

TEST REPORT



Report No. EXR/244286 (Ver. 1)

Ramboll Environ
Artillery House
11-19 Artillery Row
London
SW7P 7RT

Site: UK11-21406MT Minet Tip

The 6 samples described in this report were registered for analysis by ESG on 01-Jul-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 10-Jul-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 10-Jul-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip		
Sample Details:	BH1	Job Number:	w24_4286
LIMS ID Number:	EX1808044	Date Booked in:	01-Jul-17
QC Batch Number:	170430	Date Extracted:	04-Jul-17
Quantitation File:	Initial Calibration	Date Analysed:	04-Jul-17
Directory:	\\070417MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.15	0.055	94
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	4.32	0.057	97
Fluorene	86-73-7	4.69	0.016	97
Phenanthrene	85-01-8	5.51	0.026	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.82	0.018	69
Pyrene	129-00-0	7.10	0.015	70
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.287	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	140
Acenaphthene-d10	113
Phenanthrene-d10	131
Chrysene-d12	141
Perylene-d12	148

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	71

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip	Job Number:	W24_4286
Sample Details:	BH2	Date Booked in:	01-Jul-17
LIMS ID Number:	EX1808045	Date Extracted:	04-Jul-17
QC Batch Number:	170430	Date Analysed:	04-Jul-17
Quantitation File:	Initial Calibration	Matrix:	Water
Directory:	\070417MS10\	Ext Method:	Bottle
Dilution:	1.0		

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.51	0.012	94
Anthracene	120-12-7	5.56	0.014	93
Fluoranthene	206-44-0	6.82	0.019	97
Pyrene	129-00-0	7.10	0.017	70
Benzo[a]anthracene	56-55-3	8.78	0.016	67
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.198	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	146
Acenaphthene-d10	117
Phenanthrene-d10	137
Chrysene-d12	145
Perylene-d12	151

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	81

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip		
Sample Details:	BH3	Job Number:	w24_4286
LIMS ID Number:	EX1808046	Date Booked in:	01-Jul-17
QC Batch Number:	170430	Date Extracted:	04-Jul-17
Quantitation File:	Initial Calibration	Date Analysed:	04-Jul-17
Directory:	\\070417MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	161
Acenaphthene-d10	114
Phenanthrene-d10	150
Chrysene-d12	155
Perylene-d12	158

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	92
Terphenyl-d14	84

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Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip		
Sample Details:	BH4	Job Number:	W24_4286
LIMS ID Number:	EX1808047	Date Booked in:	01-Jul-17
QC Batch Number:	170430	Date Extracted:	04-Jul-17
Quantitation File:	Initial Calibration	Date Analysed:	04-Jul-17
Directory:	\\070417MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.16	0.024	95
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.174	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	127
Acenaphthene-d10	118
Phenanthrene-d10	140
Chrysene-d12	142
Perylene-d12	142

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	73
Terphenyl-d14	80

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Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip		
Sample Details:	BH5	Job Number:	w24_4286
LIMS ID Number:	EX1808048	Date Booked in:	01-Jul-17
QC Batch Number:	170430	Date Extracted:	04-Jul-17
Quantitation File:	Initial Calibration	Date Analysed:	04-Jul-17
Directory:	\\070417MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	148
Acenaphthene-d10	124
Phenanthrene-d10	138
Chrysene-d12	132
Perylene-d12	138

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	92
Terphenyl-d14	79

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	Ramboll Environ: UK11-21406MT Minet Tip	Job Number:	W24_4286
Sample Details:	Bh6	Date Booked in:	01-Jul-17
LIMS ID Number:	EX1808049	Date Extracted:	04-Jul-17
QC Batch Number:	170430	Date Analysed:	04-Jul-17
Quantitation File:	Initial Calibration	Matrix:	Water
Directory:	\\070417MS10\	Ext Method:	Bottle
Dilution:	1.0		

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8 *	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5 *	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3 *	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2 *	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	129
Acenaphthene-d10	116
Phenanthrene-d10	142
Chrysene-d12	145
Perylene-d12	142

