



Our Ref: 17-07572
Your Ref: 3534/17-067
Date: 31st August 2017

ENVIROCHEM

Analytical Laboratories Ltd.
Units 12-14, The Gardens
Broadcut, Fareham
Hampshire



Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
lab@envirochem.co.uk

Air Quality Monitoring for Inhalable dust, Metals and Organic content of dust

At

Natta,
HMS Daedalus,
Lee-On-Solent.

On Behalf of
White Young Green.



Date report issued: 7th September 2017

Number of pages (including this header): Six

Signed on behalf of Envirochem by an authorised signatory

reg. 12(3)

Occupational Hygienist

Accreditation

Envirochem is UKAS accredited for the sampling and determination of inhalable/respirable dust as per MDHS 14/4: June 2014 by documented in-house procedure No. 4.02

All comments and interpretations are beyond the scope of our accreditation



INTRODUCTION

Envirochem have been authorised by **reg. 12(3)** of White Young Green, to undertake air quality sampling and the subsequent analysis of inhalable dusts, metal and organic content in dusts at HMS Daedalus.

AIMS

The aim of the analysis was to assess the exposure of inhalable dust and the metal and organic content of the airborne dust currently generated by the deconstruction of the army site at HMS Daedalus. When comparing the analysis to limits, the workplace exposure limit (WEL) was used. In addition, since the aim of the exercise is also to assess exposure to neighbours to the site, in the absence of a known ambient limit, a limit of 1/10 of the WEL is used.

SAMPLING

The sampling was carried out by **reg. 12(3)** of Envirochem on the 31st August 2017. The sampling locations are shown in Table 1, which were positioned in the same locations as the current Frisbee settable dust gauges set up on site.

Table 1: Sampling positions

No.	Sample Ref	Location	Type
1	20381	M1	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20382		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
2	20383	M2	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20384		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
3	20385	M3	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20386		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
4	20387	M4	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20388		Static Monitoring: Inhalable Dust, Metals and Organics content of dust



SAMPLING LOCATIONS



Figure 1: Sample location M1



Figure 2: Sample location M2



Figure 3: Sample location M3



Figure 4: Sample location M4



SITE CONDITIONS

Partly Cloudy

Temperature: 17°c

Humidity: 75%

Wind: 6mph

Pressure: 1016hPa

METHODS

Inhalable dust:

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in a IOM open faced sampling head at a flow rate of 2.0 l/min.

The filter is subsequently re-weighed as per MDHS 14/4 and our UKAS accredited procedure 4.02.

The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100 µm and approximates to the fraction of airborne material which enters the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal content of dusts:

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Please Note: This method is not covered by our UKAS accreditation.

Organic content of dust:

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

Please Note: This method is not covered by our UKAS accreditation.



RESULTS

INHALABLE DUST

Table 2: Static sample: Inhalable Dust

Sample ref	Sampling Time (mins)	Volume sampled (l)	Mass on filter (mg)	Average Concentration (mg/m ³)
20381- M1	195	390	0.07	0.19
20382- M1	195	390	0.07	0.19
20383- M2	195	390	0.08	0.21
20384- M2	195	390	0.03	0.09
20385- M3	200	400	<0.01	<0.01
20386- M3	200	400	0.05	0.13
20387- M4	200	400	0.06	0.16
20388- M4	200	400	0.07	0.18
Workplace exposure limit for total inhalable dust, 8hr time weighted average from EH40 2005 rev 2011				10

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ The limits are taken from the HSE publication EH40 2005 rev. 2011
- △ All samples once analysed all were below the exposure limit, the results were also below the ambient limit.

ORGANIC CONTENT OF DUST

Table 3: Static sample: Organics on filter

Samp. Ref	Location	Sampling Duration (mins)	Vol. Samp. (l)	Test type	Material	Average Concentration (mg/m ³)	WEL (mg/m ³)
20381	M1	195	390	GFA Static Filter	No compounds present		
20383	M2	195	390	GFA Static Filter	No compounds present		
20385	M3	200	400	GFA Static Filter	No compounds present		
20387	M4	200	400	GFA Static Filter	No compounds present		

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ All locations, when analysed, had no compounds present.



METAL CONTENT OF DUST

Table 4: Metals in dust on filter (average concentration mg/m³)

Metal	20382- M1	20384- M2	20386- M3	20388-M4	Workplace Exposure Limit (from EH40/2005 revised in 2011)
Aluminium	<0.01	<0.01	<0.01	<0.01	10
Beryllium	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	<0.01	<0.01	<0.01	<0.01	0.025
Cobalt	<0.01	<0.01	<0.01	<0.01	0.1
Chromium	<0.01	<0.01	<0.01	<0.01	0.5
Copper	<0.01	<0.01	<0.01	<0.01	0.2
Iron	<0.01	<0.01	<0.01	<0.01	1
Mercury	<0.01	<0.01	<0.01	<0.01	0.02
Magnesium	<0.01	<0.01	<0.01	<0.01	10
Manganese	<0.01	<0.01	<0.01	<0.01	0.5
Nickel	<0.01	<0.01	<0.01	<0.01	0.1
Lead	<0.01	<0.01	<0.01	<0.01	0.15*
Antimony	<0.01	<0.01	<0.01	<0.01	0.5
Tin	<0.01	<0.01	<0.01	<0.01	0.1
Vanadium	<0.01	<0.01	<0.01	<0.01	0.05
Zinc	<0.01	<0.01	<0.01	<0.01	1

* Workplace exposure limit for Lead (Pb) exposure taken from the Health and Safety Executive document *Control of Lead (Pb) at work regulations 2002* referred to in the Health and Safety Executive document *EH40/2005 revised in 2011*

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ▲ The metal content for the airborne dust sample taken from all four locations were analysed and found to be below the detection levels for all metals, therefore below the work place exposure limits and the ambient air quality limit.

DISCUSSION:

- ▲ The samples were analysed to be below the workplace exposure limits, and the ambient air limits, for inhalable dust, metals and organic content of dust.



Our Ref: 17-07655
Your Ref: 3534/17-067
Date: 7th September 2017

ENVIROCHEM

Analytical Laboratories Ltd.
Units 12-14, The Gardens
Broadcut, Fareham
Hampshire



Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
lab@envirochem.co.uk

Air Quality Monitoring for Inhalable dust, Metals and Organic content of dust

At

Natta,
HMS Daedalus,
Lee-On-Solent.

On Behalf of
White Young Green.



Date report issued: 18th September 2017

Number of pages (including this header): Six

Signed on behalf of Envirochem by an authorised signatory

reg. 12(3)

Occupational Hygienist

Accreditation

Envirochem is UKAS accredited for the sampling and determination of inhalable/respirable dust as per MDHS 14/4:
June 2014 by documented in-house procedure No. 4.02

All comments and interpretations are beyond the scope of our accreditation



INTRODUCTION

Envirochem have been authorised by **reg. 12(3)** of White Young Green, to undertake air quality sampling and the subsequent analysis of inhalable dusts, metal and organic content in dusts at HMS Daedalus.

AIMS

The aim of the analysis was to assess the exposure of inhalable dust and the metal and organic content of the airborne dust currently generated by the deconstruction of the army site at HMS Daedalus. When comparing the analysis to limits, the workplace exposure limit (WEL) was used. In addition, since the aim of the exercise is also to assess exposure to neighbours to the site, in the absence of a known ambient limit, a limit of 1/10 of the WEL is used.

SAMPLING

The sampling was carried out by **reg. 12(3)** of Envirochem on the 7th September 2017. The sampling locations are shown in Table 1, which were positioned in the same locations as the current Frisbee settable dust gauges set up on site.

Table 1: Sampling positions

No.	Sample Ref	Location	Type
1	20607	M1	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20608		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
2	20609	M2	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20610		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
3	20611	M3	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20612		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
4	20613	M4	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20614		Static Monitoring: Inhalable Dust, Metals and Organics content of dust



SAMPLING LOCATIONS



Figure 1: Sample location M1



Figure 2: Sample location M2



Figure 3: Sample location M3



Figure 4: Sample location M4



SITE CONDITIONS

Most Cloudy

Temperature: 19°c

Humidity: 69%

Wind: 11mph

Pressure: 1016hPa

METHODS

Inhalable dust:

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in a IOM open faced sampling head at a flow rate of 2.0 l/min.

