Tender Addendum 1- Tender Reference: HCAP16065

Site Address- Tamar Building, Stratton Business Park, Bude, EX23 8LY

Date: 21/01/16

Description: Swab Testing Analysis Report and Associated Email Correspondence.

The issue of this document is referenced in Section 7.0A of Form B4 Pricing schedule and the tendering contractors should review the contents of this document in detail and make any allowances deemed necessary within their tender submission under this section.

In summary the results would suggest that any waste generated from the removal would be classed as non-hazardous. However it is still recommended that you contact a specialist waste disposal firm to remove any potentially contaminated waste from the site. This statement should be considered in the context of the whole report and all information contained within this document which should be reviewed in detail.

Any queries regarding this document should be directed to the Contract Administrator: Matthew Prior of CBRE Ltd (Mob: 07876478867) (Email: matthew.prior@cbre.com)

Prior, Matthew @ Bristol

From: David Heuston <David.Heuston@esg.co.uk>
Sent: 21 January 2016 10:51
To: Prior, Matthew @ Bristol
Subject: RE: ESG Report: Tamar Building, Bude

Hi Matthew

I have compared the results with the current hazardous waste limits (see below). I have only compared the maximum result recorded for each compound. The parameters that we tested which have hazardous waste limits were all found to be well below the applicable hazardous waste threshold limit for both the compound tested and the worst case compound.

Each compound has a different threshold limit based on the different hazards, for example Arsenic falls into the following Hazard Categories:
Carc. 1A – Carcinogenic based primarily on human evidence
Acute Tox 2 – effects following oral, dermal or inhalation
Skin Corr. 1B – causes severe skin burns and eye damage
Aquatic Acute 1 – hazardous to the aquatic environment
Aquatic Chronic 1 – hazardous to the aquatic environment through long term exposure

As such I have selected the lowest threshold limit of the various hazard categories for comparison against the results identified at the Tamar Building.

Compound	Worst Case Compound	Lowest Threshold Limit (%)	Maximum Result (mg/swab)	Result (% Concentration)	Worst Case Compound (% Concentration)
Arsenic	Diarsenic trioxide	0.1	0.02	0.000002	0.00000528
Cadmium	Cadmium oxide	0.1	0.007	0.0000007	0.0000007
Chromium	Chromium trioxide	0.1	0.071	0.0000071	0.00009301
Copper	Copper oxide	0.1	0.32	0.0000320	0.0004
Mercury	Mercury chloride	0.1	0.006	0.0000006	0.00000081
Nickel	Nickel carbonate	0.1	0.047	0.0000047	0.000009494
Lead	Lead sulphate	0.1	0.460	0.0000460	0.0000460
Selenium	Sodium selenite	0.25	0.06	0.000006	0.00001434
Zinc	Zinc oxide	0.1	1.1	0.00011	0.000137

These results would suggest that any waste generated from the removal would be classed as non-hazardous. However it is still recommended that you contact a specialist waste disposal firm to remove any potentially contaminated waste from the site.

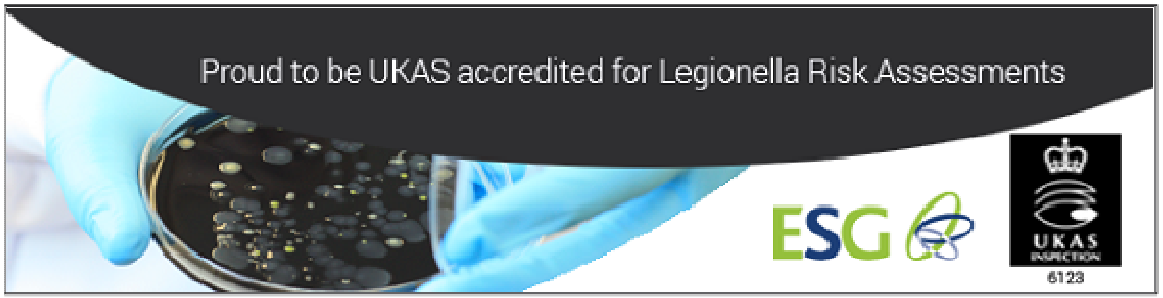
I hope you find this information useful.

Regards

Dave

David Heuston (MSc)
Environmental Field Team Leader (South)
Built Environment Services

T: +44 (0)1283 554540 Ext 4858
M: +44 (0)7740 393507
E: david.heuston@esg.co.uk
W: www.esg.co.uk



From: Prior, Matthew @ Bristol [mailto:Matthew.Prior@cbre.com]
Sent: 19 January 2016 17:14
To: David Heuston

Cc: Noelyn Allen
Subject: RE: ESG Report: Tamar Building, Bude

Thanks David as discussed if you could please advise on protocol for disposal and whether we need to deal with as contaminated waste that would be very useful.

Thanks

Regards

Matthew

Matthew Prior | Associate Director
CBRE Limited | Building Consultancy
Floors 13 &14 Clifton Heights | Triangle West | Clifton | Bristol | BS8 1EJ
DDI 0117 943 5783 | F 0117 943 5756 | T 07876 478 867
matthew.prior@cbre.com | http://www.cbre.com

Please consider the environment before printing this email

From: David Heuston [mailto:David.Heuston@esg.co.uk]
Sent: 19 January 2016 14:52
To: Prior, Matthew @ Bristol
Cc: Noelyn Allen
Subject: ESG Report: Tamar Building, Bude

Hi Matthew

Apologies for the delay, however please now find attached a copy of the report relating to the swab sampling carried out at the Tamar Building in Bude.

If you should have any queries concerning this report please do not hesitate to contact me.

Kind Regards

Dave

David Heuston (MSc)
Environmental Field Team Leader (South)
Built Environment Services

T: +44 (0)1283 554540 Ext 4858
M: +44 (0)7740 393507
E: david.heuston@esg.co.uk
W: www.esg.co.uk

Consider the environment. Please don't print this email unless you really need to.