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	92

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		BH1	Date Booked in:	01-Jul-17	Ext Method:		Sep. Funnel	Multiplier: 0.005	
LIMS ID Number:		EX1808044	Date Extracted:	05-Jul-17	Operator:		SO/RP	Dilution Factor: 1	
Job Number:		w24_4286	Date Analysed:	05-Jul-17	Directory/Quant File:		070517_MS16\	GPC (Y/N) N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	N.D	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	110
Naphthalene-d8	110
Acenaphthene-d10	110
Phenanthrene-d10	107
Chrysene-d12	101
Perylene-d12	120

Surrogates	% Rec
2-Fluorophenol	45
Phenol-d5	28
Nitrobenzene-d5	81
2-Fluorobiphenyl	86
2,4,6-Tribromophenol	76
Terphenyl-d14	76

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		BH2	Date Booked in:	01-Jul-17	Ext Method:	Sep. Funnel	Multiplier:	0.005	
LIMS ID Number:		EX1808045	Date Extracted:	05-Jul-17	Operator:	SO/RP	Dilution Factor:	1	
Job Number:		w24_4286	Date Analysed:	05-Jul-17	Directory/Quant File:	070517_MS16\	GPC (Y/N)	N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	N.D	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	99
Naphthalene-d8	99
Acenaphthene-d10	98
Phenanthrene-d10	93
Chrysene-d12	83
Perylene-d12	90

Surrogates	% Rec
2-Fluorophenol	36
Phenol-d5	24
Nitrobenzene-d5	85
2-Fluorobiphenyl	87
2,4,6-Tribromophenol	66
Terphenyl-d14	80

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		BH3	Date Booked in:	01-Jul-17	Ext Method:		Sep. Funnel	Multiplier: 0.005	
LIMS ID Number:		EX1808046	Date Extracted:	05-Jul-17	Operator:		SO/RP	Dilution Factor: 1	
Job Number:		w24_4286	Date Analysed:	05-Jul-17	Directory/Quant File:		070517_MS16\	GPC (Y/N) N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	N.D	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	118
Naphthalene-d8	118
Acenaphthene-d10	117
Phenanthrene-d10	112
Chrysene-d12	104
Perylene-d12	113

Surrogates	% Rec
2-Fluorophenol	27
Phenol-d5	16
Nitrobenzene-d5	87
2-Fluorobiphenyl	89
2,4,6-Tribromophenol	51
Terphenyl-d14	83

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		BH4	Date Booked in:	01-Jul-17	Ext Method:	Sep. Funnel	Multiplier:	0.005	
LIMS ID Number:		EX1808047	Date Extracted:	05-Jul-17	Operator:	SO/RP	Dilution Factor:	1	
Job Number:		W24_4286	Date Analysed:	06-Jul-17	Directory/Quant File:	070517_MS16\	GPC (Y/N)	N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	N.D	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	124
Naphthalene-d8	123
Acenaphthene-d10	123
Phenanthrene-d10	119
Chrysene-d12	117
Perylene-d12	129

Surrogates	% Rec
2-Fluorophenol	39
Phenol-d5	26
Nitrobenzene-d5	86
2-Fluorobiphenyl	89
2,4,6-Tribromophenol	73
Terphenyl-d14	90

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		BH5	Date Booked in:	01-Jul-17	Ext Method:	Sep. Funnel	Multiplier:	0.005	
LIMS ID Number:		EX1808048	Date Extracted:	05-Jul-17	Operator:	SO/RP	Dilution Factor:	1	
Job Number:		W24_4286	Date Analysed:	06-Jul-17	Directory/Quant File:	070517_MS16\	GPC (Y/N)	N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	< 0.020	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	118
Naphthalene-d8	119
Acenaphthene-d10	119
Phenanthrene-d10	113
Chrysene-d12	101
Perylene-d12	109

Surrogates	% Rec
2-Fluorophenol	1
Phenol-d5	1
Nitrobenzene-d5	75
2-Fluorobiphenyl	91
2,4,6-Tribromophenol	5
Terphenyl-d14	98

