Our Ref GJB/15542VA/JLJ Your Ref

19 December 2023

Redbourne Homes (Creeting) Ltd Flordon Road Creeting St Mary Ipswich Suffolk IP6 8NH ASHBURNHAM HOUSE 1 MAITLAND ROAD LION BARN ESTATE NEEDHAM MARKET SUFFOLK IP6 8NZ Telephone (01449) 723 723 Fax (01449) 723 907 www.rsa-geotechnics.co.uk

For the attention of Ralph Daff & Dominic Gravener

By Email only – <u>r.daff@terrasite.co.uk</u>, <u>d.gravener@redbournehomes.com</u>,

Dear Dominic,

# SAMPLING AND TESTING OF CLEAN COVER SOILS: ALDER MEADOW, FLORDON ROAD, CREETING ST MARY, SUFFOLK, IP6 8NH - PLOTS 34 AND 48 DEPTH CHECKS

### 1. Introduction

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.

> Directors: **P A GAWNE** BSc MSc DIC FGS **A M PHILLIPS** FGS **A J SYMIS** Eng Tech TMICE FGS Directors & Consultants: **G J T SOUTHGATE** BSc CEng MICE **G L DAVIS** BSc CEng MIMMM CGeol FGS Registered Office: Ashburnham House 1 Maitland Road Needham Market Suffolk IP6 8NZ 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).

Page 2

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 depth checks of imported clean cover soils associated with soft landscaped areas of Plots 34 and 48 at the above site in December 2023. The material used for these plots was from the same stockpiles as those tested previously in RSA Geotechnic's Letter Report 15542VA, dated 19 October 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

A site visit was made on 15 December 2023 to inspect areas where previously tested topsoil and subsoil had been placed (Plots 34 and 48). The approximate locations of validation sampling are illustrated on attached drawing number 15542VA/1 Ver.D. Photographs taken during the validation exercise have been attached to this letter report.

### 3. Laboratory Testing

Five samples of topsoil and six samples of subsoil from existing stockpiles were previously 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 topsoil concentrations were below the detection limit of the meter, of 0.1 ppm, but the subsoil ranged from 0.2 ppm to a maximum of 0.4 ppm. No samples were therefore subsequently analysed for TPH or VOC. The chemical contamination analyses were carried out between 14 August and 17 October 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: 23-10384 and 23-12603).

### 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 light and dark brown silty very sandy clayey topsoil with occasional to some fine-cobble size flint gravel and some roots and rootlets.

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

The results of the laboratory analyses from the samples recovered by RSA Geotechnics from the stockpiled 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 areas and adoptable/general hardstanding 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 1% for the topsoil and subsoil have been adopted in the derivation of the screening values.

### 4.1 Human Health

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

RSA Geotechnics returned to site on the 15 December 2023 to undertake depth checks on completed clean cover soil systems on Plots 34 and 48. The below table and attached photographs highlight the inspection results.

Table 4.1 - Clean Cover Thickness Requirements and Inspection Results											
Location	Topsoil	Subsoil	Total	Clean Cover	Membrane Present	Compliant					
(Plot No.)	Thickness	Thickness	Thickness	Requirement	(Y/N)	(Y/N)					
	(mm)	(mm)	(mm)	(mm)							
VA31 (34)	750	>50	>800		Previously observed.	Y					
				600	Not found by 0.8 m						
VA32 (48)	200	450	650		Y	Y					

Based on the initial inspections, there was more than a sufficient thickness of clean cover soil on both of the completed plots. The basal membrane was present in all locations (Found by excavation (Plot 48) and observed previously prior to placement of subsoil and topsoil (Plot 34). 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

Previous 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 stockpiled topsoil and subsoil are chemically appropriate for use in the residential development as part of the clean cover soil system.