Thank you for choosing Environmental Scientifics Group for your environmental monitoring needs. We hope our services have met your requirements and that you are fully satisfied with your experience of working with us, we really do value your custom and would welcome your feedback. We would appreciate it if you could take a moment to complete a short online questionnaire so that we can improve our operations and address any areas that have not met with your expectations, by clicking on the following link: http://www.surveymonkey.com/s/ESG_EnvSafetyCompliance_CustomerFeedback

Group for any loss or damage arising in any way from their receipt, opening or use. Please note that this e-mail has been created in the knowledge that Internet e-mail is not a 100% secure communications medium. We advise that you understand and observe this lack of security when e-mailing us. Environmental Scientifics Group Limited, registered in England and Wales under company number 02880501. ESG Asbestos Limited registered in England and Wales under company number 04951688. Environmental Scientifics Group Limited and ESG Asbestos Limited are part of the Environmental Scientifics Group and their registered office is at ESG House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ.
By virtue of your responding to this email or emailing an employee of CBRE, your name and contact information may be collected, retained, and/or processed by CBRE for its internal business purposes. Should you wish that this information not be collected, please contact the sender of this email. If you would like to know more about how CBRE and its associated companies process your personal data click http://www.cbre.com/EN/Pages/legal/privacypolicy.aspx

This e-mail and its attachments are intended for the above named only and may be confidential. If they have come to you in error you must take no action based on them, nor must you copy or show them to anyone. Please email the sender immediately and highlight the error. Although this email and any attachments are believed to be free from any virus or other defect which might affect any system into which they are opened or received, we advise that, in keeping with good computing practice, the recipient should ensure that they are actually virus-free. No responsibility is accepted by Environmental Scientifics Group for any loss or damage arising in any way from their receipt, opening or use. Please note that this e-mail has been created in the knowledge that Internet e-mail is not a 100% secure communications medium. We advise that you understand and observe this lack of security when e-mailing us. Environmental Scientifics Group Limited, registered in England and Wales under company number 02880501. ESG Asbestos Limited registered in England and Wales under company number 04951688. Environmental Scientifics Group Limited and ESG Asbestos Limited are part of the Environmental Scientifics Group and their registered office is at ESG House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ.

CBRE Limited
Building Consultancy
Floors 13 & 14 Clifton Heights
Triangle West
Clifton
Bristol
BS8 1EJ

Email copy to:
Matthew Prior

ESG
Built Environment Services
Unit D, 2 Wilkinson Road
Bankside Trading Park
Cirencester
Gloucestershire
GL7 1YT

Tel: 01283 554540
Web: www.esg.co.uk

Report No: 15_12_026105_DH_01

14th January 2016

Dear Matthew

SAMPLING OF FUME CUPBOARD EXTRACT SYSTEM DUCTS – TAMAR BUILDING, BUDE

Please find enclosed a copy of our full report regarding the assessment of the samples taken from the Tamar Building in Bude, Cornwall. I hope you find the report satisfactory.

Please do not hesitate to contact me should you have any questions regarding the enclosed report. I am more than happy to discuss any issues you may have regarding the content of the report, or on the investigation generally.

Yours sincerely
On behalf of ESG

David Heuston
Environmental Field Team Leader – (South)
Built Environment Services Division
Environmental Scientifics Group

Email: david.heuston@esg.co.uk

M: 07740 393507
T: 01283 554540

Sampling of Fume Cupboard Extract System Ducts
Tamar House, Bude
CBRE Limited

December 2015

Registered Name: Environmental Scientifics Group Ltd. Registration Number: 2880501.
Registered office: ESG House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

Sampling of Fume Cupboard Extract System Ducts

Tamar House, Bude

Project No. 026105

Carried Out For: CBRE Limited
Building Consultancy
Floors 13 & 14 Clifton Heights
Triangle West
Clifton
Bristol
BS8 1EJ

Carried Out: 15th December 2015

Prepared By: David Heuston – Environmental Field Team Leader – (South)

Authorised By: Jonathan Harries – Technical Manager – Environment Monitoring

Date of Issue: 14th January 2016

Copy No. 1

Revision: 0

Report No: 15_01_026105_DH_01

ESG
Built Environment Services
Unit D, 2 Wilkinson Road
Bankside Trading Park
Cirencester
Gloucestershire
GL7 1YT

Tel: 01283 554540

CONTENTS

1. INTRODUCTION 3

2. BACKGROUND 4

3. OBSERVATIONS 4

4. SAMPLING METHODOLOGY 5

5. ANALYSIS 8

5.1 ORGANIC ANALYSIS 8
5.2 INORGANIC ANALYSIS 8

6. RESULTS 9

7. DISCUSSION 17

8. INTERPRETATION 17

8.1 HAZARDOUS MATERIAL CLASSIFICATION 17
8.2 POSSIBLE HEALTH &SAFETY RISKS AND MITIGATION 18

9. SUMMARY OF RISK ASSESSMENT & RECOMMENDED CONTROL MEASURES 19

1. Introduction

1.1 At the request of Mr Matthew Prior (Associate Director, CRE Limited Building Consultancy) David Heuston of ESG's Built Environment Services division visited the Tamar Building in Bude, Cornwall on the 15th December 2015. The purpose of the visit was to obtain samples of debris from within ducts associated with the various fume cupboard extract systems.

1.2 As part of a re-development, the building is due to be demolished. However there is limited knowledge of the history of the building including the use of the fume cupboards and extraction system. As such, prior to demolition it has been deemed necessary to sample the internal surfaces of the ducts to identify any possible contamination present.

1.3 A single room within the Tamar Building is equipped with various fume cupboards, the extract systems of which discharge through a number of roof top mounted cowls and stacks. At the time of sampling, all the fume cupboards had been disconnected from the extraction system.

1.4 The purpose of the sampling exercise was therefore to obtain samples of any residual debris within the interior of the various cowls and determine its nature and composition. In addition an assessment would be made as to the Health & Safety implications of any material remaining.

Fig 1: general view of the Tamar Building.

Fig 2: general view of the extract system cowls on main roof of Tamar Building.

2. Background

2.1 The fume cupboards within the laboratories facility are designed primarily to remove potentially harmful vapours, fumes and particulate material from within the interior workspace of the cupboard.

2.2 Whilst the extract system is designed to exhaust the vapours and fumes to atmosphere, it is possible that some debris could be deposited along the length of the ductwork as the extracted fume passes through the extract system.