Semi-Volatile Organic Compounds

Customer and Site Details:		Ramboll Environ: UK11-21406MT Minet Tip		UKAS accredited?: No		Matrix: Water		QC Batch Number: 113	
Sample Details:		Bh6	Date Booked in:	01-Jul-17	Ext Method:	Sep. Funnel	Multiplier:	0.005	
LIMS ID Number:		EX1808049	Date Extracted:	05-Jul-17	Operator:	SO/RP	Dilution Factor:	1	
Job Number:		w24_4286	Date Analysed:	06-Jul-17	Directory/Quant File:	070517_MS16\	GPC (Y/N)	N	

Target Compounds	CAS #	R.T. (min)	Concentration mg/l	% Fit
Phenol	108-95-2	-	< 0.020	-
bis(2-Chloroethyl)ether	111-44-4	-	< 0.005	-
2-Chlorophenol	95-57-8	-	< 0.020	-
1,3-Dichlorobenzene	541-73-1	-	< 0.005	-
1,4-Dichlorobenzene	106-46-7	-	< 0.005	-
Benzyl alcohol	100-51-6	-	< 0.005	-
1,2-Dichlorobenzene	95-50-1	-	< 0.005	-
2-Methylphenol	95-48-7	-	< 0.005	-
bis(2-Chloroisopropyl)ether	108-60-1	-	< 0.005	-
Hexachloroethane	67-72-1	-	< 0.005	-
N-Nitroso-di-n-propylamine	621-64-7	-	< 0.005	-
3- & 4-Methylphenol	108-39-4/106-44-5	-	< 0.020	-
Nitrobenzene	98-95-3	-	< 0.005	-
Isophorone	78-59-1	-	< 0.005	-
2-Nitrophenol	88-75-5	-	< 0.020	-
2,4-Dimethylphenol	105-67-9	-	< 0.020	-
Benzoic Acid	65-85-0	-	< 0.100	-
bis(2-Chloroethoxy)methane	111-91-1	-	< 0.005	-
2,4-Dichlorophenol	120-83-2	-	< 0.020	-
1,2,4-Trichlorobenzene	120-82-1	-	< 0.005	-
Naphthalene	91-20-3	-	< 0.002	-
4-Chlorophenol	106-48-9	-	< 0.020	-
4-Chloroaniline	106-47-8	-	< 0.005	-
Hexachlorobutadiene	87-68-3	-	< 0.005	-
4-Chloro-3-methylphenol	59-50-7	-	< 0.005	-
2-Methylnaphthalene	91-57-6	-	< 0.002	-
1-Methylnaphthalene	90-12-0	-	< 0.002	-
Hexachlorocyclopentadiene	77-47-4	-	< 0.005	-
2,4,6-Trichlorophenol	88-06-2	-	< 0.020	-
2,4,5-Trichlorophenol	95-95-4	-	< 0.020	-
2-Chloronaphthalene	91-58-7	-	< 0.002	-
Biphenyl	92-52-4	-	< 0.002	-
Diphenyl ether	101-84-8	-	< 0.002	-
2-Nitroaniline	88-74-4	-	< 0.005	-
Acenaphthylene	208-96-8	-	< 0.002	-
Dimethylphthalate	131-11-3	-	< 0.005	-
2,6-Dinitrotoluene	606-20-2	-	< 0.005	-
Acenaphthene	83-32-9	-	< 0.002	-
3-Nitroaniline	99-09-2	-	< 0.005	-

Concentrations are reported on a wet weight basis.
"M" denotes that % fit has been manually interpreted