The filter is subsequently re-weighed as per MDHS 14/4 and our UKAS accredited procedure 4.02. The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100 µm and approximates to the fraction of airborne material which enters the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal content of dusts:

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Please Note: This method is not covered by our UKAS accreditation.

Organic content of dust:

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

Please Note: This method is not covered by our UKAS accreditation.



RESULTS

INHALABLE DUST

Table 2: Static sample: Inhalable Dust

Sample ref	Sampling Time (mins)	Volume sampled (l)	Mass on filter (mg)	Average Concentration (mg/m ³)
20607 – M1	205	410	0.15	0.35
20608 – M1	205	410	0.16	0.38
20609 – M2	210	420	0.04	0.09
20610 – M2	210	420	0.06	0.13
20611 – M3	210	420	0.12	0.28
20612 – M3	210	420	0.06	0.13
20613 – M4	215	430	<0.01	<0.01
20614 – M4	215	430	<0.01	<0.01
Workplace exposure limit for total inhalable dust, 8hr time weighted average from EH40 2005 rev 2011				10

COMMENTS:

- ⚠ The 'average concentration' is the dust concentration averaged over the sampling duration.
- ⚠ The limits are taken from the HSE publication EH40 2005 rev. 2011
- ⚠ All samples once analysed all were below the exposure limit, the results were also below the ambient limit.

ORGANIC CONTENT OF DUST

Table 3: Static sample: Organics on filter

Samp. Ref	Location	Sampling Duration (mins)	Vol. Samp. (l)	Test type	Material	Average Concentration (mg/m ³)	WEL (mg/m ³)
20608	M1	205	410	GFA Static Filter	No compounds present		
20610	M2	210	420	GFA Static Filter	No compounds present		
20612	M3	210	420	GFA Static Filter	No compounds present		
20614	M4	215	430	GFA Static Filter	No compounds present		

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ⚠ The 'average concentration' is the dust concentration averaged over the sampling duration.
- ⚠ All locations, when analysed, had no compounds present.



METAL CONTENT OF DUST

Table 4: Metals in dust on filter (average concentration mg/m³)

Metal	20607- M1	20609- M2	20611- M3	20613-M4	Workplace Exposure Limit (from EH40/2005 revised in 2011)
Aluminium	<0.01	<0.01	<0.01	<0.01	10
Beryllium	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	<0.01	<0.01	<0.01	<0.01	0.025
Cobalt	<0.01	<0.01	<0.01	<0.01	0.1
Chromium	<0.01	<0.01	<0.01	<0.01	0.5
Copper	<0.01	<0.01	<0.01	<0.01	0.2
Iron	<0.01	<0.01	<0.01	<0.01	1
Mercury	<0.01	<0.01	<0.01	<0.01	0.02
Magnesium	<0.01	<0.01	<0.01	<0.01	10
Manganese	<0.01	<0.01	<0.01	<0.01	0.5
Nickel	<0.01	<0.01	<0.01	<0.01	0.1
Lead	<0.01	<0.01	<0.01	<0.01	0.15*
Antimony	<0.01	<0.01	<0.01	<0.01	0.5
Tin	<0.01	<0.01	<0.01	<0.01	0.1
Vanadium	<0.01	<0.01	<0.01	<0.01	0.05
Zinc	<0.01	<0.01	<0.01	<0.01	1

* Workplace exposure limit for Lead (Pb) exposure taken from the Health and Safety Executive document *Control of Lead (Pb) at work regulations 2002* referred to in the Health and Safety Executive document *EH40/2005 revised in 2011*

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ▲ The metal content for the airborne dust sample taken from all four locations were analysed and found to be below the detection levels for all metals, therefore below the work place exposure limits and the ambient air quality limit.

DISCUSSION:

- ▲ The samples were analysed to be below the workplace exposure limits, and the ambient air limits, for inhalable dust, metals and organic content of dust.



Our Ref: 17-07726
Your Ref: 3534/17-067
Date: September 2017

ENVIROCHEM

Analytical Laboratories Ltd.
Units 12-14, The Gardens
Broadcut, Fareham
Hampshire



Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
lab@envirochem.co.uk

Air Quality Monitoring for Inhalable dust, Metals and Organic content of dust

At

Natta,
HMS Daedalus,
Lee-On-Solent.

On Behalf of
White Young Green.



Date report issued: 22nd September 2017

Number of pages (including this header): Six

Signed on behalf of Envirochem by an authorised signatory

reg. 12(3)

Occupational Hygienist

Accreditation

Envirochem is UKAS accredited for the sampling and determination of inhalable/respirable dust as per MDHS 14/4:
June 2014 by documented in-house procedure No. 4.02

All comments and interpretations are beyond the scope of our accreditation



INTRODUCTION

Envirochem have been authorised by **reg. 12(3)** of White Young Green, to undertake air quality sampling and the subsequent analysis of inhalable dusts, metal and organic content in dusts at HMS Daedalus.

AIMS

The aim of the analysis was to assess the exposure of inhalable dust and the metal and organic content of the airborne dust currently generated by the deconstruction of the army site at HMS Daedalus. When comparing the analysis to limits, the workplace exposure limit (WEL) was used. In addition, since the aim of the exercise is also to assess exposure to neighbours to the site, in the absence of a known ambient limit, a limit of 1/10 of the WEL is used.

SAMPLING

The sampling was carried out by **reg. 12(3)** of Envirochem on the 13th September 2017. The sampling locations are shown in Table 1, which were positioned in the same locations as the current Frisbee settable dust gauges set up on site.

Table 1: Sampling positions

No.	Sample Ref	Location	Type
1	20783	M1	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20787		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
2	20784	M2	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20788		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
3	20785	M3	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20789		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
4	20783	M4	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	20790		Static Monitoring: Inhalable Dust, Metals and Organics content of dust



SAMPLING LOCATIONS



Figure 1: Sample location M1



Figure 2: Sample location M2



Figure 3: Sample location M3



Figure 4: Sample location M4



SITE CONDITIONS

Partly Cloudy

Temperature: 17 °c

Humidity: 66%

Wind: 21mph

Pressure: 1002hPa

METHODS

Inhalable dust:

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in a IOM open faced sampling head at a flow rate of 2.0 l/min.

The filter is subsequently re-weighed as per MDHS 14/4 and our UKAS accredited procedure 4.02. The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100 µm and approximates to the fraction of airborne material which enters the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal content of dusts:

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Please Note: This method is not covered by our UKAS accreditation.

Organic content of dust:

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

Please Note: This method is not covered by our UKAS accreditation.



RESULTS

INHALABLE DUST

Table 2: Static sample: Inhalable Dust

Sample ref	Sampling Time (mins)	Volume sampled (l)	Mass on filter (mg)	Average Concentration (mg/m ³)
20783 – M1	209	418	0.15	0.35
20787 – M1	209	418	0.11	0.26
20784 – M2	212	424	0.12	0.28
20788 – M2	212	424	0.07	0.16
20785 – M3	219	438	0.08	0.18
20789 – M3	219	438	<0.01	<0.01
20786 – M4	215	430	0.03	0.06
20790 – M4	215	430	<0.01	<0.01
Workplace exposure limit for total inhalable dust, 8hr time weighted average from EH40 2005 rev 2011				10

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ The limits are taken from the HSE publication EH40 2005 rev. 2011
- △ All samples once analysed all were below the exposure limit, the results were also below the ambient limit.

ORGANIC CONTENT OF DUST

Table 3: Static sample: Organics on filter

Samp. Ref	Location	Sampling Duration (mins)	Vol. Samp. (l)	Test type	Material	Average Concentration (mg/m ³)	WEL (mg/m ³)
20787	M1	209	418	GFA Static Filter	No compounds present		
20788	M2	212	424	GFA Static Filter	No compounds present		
20789	M3	219	438	GFA Static Filter	No compounds present		
20790	M4	215	430	GFA Static Filter	No compounds present		

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ All locations, when analysed, had no compounds present.