Further validation sampling and depth checks 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

CGeol

Gavin Bell, BSc, MSc, CGeol FGS Principal Engineer

Adrian Phillips, FGS Technical Director

Encs Photographs taken during inspection visit on 15 December 2023 PID Headspace Screening Results Chemical Contamination Analyses Results (DETS Report No: 23-10384 and 23-12603) Human Health Screening Values – Table 1 Validation Sample Location Plan – Drawing Number 15542VA/1 Ver.D

### PAGE 1 of 1





VA31 – Plot 34



VA31 – Plot 34



VA32 – Plot 48



VA32 – Plot 48

15542VA DECEMBER 2023

### HEADSPACE MONITORING RECORD SHEET

Type of Test: Photoionisation Detector (PID)

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
11/08/23	VA1	D1	0.6	0.3
	VA2	D1	0.6	0.4
	VA3	D1	0.6	0.4
	VA4	D1	0.8	0.2
	VA5	D1	0.8	0.3
	VA6	D1	0.6	0.4
	VA7	D1	0.9	0.4
	VA8	D1	0.9	0.4
	VA9	D1	0.8	0.4
	VA10	D1	0.7	0.4
10/10/23	TSSPVA1	D1	Composite	<0.1
	TSSPVA2	D1	Composite	<0.1
	TSSPVA3	D1	Composite	<0.1
	TSSPVA4	D1	Composite	<0.1
	TSSPVA5	D1	Composite	<0.1
	T1ASP	D1	Composite	<0.1
	T1CSP	D1	Composite	<0.1



Phil Gawne 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: 23-10384

Site Reference:	Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH
Proiect / Job Ref:	15542VA
Order No:	None Supplied
Sample Receipt Date:	14/08/2023
Sample Scheduled Date:	14/08/2023
Report Issue Number:	1
Reporting Date:	22/08/2023

Authorised by:

Mun // Dave Ashworth Technical Manager

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

Opinions and interpretations are outside the laboratory's scope of 15O 17025 accreditation. I his 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: 23-10384	Date Sampled	11/08/23	11/08/23	11/08/23	11/08/23	11/08/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	Subsoil	Subsoil	Subsoil	Subsoil	Subsoil
St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	VA1	VA3	VA5	VA6	VA8
Order No: None Supplied	Depth (m)	0.60	0.60	0.80	0.60	0.90
Reporting Date: 22/08/2023	DETS Sample No	669463	669464	669465	669466	669467

	T							
Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	IS017025	Not Detected				
pH	pH Units	N/a	MCERTS	8.6	8.7	8.4	8.6	8.3
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	55	45	34	36	< 10
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	0.05	0.05	0.03	0.04	< 0.01
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Organic Matter (SOM)	%	< 0.1	MCERTS	0.4	0.5	0.4	0.2	0.2
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.2	0.3	0.3	0.1	0.1
Arsenic (As)	mg/kg	< 2	MCERTS	6	6	5	2	3
Barium (Ba)	mg/kg	< 2.5	MCERTS	16	20	11	11	7
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	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	5	6	4	2	2
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	6	11	5	< 4	< 4
Lead (Pb)	mg/kg	< 3	MCERTS	6	7	4	< 3	< 3
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	5	5	4	< 3	< 3
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	9	8	6	4	4
Zinc (Zn)	mg/kg	< 3	MCERTS	19	29	14	12	7
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

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



### **DETS Ltd** Unit 1, Rose Lane Industrial Estate Rose Lane Lenham Heath Maidstone Kent ME17 2JN Tel: 01622 850410



Soil Analysis Certificate						
DETS Report No: 23-10384			Date Sampled	11/08/23		
RSA Geotechnics Ltd			Time Sampled	None Supplied		
Site Reference: Alder Meadow, Flo	rdon Road, Creeting		TP / BH No	Subsoil		
St Mary, Suffolk, IP6 8NH						
Project / Job Pef: 15542VA			Additional Pefe	VA10	 	ł
Order No: None Supplied		,	Depth (m)	0.70		
Reporting Date: 22/08/2023		D	ETS Sample No	669468		1
,,,,,,,				000100		
Determinand	Unit	RL	Accreditation			
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected		
pH	pH Units	N/a	MCERTS	8.7		
Total Cyanide	mg/kg	< 1	NONE	< 1		
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10		
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01		
Elemental Sulphur	mg/kg	< 10	NONE	< 10		
Organic Matter (SOM)	%	< 0.1	MCERTS	0.3		
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.2		
Arsenic (As)	mg/kg	< 2	MCERTS	3		
Barium (Ba)	mg/kg	< 2.5	MCERTS	8		
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	3	-	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	-	
Copper (Cu)	mg/kg	< 4	MCERTS	< 4		
Lead (PD)	mg/kg	< 3	MCERTS	< 3		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	 	
NICKEI (NI)	ing/kg	< 3	MCEDIC	< 3		ł
Vanadium (A)	mg/kg	< 2	MCERTS	< 2		ł
	nig/kg	< 1	MCEDIC	4		l
ZINC (ZN)	mg/kg	< 3	PICERIS	11		