2.3 Given the wide range of experiments and chemicals which may have been used over the years within the cupboards it is difficult to say categorically what residues may be present within the extract system.

2.4 As such before any of the cowls can be removed, an assessment of any residual contamination is required. The objective of the monitoring was to ensure any hazardous materials are identified ahead of the demolition, so as to ensure appropriate Health and Safety precautions can be made prior to the commencement of the demolition.

3. Observations

3.1 There are 9 individual extract system ducts situated within the roof space of the Tamar building. These ducts are a mix of six large 12 inch diameter plastic ducts and three small six inch diameter plastic ducts.

3.2 In addition to the duct system within the roof space, within the laboratory room of the Tamar Building there are the remains of 17 fume cabinets. These consisted of three large cabinets with access to all four sides and 14 standard wall mounted fume cabinets. As little information is known about the building, it is not known if all these fume cupboards were in use within this laboratory. However there is no duct work for an extraction system situated elsewhere in the building.

Fig 3: Example of large extract system duct within roof of Tamar Building.

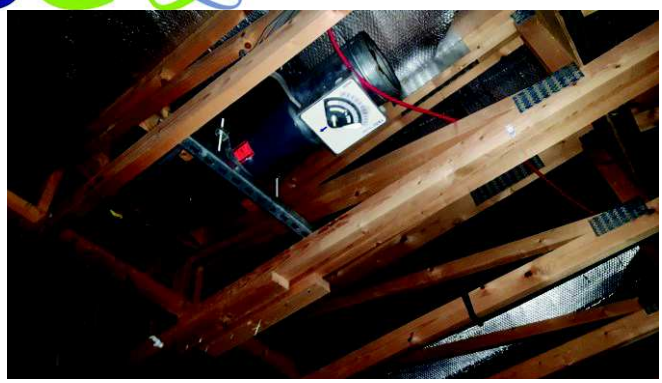


Fig 4: Example of small duct extract system within roof of the Tamar Building.

Fig 5: Large fume cupboard within Tamar Building laboratory

Fig 6: Small fume cupboards stored within the laboratory room of Tamar House.

3.3 Inspection revealed evidence of some residual contamination within the interior surface of the ducts and the fume cabinets. However it is not known how long the ducts and fume cupboards have been in the present state and as such this may have an accumulation of dust from activities which have taken place in the Tamar Building since the laboratory ceased operation.

4. Sampling Methodology

4.1 In order to obtain a representative sample of the deposits from within each cowl a number of swab samples were obtained. To remove inorganic based contamination, a water based swab was utilised whilst to remove organic residues a hexane based swab was utilised.

4.2 Samples were taken in accordance with ESG documented procedure SCI/ENV/024-01 “Sampling Surface Contamination”.

4.3 Due to the larger than expected number of ducts and fume cupboards not all extract systems or fume cupboards were swabbed for analysis. Of the extract systems, only the six large diameter duct pipes were sampled. In addition to this three of the 17 fume cupboards were swabbed, one large and two standard size fume cabinets.

4.4 Details of the various samples taken from within the ducts and fume cupboards during the survey are given in the table below. As no identification was present on the ducts or fume cabinets, each was labelled during the sampling process with the descriptions give in table one below.

Table One (a): Description of Samples, Extract Ducts and Fume Cupboards, Tamar House

Location	Sample Ref No.	Description
Duct 1 (Furthest from External Door, Southern end of Laboratory)	026105/1a	DI water swab exhibiting slight dark staining after use
	026105/1b	Hexane solvent swab exhibiting slight dark staining after use
Duct 2	026105/2a	DI water swab exhibiting slight dark staining after use
	026105/2b	Hexane solvent swab exhibiting slight dark staining after use
Duct 2	026105/3a	DI water swab exhibiting slight dark staining after use
	026105/3b	Hexane solvent swab exhibiting slight dark staining after use
Duct 4	026105/4a	DI water swab exhibiting slight dark staining after use
	026105/5b	Hexane solvent swab exhibiting slight dark staining after use
Duct 5	026105/5a	DI water swab exhibiting slight dark staining after use
	026105/5b	Hexane solvent swab exhibiting slight dark staining after use
Duct 6 (Nearest external door, northern end of Laboratory)	026105/6a	DI water swab exhibiting slight dark staining after use
	026105/6b	Hexane solvent swab exhibiting slight dark staining after use

Table One (b): Description of Samples, Extract Ducts and Fume Cupboards, Tamar House

Location	Sample Ref No.	Description
Fume 1	026105/7a	DI water swab exhibiting slight dark staining after use
	026105/7b	Hexane solvent swab exhibiting slight dark staining after use
Fume 2	026105/8a	DI water swab exhibiting slight dark staining after use
	026105/8b	Hexane solvent swab exhibiting slight dark staining after use
Fume 3	026105/9a	DI water swab exhibiting slight dark staining after use
	026105/9b	Hexane solvent swab exhibiting slight dark staining after use

5. Analysis

5.1 Organic Analysis

5.1.1 The samples were prepared and analysed following an ESG in-house documented method.

5.1.2 A portion of each Hexane swab was extracted in Dichloromethane. The Dichloromethane extracts were spiked with an internal standard (Octane). The resultant solutions were analysed by splitless injection GC/MS on a general scan to tentatively identify, by mass spectral data, the semi-volatile organic compounds (SVOCs) present.

5.1.3 An unused blank swab was used to back correct for material naturally present in the paper swabs.

5.1.4 Gas Chromatography relies on the organic components of the substance being analysed, to be soluble in a suitable organic solvent. The resultant solvent extract is injected into a Gas Chromatograph where the individual organic components of the substance are separated according to their molecular structure.

5.1.5 Determination of the structure and hence their composition is achieved by Mass Spectrometry where by the organic molecules are converted in to individual ions, the molecular weight of which and hence their structure is determined by a computer controlled detector.

5.1.6 The compounds identified were semi-quantified against the response of the internal standard. The rresults are expressed as µg in the sample “as received”.