METAL CONTENT OF DUST

Table 4: Metals in dust on filter (average concentration mg/m³)

Metal	20783- M1	20784- M2	20785- M3	20786- M4	Workplace Exposure Limit (from EH40/2005 revised in 2011)
Aluminium	0.05	0.09	0.05	0.04	10
Beryllium	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	<0.01	<0.0	<0.01	<0.01	0.025
Cobalt	<0.01	<0.01	<0.01	<0.01	0.1
Chromium	<0.01	<0.01	<0.01	<0.01	0.5
Copper	<0.01	<0.01	<0.01	<0.01	0.2
Iron	<0.01	<0.01	<0.01	<0.01	1
Mercury	<0.01	<0.01	<0.01	<0.01	0.02
Magnesium	<0.01	<0.01	<0.01	<0.01	10
Manganese	<0.01	<0.01	<0.01	<0.01	0.5
Nickel	<0.01	<0.01	<0.01	<0.01	0.1
Lead	<0.01	<0.01	<0.01	<0.01	0.15*
Antimony	<0.01	<0.01	<0.01	<0.01	0.5
Tin	<0.01	<0.01	<0.01	<0.01	0.1
Vanadium	<0.01	<0.01	<0.01	<0.01	0.05
Zinc	0.06	0.07	0.06	0.05	1

* Workplace exposure limit for Lead (Pb) exposure taken from the Health and Safety Executive document *Control of Lead (Pb) at work regulations 2002* referred to in the Health and Safety Executive document *EH40/2005 revised in 2011*

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ▲ The metal content for the airborne dust sample taken from all four locations were analysed and found to be below the detection levels for all metals, therefore below the work place exposure limits and the ambient air quality limit.

DISCUSSION:

- ▲ The samples were analysed to be below the workplace exposure limits, and the ambient air limits, for inhalable dust, metals and organic content of dust.



Our Ref: 17-07822
Your Ref: 3534/17-067
Date: 20th September 2017

ENVIROCHEM

Analytical Laboratories Ltd.
Units 12-14, The Gardens
Broadcut, Fareham
Hampshire



Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
lab@envirochem.co.uk

Air Quality Monitoring for Inhalable dust, Metals and Organic content of dust

At

Natta,
HMS Daedalus,
Lee-On-Solent.

On Behalf of
White Young Green.



Date report issued: 2nd October 2017

Number of pages (including this header): Six

Signed on behalf of Envirochem by an authorised signatory

reg. 12(3)

Occupational Hygienist

Accreditation

Envirochem is UKAS accredited for the sampling and determination of inhalable/respirable dust as per MDHS 14/4:
June 2014 by documented in-house procedure No. 4.02

All comments and interpretations are beyond the scope of our accreditation



INTRODUCTION

Envirochem have been authorised by **reg. 12(3)** of White Young Green, to undertake air quality sampling and the subsequent analysis of inhalable dusts, metal and organic content in dusts at HMS Daedalus.

AIMS

The aim of the analysis was to assess the exposure of inhalable dust and the metal and organic content of the airborne dust currently generated by the deconstruction of the army site at HMS Daedalus. When comparing the analysis to limits, the workplace exposure limit (WEL) was used. In addition, since the aim of the exercise is also to assess exposure to neighbours to the site, in the absence of a known ambient limit, a limit of 1/10 of the WEL is used.

SAMPLING

The sampling was carried out by **reg. 12(3)** of Envirochem on the 20th September 2017. The sampling locations are shown in Table 1, which were positioned in the same locations as the current Frisbee settable dust gauges set up on site.

Table 1: Sampling positions

No.	Sample Ref	Location	Type
1	21018	M1	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21019		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
2	21020	M2	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21021		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
3	21022	M3	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21023		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
4	21024	M4	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21025		Static Monitoring: Inhalable Dust, Metals and Organics content of dust



SAMPLING LOCATIONS



Figure 1: Sample location M1



Figure 2: Sample location M2



Figure 3: Sample location M3



Figure 4: Sample location M4



SITE CONDITIONS

Cloudy

Temperature: 17°c

Humidity: 77%

Wind: 12mph

Pressure: 1019hPa

METHODS

Inhalable dust:

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in a IOM open faced sampling head at a flow rate of 2.0 l/min.

The filter is subsequently re-weighed as per MDHS 14/4 and our UKAS accredited procedure 4.02. The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100 µm and approximates to the fraction of airborne material which enters the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal content of dusts:

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Please Note: This method is not covered by our UKAS accreditation.

Organic content of dust:

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

Please Note: This method is not covered by our UKAS accreditation.



RESULTS

INHALABLE DUST

Table 2: Static sample: Inhalable Dust

Sample ref	Sampling Time (mins)	Volume sampled (l)	Mass on filter (mg)	Average Concentration (mg/m ³)
21018 – M1	255	510	0.06	0.12
21019 – M1	255	510	0.01	0.02
21020 – M2	255	510	0.01	0.02
21021 – M2	255	510	0.17	0.33
21022 – M3	250	500	0.06	0.12
21023 – M3	250	500	0.02	0.04
21024 – M4	250	500	0.04	0.08
21025 – M4	250	500	0.07	0.14
Workplace exposure limit for total inhalable dust, 8hr time weighted average from EH40 2005 rev 2011				10

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ The limits are taken from the HSE publication EH40 2005 rev. 2011
- △ All samples once analysed all were below the exposure limit, the results were also below the ambient limit.

ORGANIC CONTENT OF DUST

Table 3: Static sample: Organics on filter

Samp. Ref	Location	Sampling Duration (mins)	Vol. Samp. (l)	Test type	Material	Average Concentration (mg/m ³)	WEL (mg/m ³)
21018	M1	255	510	GFA Static Filter	No compounds present		
21020	M2	255	510	GFA Static Filter	No compounds present		
21022	M3	250	500	GFA Static Filter	No compounds present		
21024	M4	250	500	GFA Static Filter	No compounds present		

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ All locations, when analysed, had no compounds present.



METAL CONTENT OF DUST

Table 4: Metals in dust on filter (average concentration mg/m³)

Metal	21019- M1	21021- M2	21023- M3	21025- M4	Workplace Exposure Limit (from EH40/2005 revised in 2011)
Aluminium	<0.01	<0.01	<0.01	<0.01	10
Beryllium	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	<0.01	<0.01	<0.01	<0.01	0.025
Cobalt	<0.01	<0.01	<0.01	<0.01	0.1
Chromium	<0.01	<0.01	<0.01	<0.01	0.5
Copper	0.0002	0.0002	0.0002	0.0002	0.2
Iron	<0.01	0.004	<0.01	0.002	1
Mercury	<0.01	<0.01	<0.01	<0.01	0.02
Magnesium	0.0007	<0.01	<0.01	0.0002	10
Manganese	<0.01	<0.01	<0.01	<0.01	0.5
Nickel	<0.01	<0.01	<0.01	0.0002	0.1
Lead	<0.01	<0.01	<0.01	<0.01	0.15*
Antimony	<0.01	<0.01	<0.01	<0.01	
Tin	<0.01	<0.01	<0.01	<0.01	0.1
Vanadium	<0.01	<0.01	<0.01	<0.01	0.05
Zinc	<0.01	<0.01	<0.01	<0.01	1

* Workplace exposure limit for Lead (Pb) exposure taken from the Health and Safety Executive document *Control of Lead (Pb) at work regulations 2002* referred to in the Health and Safety Executive document *EH40/2005 revised in 2011*

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ▲ The metal content for the airborne dust sample taken from all four locations were analysed and found to be below the detection levels for all metals, therefore below the work place exposure limits and the ambient air quality limit.

DISCUSSION:

- ▲ The samples were analysed to be below the workplace exposure limits, and the ambient air limits, for inhalable dust, metals and organic content of dust.



Our Ref: 17-07933
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Date: 27th September 2017

ENVIROCHEM

Analytical Laboratories Ltd.
Units 12-14, The Gardens
Broadcut, Fareham
Hampshire



Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
lab@envirochem.co.uk

Air Quality Monitoring for Inhalable dust, Metals and Organic content of dust

At

Natta,
HMS Daedalus,
Lee-On-Solent.

On Behalf of
White Young Green.



Date report issued: 6th October 2017

Number of pages (including this header): Six

Signed on behalf of Envirochem by an authorised signatory

reg. 12(3)

Occupational Hygienist

Accreditation

Envirochem is UKAS accredited for the sampling and determination of inhalable/respirable dust as per MDHS 14/4:
June 2014 by documented in-house procedure No. 4.02

All comments and interpretations are beyond the scope of our accreditation



INTRODUCTION

Envirochem have been authorised by **reg. 12(3)** of White Young Green, to undertake air quality sampling and the subsequent analysis of inhalable dusts, metal and organic content in dusts at HMS Daedalus.

