg	< 3	MCERTS	75	36	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	





Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon	TP / BH No	VA17	VA17	VA18	VA19	VA19
Road, Creeting St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	D1	D2	D1	D1	D2
Order No: None Supplied	Depth (m)	0.10 - 0.20	0.30 - 0.50	0.10 - 0.20	0.10 - 0.20	0.30 - 0.50
Reporting Date: 21/06/2023	DETS Sample No	656894	656895	656896	656897	656898

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg		MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.35		< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.34	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.16	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.22	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.27	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.26	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.16	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.15	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	1.9	< 1.6	< 1.6





Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon	TP / BH No	VA20	VA21	VA21	VA22	VA23
Road, Creeting St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	D1	D1	D2	D1	D1
Order No: None Supplied	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.60	0.10 - 0.20	0.10 - 0.20
Reporting Date: 21/06/2023	DETS Sample No	656899	656900	656901	656902	656903

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 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	< 0.1
Phenanthrene	mg/kg		MCERTS	< 0.1	0.29	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.24	0.63	< 0.1	0.13	0.21
Pyrene	mg/kg	< 0.1	MCERTS	0.23	0.60	< 0.1	0.12	0.22
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.11	0.26	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.15	0.33	< 0.1	< 0.1	0.13
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.17	0.39	< 0.1	< 0.1	0.13
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.18	0.38	< 0.1	< 0.1	0.14
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.11	0.21	< 0.1	< 0.1	0.12
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.20		< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3.4	< 1.6	< 1.6	< 1.6





Soil Analysis Certificate - Speciated PAHs					
DETS Report No: 23-07595	Date Sampled	09/06/23	09/06/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Alder Meadow, Flordon	TP / BH No	VA23	VA24		
Road, Creeting St Mary, Suffolk, IP6 8NH					
Project / Job Ref: 15542VA	Additional Refs	D2	D1		
Order No: None Supplied	Depth (m)	0.40 - 0.60	0.10 - 0.20		
Reporting Date: 21/06/2023	DETS Sample No	656904	656905		

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.26		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.24		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.11		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.15		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.20		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.11		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6		





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-07595	
RSA Geotechnics Ltd	
Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH	
Project / Job Ref: 15542VA	
Order No: None Supplied	
Reporting Date: 21/06/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
656894	VA17	D1	0.10 - 0.20	6.8	Light brown sandy clay
656895	VA17	D2	0.30 - 0.50		Brown sandy clay with stones
656896	VA18	D1	0.10 - 0.20		Brown sandy clay with stones and vegetation
656897	VA19	D1	0.10 - 0.20		Brown sandy clay with vegetation
656898	VA19	D2	0.30 - 0.50		Brown sandy clay with stones
656899	VA20	D1	0.20 - 0.30		Brown sandy clay with stones
656900	VA21	D1	0.20 - 0.30	4.7	Brown sandy clay with stones and concrete
656901	VA21	D2	0.40 - 0.60	7.2	Brown sandy clay with stones
656902	VA22	D1	0.10 - 0.20	6.8	Brown sandy clay with stones
656903	VA23	D1	0.10 - 0.20	7.7	Brown sandy clay with stones
656904	VA23	D2	0.40 - 0.60	8.2	Brown sandy clay with stones
656905	VA24	D1	0.10 - 0.20	8.8	Brown sandy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test Insufficient Sample $^{\rm I/S}$ Unsuitable Sample $^{\rm U/S}$





Soil Analysis Certificate - Methodology & Miscellaneous Information DETS Report No: 23-07595

RSA Geotechnics Ltd Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH Project / Job Ref: 15542VA

Order No: None Supplied
Reporting Date: 21/06/2023

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		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	E016
3011			1,5 diphenylcarbazide followed by colorimetry	
Soil	AR			E015
Soil	AR		Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR		Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D		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		Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D		Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	C12-C16, C16-C21, C21-C40)		E004
Soil	D		Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D		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 @ 450oC	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	Hq	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		Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D		Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR		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)		E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
		TPH CWG (ali: C5- C6, C6-C8, C8-C10,		
Soil	AR		Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
			cartridge for C8 to C35. C5 to C8 by headspace GC-MS] l
-		C12-C16 C16-C21 C21-C35)		\vdash
		TPH LQM (ali: C5-C6, C6-C8, C8-C10,		
Soil	AR		Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
3011	AIL	aro: C5-C7, C7-C8, C8-C10, C10-C12,	cartridge for C8 to C44. C5 to C8 by headspace GC-MS	L004
		C12-C16, C16-C21, C21-C35, C35-C44)		
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR		Determination of volatile organic compounds by headspace GC-MS & C8-C10 by GC-FID	E001
	Dried	(00 00 4 00-010)	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

