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1st September 2023

ref: A11804/230829/L1

Becci Brisland
Rivendale Homes Limited
15 Pirelli Way
Eastleigh
SO50 5GE

By Email BecciB@rivendalededevelopments.co.uk

Dear Becci,

RE: Soft landscaping validation report – Bampton House, Hursley Road, Chandlers Ford, SO53 2TA

Please find attached Omnia Report A11804/230829/L1 detailing the results of the hotspot removal and clean cover validation work undertaken to date at the above site.

If you have any questions, please do not hesitate to contact us.

Yours sincerely,
For Omnia



Tommy Holloway
Geo-Environmental Consultant



Olivia Maxwell
Principal Geo-Environmental Consultant

Attachments:

Attachment 1: Limitations

Attachment 2: Drawings

Attachment 3: Photographs

Attachment 4: Laboratory Testing Results

Attachment 5: Origin of Tier 1 Screening Values

Quality Assurance

Remarks	
Date	August 2023
Prepared by	T.Holloway
Signature	
Checked & Authorised by	O. Maxwell
Signature	
Project number	A11804
Comments	

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VALIDATION REPORT

Site Address	Bampton House, Hurlsey Road, Chandlers Ford, SO53 2TA
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Objectives & Terms of Reference

The objective of this report is to provide an assessment of the removal of a PAH hotspot at location HP101 and an Asbestos hotspot at location HP103 and the subsequent installation of a clean cover system in the area surrounding HP101 and HP103 at the above site in line with the requirements of the agreed Remediation Method Statement (Omnia Ref. A11591/3.2 – Remediation Method Statement (June 2023)). This involves a combination of on-site observations, review of chemical results of soil sampling, and photographic evidence.

Background

Omnia were commissioned by Rivendale Homes Limited to provide geo-environmental consultancy support of the proposed development. The site, when initially assessed comprised an unoccupied office building and parking spaces.

The development is understood to comprise the conversion of the existing building to 15no. residential units (Class C3), along with associated parking, infrastructure and communal areas.

The proposed site layout is included as Figure 2.0 in Attachment 2.

Omnia has undertaken several phases of investigation at the site in 2021, detailed within the following reports:

- Phase I Geo-Environmental Site Assessment (Ref: A11516/1.1 dated January 2022*); and,
- Phase II Geo-Environmental Site Assessment (Ref: A11591/2.1 dated July 2021).

*Initial issue was in July 2020 with subsequent re-issue in January 2022 following discussions with the land authority.

The Phase II investigation identified the presence of elevated concentrations of Asbestos and Polycyclic Aromatic Hydrocarbons (PAHs) in near surface soils in two 'hot spot' locations across the site.

Based on the finding of the above reports, Omnia prepared a Remediation Method Statement (RMS) report (Ref: A11591/3.2, dated June 2023 with the following recommendations:

Excavation and removal of soil impacted PAHs in the vicinity of HP101 & HP201 and Asbestos in the vicinity of HP103

The RMS (A11591/3.2) stipulated that remedial works were required in the vicinity of HP102, HP201 and HP103, as shown in Figure 4.0 of the report.

Validation of remedial work was specified to comprise a controlled excavation of impacted soils within the affected areas until either visually clean natural soils are encountered or a minimum of 450mm bFGL is reached with samples obtained for chemical laboratory analysis.

Clean Cover System

The RMS (A11591/3.2) stipulated that remedial works were required in the vicinity of HP102 & HP201 (PAH) and HP103 (Asbestos) within landscaping areas to sever the currently active pollution linkage through;

- Placement of a high visibility geotextile in areas of soft landscaping; and,
- Placement of clean soils to a depth of 450mm in areas of grass lawn, 600mm in areas of shrub planting or 900mm in areas of tree planting.

Validation of remedial work was specified to comprise the hand excavation of validation pits in each of the soft landscaping areas to confirm the thickness of the clean cover system with samples obtained for chemical laboratory analysis. The sampling frequency is set at 1 per 150m³ of imported/placed soils, as set out within BS3882:2015 with a minimum of 3 samples tested per source.

Scope of works – Removal of impacted soils

A site location map (Figure 1.0), the proposed site layout for Phase 2 (Figure 2.0) and validation sample location plan (Figure 3.0) are included within Attachment 2.

RMS Requirements

As per the requirements of the approved RMS, the scope of the initial validation works comprised the supervision of a controlled excavation of impacted soils within the affected areas until either visually clean natural soils are encountered or a minimum of 450mm bFGL is reached with samples obtained for chemical laboratory analysis. Soils would then be subject to laboratory analysis to confirm the removal of impacted soils.