5.2 Inorganic Analysis

5.2.1 Duplicate portions of each sample were prepared for analysis by extraction of the swab material in trace analysis grade concentrated nitric acid using hotplate assisted heating. The resulting acid solutions were made to a known volume with deionised water having a resistivity of 18.2 MΩ.cm and then filtered. A blank corrected reference sample was also made using an unused swab.

5.2.2 The resultant samples were analysed for ESG’s “45 element” scan suite by ICP-AES. Results are expressed in µg per swab sample.

6. Results

6.1 Organic Analysis

Duct 1 - PN-026105/1b

Solvent extract and GC/MS analysis of the sample found it to contain Butylated hydroxytoluene (11µg), Phthalates (682µg) and a hydrocarbon mineral oil with trace levels of silicones (40000µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 7.

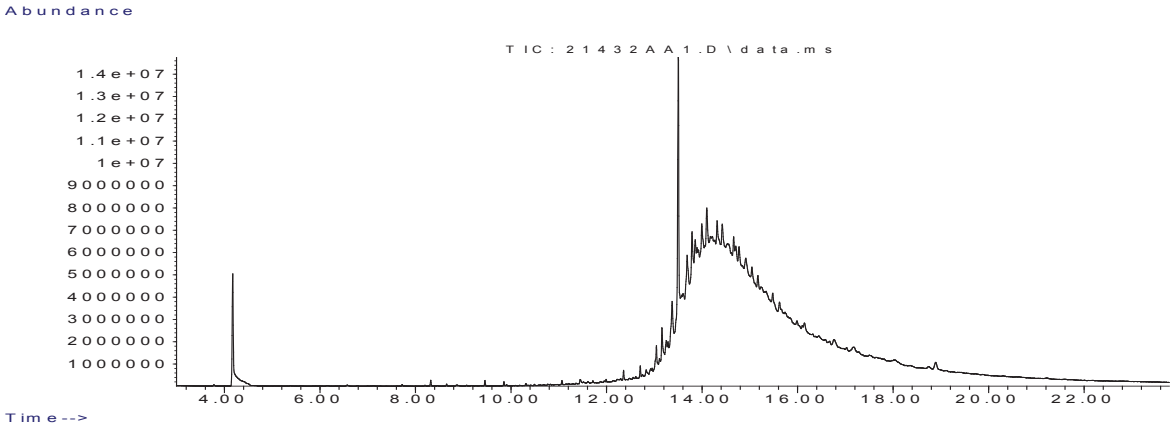


Figure 7. TIC obtained from solvent extract of sample PN-026105/1

Duct 2 - PN-026105/2b

Solvent extract and GC/MS analysis of the sample found it to contain 2,4,7,9-Tetramethyl-5-decyn-4, 7-diol (1.2µg), Butylated hydroxytoluene (1.7µg), Phthalates (65µg) and a hydrocarbon mineral oil with trace levels of silicones (18000µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 8.

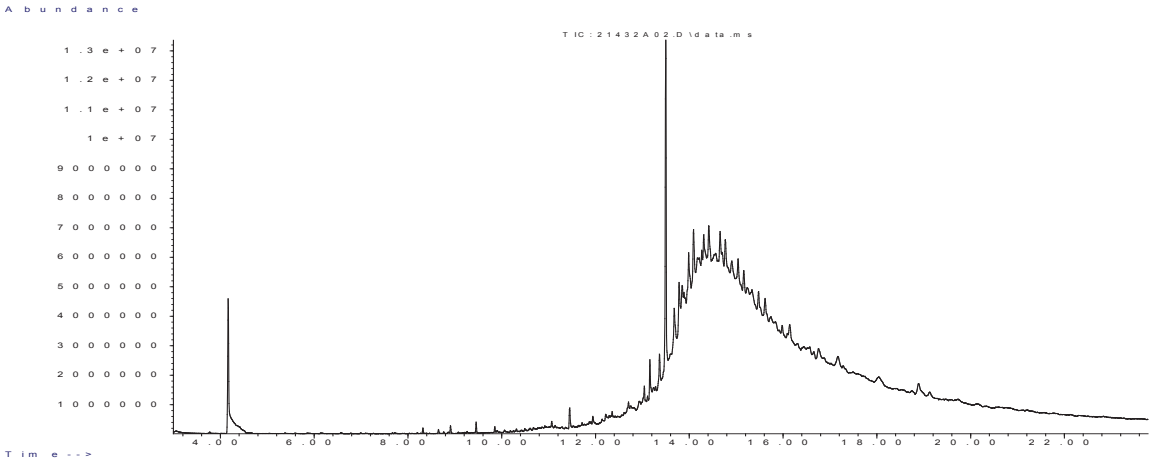


Figure 8. TIC obtained from solvent extract of sample PN-026105/2

Duct 3 - PN-026105/3b

Solvent extract and GC/MS analysis of the sample found it to contain Butylated hydroxytoluene (2.6µg), C_{16}-C_{18} Fatty acids (42µg), Phthalates (78µg) and a hydrocarbon mineral oil containing hydrocarbon waxes and trace levels of silicones (2200µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 9.