Target Compounds	CAS #	R.T.	Concentration mg/l	% Fit
2,4-Dinitrophenol	51-28-5	-	< 0.010	-
Dibenzofuran	132-64-9	-	< 0.005	-
4-Nitrophenol	100-02-7	-	< 0.050	-
2,4-Dinitrotoluene	121-14-2	-	< 0.005	-
Fluorene	86-73-7	-	< 0.002	-
Diethylphthalate	84-66-2	-	< 0.005	-
4-Chlorophenyl-phenylether	7005-72-3	-	< 0.005	-
4,6-Dinitro-2-methylphenol	534-52-1	-	< 0.050	-
4-Nitroaniline	100-01-6	-	< 0.005	-
N-Nitrosodiphenylamine	86-30-6	-	< 0.005	-
4-Bromophenyl-phenylether	101-55-3	-	< 0.005	-
Hexachlorobenzene	118-74-1	-	< 0.005	-
Pentachlorophenol	87-86-5	-	< 0.050	-
Phenanthrene	85-01-8	-	< 0.002	-
Anthracene	120-12-7	-	< 0.002	-
Di-n-butylphthalate	84-74-2	-	< 0.005	-
Fluoranthene	206-44-0	-	< 0.002	-
Pyrene	129-00-0	-	< 0.002	-
Butylbenzylphthalate	85-68-7	-	< 0.005	-
Benzo[a]anthracene	56-55-3	-	< 0.002	-
Chrysene	218-01-9	-	< 0.002	-
3,3'-Dichlorobenzidine	91-94-1	-	N.D	-
bis(2-Ethylhexyl)phthalate	117-81-7	-	< 0.005	-
Di-n-octylphthalate	117-84-0	-	< 0.002	-
Benzo[b]fluoranthene	205-99-2	-	< 0.002	-
Benzo[k]fluoranthene	207-08-9	-	< 0.002	-
Benzo[a]pyrene	50-32-8	-	< 0.002	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.002	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.002	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.002	-
Coronene	191-07-1	-	< 0.050	-

Internal Standards	% Area
1,4-Dichlorobenzene-d4	122
Naphthalene-d8	122
Acenaphthene-d10	124
Phenanthrene-d10	123
Chrysene-d12	115
Perylene-d12	127

Surrogates	% Rec
2-Fluorophenol	12
Phenol-d5	8
Nitrobenzene-d5	85
2-Fluorobiphenyl	87
2,4,6-Tribromophenol	25
Terphenyl-d14	78

Gasoline Range Organics (BTEX and Aliphatic Carbon Ranges)

Customer and Site Details: Ramboll Environ : UK11-21406MT Minet Tip
Job Number: W24_4286
Directory: E:\TES\DATA\2017\0703HSA_GC9\070317 2017-07-03 11-07-13\165B6501.D
Method: Headspace GCFID

Matrix: Water
Date Booked in: 01-Jul-17
Date extracted: 03-Jul-17
Date Analysed: 04-Jul-17, 06:58

* Sample data with an asterisk are not UKAS accredited.

[illegible]

Note: Benzene elutes between C6 and C7, toluene elutes between C7 and C8, ethyl benzene and the xylenes elute between C8 and C9.

Each BTEX compound is deducted from the appropriate band to give the aliphatic fractions, however aromatic compounds may still be contributing to these fractions

Where individual results are flagged see report notes for status.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details:	Ramboll Environ : UK11-21406MT Minet Tip		
Job Number:	W24_4286	Separation:	Silica gel
QC Batch Number:	170430	Eluents:	Hexane, DCM
Directory:	C:\CHEM32\1\DATA\070517\070517 2017-07-05 14-04-25\B-020-66-EX1808049ARO.D		
Method:	Bottle		

Matrix: Water
Date Booked in 01-Jul-17
Date Extracted 04-Jul-17
Date Analysed 05-Jul-17, 18:38:20

*** This sample data is not UKAS accredited.**

[illegible]

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: BH1
LIMS ID Number: EX1808044
Job Number: W24_4286

Directory/Quant file: 2017\070417\ Initial Calibration
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 12

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.60	91	Dibromofluoromethane	120
1,4-Difluorobenzene	3.95	93	Toluene-d8	99
Chlorobenzene-d5	5.09	93	Bromofluorobenzene	95
1,4-Dichlorobenzene-d4	5.89	90		

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: BH2
LIMS ID Number: EX1808045
Job Number: W24_4286

Directory/Quant file: 2017\070417\ Initial Calibration
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 13

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.60	90	Dibromofluoromethane	117
1,4-Difluorobenzene	3.95	92	Toluene-d8	98
Chlorobenzene-d5	5.09	92	Bromofluorobenzene	96
1,4-Dichlorobenzene-d4	5.89	88		