Site Work and Observations – 16/06/2023

Site Works

The initial validation visit was undertaken on 16/06/2023 by an Omnia engineer to observe the removal of the impacted soils and obtain soil samples to confirm removal of impacted material within the vicinity of HP101, HP201 and HP103.

Two (2no.) machine-dug pits were advanced within each impacted area to a maximum depth of 450mm bgl in order to remove the exceedance hotspots. The ground conditions encountered are detailed in the following section.

Ground Conditions

Made Ground was encountered to a maximum depth of 450mm bgl and generally comprised a dry and friable greyish brown or yellowish brown slightly sandy gravelly CLAY. Gravel was angular to rounded fine to coarse flint, brick, plastic, asphalt, concrete and wood. Within VP101 there was medium cobble content of angular to subrounded brick, concrete and asphalt, along with occasional boulders of angular to subangular concrete, asphalt, plastic and relic piping.

Laboratory Analysis

Five (5no.) soil samples were collected from each validation pit and submitted for testing to Element Materials Technology under UKAS accreditation for analysis. Samples from VP101 were submitted for Banded Polycyclic Aromatic Hydrocarbons (PAHs). Samples from VP102 were submitted for Asbestos Fibres in Soil.

Laboratory results are presented as Attachment 4.

Risk Assessment

The analytical results have been directly compared to the most appropriate Tier 1 Human Health screening criteria as set out within the RMS A11591/3.2. This comparison is detailed within Table 5.1 for the samples tested. The origin of the Tier 1 screening values is presented as Attachment 5.

Table 5.1 Tier 1 risk assessment – Soil – Residential End Use without Homegrown Produce

Determinant	Units	GAC	n	MC	Loc. of Ex	Pathway	Assessment
General Inorganics							
Asbestos	%	0.001	5	<0.001 Chrysotile	N/A	6	No Further Action
General Organics							
PAH							
Naphthalene	mg/kg	2.3	5	0.39	N/A	2	No Further Action
Acenaphthylene	mg/kg	2,900	5	0.65	N/A	2	No Further Action
Acenaphthene	mg/kg	3,000	5	0.24	N/A	2	No Further Action
Fluorene	mg/kg	2,800	5	0.57	N/A	2	No Further Action
Phenanthrene	mg/kg	1,300	5	9.00	N/A	2	No Further Action
Anthracene	mg/kg	31,000	5	3.06	N/A	2	No Further Action
Fluoranthene	mg/kg	1,500	5	16.87	N/A	1,2	No Further Action
Pyrene	mg/kg	3,700	5	12.89	N/A	1,2	No Further Action
Benzo(a)Anthracene	mg/kg	11	5	7.55	N/A	1	No Further Action
Chrysene	mg/kg	30	5	6.70	N/A	1	No Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	5	8.31	VP101 0.45-0.50m	1	Further Assessment Below
Benzo(k)Fluoranthene	mg/kg	110	5	3.23	N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	3.2	5	6.88	VP101 0.45-0.50m	1	Further Assessment Below
Indeno(123-cd)Pyrene	mg/kg	45	5	4.72	N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	5	0.83 0.31	VP101 0.45-0.50m VP101 ES1 0.10-0.20m	1	Further Assessment Below
Benzo(ghi)Perylene	mg/kg	360	5	3.82	N/A	1	No Further Action

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil; 3 = Dermal Contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor); 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit.

(vap) – GAC presented exceeds the vapour saturation limit.

Referring to Table 5.1 above, concentrations of PAHs exceeding the adopted Tier 1 screening criteria have been identified within VP101. Although exceedances have been identified, the majority of exceedances are present within the sample from the base of the excavation VP101 0.45 – 0.50m bgl. Given the requirement to install a clean cover system comprising placement of a geotextile membrane, and clean

soils, this potential pollution pathway will be severed such that the concentrations are not considered further. A further exceedance was identified at VP101 ES1, which was obtained from the eastern side of the pit. From review of the soil log at this location, asphalt was noted with the sample, and from conversation with site operatives on-site, it is understood a road used to present in this area. It is therefore considered that the exceedance is attributed to the asphalt within the sample, and is therefore not bioavailable, and is therefore not considered to present a significant risk to the end users of the site. It is therefore considered that this hotspot has been suitably removed prior to the installation of a clean cover system.

Chrysotile Asbestos was also identified within one (1no.) location in VP102, however this didn't exceed the adopted screening criteria. Furthermore, the concentration was identified at the base of the pit, given the requirement to install a clean cover system comprising placement of a geotextile membrane, and clean soils, this potential pollution pathway will be severed such that the concentrations are not considered further. The sides of the pit did not identified asbestos such that it is considered the hotspot has been suitably removed.