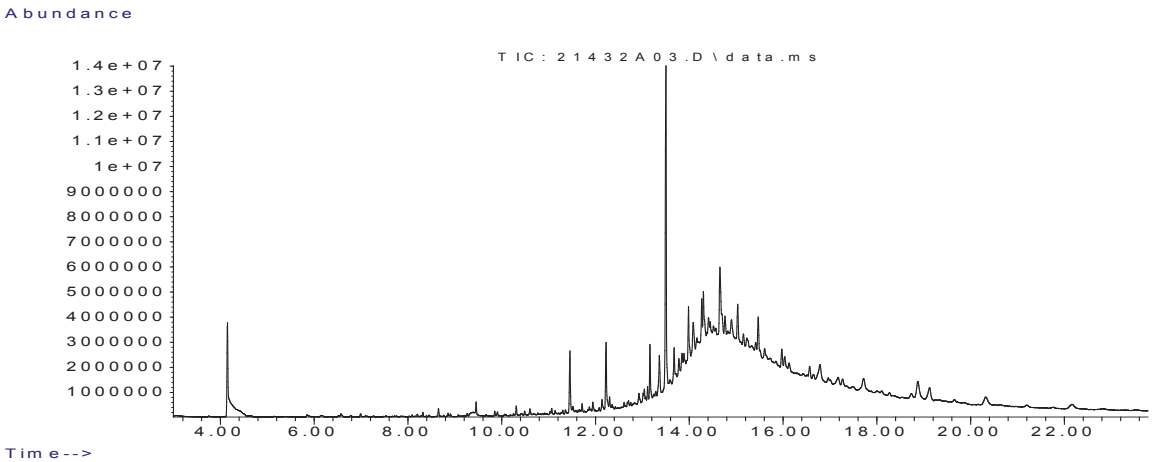


Figure 9. TIC obtained from solvent extract of sample PN-026105/3

Duct 4 - PN-026105/4b

Solvent extract and GC/MS analysis of the sample found it to contain Butylated hydroxytoluene (1.1µg), Fatty acids (3.3µg), Phthalates (36µg) and a hydrocarbon mineral oil containing hydrocarbon waxes and trace levels of silicones (900µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 10.

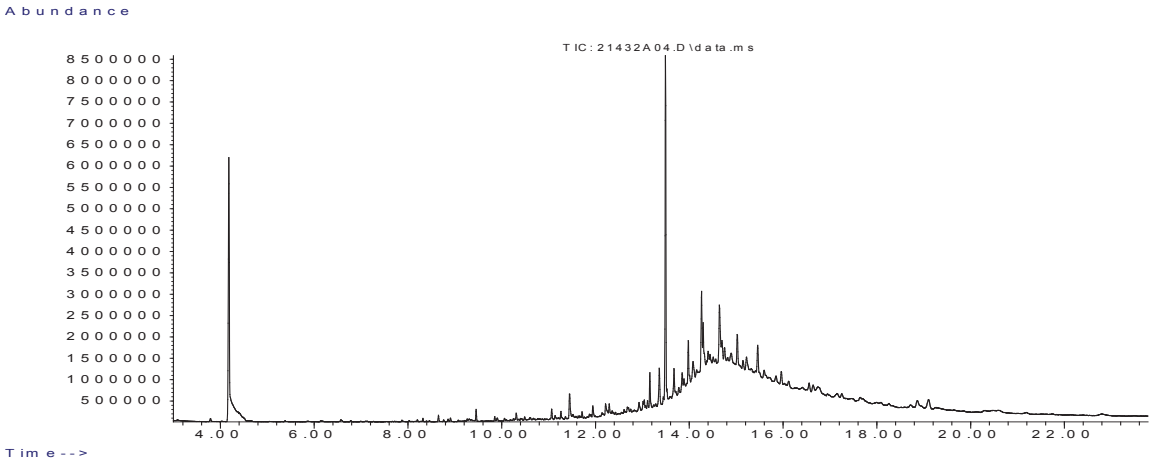


Figure 10. TIC obtained from solvent extract of sample PN-026105/4

Duct 5 - PN-026105/5b

Solvent extract and GC/MS analysis of the sample found it to contain Butylated hydroxytoluene (6.8µg), C_{16}-C_{18} Fatty acids (65µg), Phthalates (160µg) and a silicone oil (5200µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 11.

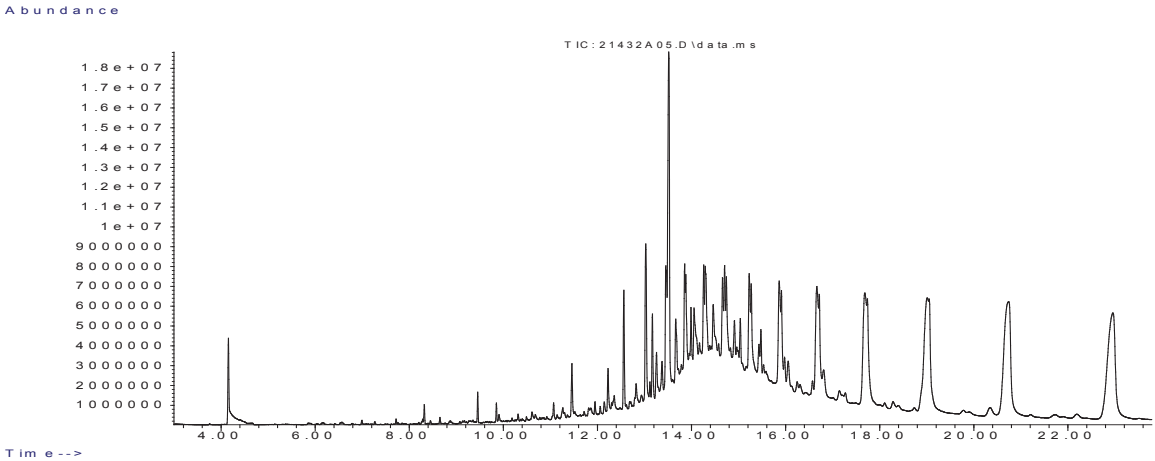


Figure 11. TIC obtained from solvent extract of sample PN-026105/5

Duct 6 - PN-026105/6b

Solvent extract and GC/MS analysis of the sample found it to contain Butylated hydroxytoluene (3.1µg), C_{16}-C_{18} Fatty acids (66µg), Phthalates (120µg) and a silicone oil containing hydrocarbon waxes (2300µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 12.