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: BH3
LIMS ID Number: EX1808046
Job Number: W24_4286

Directory/Quant file: 2017\070417\ Initial Calibration
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 14

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.60	87	Dibromofluoromethane	120
1,4-Difluorobenzene	3.95	90	Toluene-d8	98
Chlorobenzene-d5	5.09	90	Bromofluorobenzene	94
1,4-Dichlorobenzene-d4	5.89	85		

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: BH4
LIMS ID Number: EX1808047
Job Number: W24_4286

Directory/Quant file: 2017\070417\ Initial Calibration
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 15

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.60	92	Dibromofluoromethane	117
1,4-Difluorobenzene	3.95	95	Toluene-d8	98
Chlorobenzene-d5	5.09	95	Bromofluorobenzene	95
1,4-Dichlorobenzene-d4	5.89	89		

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: BH5
LIMS ID Number: EX1808048
Job Number: W24_4286

Directory/Quant file: 2017\070417\ Initial Calibration
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 16

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.60	94	Dibromofluoromethane	118
1,4-Difluorobenzene	3.95	97	Toluene-d8	98
Chlorobenzene-d5	5.09	97	Bromofluorobenzene	96
1,4-Dichlorobenzene-d4	5.89	93		

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details: Ramboll Environ: UK11-21406MT Minet Tip
Sample Details: Bh6
LIMS ID Number: EX1808049
Job Number: W24_4286

Directory/Quant file: 2017\070417\
Date Booked in: 01-Jul-17
Date Analysed: 04-Jul-17
Operator: PR
Initial Calibration:
Matrix: Water
Method: Headspace
Multiplier: 1
Position: 17

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

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1,4-Difluorobenzene	3.95	96	Toluene-d8	98
Chlorobenzene-d5	5.09	95	Bromofluorobenzene	94
1,4-Dichlorobenzene-d4	5.89	89		

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W244286

Customer Ramboll Environ
Site UK11-21406MT Minet Tip
Report No W244286

Consignment No W122661
Date Logged 01-Jul-2017
In-House Report Due 10-Jul-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	MethodID	Sampled	Report A	GRO-HSA GCFID (AA)	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Manganese as Mn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Ferrous Iron as Fe(2+) KONE	Iron as Fe (Total) KONE	Ammoniacal Nitrogen (Kone)	Nitrite as N (Kone)	Nitrate as N (Kone calc)
EX/1808044	BH1	Groundwater	29/06/17																			
EX/1808045	BH2	Groundwater	29/06/17																			
EX/1808046	BH3	Groundwater	29/06/17																			
EX/1808047	BH4	Groundwater	30/06/17																			
EX/1808048	BH5	Groundwater	30/06/17																			
EX/1808049	Bh6	Groundwater	30/06/17																			

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W244286

Customer Ramboll Environ
Site UK11-21406MT Minet Tip
Report No W244286

Consignment No W122661
Date Logged 01-Jul-2017
In-House Report Due 10-Jul-2017

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	MethodID Sampled	MethodID	PAHMSW	SFAPL	SFAS	SVOCSW	Carbazole	SVOC	TPHFD-SI	VOCHSAW	Carbon Disulphide	Dichloromethane	WMLM3
					PAH GC-MS (16)	Cyanide (Total) as CN SFA	Sulphide as S SFA	Azobenzene			TPH by GC(SI)	VOC HSA-GCMS			pH units
EX/1808044	BH1	Groundwater	29/06/17		✓	✓	✓				✓	✓			✓
EX/1808045	BH2	Groundwater	29/06/17												
EX/1808046	BH3	Groundwater	29/06/17												
EX/1808047	BH4	Groundwater	30/06/17												
EX/1808048	BH5	Groundwater	30/06/17												
EX/1808049	Bh6	Groundwater	30/06/17												

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Report Number : W/EXR/244286