AIMS

The aim of the analysis was to assess the exposure of inhalable dust and the metal and organic content of the airborne dust currently generated by the deconstruction of the army site at HMS Daedalus. When comparing the analysis to limits, the workplace exposure limit (WEL) was used. In addition, since the aim of the exercise is also to assess exposure to neighbours to the site, in the absence of a known ambient limit, a limit of 1/10 of the WEL is used.

SAMPLING

The sampling was carried out by **reg. 12(3)** of Envirochem on the 27th September 2017. The sampling locations are shown in Table 1, which were positioned in the same locations as the current Frisbee settable dust gauges set up on site.

Table 1: Sampling positions

No.	Sample Ref	Location	Type
1	21204	M1	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21205		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
2	21206	M2	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21207		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
3	21208	M3	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21209		Static Monitoring: Inhalable Dust, Metals and Organics content of dust
4	21210	M4	Static Monitoring: Inhalable Dust, Metals and Organics content of dust
	21211		Static Monitoring: Inhalable Dust, Metals and Organics content of dust



SAMPLING LOCATIONS



Figure 1: Sample location M1



Figure 2: Sample location M2



Figure 3: Sample location M3



Figure 4: Sample location M4



SITE CONDITIONS

Partly Cloudy

Temperature: 19°c

Humidity: 75%

Wind: 10mph

Pressure: 1019hPa

METHODS

Inhalable dust:

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in a IOM open faced sampling head at a flow rate of 2.0 l/min.

The filter is subsequently re-weighed as per MDHS 14/4 and our UKAS accredited procedure 4.02. The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100 µm and approximates to the fraction of airborne material which enters the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal content of dusts:

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Please Note: This method is not covered by our UKAS accreditation.

Organic content of dust:

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

Please Note: This method is not covered by our UKAS accreditation.



RESULTS

INHALABLE DUST

Table 2: Static sample: Inhalable Dust

Sample ref	Sampling Time (mins)	Volume sampled (l)	Mass on filter (mg)	Average Concentration (mg/m ³)
21204 – M1	120	240	<0.01	<0.01
21205 – M1	120	240	<0.01	<0.01
21206 – M2	120	240	0.06	0.24
21207 – M2	120	240	0.04	0.15
21208 – M3	120	240	0.17	0.69
21209 – M3	120	240	<0.01	<0.01
21210 – M4	120	240	0.04	0.15
21211 – M4	120	240	0.06	0.24
Workplace exposure limit for total inhalable dust, 8hr time weighted average from EH40 2005 rev 2011				10

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ The limits are taken from the HSE publication EH40 2005 rev. 2011
- △ All samples once analysed all were below the exposure limit, the results were also below the ambient limit.

ORGANIC CONTENT OF DUST

Table 3: Static sample: Organics on filter

Samp. Ref	Location	Sampling Duration (mins)	Vol. Samp. (l)	Test type	Material	Average Concentration (mg/m ³)	WEL (mg/m ³)
21204	M1	120	240	GFA Static Filter	No compounds present		
21206	M2	120	240	GFA Static Filter	No compounds present		
21208	M3	120	240	GFA Static Filter	No compounds present		
21210	M4	120	240	GFA Static Filter	No compounds present		

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- △ The 'average concentration' is the dust concentration averaged over the sampling duration.
- △ All locations, when analysed, had no compounds present.



METAL CONTENT OF DUST

Table 4: Metals in dust on filter (average concentration mg/m³)

Metal	21205- M1	21207- M2	21209- M3	21211- M4	Workplace Exposure Limit (from EH40/2005 revised in 2011)
Aluminium	<0.01	0.04	<0.01	<0.01	10
Beryllium	<0.002	<0.002	<0.002	<0.002	0.002
Cadmium	<0.01	<0.01	<0.01	<0.01	0.025
Cobalt	<0.01	<0.01	<0.01	<0.01	0.1
Chromium	<0.01	<0.01	<0.01	<0.01	0.5
Copper	<0.01	<0.01	<0.01	<0.01	0.2
Iron	0.004	0.002	0.001	0.002	1
Mercury	<0.01	<0.01	<0.01	<0.01	0.02
Magnesium	0.001	0.003	0.0008	<0.01	10
Manganese	<0.01	<0.01	<0.01	<0.01	0.5
Nickel	<0.01	<0.01	<0.01	0.0004	0.1
Lead	<0.01	<0.01	0.004	<0.01	0.15*
Antimony	<0.01	<0.01	<0.01	<0.01	
Tin	<0.01	<0.01	<0.01	<0.01	0.1
Vanadium	<0.01	<0.01	<0.01	<0.01	0.05
Zinc	<0.01	0.07	<0.01	<0.01	1

* Workplace exposure limit for Lead (Pb) exposure taken from the Health and Safety Executive document *Control of Lead (Pb) at work regulations 2002* referred to in the Health and Safety Executive document *EH40/2005 revised in 2011*

Please Note: This method is not covered by our UKAS accreditation.

COMMENTS:

- ▲ The metal content for the airborne dust sample taken from all four locations were analysed and found to be below the detection levels for all metals, therefore below the work place exposure limits and the ambient air quality limit.

DISCUSSION:

- ▲ The samples were analysed to be below the workplace exposure limits, and the ambient air limits, for inhalable dust, metals and organic content of dust.



Executive Summary

For

The Report of Dust, Heavy Metals and Organic Compounds Monitoring

21st August 2017

WYG have conducted monitoring of inhalable dust, heavy metals and organic compounds at the development site at HMS Daedalus, Lee-On-Solent, Hampshire. A monitoring report was issued on 21st August 2017 and the report is presented in Appendix A.

Monitoring and Method

Glass fibre filter monitoring equipment was used at four locations on the site, over five monitoring periods, to enable assessment of the levels of inhalable dust, heavy metals and organic compounds potentially associated with the construction works. Sampling was conducted on the 24th, 26th, 28th July 2017 and the 2nd and 9th August 2017.

The samples collected using the glass fibre filter are able to be tested for the total dust volume and further analysed to determine any pollutants within the dust which may be hazardous to human health.

Selected Threshold

To determine the effects of any detected inhalable dust, heavy metals and organic compounds, the results have been compared to the occupational exposure limits from the Health and Safety, England (HSE) document "*EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations*". These limits outline the exposure limits, which if exceeded may cause hazard to human health.

The most representative threshold to compare the results of the analyses are those of the EH40 criteria. This is due to the monitoring of dust occurring at locations on the deconstruction site. Dust emissions associated with the current on-site construction works are predicted to cease with the completion of the works.

Detection Limit

The detection limit for each pollutant has been selected in line with best practice monitoring methods to cover Workplace Exposure Limits. The metal content of airborne dust in all periods has been analysed with respect to their relevant short term ambient air directive limit and workplace exposure limit from the EH40/2005 document. During all monitoring periods exposure to the metal content is generally below the detection levels of the methodology and therefore is below the EH40 exposure limit for each metal respectively and as such it is not considered that there would be any significant health effects.



Weather during Monitoring

Most residential properties within close proximity to the site lie along the east and south eastern boundary of the site. The weather during each monitoring period is shown in Table 1 below. Monitoring is located all around the site and so all wind directions will be reflected in the monitoring results.

Table 1 Weather Conditions

Date	Wind Directions	Wind Speed (km/h)	Weather Conditions
24/07/2017	North West	13	Partly Cloudy
26/07/2017	South West	14	Light Rain
28/07/2017	South West	13	Partly Cloudy
02/08/2017	South	17	Light Rain
09/08/2017	North West	11	Rain

Monitoring Results

Overall, the monitoring taken over the five periods, showed that levels of inhalable dust, heavy metals and organic compounds were well below the exposure limits contained in Health and Safety England's EH40 document. Therefore present low risk to human health.

The metal content of airborne dust in all periods has been analysed with respect to their relevant exposure limit from the EH40/2005 document. During all monitoring periods exposure to the metal content is generally below the detection levels of the methodology and therefore is below the exposure limit for each metal respectively and as such it is considered that there would not be any significant health effects.

No organic compounds were identified during monitoring periods 2, 3, 4 and 5. During monitoring period 1, Methyl Methacrylate was the only identified organic compound. This was due to burning plastic on site, not due to any scheduled construction or deconstruction works. The concentration of Methyl Methacrylate present in the sample at M2, was lower than the limit set out in EH40 and therefore presents no risk to human health.