The laboratory results are presented within Attachment 4 and the origin of screening criteria is presented within Attachment 5.

Scope of Works – Validation of Clean Cover

A site location map (Figure 1.0), the proposed site layout for Phase 2 (Figure 2.0) and validation pit location plan (Figure 3.0) are included within Attachment 2.

RMS Requirements

As per the requirements of the approved RMS, the scope of the validation works comprised the validation of the emplacement of a 450mm thick over a high visibility geotextile membrane, clean cover system within areas of soft landscaping with grass lawn, with samples obtained for chemical laboratory analysis. Soils would then be subject to laboratory analysis for assessment of chemical suitability and compared to the chemical suitability criteria set out in Table 5.2 of the agreed RMS (A11591/3.2).

Site Work and Observations – 11/08/2023

Site Works

The validation visit was undertaken on 11/08/2023 by an Omnia engineer to confirm the thickness of the emplaced clean cover and obtain soil samples for confirmation of chemical suitability.

Three (3no.) hand-dug pits were advanced within the areas of soft landscaping, two (2no.) within the vicinity of HP101/HP201 and one (1no.) within the vicinity of HP103, to a maximum depth of 500mm bgl. The ground conditions encountered are detailed in the following section.

Ground Conditions

Topsoil was encountered to a maximum depth of 500mm bgl and generally comprised a brown slightly gravelly slightly clayey fine to coarse SAND. Gravel was angular to subrounded fine flint.

A red geotextile membrane was recorded at the base of all pits.

The topsoil depth for the areas of soft landscaping is summarised in Table 6.1 below.

Table 6.1 Measured thickness of cover system

Validation Area	Thickness	HP301	HP302	HP303
Soft landscaping in areas of grass lawn	Total cover system thickness (mm)	500	460	450
Pass/Fail required thicknesses		<u>Pass</u>	<u>Pass</u>	<u>Pass</u>

Geotextile Validation

The validation in areas of soft landscaping confirms that the thickness of the installed clean cover system and high-visibility geotextile was encountered within all exploratory holes and complies with a minimum of 450mm for soft landscaped areas of grass lawn as set out within Omnia RMS Report (A11591/3.2) dated June 2023.

Laboratory Analysis

Three (3no.) soil samples were collected from the encountered Topsoil and submitted for testing to Element Materials Technology under UKAS accreditation for analysis comprising:

- Total Organic Carbon;
- CLEA Metals;
- Banded Polycyclic Aromatic Hydrocarbons (PAHs);
- Banded Total Petroleum Hydrocarbons (TPH);
- Asbestos Fibres in Soil;
- Soluble Sulphate;
- pH;
- Phenols; and,
- Total Cyanide.

Laboratory results are presented as Attachment 4.

Risk Assessment

The analytical results have been directly compared to the most appropriate Tier 1 Human Health screening criteria as set out within the RMS A11591/3.2. This comparison is detailed within Table 5.1 8.1 for the samples tested. The origin of the Tier 1 screening values is presented as Attachment 5.

Table 8.1 Tier 1 risk assessment – Soil – Residential End Use without Homegrown Produce

Determinant	Units	GAC	n	MC	Loc. of Ex	Path way	Assessment
Inorganics							
Metals							
Arsenic	mg/kg	40	3	4.5	N/A	1	No Further Action
Beryllium	mg/kg	1.7	3	<0.5	N/A	1	No Further Action
Boron	mg/kg	11,000	3	0.9	N/A	1	No Further Action
Cadmium	mg/kg	85	3	<0.1	N/A	2	No Further Action
Chromium (III)	mg/kg	910	3	47.8	N/A	1	No Further Action
Chromium (VI)	mg/kg	6	3	<0.3	N/A	2	No Further Action
Copper	mg/kg	7,100	3	15	N/A	2	No Further Action