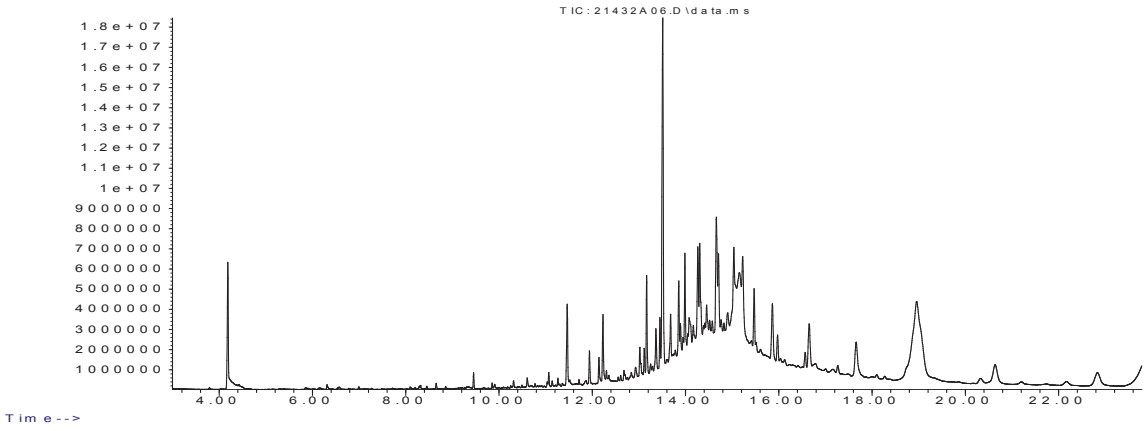


Figure 12. TIC obtained from solvent extract of sample PN-026105/6)

Fume 1 - PN-026105/7b

Solvent extract and GC/MS analysis of the sample found it to contain Phthalates (20µg) and lesser amounts of Butylated hydroxytoluene (0.6µg) and Fatty acids (1.9µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 13.

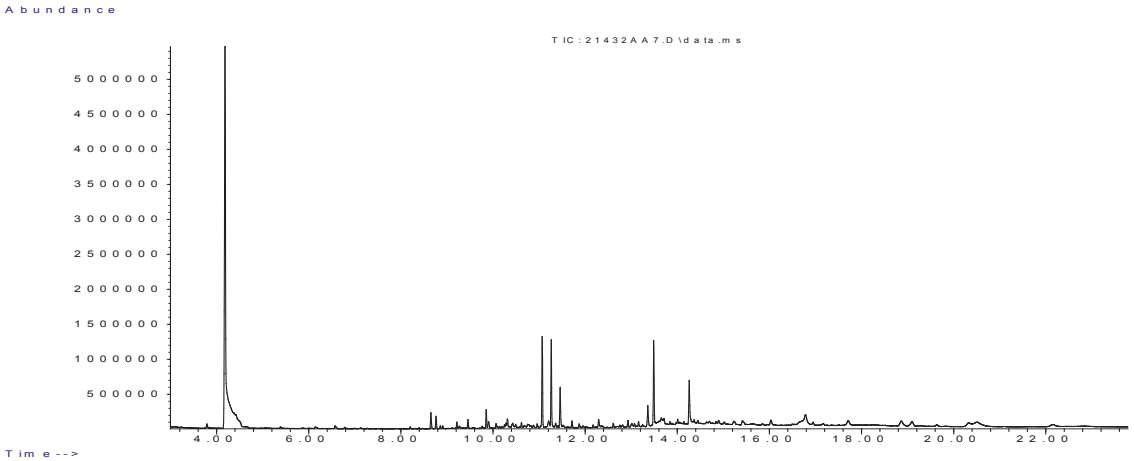


Figure 13. TIC obtained from solvent extract of sample PN-026105/7

Fume 2 - PN-026105/8b

Solvent extract and GC/MS analysis of the sample found it to contain Phthalates (18µg) and lesser amounts of 2,4,7,9-tetramethyl-5-decyn-4, 7-diol (0.1µg) and Butylated hydroxytoluene (0.3µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 14.

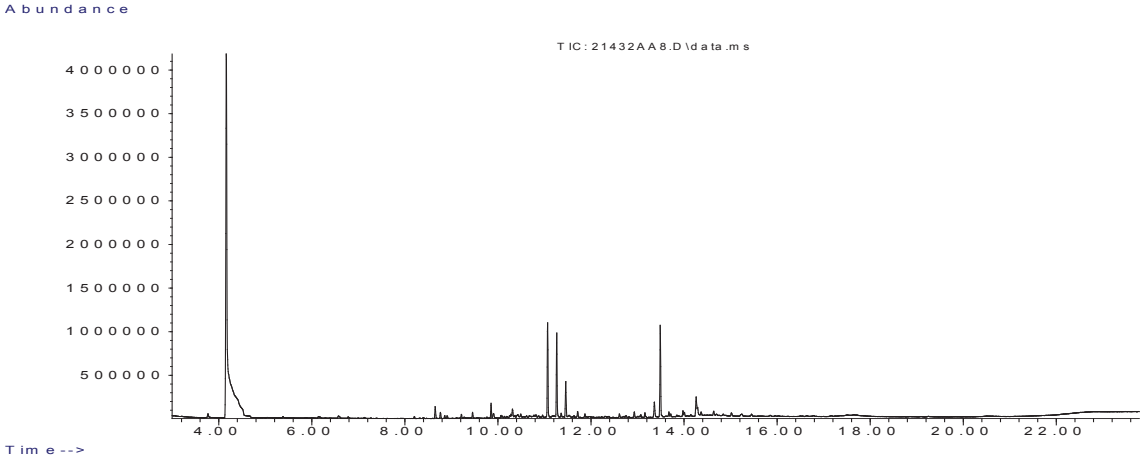


Figure 14. TIC obtained from solvent extract of sample PN-026105/8

Fume 3 - PN-026105/9b

Solvent extract and GC/MS analysis of the sample found it to contain a mixture of Phthalates (10µg) and Fatty acids (2.1µg). Quantified figures stated are an estimate based of the response of the compound against the response of the internal standard (Octane). The Total Ion Chromatograph (TIC) is shown in figure 15.