Appendix A Monitoring Report



Homes and Communities Agency

HMP Daedalus, Hampshire

Dust, Heavy Metals and Organic Compounds Monitoring

August 2017

Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR

Tel: +44 (0)116 234 8000

Nigel.mann@wyg.com



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Issue	Date	Status	
1	3 rd August 2017	First Issue	
2	9 th August 2017	Second Issue – Inclusive of the 4 th Period Additional Monitoring Results	
3	21 st August 2017	Third Issue – Inclusive of the 5 th Period Monitoring results and updated in response to comments	



Contents Page

1.	Introduction.....	1
2.	Legislation and Policy	2
2.1	Background	2
2.2	Exposure Limits for Dust.....	2
3.	Monitoring Equipment and Locations	3
3.1	Monitoring Equipment and Locations	3
3.2	Monitoring Program.....	5
4.	Monitoring Results	6
4.1	Dust Monitoring Results.....	6
5.	Conclusions	11



Non Technical Summary

Inhalable dust, heavy metals and organic compounds monitoring has been undertaken at the development site at HMS Daedalus, Lee-On-Solent, Hampshire.

Air quality active monitoring has been undertaken at four locations by Envirochem during deconstruction and construction works. The methods used included the use of air drawn through a pre-weighed glass fibre filter. The content of the dust has been analysed by Envirochem to determine quantities of inhalable dust, heavy metals and organic compounds.

On-site active dust monitoring was conducted at four locations over five periods on the 24th, 26th, 28th July 2017 and 2nd and 9th August 2017. This showed that levels of inhalable dust, heavy metals and organic compounds were well below of the workplace exposure limits contained in Health and Safety England's EH40 document.



1. Introduction

Inhalable dust, heavy metals and organic compounds monitoring has been carried out at four locations, over three periods on the deconstruction site at HMS Daedalus, Lee-On-Solent, Hampshire.

Figure 1 in Section 3.1 shows the site locations and the monitoring locations.

Glass fibre filter monitoring equipment was used at four locations on the site, to enable assessment of the levels of inhalable dust, heavy metals and organic compounds potentially associated with the deconstruction works.

On-site monitoring was conducted by Envirochem technicians over five periods on the 24th, 26th, 28th July 2017 and 2nd and 9th August 2017.

Study Area

HMS Daedalus is located to the north of the town of Lee-on-the-Solent and is bounded in all directions by residential properties, and additionally to the south by industrial properties. The study has been undertaken within the deconstruction area.

2. Legislation and Policy

2.1 Background

The assessment considers the likely 'hazardous substances' associated with the site and identify the potential risks of these substances referencing the 1/10 of the WEL limits and Workplace Exposure Limits within "EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations". .

2.2 Exposure Limits for Dust

The substances identified in Table 2.1 have been identified as the most likely substances to be emitted from the study site based on similar sites, professional judgement, and the occupational exposure limits from the HSE document "EH40/2005 Workplace exposure limits" have been used to reference the limits at these site. These are considered the most representative as the measurements have been undertaken on an active construction site.

Table 2.1 Exposure Limits

Substance	EH40/2005 Workplace Exposure Limit ($\mu\text{g}/\text{m}^3$)
Inhalable Dust	10,000
Aluminium	10,000
Beryllium	2
Cadmium	25
Cobalt	100
Chromium	500
Copper	200
Iron	1000
Mercury	20
Magnesium	10,000
Manganese	500
Nickel	100
Lead	150
Antimony	500
Tin	100
Vanadium	50
Zinc	100
Methyl Methacrylate	208

3. Monitoring Equipment and Locations

3.1 Monitoring Equipment and Locations

The dust and air quality monitoring was undertaken to monitor the following:

- Total Inhalable Particles, Heavy Metals, and Organic Compounds content of dust.

The details of the monitoring locations are presented in Table 4.1 and Figure 1 below.

Table 4.1 Glass Fibre Filter Monitoring Locations

Designation	Location	Monitoring
M1	Glass Fibre Filter Location 1	Inhalable Particles, Heavy Metals, Organic Compounds
M2	Glass Fibre Filter Location 2	Inhalable Particles, Heavy Metals, Organic Compounds
M3	Glass Fibre Filter Location 3	Inhalable Particles, Heavy Metals, Organic Compounds
M4	Glass Fibre Filter Location 4	Inhalable Particles, Heavy Metals, Organic Compounds

Weather during Monitoring

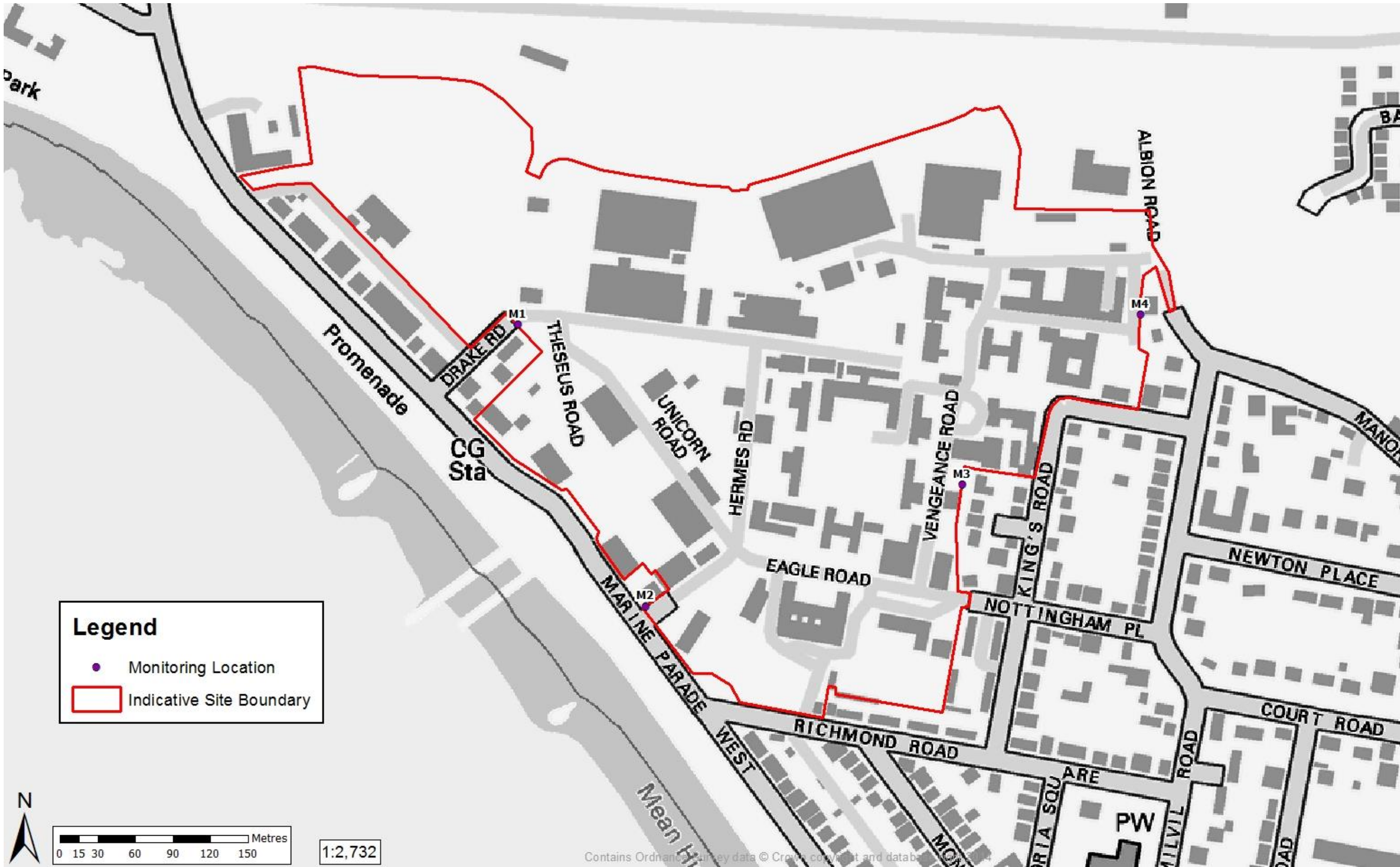
Most residential properties within close proximity to the site lie along the east and south eastern boundary of the site. Monitoring is located all around the site and so all wind directions will be reflected in the monitoring results.