Determinant	Units	GAC	n	MC	Loc. of Ex	Path way	Assessment
Lead	mg/kg	310	3	39	N/A	1	No Further Action
Mercury	mg/kg	56	3	<0.1	N/A	1	No Further Action
Nickel	mg/kg	180	3	12.6	N/A	1,2	No Further Action
Selenium	mg/kg	430	3	<1	N/A	1,2	No Further Action
Vanadium	mg/kg	1,200	3	15	N/A	2	No Further Action
Zinc	mg/kg	40,000	3	62	N/A	2	No Further Action
General Inorganics							
Asbestos	%	0.001	3	NAD	N/A	6	No Further Action
Total Cyanide *	mg/kg	50	3	<0.5	N/A	1	No Further Action
Organics							
General Organics							
Phenol	mg/kg	750	3	<0.15	N/A	2	No Further Action
PAH							
Naphthalene	mg/kg	2.3	3	<0.04	N/A	2	No Further Action
Acenaphthylene	mg/kg	2,900	3	0.06	N/A	2	No Further Action
Acenaphthene	mg/kg	3,000	3	<0.05	N/A	2	No Further Action
Fluorene	mg/kg	2,800	3	<0.04	N/A	2	No Further Action
Phenanthrene	mg/kg	1,300	3	0.16	N/A	2	No Further Action
Anthracene	mg/kg	31,000	3	0.08	N/A	2	No Further Action
Fluoranthene	mg/kg	1,500	3	0.52	N/A	1,2	No Further Action
Pyrene	mg/kg	3,700	3	0.46	N/A	1,2	No Further Action
Benzo(a)Anthracene	mg/kg	11	3	0.28	N/A	1	No Further Action
Chrysene	mg/kg	30	3	0.27	N/A	1	No Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	3	0.41	N/A	1	No Further Action
Benzo(k)Fluoranthene	mg/kg	110	3	0.16	N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	3.2	3	0.34	N/A	1	No Further Action
Indeno(123-cd)Pyrene	mg/kg	45	3	0.28	N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	3	0.05	N/A	1	No Further Action
Benzo(ghi)Perylene	mg/kg	360	3	0.32	N/A	1	No Further Action
Banded TPH							
TPH EC 5-6**	mg/kg	42	3	<0.1	N/A	4	No Further Action
TPH EC >6-8**	mg/kg	100	3	<0.1	N/A	4	No Further Action
TPH EC >8-10**	mg/kg	27	3	<5	N/A	4	No Further Action
TPH EC > 10-12**	mg/kg	130	3	<10	N/A	2	No Further Action
TPH EC > 12-16**	mg/kg	1,100	3	<10	N/A	2	No Further Action
TPH EC > 16-21**	mg/kg	1,900	3	59	N/A	1	No Further Action
TPH EC > 21-35**	mg/kg	1,900	3	331	N/A	1	No Further Action
TPH EC > 35-44**	mg/kg	1,900	3	60	N/A	1	No Further Action

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil; 3 = Dermal Contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor); 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.

* Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit.

Laboratory results were also compared to the BS3882:2015 phytotoxic screening criteria and are

summarised in the table below.

Table 8.2 BS3882:2015 Chemical Suitability Criteria for Potentially Phytotoxic Elements

Determinant	Units	pH >7.0	No	MC	Assessment
Copper	mg/kg	<200	3	15	No Further Action
Nickel	mg/kg	<110	3	12.6	No Further Action
Zinc	mg/kg	<300	3	62	No Further Action

Referring to Table 8.1 and Table 8.2 above, all recorded concentrations comply with the adopted screening level for the protection of Human Health, as well as the BS 3882:2015 phytotoxic suitability criteria and therefore considered suitable for the proposed residential end use.

The laboratory results are presented within Attachment 4 and the origin of screening criteria is presented within Attachment 5.

9.0 Conclusion

Based on the findings of the validation visits set out above, Omnia found that the remedial measures have been completed in accordance with Omnia's RMS Report, and therefore the areas of soft landscaping are deemed suitable for their intended residential end use.