Total Phenols (monohydric) mg/kg < 2 NONE < 2 Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion Subcontracted analysis (S)





Soil Analysis Certificate	- Speciated PAHs							
DETS Report No: 23-103	84		Date Sampled	11/08/23	11/08/23	11/08/23	11/08/23	11/08/23
RSA Geotechnics Ltd			Time Sampled	None Supplied				
Site Reference: Alder Me	adow, Flordon		TP / BH No	Subsoil	Subsoil	Subsoil	Subsoil	Subsoil
Road, Creeting St Mary, S	uffolk, IP6 8NH							
Project / Job Ref: 15542	VA	4	Additional Refs	VA1	VA3	VA5	VA6	VA8
Order No: None Supplied			Depth (m)	0.60	0.60	0.80	0.60	0.90
Reporting Date: 22/08/2	2023	D	ETS Sample No	669463	669464	669465	669466	669467
-								
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	< 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	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 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	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 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	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6





Soil Analysis Certificate	- Speciated PAHs						
DETS Report No: 23-103	84		Date Sampled	11/08/23			
RSA Geotechnics Ltd			Time Sampled	None Supplied			
Site Reference: Alder Me	adow, Flordon		TP / BH No	Subsoil			
Road, Creeting St Mary, S	uffolk, IP6 8NH						
Project / Job Ref: 15542	VA		Additional Refs	VA10		-	
Order No: None Supplied			Deptn (m)	0.70			
Reporting Date: 22/08/2	023	D	ETS Sample No	669468			
			A				
Determinand	Unit	RL	Accreditation		1	1	T
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	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6			





Soil Analysis Certificate -	<ul> <li>Sample Description</li> </ul>	ins			
DETS Report No: 23-10384	4				
RSA Geotechnics Ltd					
Site Reference: Alder Mean	dow, Flordon Road, C	Creeting St Mary, St	Suffolk, IP6 8NF	1	
Project / Job Ref: 15542V	A				
Order No: None Supplied					
Reporting Date: 22/08/20	23				
DETS Sample No	TP / BH No	Additional Refs	Denth (m)	Moisture	Sample Matrix Description

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Content (%)	Sample Matrix Description
669463	Subsoil	VA1	0.60	7.4	Brown sandy clay
669464	Subsoil	VA3	0.60	9.2	Brown sandy clay
669465	Subsoil	VA5	0.80	8.5	Brown sandy clay
669466	Subsoil	VA6	0.60	6.1	Brown sandy clay
669467	Subsoil	VA8	0.90	5.6	Brown sandy clay
669468	Subsoil	VA10	0.70	4.9	Brown sandy clay with stones

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





Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-10384
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: 22/08/2023