Table 1 Weather Conditions

Date	Wind Directions	Wind Speed (km/h)	Weather Conditions
24/07/2017	North West	13	Partly Cloudy
26/07/2017	South West	14	Light Rain
28/07/2017	South West	13	Partly Cloudy
02/08/2017	South	17	Light Rain
09/08/2017	North West	11	Rain



Figure 1 Monitoring Locations





3.2 Monitoring Program

Glass fibre filter monitoring equipment was used at four locations on the site, to enable assessment of the levels of inhalable dust, heavy metals and organic compounds potentially associated with the works contained within the deconstruction area.

On-site monitoring was conducted by Envirochem on the 24th, 26th, 28th July 2017 and 2nd and 9th August 2017.

All samples were subsequently analysed by Envirochem as outlined below, and reported to WYG.

Inhalable Dust

A known volume of air is drawn through a pre-weighed glass fibre filter. The filter is either housed in an IOM open faced sampling head at a flow rate of 2.01/min. The filter is subsequently re-weighed as per MDHS 14/4 and Envirochem's UKAS accredited procedure 4.02. The filter paper used was Whatman GF/A with particle size retention down to 1.6 µm.

Inhalable dust is defined as less than 100µm and approximates to the fraction of airborne material which enter the nose and mouth during normal breathing and is therefore available for deposition in the respiratory tract.

Metal Content of Dusts

After re-weighing, the exposed filters are digested in aqua regia and made up to 20ml in deionised water. The digest is then analysed by inductively coupled plasma optical emission spectrometry (Varian Vista MPX axial ICP-OES).

Organic Content of Dusts

After re-weighing, the exposed filters are extracted into acetone and then the digest is analysed by GC-MS.

4. Monitoring Results

4.1 Dust Monitoring Results

Inhalable particles, heavy metals and organic compounds contents monitoring were conducted at each of the selected monitoring locations displayed in Figure 1. Monitoring was conducted using a fibre glass filter, and analysed by Envirochem.

Three periods of dust monitoring have been completed. The results of the inhalable particles, heavy metals and organic compounds contents are presented in Table 4.1, 4.2 and 4.3 for each monitoring period.

A limit from H4 and a limit of 1/10 of the WEL is used. Background concentrations of dust with diameter greater than 10 µm are not available and therefore the results are not comparable with the DEFRA published 2017 background levels.

Inhalable Particles Results

Table 4.1 Inhalable Particles Monitoring Results

Period	Location	Date	Duration of Sample (mins)	Volume Sampled (l)	Inhalable Particles (µg/m³)	Below Criteria? (Y/N)
1	M1	24/07/2017	270	540	50	Yes
		24/07/2017	270	540	10	Yes
	M2	24/07/2017	255	510	50	Yes
		24/07/2017	255	510	<10	Yes
	M3	24/07/2017	268	536	90	Yes
		24/07/2017	268	536	110	Yes
	M4	24/07/2017	268	536	120	Yes
		24/07/2017	268	536	10	Yes
2	M1	26/07/2017	233	466	110	Yes
		26/07/2017	233	466	110	Yes
	M2	26/07/2017	218	436	390	Yes
		26/07/2017	218	436	210	Yes
	M3	26/07/2017	185	370	140	Yes
		26/07/2017	185	370	80	Yes
	M4	26/07/2017	195	390	330	Yes
		26/07/2017	195	390	50	Yes
3	M1	28/07/2017	245	490	120	Yes



Period	Location	Date	Duration of Sample (mins)	Volume Sampled (l)	Inhalable Particles (µg/m³)	Below Criteria? (Y/N)	
		28/07/2017	245	490	60	Yes	
	M2	28/07/2017	228	456	120	Yes	
		28/07/2017	228	456	60	Yes	
	M3	28/07/2017	210	420	70	Yes	
		28/07/2017	210	420	<10	Yes	
	M4	28/07/2017	200	400	70	Yes	
		28/07/2017	200	400	<10	Yes	
	4	M1	02/08/2017	190	380	610	Yes
02/08/2017			190	380	610	Yes	
M2		02/08/2017	195	390	290	Yes	
		02/08/2017	195	390	240	Yes	
M3		02/08/2017	190	380	770	Yes	
		02/08/2017	190	380	510	Yes	
M4		02/08/2017	190	380	430	Yes	
		02/08/2017	190	380	640	Yes	
5		M1	09/08/2017	220	440	360	Yes
			09/08/2017	220	440	540	Yes
	M2	09/08/2017	205	410	<10	Yes	
		09/08/2017	205	410	<10	Yes	
	M3	09/08/2017	180	360	100	Yes	
		09/08/2017	180	360	380	Yes	
	M4	09/08/2017	170	340	370	Yes	
		09/08/2017	170	340	520	Yes	
EH40 Limit (µg/m³)					1,000		

EH40/2005 Workplace exposure limits included the definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than $1,000 \mu\text{g}/\text{m}^3$ 8-hour time-weighted averages (TWA) of inhalable dust (up to $100 \mu\text{m}$).

At locations M3 and M4, the maximum monitored inhalable particles during the first period is $120 \mu\text{g}/\text{m}^3$ at M4 which is significantly less than the $10 \text{ mg}/\text{m}^3$ ($1,000 \mu\text{g}/\text{m}^3$) 8-hour TWA of inhalable dust limit.

The maximum monitored inhalable particles during the second period is 390 µg/m³ at M2 which is significantly less than the 10 mg/m³ (1,000 µg/m³) 8-hour TWA of inhalable dust limit.

The maximum monitored inhalable particles during the third period is 120 µg/m³ at M1 and M2 which is significantly less than the 10 mg/m³ (1,000 µg/m³) 8-hour TWA of inhalable dust limit.

The maximum monitored inhalable particles during the fourth period is 770 µg/m³ at M3 which is significantly less than the 10 mg/m³ (1,000 µg/m³) 8-hour TWA of inhalable dust limit.

The maximum monitored inhalable particles during the fourth period is 540 µg/m³ at M1 which is significantly less than the 10 mg/m³ (1,000 µg/m³) 8-hour TWA of inhalable dust limit.

As shown above, all levels of inhalable dust recorded on site is significantly lower than the criteria set out in EH40 and therefore present low risk to human health.

Heavy Metals Results

Table 4.2 Heavy Metals Monitoring Results (µg/m³)

Metal	M1	M2	M3	M4	Exposure Limit	Below Criteria? (Y/N)
Period 1						
Aluminium	6	9	8	8	10,000	Yes
Beryllium	<0.2	<0.2	<0.2	<0.2	2	Yes
Cadmium	<10	<10	<10	<10	25	Yes
Cobalt	<10	<10	<10	<10	100	Yes
Chromium	<10	<10	<10	<10	500	Yes
Copper	<10	<10	<10	<10	200	Yes
Iron	0.1	0.2	0.2	0.2	1,000	Yes
Mercury	<10	<10	<10	<10	20	Yes
Magnesium	0.4	0.7	0.7	0.6	10,000	Yes
Manganese	<10	<10	<10	<10	500	Yes
Nickel	<10	<10	<10	<10	100	Yes
Lead	<10	<10	<10	<10	150	Yes
Antimony	<10	<10	<10	<10	500	Yes
Tin	<10	<10	<10	<10	100	Yes
Vanadium	<10	<10	<10	<10	50	Yes
Zinc	<10	<10	<10	<10	100	Yes
Period 2						
Aluminium	<10	<10	<10	<10	10,000	Yes
Beryllium	<0.2	<0.2	<0.2	<0.2	2	Yes
Cadmium	<10	<10	<10	<10	25	Yes
Cobalt	<10	<10	<10	<10	100	Yes
Chromium	<10	<10	<10	<10	500	Yes
Copper	<10	<10	<10	<10	200	Yes
Iron	<10	<10	<10	<10	1000	Yes
Mercury	<10	<10	<10	<10	20	Yes
Magnesium	<10	<10	<10	<10	10,000	Yes
Manganese	<10	<10	<10	<10	500	Yes
Nickel	<10	<10	<10	<10	100	Yes
Lead	<10	<10	<10	<10	150	Yes
Antimony	<10	<10	<10	<10	500	Yes
Tin	<10	<10	<10	<10	100	Yes
Vanadium	<10	<10	<10	<10	50	Yes
Zinc	<10	<10	<10	<10	100	Yes
Period 3						
Aluminium	<10	<10	<10	<10	10,000	Yes