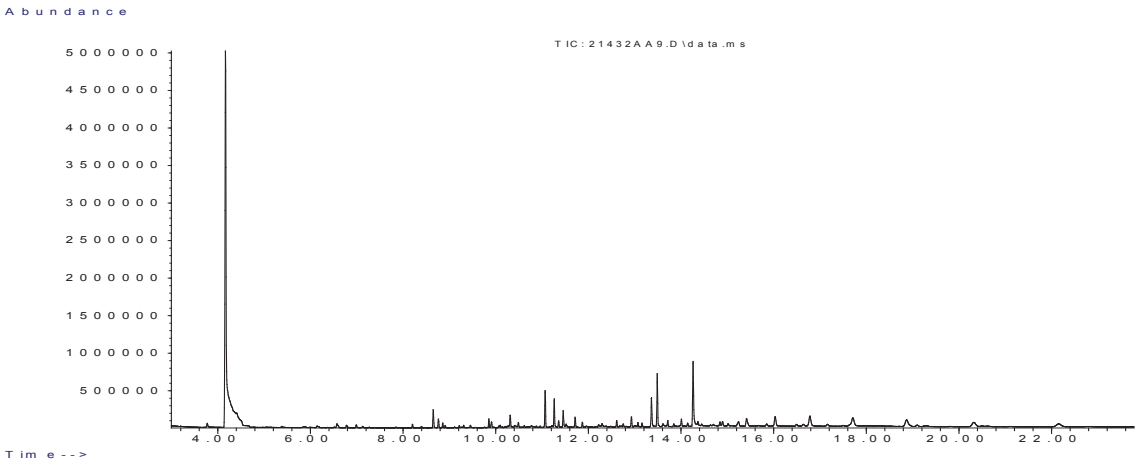


Figure 15. TIC obtained from solvent extract of sample PN-026105/9

6.2 Inorganic Analysis

Table Two (a): Analysis of Swab Samples for Metals

System Location	Sample Reference	Aluminium (Al)	Arsenic (As)	Barium (Ba)	Calcium (Ca)	Cadmium (Cd)	Cobalt (Co)	Chromium (Cr)	Copper (Cu)	Iron (Fe)
	Units	µg	µg	µg	µg	µg	µg	µg	µg	µg
	LOD	*1*	*20*	*0.04*	*0.4*/1*	*2*	*4*	*1*	*0.6*	*10*/0.6*
Duct 1	PN026105/1a	1900	<20	36	4000	<2	<4	26	110	2000
Duct 2	PN026105/2a	720	<20	18	2100	<2	<4	10	45	1200
Duct 3	PN026105/3a	1800	<20	32	4600	<2	<4	33	86	2000
Duct 4	PN026105/4a	3300	<20	39	4200	<2	<4	22	99	2300
Duct 5	PN026105/5a	5300	<20	150	20000*	7	5	71	320	9800*
Duct 6	PN026105/6a	990	<20	34	3300	2	<4	15	54	2200
Fume 1	PN026105/7a	2300	<20	9.1	460	<2	<4	3	26	600
Fume 2	PN026105/8a	130	<20	0.75	230	<2	<4	2	6	90
Fume 3	PN026105/9a	43	<20	1.0	520	<2	<4	<1	6.4	38

An * indicates corresponding instrument limit of detection.
Results are given as µg per swab.

Table Two (b): Analysis of Swab Samples for Metals

System Location	Sample Reference	Mercury (Hg)	Magnesium (Mg)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Lead (Pb)	Selenium (Se)	Vanadium (V)	Zinc (Zn)
	Units	µg	µg	µg	µg	µg	µg	µg	µg	µg
	LOD	*6*	*0.4*	*0.1*	*10*	*4*	*20*	*60*	*0.4*	*8*/0.8*
Duct 1	PN026105/1a	<6	1700	27	<10	20	100	<60	4.7	260
Duct 2	PN026105/2a	<6	780	16	<10	8	50	<60	2	150
Duct 3	PN026105/3a	<6	1900	28	<10	20	200	<60	4	270
Duct 4	PN026105/4a	<6	1300	29	<10	10	100	<60	4.3	260
Duct 5	PN026105/5a	<6	6300	140	<10	47	460	<60	16	1100*
Duct 6	PN026105/6a	<6	1200	26	<10	7	100	<60	4	140
Fume 1	PN026105/7a	<6	130	12	<10	7	30	<60	1	220
Fume 2	PN026105/8a	<6	59	0.9	<10	<4	<20	<60	0.6	8
Fume 3	PN026105/9a	<6	38	0.6	<10	<4	<20	<60	0.4	6

An * indicates corresponding instrument limit of detection.
Results are given as µg per swab.

Table Three: Analysis of Swab Samples for Anions

System Location	Sample Reference	Fluorine (F)	Chlorine (Cl)	Nitrite (NO2)	Nitrate (NO3)	Bromine (Br)	Sulphate (SO4)	Phosphate (PO4)
	Units	µg	µg	µg	µg	µg	µg	µg
	LOD	*0.2/2*/200***	*0.2/2*/200***	*0.2/2*/200***	*0.2/2*/200***	*0.2/2*/200***	*0.4/4*/400***	*0.2/2*/200***
Duct 1	PN026105/1a	36	1100	80	0.8	<0.2	5900**	0.6
Duct 2	PN026105/2a	4.0	5600	<0.2	0.2	2000	20	4.0
Duct 3	PN026105/3a	42	15000**	3.8	0.6	<0.2	9800**	8.0
Duct 4	PN026105/4a	12	10000	10	0.6	300**	3000*	0.6
Duct 5	PN026105/5a	<200**	61000**	36000**	<200**	<200**	30000**	<200**
Duct 6	PN026105/6a	22	7400*	<2*	<2*	<2*	3100*	<2*
Fume 1	PN026105/7a	<2*	680*	<2*	36*	<2*	120*	<2*
Fume 2	PN026105/8a	<2*	1800*	<2*	120*	<2*	660*	<2*
Fume 3	PN026105/9a	<2*	70*	<2*	50*	<2*	110*	<2*

An * indicates corresponding instrument limit of detection.
An ** indicates corresponding instrument limit of detection.
Results are given as µg per swab.

7. Discussion

7.1 Composition of Debris

7.1.1 Analysis of debris and material present on the inside of the extract system ducts and fume cupboards has revealed there to be very little contaminative material present. That material which was visible was only present in the form of a slight dark staining and dust on the inside of the various ducts and fume cupboards.

7.2 Inorganic Analysis

7.2.1 Analysis of the inorganic swabs taken from the interior of the various extract ducts and fume cupboards has revealed very low levels of all elements analysed for. The only elements found to be present at any appreciable level above the applicable limit of detection (LoD) were aluminium, calcium, iron, magnesium and Zinc. Furthermore Duct five had higher than average levels of Chlorine, Nitrite and Sulphate.