END OF REPORT

Attachment 1

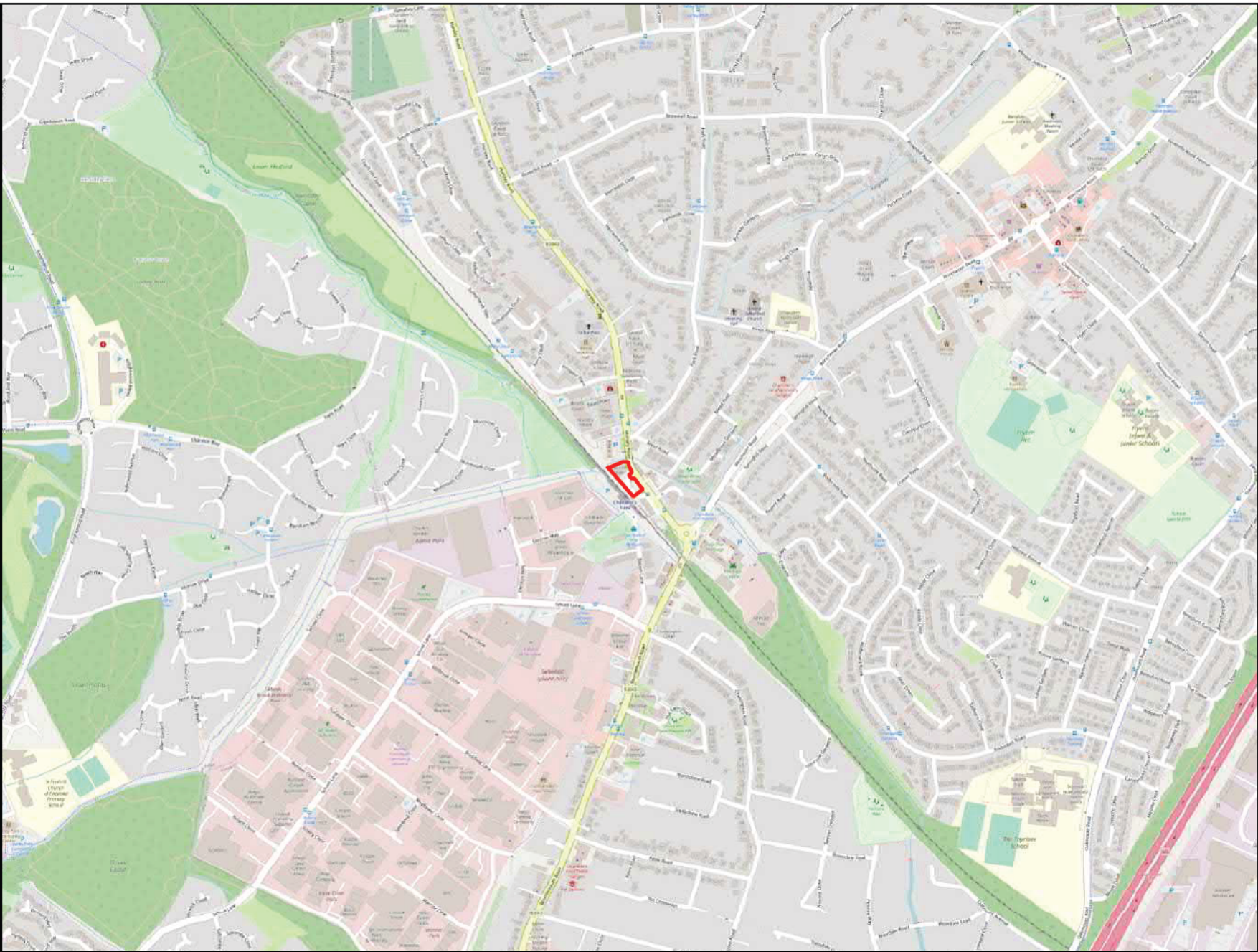
Limitations

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between OE Ltd and the Client as indicated in Section 1.2.
 2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
 3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
 4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
 5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
 6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
 7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
 8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
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 10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
-

Attachment 2

Drawings

Key  Site Boundary	
	
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Client:
Rivendale Developments

Project Number:
A11804

Drawn By:
T.Holloway

Date:
30/08/2023

Authorised By:
O. Maxwell

Drawing Title:
Figure 1.0
Site Location Map



Scale
1:400

Paper Size
A4

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Job Title:
Bampton House

Client:
Rivendale Developments

Project Number:
A11804

Drawn By:
L. Burnett

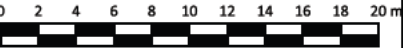
Date:
22/06/2023

Authorised By:
O. Maxwell

Drawing Title:
Figure 2.0 -
Proposed Development Plan

Key

- Areas Requiring Hotspot Removal
- Validation Pit Location



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Paper Size A4

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Job Title:
Bampton House Validation

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Rivendale Developments

Project Number:
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Drawn By:
T.Holloway

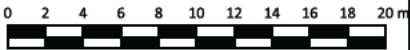
Date:
30/08/2023

Authorised By:
O. Maxwell

Drawing Title:
Figure 3.0
Validation Pit Location Plan

Key

- Areas Requiring Clean Cover
- Hand Pit Location



Scale
1:400

Paper Size
A4

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Bampton House Validation

Client:
Rivendale Developments

Project Number:
A11804

Drawn By:
T.Holloway

Date:
30/08/2023

Authorised By:
O. Maxwell

Drawing Title:
Figure 3.1
Clean Cover Validation Plan

Attachment 3

Validation Pit Photographs

Photograph 1 Overview of VP101 prior to excavation



Photograph 2 VP101 Excavated to 450mm bgl



Photograph 3 Overview of VP102 prior to excavation



Photograph 4 VP102 Excavated to 450mm bgl



Photograph 5 HP301 Validation Pit



Photograph 6 VP102 with clean cover system installed



Photograph 7 HP302 Validation Pit



Photograph 8 VP101 with clean cover system installed



Photograph 9 HP303 Validation Pit



Attachment 4

Chemical Testing Results

Omnia
3-6 The Quarterdeck
Port Solent
Portsmouth
United Kingdom
PO6 4TP



4225



Attention : Olivia Maxwell
Date : 11th July, 2023
Your reference : A11804
Our reference : Test Report 23/9964 Batch 1
Location : Bapton House
Date samples received : 20th June, 2023
Status : Final Report
Issue : 2