D Dried

AR As Received





List of HWOL Acronyms and Operators

DETS Report No: 23-07595

RSA Geotechnics Ltd

Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH

Project / Job Ref: 15542VA

Order No: None Supplied

Reporting Date: 21/06/2023

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym	





Gavin Bell RSA Geotechnics Ltd Ashburnham House 1 Maitland Road Lion Barn Estate Needham Market Suffolk IP6 8NZ Derwentside Environmental Testing Services Ltd Unit 1 Rose Lane Industrial Estate Rose Lane Lenham Heath Kent ME17 2JN t: 01622 850410

DETS Report No: 23-07804

Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH

Project / Job Ref: 15542VA

Order No: None Supplied

Sample Receipt Date: 15/06/2023

Sample Scheduled Date: 15/06/2023

Report Issue Number: 1

Reporting Date: 22/06/2023

Authorised by:

Kevin Old Operations Director

10 C

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

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Soil Analysis Certificate				
DETS Report No: 23-07804	Date Sampled	13/06/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied		
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	New Source		
St Mary, Suffolk, IP6 8NH				
Project / Job Ref: 15542VA	Additional Refs	D1		
Order No: None Supplied	Depth (m)	None Supplied		
Reporting Date: 22/06/2023	DETS Sample No	657579		

Determinand	Unit	RI	Accreditation			
Asbestos Screen (S)	N/a	N/a		Not Detected		
Ha	pH Units	N/a	MCERTS	8.0		
Total Cyanide	mg/kg	< 1	NONE	< 1		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	580		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.58		
Elemental Sulphur	9	< 10	NONE	< 10		
Organic Matter (SOM)	%	< 0.1	MCERTS	2.4		
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.4		
Arsenic (As)	mg/kg	< 2	MCERTS	8		
Barium (Ba)	mg/kg	< 2.5	MCERTS	43		
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5		
W/S Boron	mg/kg	< 1	NONE	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	11		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	17		
Lead (Pb)	mg/kg	< 3	MCERTS	41		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	8		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	23		
Zinc (Zn)	mg/kg	< 3	MCERTS	64		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		





Soil Analysis Certificate - Speciated PAHs				
DETS Report No: 23-07804	Date Sampled	13/06/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied		
Site Reference: Alder Meadow, Flordon	TP / BH No	New Source		
Road, Creeting St Mary, Suffolk, IP6 8NH				
Project / Job Ref: 15542VA	Additional Refs	D1		
Order No: None Supplied	Depth (m)	None Supplied		
Reporting Date: 22/06/2023	DETS Sample No	657579		

Determinand	Unit	RL	Accreditation			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	0.12		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	0.39		
Pyrene	mg/kg	< 0.1	MCERTS	0.36		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.24		
Chrysene	mg/kg	< 0.1	MCERTS	0.23		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.26		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.11		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.26		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.14		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.13		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.2		





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-07804	
RSA Geotechnics Ltd	
Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH	
Project / Job Ref: 15542VA	
Order No: None Supplied	
Reporting Date: 22/06/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
657579	New Source	D1	None Supplied	7.3	Brown sandy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test Insufficient Sample $^{\rm I/S}$ Unsuitable Sample $^{\rm I/S}$





Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-07804

RSA Geotechnics Ltd

Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH

Project / Job Ref: 15542VA

Order No: None Supplied

Reporting Date: 22/06/2023

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		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	E016
			1,5 diphenylcarbazide followed by colorimetry	
Soil	AR			E015
Soil	AR		Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR		Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D		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		Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D		Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	C12-C16, C16-C21, C21-C40)		E004
Soil	D		Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D		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 @ 450oC	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		E008
Soil	D		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		Determination of phenols by distillation followed by colorimetry	E021
Soil	D		Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D		Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR		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)		E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
		TPH CWG (ali: C5- C6, C6-C8, C8-C10,		
Soil	AR	C10-C12, C12-C16, C16-C21, C21-C34,	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
3011	AK		cartridge for C8 to C35. C5 to C8 by headspace GC-MS	EUU4
		TPH LQM (ali: C5-C6, C6-C8, C8-C10,	Determination of havana lacatons autrastable hydrocarbane by CC FID freetimeting with CDF	
Soil	AR		Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
			cartridge for C8 to C44. C5 to C8 by headspace GC-MS	
		C12-C16, C16-C21, C21-C35, C35-C44)		
Soil	AR	VOCs		E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001
	Dried			