Metal	M1	M2	M3	M4	Exposure Limit	Below Criteria? (Y/N)
Beryllium	<0.2	<0.2	<0.2	<0.2	2	Yes
Cadmium	<10	<10	<10	<10	25	Yes
Cobalt	<10	<10	<10	<10	100	Yes
Chromium	<10	<10	<10	<10	500	Yes
Copper	<10	<10	<10	<10	200	Yes
Iron	<10	<10	<10	<10	1000	Yes
Mercury	<10	<10	<10	<10	20	Yes
Magnesium	<10	<10	<10	<10	10,000	Yes
Manganese	<10	<10	<10	<10	500	Yes
Nickel	<10	<10	<10	<10	100	Yes
Lead	<10	<10	<10	<10	150	Yes
Antimony	<10	<10	<10	<10	500	Yes
Tin	<10	<10	<10	<10	100	Yes
Vanadium	<10	<10	<10	<10	50	Yes
Zinc	<10	<10	<10	<10	100	Yes
Aluminium	<10	<10	<10	<10	10,000	Yes
Beryllium	<0.2	<0.2	<0.2	<0.2	2	Yes
Cadmium	<10	<10	<10	<10	25	Yes
Cobalt	<10	<10	<10	<10	100	Yes
Chromium	<10	<10	<10	<10	500	Yes
Copper	<10	<10	<10	<10	200	Yes
Iron	<10	<10	<10	<10	1000	Yes
Mercury	<10	<10	<10	<10	20	Yes
Magnesium	<10	<10	<10	<10	10,000	Yes
Manganese	<10	<10	<10	<10	500	Yes
Nickel	<10	<10	<10	<10	100	Yes
Lead	<10	<10	<10	<10	150	Yes
Antimony	<10	<10	<10	<10	500	Yes
Tin	<10	<10	<10	<10	100	Yes
Vanadium	<10	<10	<10	<10	50	Yes
Zinc	<10	<10	<10	<10	100	Yes
Period 5						
Aluminium	<10	<10	<10	<10	10,000	Yes
Beryllium	<0.2	<0.2	<0.2	<0.2	2	Yes
Cadmium	<10	<10	<10	<10	25	Yes
Cobalt	<10	<10	<10	<10	100	Yes
Chromium	<10	<10	<10	<10	500	Yes
Copper	<10	<10	<10	<10	200	Yes
Iron	<10	<10	<10	<10	1000	Yes
Mercury	<10	<10	<10	<10	20	Yes
Magnesium	<10	<10	<10	<10	10,000	Yes
Manganese	<10	<10	<10	<10	500	Yes
Nickel	<10	<10	<10	<10	100	Yes
Lead	<10	<10	<10	<10	150	Yes
Antimony	<10	<10	<10	<10	500	Yes
Tin	<10	<10	<10	<10	100	Yes
Vanadium	<10	<10	<10	<10	50	Yes
Zinc	<10	<10	<10	<10	100	Yes

The metal content for the airborne dust samples taken from all four locations have been analysed. It is found that all the metal concentrations are below the detection levels for periods 2, 3, 4 and 5. This also applies to the monitoring data for the period 1 with the exception of aluminium, iron, magnesium and zinc, however these were still monitored to be below workplace exposure limits.

The metal content of airborne dust in all periods have been analysed with respect to their relevant short term ambient air directive limit and workplace exposure limit from the EH40/2005 document. During all monitoring periods exposure to the metal content is generally below the detection levels of the methodology and as such it is considered that there would not be any significant health effects.

As shown above in Table 4.2 all concentrations of airborne metal contents recorded on site are significantly lower than the criteria set out in EH40 and therefore present no risk to human health.

Organic Compounds Results

Table 4.3 Organic Materials Content Monitoring Results

Period	Location	Date	Duration of Sample (mins)	Volume Sampled (l)	Organic Compounds Present	Below Criteria? (Y/N)
1	M1	24/072017	270	540	-	Yes
	M2	24/072017	255	510	Methyl Methacrylate 89.16 µg/m ³	Yes
	M3	24/072017	268	536	-	Yes
	M4	24/072017	268	536	-	Yes
2	M1	26/07/2017	233	466	-	Yes
	M2	26/07/2017	218	436	-	Yes
	M3	26/07/2017	185	370	-	Yes
	M4	26/07/2017	195	390	-	Yes
3	M1	28/07/2017	245	490	-	Yes
	M2	28/07/2017	228	456	-	Yes
	M3	28/07/2017	210	420	-	Yes
	M4	28/07/2017	200	400	-	Yes
4	M1	02/08/2017	190	380	-	Yes
	M2	02/08/2017	195	390	-	Yes
	M3	02/08/2017	190	380	-	Yes
	M4	02/08/2017	190	380	-	Yes
5	M1	09/08/2017	220	440	-	Yes
	M2	09/08/2017	205	410	-	Yes
	M3	09/08/2017	180	360	-	Yes
	M4	09/08/2017	170	340	-	Yes

During Period 1 of monitoring, no compounds were present except Methyl Methacrylate at the M2 monitoring location. Although there is no environmental exposure limit the concentration of 89.16 µg/m³ which was observed, is well below the WEL of 208 µg/m³ for Methyl Methacrylate.

Methyl Methacrylate was not observed in any other samples across all monitoring periods. It was noted by Envirochem technicians that during the monitoring of Period 1, there was burning plastic on site within close proximity of the M2 location. This is the believed reason for the presence of Methyl Methacrylate within the sample, as at this location there were no deconstruction activities taking place during sampling.

No organic compounds were identified during monitoring periods 2, 3, 4 and 5.

As shown above all levels of organic compounds recorded on site are significantly lower than the criteria set out in EH40 and therefore present low risk to human health within the deconstruction/construction area.



5. Conclusions

Dust and Air Quality monitoring has been undertaken within the HMS Daedalus deconstruction/construction site, Lee-on-Solent, Hampshire for potential health effects from inhalable particles, heavy metals and organic compounds.

Health Effects

The on-site fibre glass vacuum monitoring conducted on the development site shows that levels of inhalable particles, heavy metals and organic compounds were significantly below the EH40 exposure limits at all monitoring locations, in all monitoring periods.

The monitoring of heavy metals and organic compounds are all below the detection levels at all monitoring locations in all periods and it is considered highly unlikely that there would be any significant health effects.

Therefore there are no predicted adverse effects on human health from inhalable dust, and airborne heavy metals and organic compounds with reference to the EH40 workplace exposure limits. There are no predicted adverse health effects from the contents of the dust with respect to heavy metals and organic compounds.



HMS Daedalus, Hampshire

Asbestos Air Monitoring – 4th August 2017

A090070-383

Homes & Communities Agency

25 August 2017

Prepared on behalf of WYG Environment Planning Transport Limited.



100 St John Street, London, EC1M 4EH
Tel: +44 (0)20 7250 7500 Fax: +44 (0)20 7250 7501
Email: info@wyg.com Website: www.wyg.com

WYG Environment Planning Transport Limited. Registered in England & Wales Number: 03050297
Registered Office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ



Document control

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Date:	25 th August 2017	
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[redacted] reg. 12(3)	[redacted] reg. 12(3)	



Executive Summary **For** **The Analysis of Airborne Fibre Concentrations**

25th August 2017

Asbestos is subject to The Control of Asbestos Regulations (CAR) 2012. Regulation 4 of CAR 2012 contains an explicit duty on the owners and occupiers of non-domestic premises to assess and manage the risks from the presence of asbestos. Regulation 5 contains a duty to identify the presence of asbestos which may be disturbed during building or demolition works.

In order to assist the HCA to comply with these regulations WYG have arranged air monitoring for the analysis of airborne fibre concentrations at the development site at HMS Daedalus, Lee-On-Solent, Hampshire. A fibre counting report was issued on 4th August 2017 and the report is presented here in Appendix A.

Monitoring and Method

Sampling was carried out at four locations on the site on the 4th August 2014 to enable assessment of the levels of respirable fibres potentially associated with the construction works.

Air sampling involves drawing a known flow rate of air through a filter for a measured time, so that airborne particles are collected. The calculated total number of fibres collected is divided by the volume of air sampled to determine the fibre concentration in terms of fibre per millimetre of air (f/ml). All air monitoring was conducted in accordance with HSG248 The Analysts' Guide for Sampling, Analysis and Clearance Procedures which is the HSE guidance document for analysis of airborne fibre concentrations.