Ten samples were received for analysis on 20th June, 2023 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Note

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

QF-PM 3.1.15 v10

[illegible]

4 of 9

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/9964

SOILS and ASH

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.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 23/9964

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1 2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM131	Quantification of Asbestos Fibres and ACM based on HSG 248 Second edition 2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1 2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

Omnia
3-6 The Quarterdeck
Port Solent
Portsmouth
United Kingdom
PO6 4TP



4225



Attention : Olivia Maxwell
Date : 24th August, 2023
Your reference : A11804
Our reference : Test Report 23/13391 Batch 1
Location : Bampton House
Date samples received : 12th August, 2023
Status : Final Report
Issue : 1

Three samples were received for analysis on 12th August, 2023 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Omnia
Reference: A11804
Location: Bampton House
Contact: Olivia Maxwell
EMT Job No: 23/13391

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	HP301	HP302	HP303										
Depth	0.00-0.50	0.00-0.46	0.00-0.45										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	11/08/2023	11/08/2023	11/08/2023										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	12/08/2023	12/08/2023	12/08/2023								LOD/LOR	Units	Method No.
Arsenic [#]	4.4	4.2	4.5								<0.5	mg/kg	TM30/PM15
Barium [#]	51	50	53								<1	mg/kg	TM30/PM15
Beryllium	<0.5	<0.5	<0.5								<0.5	mg/kg	TM30/PM15
Cadmium [#]	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Chromium [#]	47.8	36.0	29.5								<0.5	mg/kg	TM30/PM15
Copper [#]	12	13	15								<1	mg/kg	TM30/PM15
Lead [#]	34	33	39								<5	mg/kg	TM30/PM15
Mercury [#]	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel [#]	10.2	10.8	12.6								<0.7	mg/kg	TM30/PM15
Selenium [#]	<1	<1	<1								<1	mg/kg	TM30/PM15
Vanadium	15	13	15								<1	mg/kg	TM30/PM15
Water Soluble Boron [#]	0.8	0.8	0.9								<0.1	mg/kg	TM74/PM32
Zinc [#]	49	46	62								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene [#]	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.05	0.05	0.06								<0.03	mg/kg	TM4/PM8
Acenaphthene [#]	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene [#]	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene [#]	0.09	0.14	0.16								<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.05	0.06	0.08								<0.04	mg/kg	TM4/PM8
Fluoranthene [#]	0.44	0.40	0.52								<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.40	0.36	0.46								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.24	0.28	0.27								<0.06	mg/kg	TM4/PM8
Chrysene [#]	0.24	0.25	0.27								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene [#]	0.49	0.53	0.57								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.29	0.32	0.34								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene [#]	0.21	0.24	0.28								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	0.05	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.20	0.23	0.32								<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.7	2.9	3.3								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.35	0.38	0.41								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.14	0.15	0.16								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99	102	101								<0	%	TM4/PM8
EPH >C8-C10 (EH_1D_Total) [#]	<5	<5	<5								<5	mg/kg	TM5/PM8
EPH >C10-C12 (EH_1D_Total) [#]	<10	<10	<10								<10	mg/kg	TM5/PM8
EPH >C12-C16 (EH_1D_Total) [#]	<10	<10	<10								<10	mg/kg	TM5/PM8
EPH >C16-C21 (EH_1D_Total) [#]	41	59	48								<10	mg/kg	TM5/PM8
EPH >C21-C35 (EH_1D_Total) [#]	331	319	321								<10	mg/kg	TM5/PM8
EPH >C35-C44 (EH_1D_Total)	60	48	50								<10	mg/kg	TM5/PM8
EPH >C8-C44 (EH_1D_Total)	432	426	419								<30	mg/kg	TM5/PM8
GRO (>C4-C6)	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12

Element Materials Technology

Client Name: Omnia
Reference: A11804
Location: Bampton House
Contact: Olivia Maxwell
EMT Job No: 23/13391

Report : Solid

Solids V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Note

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

QF-PM 3.1.15 v10

Client Name: Omnia
Reference: A11804
Location: Bampton House
Contact: Olivia Maxwell

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/13391

SOILS and ASH

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.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

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Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
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M	MCERTS accredited.
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ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 23/13391

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5 2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCF D. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev 2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev 2, Dec 1996; Modified BS EN ISO 11885:2009: SO LS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev 2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 23/13391

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1 2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