Matrix	Analysed	Determinand	Brief Method Description	Method
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 bot water extract followed by ICP-OFS	F012
Soil	AR	BOION Water Soluble	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1.5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12,	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by	E004
Ceil	D	C12-C16, C16-C21, C21-C40)	headspace GC-MS	E000
Soll	D	Fluoride - Waler Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027 E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	F029
0011	743		Determination of fraction of organic carbon by oxidising with potassium dichromate followed by	2025
Soil	D	FOC (Fraction Organic Carbon)	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	ΔR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	F004
5011	743		cartridge	2001
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soll	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soll	AR	Phenois - Total (mononydric)	Determination of phenois by distillation followed by colorimetry	E021
Soil		Sulphate (as SO4) - Total	Determination of prospirate by extraction with water & analysed by ion chromatography	E009 E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E015
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble subhate by extraction with water followed by ICP-OES	F014
Soil	AR	Sulphace (do Sol 1) Match Soluble (211)	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with agua-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 pitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) suppare	E010
		TPH CWG (ali: C5- C6, C6-C8, C8-C10,		
Cail		C10-C12, C12-C16, C16-C21, C21-C34,	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	F004
5011	AK	aro: C5-C7, C7-C8, C8-C10, C10-C12,	cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
		C12-C16, C16-C21, C21-C35)		
		TPH LOM (ali: C5-C6, C6-C8, C8-C10.		
		C10-C12, C12-C16, C16-C35, C35-C44	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPF	
Soil	AR	aro: C5-C7, C7-C8, C8-C10, C10-C12	cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
		$C_{12}$ - $C_{16}$ , $C_{16}$ - $C_{21}$ , $C_{21}$ - $C_{35}$ , $C_{35}$ - $C_{44}$ )		
Coil	٨٥		Determination of volatile organic compounds by beadenase CC MS	E001
Soil	ΔD ΔD	VUUS \/PH (۲۸-۲۹ & ۲۹-۲۱۵)	Determination of hydrocarbons C6-C8 by headspace CC-MS & C8-C10 by CC-FID	E001 E001
		vi ii (CO-CO & CO-CIU)	Determination of hydrocarbons co-co by nearspace detries & co-cto by detries	L001

D Dried AR As Received





#### List of HWOL Acronyms and Operators DETS Report No: 23-10384 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: 22/08/2023

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: 23-12603

Site Reference:	Alder Meadow, Flordon Road, Creeting St Mary, Suffolk, IP6 8NH
Proiect / Job Ref:	15542VA
Order No:	None Supplied
Sample Receipt Date:	11/10/2023
Sample Scheduled Date:	11/10/2023
Report Issue Number:	1
Reporting Date:	17/10/2023

Authorised by:

Mun // Dave Ashworth Technical Manager

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

Opinions and interpretations are outside the laboratory's scope of 15O 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.





Soil Analysis Certificate						
DETS Report No: 23-12603	Date Sampled	10/10/23	10/10/23	10/10/23	10/10/23	10/10/23
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	TSSPVA1	TSSPVA2	TSSPVA3	TSSPVA4	TSSPVA5
St Mary, Suffolk, IP6 8NH						
Project / Job Ref: 15542VA	Additional Refs	D1	D1	D1	D1	D1
Order No: None Supplied	Depth (m)	None Supplied				
Reporting Date: 17/10/2023	DETS Sample No	679350	679351	679352	679353	679354

Determinand	Unit	RL	Accreditation					(n)
Asbestos Screen (S)	N/a	N/a	IS017025	Not Detected				
pH	pH Units	N/a	MCERTS	6.8	7.2	7.0	7.0	7.1
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	< 10	15	12	11	11
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.01	0.01	0.01	0.01
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Organic Matter (SOM)	%	< 0.1	MCERTS	1.6	1.7	1.7	2.1	1.8
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.9	1	1	1.2	1
Arsenic (As)	mg/kg	< 2	MCERTS	7	8	7	7	7
Barium (Ba)	mg/kg	< 2.5	MCERTS	20	22	22	22	20
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	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	8	8	8	8	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9	10	11	10	9
Lead (Pb)	mg/kg	< 3	MCERTS	21	23	24	24	21
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	4	4	4	4	4
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	17	19	19	18	18
Zinc (Zn)	mg/kg	< 3	MCERTS	32	37	37	37	34
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

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

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation





Soll Analysis Certificate					
DETS Report No: 23-12603	Date Sampled	10/10/23	10/10/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Alder Meadow, Flordon Road, Creeting	TP / BH No	T1ASP	T1CSP		
St Mary, Suffolk, IP6 8NH					
Project / Job Ref: 15542VA	Additional Refs	D1	D1		
Order No: None Supplied	Depth (m)	None Supplied	None Supplied		
Reporting Date: 17/10/2023	DETS Sample No	679355	679356		