D Dried AR As Received





List of HWOL Acronyms and Operators

DETS Report No: 23-07804

RSA Geotechnics Ltd

Site Reference: Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH

Project / Job Ref: 15542VA

Order No: None Supplied

Reporting Date: 22/06/2023

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym	

GENERIC SCREENING VALUES ADOPTED IN THE ASSESSMENT

HUMAN HEALTH SCREENING VALUES

<u>Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use</u>

Tuble 1 Son Servering Values, Nes	naciitiai witi	irriomegrovi	miniodace El	<u>10 030</u>		
Determinand	Screening Value (mg/kg) Source					
	Soil Organic Matter Content		Content			
	1%	2.5%	6%			
Arsenic	37	37	37	LQM/CIEH 2015		
Barium	1300*	1300*	1300*	CL:AIRE GAC 2010		
Beryllium	1.7	1.7	1.7	LQM/CIEH 2015		
Boron	290	290	290	LQM/CIEH 2015		
Cadmium	11	11	11	LQM/CIEH 2015		
Chromium (III)	910	910	910	LQM/CIEH 2015		
Chromium (VI)	6	6	6	LQM/CIEH 2015		
Copper	2400	2400	2400	LQM/CIEH 2015		
Lead	200	200	200	DEFRA 2014		
Mercury	40	40	40	LQM/CIEH 2015		
Nickel	130	130	130	LQM/CIEH 2015		
Selenium	250	250	250	LQM/CIEH 2015		
Vanadium	410	410	410	LQM/CIEH 2015		
Zinc	3700	3700	3700	LQM/CIEH 2015		
Cyanide	34	34	34	ATRISK SOIL		
Phenol	120	200	380	LQM/CIEH 2015**		
Benzene	0.087	0.17	0.37	LQM/CIEH 2015**		
Toluene	130	290	660	LQM/CIEH 2015**		
Ethylbenzene	47	110	260	LQM/CIEH 2015**		
Xylenes	56	130	310	LQM/CIEH 2015**		
MTBE	49	84	160	CL:AIRE GAC 2010		
TPH CWG - Aliphatic >C5-C6	42	78	160	LQM/CIEH 2015**		
TPH CWG - Aliphatic >C6-C8	100	230	530	LQM/CIEH 2015**		
TPH CWG - Aliphatic >C8-C10	27	65	150	LQM/CIEH 2015**		
TPH CWG - Aliphatic >C10-C12	130	330	760	LQM/CIEH 2015**		
TPH CWG - Aliphatic >C12-C16	1100	2400	4300	LQM/CIEH 2015**		
TPH CWG - Aliphatic >C16-C35	65000	92000	110000	LOM/CIEH 2015**		
TPH CWG - Aliphatic >C35-C44	65000	92000	110000	LQM/CIEH 2015**		
TPH CWG - Aromatic >C5-C7	70	140	300	LOM/CIEH 2015**		
TPH CWG - Aromatic > C7-C8	130	290	660	LQM/CIEH 2015**		
TPH CWG - Aromatic > C8-C10	34	83	190	LOM/CIEH 2015**		
TPH CWG - Aromatic > C10-C12	74 140	180	380	LQM/CIEH 2015** LQM/CIEH 2015**		
TPH CWG - Aromatic >C12-C16 TPH CWG - Aromatic >C16-C21	140 260	330 540	660 930	LQM/CIEH 2015**		
TPH CWG - Aromatic >C10-C21 TPH CWG - Aromatic >C21-C35	1100	1500	930 1700	LQM/CIEH 2015 LQM/CIEH 2015**		
TPH CWG - Aromatic >C21-C35 TPH CWG - Aromatic >C35-C44	1100	1500	1700	LQM/CIEH 2015**		
II II GVVO - AIOIIIAUG 2000-044	1100	1500	1700	EQIVI/CILIT ZUTO		