Detection Limit

According to HSG 248, the lowest airborne respirable asbestos concentration that the method described above can reliably quantify is 0.01 fibres/ml. Therefore, this is taken as the 'clearance indicator' threshold. Levels below this concentration are described as below the limit of quantification and a site is normally regarded as fit for occupation when asbestos in air measurements are below this level. All of the air sampling carried out at this site on the 4th of August 2017 was below this level, therefore it is not considered that there should be any adverse health effects resulting from airborne fibre levels.



Appendix A. Envirochem Fibre Counting Report



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777

Fax: (01329) 287755

CLIENT: WYG Environment Ltd.

SITE ADDRESS: HMS Daedalus, Broom Way, Lee-on-Solent, Fareham,
Hampshire, PO13 9YA.

Our Ref: J126157-FC4

Your Ref: N/A

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Envirochem reg. 12(3)

DATE OF SAMPLING: 04/08/17 reg. 12(3)

ANALYSED BY (if different): N/A

DATE OF ANALYSIS (if different): N/A

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	EW 45	K1	Monitoring Location M1 (see plan)	0909	1109	4.0	4.0	4.0	480	200	1	0.001	<0.01
2	EW 50	K3	Monitoring Location M2 (see plan)	0914	1114	4.0	4.0	4.0	480	200	1/2	0.001	<0.01
3	EW	A61	Monitoring Location M3 (see plan)	0920	1120	4.0	4.0	4.0	480	200	1	0.001	<0.01
4	EW 51	K4	Monitoring Location M4 (see plan)	0930	1130	4.0	4.0	4.0	480	200	1 1/2	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: PCM2

Barometer: 25

Stage Micrometer: WSM20

Thermometer: 25

Tally Counter: S/M

Flow Meter: 25

Environment:

Temperature (°C): 19

Pressure (mb): 1002

Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5

Test Slide (5 bands): Yes

W/B Grate diameter (µm): 100

Blank Filter

Head: H4

Graticules: 100

Fibres: 1/2

Place of Analysis:

Lab

On Site

Mob Lab

REF PUK

Comments

Reassurance testing carried out to ascertain airborne fibre concentrations during ground remediation works. Results satisfactory.

SIGNATURE: reg. 12(3)

(on behalf of Envirochem)

ENVIROCHEM/FE07/NOV06

PRINT NAME: reg. 12(3)



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



1227

Tel: (01329) 287777

Fax: (01329) 287755

CLIENT: WYG Environment, Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR

Our Ref: J127098 - FC4

SITE ADDRESS: HMS Daedalus, Broom Way, Lee on Solent, PO13 9YA

Your Ref:

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: reg. 12(3)

ANALYSED BY (if different):

DATE OF SAMPLING: 25/08/17

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1FC	ENV28	H2	M1	0909	1009	8.0	8.0	8.0	480	200	1	0.001	<0.01
2FC	JS1	H1	M2	0933	1033	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
3FC	LD6	C4	M3	0938	1038	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4FC	RY4	H3	M4	0941	1041	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: PCM7

Barometer: BTC39

Stage Micrometer: WSM16

Thermometer: BTC39

Tally Counter: S/US

Flow Meter: FM15

Environment:

Temperature (°C): 24

Pressure (mb): 1009

Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5

Test Slide (5 bands): Yes/No

W/B Grate diameter (µm): 100

Blank Filter

Head: -

Graticules: -

Fibres: -

Place of Analysis:

Lab K008 BJB

On Site

Lab

Comments Reassurance on perimeters. Results satisfactory

reg. 12(3)

SIGNATURE: (on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: reg. 12(3)



WYG Environmental Ltd

CLIENT:

SITE ADDRESS: HMS Daedalus, Broom Way, Lee-on-Solent

ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

Our Ref: J127784 FC4

Your Ref: -

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: reg. 12(3)

DATE OF SAMPLING: 06/09/17

ANALYSED BY (if different): -

DATE OF ANALYSIS (if different): -

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
FC1	ENV16	JB1	Next to the M1 dust monitor point	0907	1107	4.0	4.0	4.0	480	200	0.5	0.001	<0.01
FC2	ENV6	JB2	Next to the M2 dust monitor point	0916	1116	4.0	4.0	4.0	480	200	1.0	0.001	<0.01
FC3	MS2	JB3	Next to the M3 dust monitor point	0923	1123	4.0	4.0	4.0	480	200	1.5	0.001	<0.01
FC5	MS3	JB4	Next to the M4 dust monitor point	0927	1127	4.0	4.0	4.0	480	200	1.0	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: LBH2

Stage Micrometer: 17

Tally Counter: S/US

Barometer: 34

Thermometer: 10

Flow Meter: FM 46

Environment:

Temperature (°C): 10

Pressure (mb): 1009

Correction Factor (F): NA

Diam. of dust deposit (D) (mm): 22.5

Test Slide (5 bands): Yes/No

W/B Grate diameter (µm): 100

Blank Filter

Head: JB

Graticules: -

Fibres: -

Place of Analysis:

Lab

On Site HK65 NFR

✓ Mob Lab

Comments Reassurance air monitoring was undertaken to establish the airborne fiber concentration is <0.01 in various location around the building site during demolition Results Satisfactory.

reg. 12(3)

SIGNATURE:
(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: reg. 12(3)



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: WYG Environment Ltd

SITE ADDRESS: HMS Daedalus, Broom Way, Lee on Solent, PO13 9YA

Our Ref: J128346 - FC4

Your Ref: -

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: reg. 12(3)

DATE OF SAMPLING: 20/09/2017

ANALYSED BY (if different): -

DATE OF ANALYSIS (if different): -

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1FC	RY4	H3	Monitoring Point 1	1259	1459	4.0	4.0	4.0	480	200	1.5	0.001	<0.01
2FC	ENV 28	H1	Monitoring Point 2	1306	1506	4.0	4.0	4.0	480	200	0.5	0.001	<0.01
3FC	JS1	C4	Monitoring Point 3	1313	1513	4.0	4.0	4.0	480	200	0.5	0.001	<0.01
4FC	LD6	H2	Monitoring Point 4	1315	1515	4.0	4.0	4.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: PCM 7

Stage Micrometer: WSM 16

Tally Counter: S/US

Barometer: BTC 39

Thermometer: BTC 39

Flow Meter: FM 15

Environment:

Temperature (°C): 18

Pressure (mb): 1004

Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5

Test Slide (5 bands): Yes/No

W/B Grate diameter (µm): 100

Blank Filter

Head: -

Graticules: -

Fibres: -

Place of Analysis:

Lab

On Site

✓ Mob Lab KO08 BJF

Comments

Reassurance air monitoring carried out on site perimeters in order to ascertain the airborne fibre concentration levels. Results satisfactory.

SIGNATURE: reg. 12(3)
(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: reg. 12(3)



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: WYG Environment Ltd,
SITE ADDRESS: HMS Daedalus, Broom Way, Lee-on-Solent,
Fareham, Hampshire, PO13 9PA

Our Ref: J128347-fch

Your Ref: N/A

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Envirochem

DATE OF SAMPLING: 27/09/17

reg. 12(3)

ANALYSED BY (if different): N/A

DATE OF ANALYSIS (if different): N/A

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	UN	K1	Sampling point M1 (See plan)	1040	1240	4.0	4.0	4.0	480	200	2	0.001	<0.01
2	EW 45	A61	Sampling point M2 (See plan)	1045	1245	4.0	4.0	4.0	480	200	1	0.001	<0.01
3	EW 50	K2	Sampling point M4 (See plan)	1056	1256	4.0	4.0	4.0	480	200	1 1/2	0.001	<0.01
4	EW 51	K6	Sampling point M3 (See plan)	1101	1301	4.0	4.0	4.0	480	200	1	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.
3. Comments, observations and opinions are outside the scope of UKAS accreditation.
5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.
4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: PCM 2
Stage Micrometer: WSM 20
Tally Counter: S/ES

Barometer: 25
Thermometer: 25
Flow Meter: 25

Environment:

Temperature (°C): 18
Pressure (mb): 1001
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: N4
Graticules: 100
Fibres: 1/2

Place of Analysis:

Lab
On Site
Mob Lab

REF: PUK.

Comments

Reassurance testing carried out to ascertain airborne fibre concentrations.
Results satisfactory.

SIGNATURE:
(on behalf of Envirochem by)

reg. 12(3)

PRINT NAME: reg. 12(3)

ENVIROCHEM/FORMS

7/NOV06

PAGE

1 of 2