Determinand	Unit	RL	Accreditation	(n)	(n)		
Asbestos Screen (S)	N/a	N/a	IS017025	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	8.0	9.8		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1		
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	346	395		
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	0.35	0.39		
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10		
Organic Matter (SOM)	%	< 0.1	MCERTS	2.3	1		
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.3	0.6		
Arsenic (As)	mg/kg	< 2	MCERTS	6	4		
Barium (Ba)	mg/kg	< 2.5	MCERTS	119	122		
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	< 0.5		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.8	1.4		
Chromium (Cr)	mg/kg	< 2	MCERTS	24	17		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	36	282		
Lead (Pb)	mg/kg	< 3	MCERTS	30	35		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	35	14		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	19	10		
Zinc (Zn)	mg/kg	< 3	MCERTS	206	299		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2		

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





Soil Analysis Certificate - Speciated PAHs								
DETS Report No: 23-126	03		Date Sampled	10/10/23	10/10/23	10/10/23	10/10/23	10/10/23
RSA Geotechnics Ltd			Time Sampled	None Supplied				
Site Reference: Alder Me	adow, Flordon		TP / BH No	TSSPVA1	TSSPVA2	TSSPVA3	TSSPVA4	TSSPVA5
Road, Creeting St Mary, S	uffolk, IP6 8NH							
Project / Job Ref: 15542	VA	ŀ	Additional Refs	D1	D1	D1	D1	D1
Order No: None Supplied			Depth (m)	None Supplied				
Reporting Date: 17/10/2	2023	D	ETS Sample No	679350	679351	679352	679353	679354
Determinand	Unit	RL	Accreditation					(n)
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	< 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	< 0.1	< 0.1	0.11
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 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	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 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	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation





Soil Analysis Certificate	- Speciated PAHs						
DETS Report No: 23-126	03		Date Sampled	10/10/23	10/10/23		
RSA Geotechnics Ltd			Time Sampled	None Supplied	None Supplied		
Site Reference: Alder Me	adow, Flordon		TP / BH No	T1ASP	T1CSP		
Road, Creeting St Mary, S	uffolk, IP6 8NH						
Project / Job Ref: 15542	VA	/	Additional Refs	D1	D1		-
Order No: None Supplied		_	Deptn (m)	None Supplied	None Supplied		
Reporting Date: 17/10/2	2023	D	ETS Sample No	679355	679356		
					( )		
Determinand	Unit	RL	Accreditation	(n)	(n)	1	T
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	0.48	0.71		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.19		
Fluoranthene	mg/kg	< 0.1	MCERTS	0.60	0.88		
Pyrene	mg/kg	< 0.1	MCERTS	0.59	0.79		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.36	0.46		
Chrysene	mg/kg	< 0.1	MCERTS	0.38	0.38		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.39	0.43		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.14	0.12		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.32	0.38		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.29		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.24		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	3.3	4.9		





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-12603	
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: 17/10/2023	
Mois	ture

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
679350	TSSPVA1	D1	None Supplied	8.9	Brown sand
679351	TSSPVA2	D1	None Supplied	7.8	Brown sand
679352	TSSPVA3	D1	None Supplied	9.2	Brown sand
679353	TSSPVA4	D1	None Supplied	9.7	Brown sand
679354	TSSPVA5	D1	None Supplied	7.2	Brown sand with stones
679355	T1ASP	D1	None Supplied	2.9	Light brown sand with stones and concrete
679356	T1CSP	D1	None Supplied	3.4	Light brown sand with stones

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





Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-12603
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: 17/10/2023