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHMSW	EX1808044-49	The Secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily (including the Primary Process Control) and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation from the affected analytes (Acenaphthylene) . These circumstances should be taken into consideration when utilising the data.
KONEFE	EX/1808049	Sample matrix effect caused inconsistent results when analysing for Ferrous Iron and Total Iron. The sample was diluted to try to negate these effects but a consistent result could not be obtained. Sample has therefore been marked as not amenable.
SVOCSW	EX1808048 EX1808049	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONEFE	As Received	Direct analysis using discrete colorimetric analysis (calculation of Ferric Iron from Total Iron and Ferrous Iron data if required)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	SVOCSW	As Received	Determination of Semi Volatile Organic Compounds (SVOC) by DCM extraction followed by GCMS detection
Water	TPHFID-Si	As Received	Determination of speciated pentane extractable hydrocarbons in water by GCFID
Water	VOCHSAW	As Received	Determination of Volatile Organics Compounds by Headspace GCMS
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▮ Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

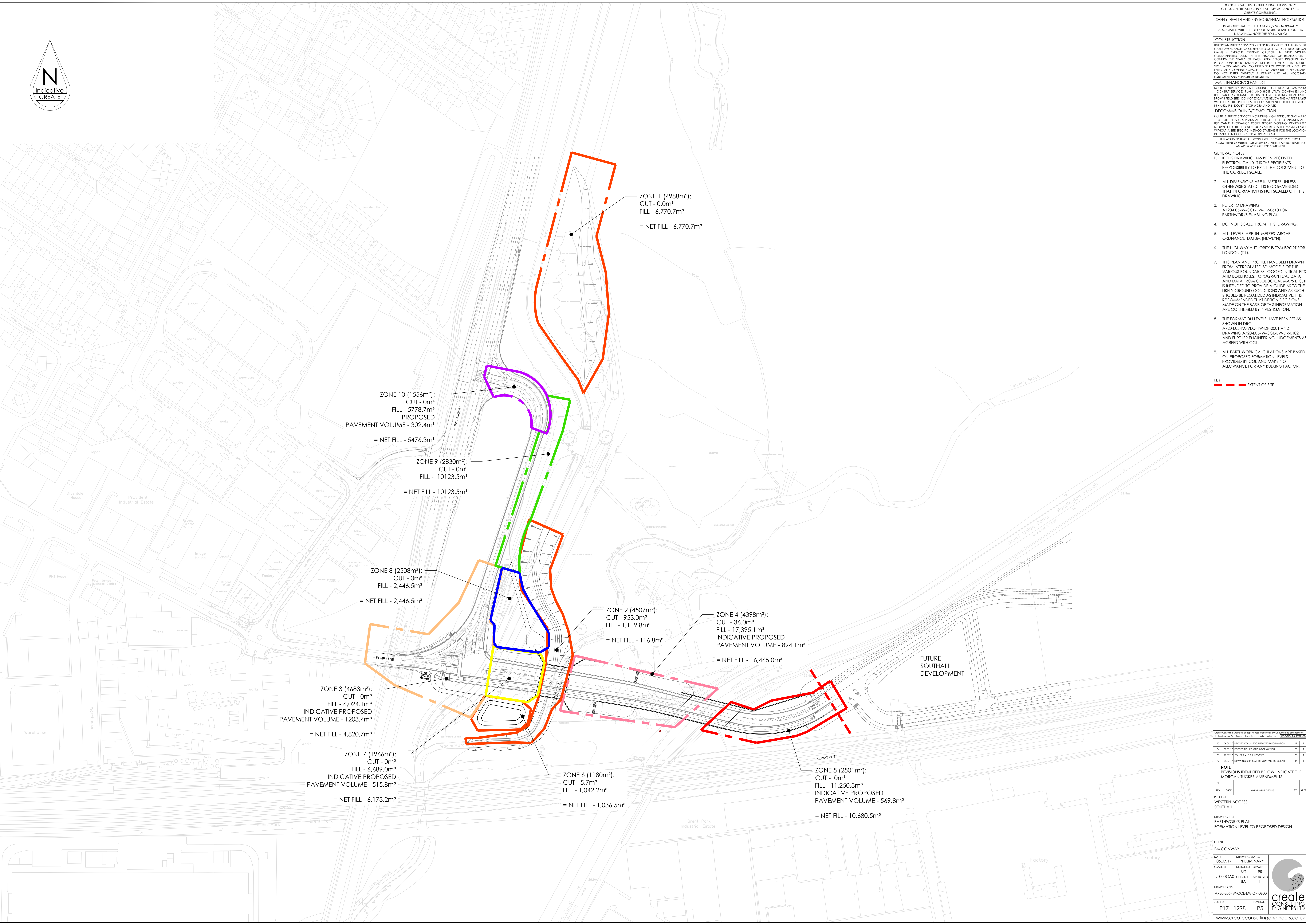
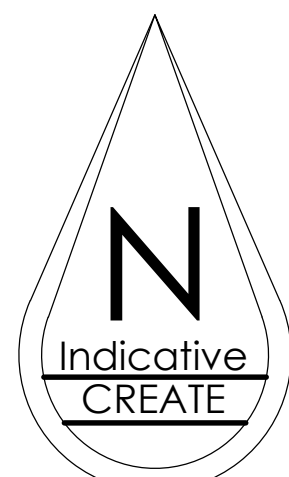
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Ramboll Environ
Site : UK11-21406MT Minet Tip
Report Number : W24_4286