Attachment 5
Origin of Tier I Screening Values

	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Metals				
Arsenic	mg/kg	40	1	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Arsenic
Beryllium	mg/kg	1.7	1	LQM CIEH Suitable for Use Levels (S4UL) 2015
Boron	mg/kg	11,000	1	
Cadmium	mg/kg	85	1	
Chromium (III)	mg/kg	910	1	
Chromium (VI)	mg/kg	6	1	
Copper	mg/kg	7,100	1	
Lead	mg/kg	310	1	Category 4 Screening Level (C4SL) utilising exposure parameters from CLEA SR3 report.
Mercury	mg/kg	56	4	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Mercury
Nickel	mg/kg	180	1	LQM CIEH Suitable for Use Levels (S4UL) 2015
Selenium	mg/kg	430	1	
Vanadium	mg/kg	1,200	1	
Zinc	mg/kg	40,000	1	
General Inorganics				
Total Cyanide*	mg/kg	50	1	Dutch Intervention Values 2010
Asbestos	%	0.001%	6	OEC Derived Value based on ICRCL
General Organics				
Phenol	mg/kg	750	4,1	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
PAHs				
Naphthalene	mg/kg	2.3	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Acenaphthylene	mg/kg	2,900	1	
Acenaphthene	mg/kg	3,000	1	
Fluorene	mg/kg	2,800	1	
Phenanthrene	mg/kg	1,300	1	
Anthracene	mg/kg	31,000	1	
Fluoranthene	mg/kg	1,500	1	
Pyrene	mg/kg	3,700	1	
Benzo(a)Anthracene ^l	mg/kg	11	1	
Chrysene	mg/kg	30	1	
Benzo(b)Fluoranthene	mg/kg	3.9	1	
Benzo(k)Fluoranthene	mg/kg	110	1	
Benzo(a)Pyrene	mg/kg	3.2	1	
Indeno(123-cd)Pyrene	mg/kg	45	1	
Dibenzo(a,h)Anthracene	mg/kg	0.31	1	

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Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Benzo(ghi)Perylene	mg/kg	360	1	
BTEX & MTBE				
Benzene	mg/kg	0.38	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
Toluene	mg/kg	880	4	
Ethylbenzene	mg/kg	83	4	
Xylenes	mg/kg	79	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1% SOM p-Xylene
MTBE	mg/kg	73	4	CL:AIRE SGV 2010 1% SOM
TPH-CWG				
Aliphatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aliphatic EC 5-6	mg/kg	42	4	
Aliphatic EC >6-8	mg/kg	100	4	
Aliphatic EC >8-10	mg/kg	27	4	
Aliphatic EC >10-12	mg/kg	130 ^(vap)	4	
Aliphatic EC > 12-16	mg/kg	1,100 ^(sol)	4	
Aliphatic EC > 16-35	mg/kg	65,000 ^(sol)	1	
Aliphatic EC >35-44	mg/kg	65,000 ^(sol)	1	
Aromatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aromatic EC 5-7	mg/kg	370	4	
Aromatic EC>7-8	mg/kg	860	4	
Aromatic EC> 8-10	mg/kg	47	4	
Aromatic EC> 10-12	mg/kg	250	2	
Aromatic EC> 12-16	mg/kg	1,800	2	
Aromatic EC> 16-21	mg/kg	1,900	2	
Aromatic EC> 21-35	mg/kg	1,900	1	
Aromatic EC> 35-44	mg/kg	1,900	1	
Banded TPH				
TPH EC 5-6**	mg/kg	42	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM, utilising the most conservative of the Ali/Aro chain lengths.
TPH EC >6-8**	mg/kg	100	4	
TPH EC >8-10**	mg/kg	27	4	
TPH EC> 10-12**	mg/kg	130	4	
TPH EC> 12-16**	mg/kg	1,100	4	
TPH EC> 16-21**	mg/kg	1,900	2	
TPH EC> 21-35**	mg/kg	1,900	1	
TPH EC> 35-44**	mg/kg	1,900	1	

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	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil, 3 = Dermal contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor), 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres.

Abbreviations: GAC = General Assessment Criteria

* Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit.