Matrix	Analysed	Determinand	Brief Method Description	Method
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 bot water extract followed by ICP-OFS	F012
Soil	AR	BOION Water Soluble	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1.5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12,	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by	E004
Ceil	D	C12-C16, C16-C21, C21-C40)	headspace GC-MS	E000
Soll	D	Fluoride - Waler Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027 E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	F029
0011	743		Determination of fraction of organic carbon by oxidising with potassium dichromate followed by	
Soil	D	FOC (Fraction Organic Carbon)	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	ΔR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	F004
5011	743		cartridge	2001
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soll	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soll	AR	Phenois - Total (mononydric)	Determination of phenois by distillation followed by colorimetry	E021
Soil		Sulphate (as SO4) - Total	Determination of prospirate by extraction with water & analysed by ion chromatography	E009 E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E015
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble subhate by extraction with water followed by ICP-OES	F014
Soil	AR	Sulphace (do Sol 1) Match Soluble (211)	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with agua-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 pitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) suppare	E010
		TPH CWG (ali: C5- C6, C6-C8, C8-C10,		
Cail		C10-C12, C12-C16, C16-C21, C21-C34,	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	F004
5011	AK	aro: C5-C7, C7-C8, C8-C10, C10-C12,	cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
		C12-C16, C16-C21, C21-C35)		
		TPH LOM (ali: C5-C6, C6-C8, C8-C10.		
		C10-C12, C12-C16, C16-C35, C35-C44	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPF	
Soil	AR	aro: C5-C7, C7-C8, C8-C10, C10-C12	cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
		$C_{12}$ - $C_{16}$ , $C_{16}$ - $C_{21}$ , $C_{21}$ - $C_{35}$ , $C_{35}$ - $C_{44}$ )		
Coil	٨٥		Determination of volatile organic compounds by beadenase CC MS	E001
Soil	ΔD ΔD	VUUS \/PH (۲۸-۲۹ & ۲۹-۲۱۵)	Determination of hydrocarbons C6-C8 by headspace CC-MS & C8-C10 by CC-FID	E001 E001
		vi ii (CO-CO & CO-CIU)	Determination of hydrocarbons co-co by nearspace detries & co-cto by detries	L001

D Dried AR As Received





List of HWOL Acronyms and Operators DETS Report No: 23-12603 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: 17/10/2023

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>					
Determinand	Screening Value (mg/kg) Source				
	Soil Organic Matter 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**	
МТВЕ	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	LQM/CIEH 2015**	
TPH CWG - Aliphatic >C35-C44	65000	92000	110000	LQM/CIEH 2015**	
TPH CWG - Aromatic >C5-C7	70	140	300	LQM/CIEH 2015**	
TPH CWG - Aromatic >C7-C8	130	290	660	LQM/CIEH 2015**	
TPH CWG - Aromatic >C8-C10	34	83	190	LQM/CIEH 2015**	
TPH CWG - Aromatic >C10-C12	74	180	380	LQM/CIEH 2015**	
TPH CWG - Aromatic >C12-C16	140	330	660	LQM/CIEH 2015**	
TPH CWG - Aromatic >C16-C21	260	540	930	LQM/CIEH 2015**	
TPH CWG - Aromatic >C21-C35	1100	1500	1700	LQM/CIEH 2015**	
TPH CWG - Aromatic >C35-C44	1100	1500	1700	LQM/CIEH 2015**	

Determinand	Screening	Value (mg/	Source		
	Soil Organic Matter Content				
	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**	
Chloromethane	0.0083	0.0098	0.013	CL:AIRE GAC 2010	
Chloroethane	8.3	11	18	CL:AIRE GAC 2010	
Vinyl Chloride	0.00064	0.00087	0.0014	LQM/CIEH 2015**	
1,1-dichloroethene	0.23	0.4	0.82	CL:AIRE GAC 2010	
Cis-1,2-dichloroethene	0.11	0.19	0.37	CL:AIRE GAC 2010	
1,1-dichloroethane	2.4	3.9	7.4	CL:AIRE GAC 2010	
Trichloromethane	0.91	1.7	3.4	LQM/CIEH 2015**	
1,1,1-Trichloroethane	8.8	18	39	LQM/CIEH 2015**	
Trans-1,2-dichloroethene	0.19	0.34	0.7	CL:AIRE GAC 2010	
Tetrachloromethane	0.026	0.056	0.13	LQM/CIEH 2015**	
1,2-dichloropropane	0.024	0.042	0.084	CL:AIRE GAC 2010	
Trichloroethene	0.016	0.034	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	