<u>Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use continued</u>

Determinand	Screening	Value (mg/l	kg)	Source
	Soil Orgar			
	1%	2.5%	6%	
Naphthalene	2.3	5.6	13	LQM/CIEH 2015**
Acenaphthylene	170	420	920	LQM/CIEH 2015**
Acenaphthene	210	510	1100	LQM/CIEH 2015**
Fluorene	170	400	860	LQM/CIEH 2015**
Phenanthrene	95	220	440	LQM/CIEH 2015**
Anthracene	2400	5400	11000	LQM/CIEH 2015**
Fluoranthene	280	560	890	LQM/CIEH 2015**
Pyrene	620	1200	2000	LQM/CIEH 2015**
Benzo(a)anthracene	7.2	11	13	LQM/CIEH 2015**
Chrysene	15	22	27	LQM/CIEH 2015**
Benzo(b)fluoranthene	2.6	3.3	3.7	LQM/CIEH 2015**
Benzo(k)fluoranthene	77	93	100	LQM/CIEH 2015**
Benzo(a)pyrene	2.2	2.7	3.0	LQM/CIEH 2015**
Indeno(1,2,3-cd)pyrene	27	36	41	LQM/CIEH 2015**
Di-benzo(a,h)anthracene	0.24	0.28	0.3	LQM/CIEH 2015**
Benzo(g,h,i)perylene	320	340	350	LQM/CIEH 2015**
Chlaramathara	0.0002	0.0000	0.012	CLAIDE CAC 2010
Chloromethane	0.0083 8.3	0.0098 11	0.013 18	CL:AIRE GAC 2010
Chloroethane	0.00064	0.00087	0.0014	CL:AIRE GAC 2010 LQM/CIEH 2015**
Vinyl Chloride	0.00064		0.0014	CL:AIRE GAC 2010
1,1-dichloroethene	0.23 0.11	0.4 0.19	0.82	CL:AIRE GAC 2010 CL:AIRE GAC 2010
Cis-1,2-dichloroethene 1,1-dichloroethane	2.4	3.9	0.37 7.4	CL:AIRE GAC 2010 CL:AIRE GAC 2010
Trichloromethane	0.91	1.7	3.4	LQM/CIEH 2015**
1,1,1-Trichloroethane	8.8	1.7	3.4	LQM/CIEH 2015**
Trans-1,2-dichloroethene	0.19	0.34	0.7	CL:AIRE GAC 2010
Tetrachloromethane	0.026	0.056	0.7	LQM/CIEH 2015**
1,2-dichloropropane	0.024	0.030	0.13	CL:AIRE GAC 2010
Trichloroethene	0.016	0.042	0.075	LQM/CIEH 2015**
Bromodichloromethane	0.016	0.03	0.061	CL:AIRE GAC 2010
1,1,2-Trichloroethane	0.6	1.2	2.7	CL:AIRE GAC 2010
Tetrachloroethene	0.18	0.39	0.9	LQM/CIEH 2015**
Chlorobenzene	0.46	1	2.4	LQM/CIEH 2015**
1,1,1,2-Tetrachloroethane	1.2	2.8	6.4	LQM/CIEH 2015**
Styrene	8.1	19	43	CL:AIRE GAC 2010
1,1,2,2-Tetrachloroethane	1.6	3.4	7.5	LQM/CIEH 2015**
Isopropylbenzene	11	27	64	CL:AIRE GAC 2010
Bromobenzene	0.87	2	4.7	CL:AIRE GAC 2010
N-Propylbenzene	34	82	190	CL:AIRE GAC 2010
1,2,4-Trimethylbenzene	0.35	0.85	2	CL:AIRE GAC 2010
1,2,3-Trichlorobenzene	1.5	3.6	8.6	LQM/CIEH 2015**
1,3-Dichlorobenzene	0.4	1	2.3	LQM/CIEH 2015**
1,2-Dichlorobenzene	23	55	130	LQM/CIEH 2015**
1,4-Dichlorobenzene	61	150	350	LQM/CIEH 2015**
Hexachloroethane	0.2	0.48	1.1	CL:AIRE GAC 2010

<u>Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use continued</u>

Determinand	Screenin	ig Value (mg	Source	
	Soil Orga	anic Matter		
	1%	2.5%	6%	
2,4-Dimethylphenol	19	43	97	CL:AIRE GAC 2010
1,2,4-Trichlorobenzene	2.6	6.4	15	LQM/CIEH 2015**
Hexachlorobutadiene	0.29	0.7	1.6	LQM/CIEH 2015**
2-Chloronaphthalene	3.7	9.2	22	CL:AIRE GAC 2010
2,6-Dinitrotoluene	0.78	1.7	3.9	CL:AIRE GAC 2010
2,4-Dinitrotoluene	1.5	3.2	7.2	CL:AIRE GAC 2010
Diethyl phthalate	120	260	570	CL:AIRE GAC 2010
Hexachlorobenzene	1.8	3.3	4.9	LQM/CIEH 2015**
Butyl benzyl phthalate	1400	3300	7200	CL:AIRE GAC 2010
Di-n-octylphthalate	2300	2800	3100	CL:AIRE GAC 2010
Bis(2-ethylhexyl)phthalate	280	610	1100	CL:AIRE GAC 2010
Pentachlorophenol	0.22	0.52	1.2	LQM/CIEH 2015**

^{*} Based on residential without home grown produce

^{**} Assumes no free product