(vap) – GAC presented exceeds the vapour saturation limit

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	DOC REF	DOCUMENT NAME
	TECH11102	Residential End Use without Homegrown Produce

Tier 1 Risk Assessment - Soils – Residential End Use without Homegrown Produce

Determinant	Units	GAC	n	MC	Loc. of Ex	Pathway	Assessment
Inorganics							
Metals							
Arsenic	mg/kg	40			N/A	1	No Further Action
Beryllium	mg/kg	1.7			N/A	1	No Further Action
Boron	mg/kg	11,000			N/A	1	No Further Action
Cadmium	mg/kg	85			N/A	1	No Further Action
Chromium (III)	mg/kg	910			N/A	1	No Further Action
Chromium (VI)	mg/kg	6			N/A	1	No Further Action
Copper	mg/kg	7,100			N/A	1	No Further Action
Lead	mg/kg	310			N/A	1	No Further Action
Mercury	mg/kg	56			N/A	4	No Further Action
Nickel	mg/kg	180			N/A	1	No Further Action
Selenium	mg/kg	430			N/A	1	No Further Action
Vanadium	mg/kg	1,200			N/A	1	No Further Action
Zinc	mg/kg	40,000			N/A	1	No Further Action
General Inorganics							
Asbestos	%	0.001			N/A	6	No Further Action
Total Cyanide *	mg/kg	50			N/A	1	No Further Action
Organics							
General Organics							
Phenol	mg/kg	750			N/A	4,1	No Further Action
PAH							
Naphthalene	mg/kg	2.3			N/A	4	No Further Action
Acenaphthylene	mg/kg	2,900			N/A	1	No Further Action
Acenaphthene	mg/kg	3,000			N/A	1	No Further Action
Fluorene	mg/kg	2,800			N/A	1	No Further Action
Phenanthrene	mg/kg	1,300			N/A	1	No Further Action
Anthracene	mg/kg	31,000			N/A	1	No Further Action
Fluoranthene	mg/kg	1,500			N/A	1	No Further Action
Pyrene	mg/kg	3,700			N/A	1	No Further Action
Benzo(a)Anthracene	mg/kg	11			N/A	1	No Further Action
Chrysene	mg/kg	30			N/A	1	No Further Action
Benzo(b)Fluoranthene ⁽ⁱ⁾	mg/kg	3.9			N/A	1	No Further Action
Benzo(k)Fluoranthene ⁽ⁱ⁾	mg/kg	110			N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	3.2			N/A	1	No Further Action
Indeno(123-cd)Pyrene	mg/kg	45			N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31			N/A	1	No Further Action
Benzo(ghi)Perylene	mg/kg	360			N/A	1	No Further Action
BTEX							
Benzene	mg/kg	0.38			N/A	4	No Further Action
Toluene	mg/kg	880			N/A	4	No Further Action
Ethylbenzene	mg/kg	83			N/A	4	No Further Action
Xylenes (p-Xylene)	mg/kg	79			N/A	4	No Further Action
MTBE	mg/kg	73			N/A	4	No Further Action
Aliphatic TPH							
Aliphatic EC 5-6	mg/kg	42			N/A	4	No Further Action
Aliphatic EC >6-8	mg/kg	100			N/A	4	No Further Action
Aliphatic EC >8-10	mg/kg	27			N/A	4	No Further Action
Aliphatic EC >10-12	mg/kg	130 ^(vap)			N/A	4	No Further Action
Aliphatic EC > 12-16	mg/kg	1,100 ^(sol)			N/A	4	No Further Action
Aliphatic EC > 16-35	mg/kg	65,000 ^(sol)			N/A	1	No Further Action

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Aliphatic EC >35-44	mg/kg	65,000 ^(sol)			N/A	1	No Further Action
Aromatic TPH							
Aromatic EC 5-7	mg/kg	370			N/A	4	No Further Action
Aromatic EC >7-8	mg/kg	860			N/A	4	No Further Action
Aromatic EC > 8-10	mg/kg	47			N/A	4	No Further Action
Aromatic EC > 10-12	mg/kg	250			N/A	2	No Further Action
Aromatic EC > 12-16	mg/kg	1,800			N/A	2	No Further Action
Aromatic EC > 16-21	mg/kg	1,900			N/A	2	No Further Action
Aromatic EC > 21-35	mg/kg	1,900			N/A	1	No Further Action
Aromatic EC > 35-44	mg/kg	1,900			N/A	1	No Further Action
Banded TPH							
TPH EC 5-6**	mg/kg	42			N/A	4	No Further Action
TPH EC >6-8**	mg/kg	100			N/A	4	No Further Action
TPH EC >8-10**	mg/kg	27			N/A	4	No Further Action
TPH EC > 10-12**	mg/kg	130 ^(vap)			N/A	4	No Further Action
TPH EC > 12-16**	mg/kg	1,100 ^(sol)			N/A	4	No Further Action
TPH EC > 16-21**	mg/kg	1,900			N/A	2	No Further Action
TPH EC > 21-35**	mg/kg	1,900			N/A	1	No Further Action
TPH EC > 35-44**	mg/kg	1,900			N/A	1	No Further Action

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil, 3 = Dermal contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor), 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres.

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.

* Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

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