Screening V Soil Organi	;) ntent	Source	
1%	2.5%	6%	
19	43	97	CL:AIRE GAC 2010
2.6	6.4	15	LQM/CIEH 2015**
0.29	0.7	1.6	LQM/CIEH 2015**
3.7	9.2	22	CL:AIRE GAC 2010
0.78	1.7	3.9	CL:AIRE GAC 2010
1.5	3.2	7.2	CL:AIRE GAC 2010
120	260	570	CL:AIRE GAC 2010
1.8	3.3	4.9	LQM/CIEH 2015**
1400	3300	7200	CL:AIRE GAC 2010
2300	2800	3100	CL:AIRE GAC 2010
280	610	1100	CL:AIRE GAC 2010
0.22	0.52	1.2	LQM/CIEH 2015**
	Screening V Soil Organia 1% 19 2.6 0.29 3.7 0.78 1.5 120 1.8 1400 2300 280 0.22	Screening Value (mg/kg         Soil Organic Matter Construction         1%       2.5%         19       43         2.6       6.4         0.29       0.7         3.7       9.2         0.78       1.7         1.5       3.2         120       260         1.8       3.3         1400       3300         2300       2800         280       6.10         0.22       0.52	Screening Watter ConstructionSoil Organ/ Matter Construction1%2.5%6%1943972.66.4150.290.71.63.79.2220.781.73.91.53.27.21202605701.83.34.914003300720028061011000.220.521.2

\* Based on residential without home grown produce

\*\* Assumes no free product

#### HOUSE TYPE SCHEDULE: ORIGINAL SCHEME AFFORD

1 BED FLAT AFFORDABLE	TYPE 1A	2
1 BED FLAT AFFORDABLE	TYPE 18	2
2 BED AFFORDABLE	TYPE 2	10
3 BED AFFORDABLE	TYPE 3	4
		18
OPEN MARKET		
2 BED BUNGALOW	TYPE 4	6
2 BED HOUSE	TYPE 5	6
3 8ED	TYPE 6	13
4 BED HOUSE	TYPE 7	4
4 BED HOUSE	TYPE 8	5
		34
	OVERALL TOTAL	52

Original Scheme Affordable Units:

(Plots 1-18)



Visit 7 – 15 December 2023

### VALIDATION SAMPLE LOCATION PLAN (Based upon Wincer Kievenaar drawing number FE100 Rev /

"ALDER MEADOW", BREHENY'S YARD, FLORDON ROA CREETING ST MARY, IPSWICH, SUFFOLK IP6 8NH

**RSA GEOTECHNICS LIMITED** 

Affordable housing within original scheme to stay as such in new proposals

PROPOSED SCHEME EXTENSION :

Affordable Units (Plots A-N)	
2 No. 1 Bedroom 2 Person Apartments @ 48som - Plots A-B	
7 No. 2 Bedroom 4 Person Houses @ 76som - Plots C-H & J	
4 No. 3 Bedroom 5 Person Houses @ 85som - Plots KL, M&N	

Open Market Residential Units

1 No 2 Bedroom 4 Person House @ 76sqm - Plot P 2 No. 1 Bedroom 2 Person Apartments @ 48sqm - P s @ 48som - Plots Q.&R

13 Affordable Dweilings, Piots A-M 3 Open Market Dweilings, Piots P-R

Total 18No Additional Dwellings

ORIGINAL SCHEME

Existing Approved Houses to remain as Affordable PLOT8 1-10 3 No 2 Bedroom 4 Person Houses @75sgm - Plots 1-3 4 No. 1 Bedroom 2 Person Apartments @ 48sgm - Plots 4-7 3 No 2 Bedroom 4 Person Houses @75sgm - Plots 8-10 Originally Approved Affordable Housing to become Open Market 4 No 3 Bed Houses @85sqm, Piots 11-12 & 17-18 4 No 2 Bed Houses @76sqm, Piots 13-16 Affordable housing within original scheme to stay as such in new proposals 42 Open Market Dweilings, Plots 11-52 10 Affordable Units, Plots 1-10

TOTAL DWELLINGS ON SITE: =88 35% AFFORDABLE =23 OPEN MARKET =45 TOTAL AFFORDABLE PROVISION 1 Bedroom Flats 6 2 Bedroom Houses 13 2 Bedroom Houses 13 13 4 23 3 Bedroom Houses Total Affordable

	NOTE: All locations are approximate
۵)	Date 19 DECEMBER 2023
D,	Scale NOT TO SCALE
	Drawing No 15542VA/1 Version D