7.3 Organic Analysis

7.3.1 Analysis of the organic swabs taken from the interior of the various ducts and fume cupboards revealed the following to be present at low levels (micrograms) in each sample Butylated hydroxytoluene, Phthalates, Silicone Oil, Hydrocarbon Waxes, and traces of Mineral oils. These chemicals are found in various organic sources from plasticisers in plastics to oils and lubricants.

8. Interpretation

8.1 Hazardous Material Classification

8.1.1 It should be noted that the assessment of risks posed by the various aspects of the removal of the extraction system ducts and fume cupboards is based around the proposed demolition of the Tamar Building.

8.1.2 It does not apply to or take into consideration staff that are carrying out non-intrusive inspection works. This is based on the fact that staff carrying out these specific types of non-intrusive work should have limited exposure to various hazards and as such the risks posed are minimal.

8.1.3 Analysis of the debris samples has revealed that with regard to organic contamination, the levels present are very low (µg level) and do not pose a major risk with regard to possible health & safety implications, based on the proposed works.

8.1.4 With regard to inorganic elements, interpretation of the results indicates the levels present are very low (µg level) and do not pose a major risk with regard to possible health & safety implications, based on the nature of the proposed works.

8.1.5 It should be noted that the levels of contaminants present do not pose a

major risk to the health of site operatives *providing* employees carrying out any work involving a likely/possible disturbance of the debris material within the ducts and fume cupboards, practise good personal hygiene, i.e. wearing gloves and thoroughly washing hands before eating or smoking.

8.1.6 With regard to Health & Safety implications, the levels recorded present are very low and do not pose a major risk with regard to possible health & safety implications.

8.2 Possible Health &Safety Risks and Mitigation

8.2.1 Skin absorption of a range of materials may have a general effect if the material is absorbed into the bloodstream, or it may have a localised effect and cause skin irritation, dermatitis, or skin cancer. Substances such as tars, oils, waxes and corrosive substances (acids and bases) can lead to skin irritation and possibly longer term skin sensitisation and dermatitis. Carcinogens such as oxidised oils and similar compounds may be encountered and certain organic residues may cause related skin rashes.

8.2.2 With regard to skin penetration, materials may enter the body as a result of a puncture wound to the skin, this is a common route of entry for microbiological hazards such as Leptospirosis (Well's Disease), or Tetanus.

8.2.3 With regard to ingestion, material may enter the mouth often from the fingers. This will normally arise if smoking and eating are allowed on site. Handling contaminated clothing outside the site may also present problems, especially if overalls are taken home and this should not be permitted.

8.2.4 Hazardous materials can be accidentally inhaled. The material may be in the form of a dust or vapour. Effects can range from mildly irritant to being highly poisonous. Examples are debris being possibly contaminated with a range of materials such as oils and heavy metals.

8.2.5 Given the low levels of contamination found to be present in the debris on the inside of the various cowls and stacks, from a health and safety point of view, it is however recommended that disposable overalls (to prevent contamination of normal "day to day" work wear) and suitable nitrile gloves be worn when moving the cowls.

8.2.6 If it is likely that dust and debris will become airborne when the ducts are being moved it may be prudent to wear disposable RPE in the form of PF3 dust masks. This will reduce the risk of accidental ingestion and inhalation of debris material released when the cowls are moved..

8.2.7 Additionally the work area should declared a no smoking or eating zone and staff should remove overalls etc and wash hands before eating, drinking or smoking. All overalls gloves etc should then be bagged upon completion of the works before leaving the roof to prevent accidental contamination of the interior of the building.

9. Summary of Risk Assessment & Recommended Control Measures

Hazard Description		Uncontrolled			Controlled			Action Recommended
		H	L	Risk	H	L	Risk	
Temporarily removing roof top cowls and stacks from fume cupboard extract systems	Skin Absorption	2	2	4	2	1	2	Define contaminated area Minimise handling of debris deposits Wear suitable PPE (gloves, overalls, safety boots) Provide suitable decontamination & hygiene facilities off site Provide suitable information, instruction and training for all site workers
	Skin Penetration	2	2	4	2	1	2	Define contaminated area Minimise handling of material Wear suitable PPE (gloves, overalls, safety boots) Provide suitable decontamination & hygiene facilities off site Provide suitable information, instruction and training for all site workers
	Ingestion	3	3	9	3	1	3	Define contaminated area Minimise handling of soot deposits Wear suitable PPE (gloves, overalls, safety boots) and RPE whilst carrying out work involving disturbance of debris from within interior of ducts Provide suitable decontamination & hygiene facilities Ensure that no-one eats, drinks or smokes within the work zone and that everyone washes hands & face prior to eating, drinking or smoking Provide suitable information, instruction and training for all site workers
	Inhalation	2	3	6	2	1	2	Define contaminated area Minimise handling of debris deposits Dampen material at regular intervals to minimise dust release Wear suitable RPE whilst carrying out work involving disturbance of deposits from within inside of ducts. Monitor atmospheric particulate dust concentrations if necessary Provide suitable information, instruction and training for all site workers

Hazard x **L**ikelihood = **R**isk:

	Severity of Harm from Hazard (H)		
Likelihood (L) of Harm	Minor	Moderate	Major
Certain	3 Low	6 High	9 High
Likely	2 Low	4 Medium	6 High
Unlikely	1 Low	2 Low	3 Low

Low, Monitor situation	**Medium**, Identify improvements to reduce risk rating, draw up plans & set time scales for implementation.	**High**, Requires Urgent & Immediate reduction of exposure. Take action and then re-assess.

DISTRIBUTION LIST

Report No.:	15_12_026105_DH_01
Title:	Sampling of Fume Cupboard Extract System Ducts – Tamar Building, Bude

Copy No.	Recipient
1	CBRE Limited
2	ESG

Authorised for distribution to the above list.

Jonathan Harries – Technical Manager
Environmental Monitoring

CONFIDENTIALITY

The information contained in this report shall not be disclosed outside ESG without the permission of the client.

In addition to those named on the distribution list above, the information contained in this report will be restricted to:

Category of Restriction	
	ESG (Unrestricted)
	ESG Built Environment Services Division
✔	Distribution List Only