APPENDIX C

Proposed Earthworks Cut and Fill Volumes



DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
CHECK ON SITE AND REPORT ALL DISCREPANCIES TO
CREATE CONSULTING.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDOUSNESS NORMALLY
ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS
DRAWING, NOTE THE FOLLOWING:

CONSTRUCTION

UNKNOWN BURIED SERVICES - REFER TO SERVICES PLANS AND USE
CABLE AVOIDANCE TOOLS BEFORE DIGGING. HIGH PRESSURE GAS
MANG - EXERCISE EXTREME CAUTION IN THEIR VICINITY.
CONFIRM THE STATUS OF EACH AREA BEFORE DIGGING AND
PRECAUTIONS TO BE TAKEN AT DIFFERENT LEVELS. IF IN DOUBT
STOP WORK AND ASK. CONFINED SPACE WORKING - DO NOT
ENTER ANY CONFINED SPACE UNLESS ABSOLUTELY NECESSARY.
DO NOT ENTER WITHOUT A PERMIT AND ALL NECESSARY
EQUIPMENT AND SUPPORT AS REQUIRED.

MAINTENANCE/CLEANING

MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MANG
- CHECK SERVICES PLANS AND HOI UTILITY COMPANIES AND
USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED
BROWN FELD SITE - DO NOT DIG DEEPER BELOW THE WATER LAYER
WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION
IN HAND. IF IN DOUBT STOP WORK AND ASK.

DECOMMISSIONING/DEMOLITION

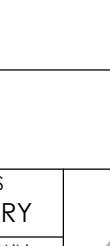
MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MANG
- CHECK SERVICES PLANS AND HOI UTILITY COMPANIES AND
USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED
BROWN FELD SITE - DO NOT DIG DEEPER BELOW THE WATER LAYER
WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION
IN HAND. IF IN DOUBT STOP WORK AND ASK.

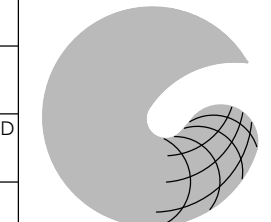
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A
COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO
AN APPROVED METHOD STATEMENT.

- GENERAL NOTES:**
- IF THIS DRAWING HAS BEEN RECEIVED
ELECTRONICALLY IT IS THE RECIPIENT'S
RESPONSIBILITY TO PRINT THE DOCUMENT TO
THE CORRECT SCALE.
 - ALL DIMENSIONS ARE IN METRES UNLESS
OTHERWISE STATED. IT IS RECOMMENDED
THAT INFORMATION IS NOT SCALED OFF THIS
DRAWING.
 - REFER TO DRAWING
A720-EDS-IW-CCE-EW-DR-0610 FOR
EARTHWORKS ENABLING PLAN.
 - DO NOT SCALE FROM THIS DRAWING.
 - ALL LEVELS ARE IN METRES ABOVE
ORDNANCE DATUM (NEWLYN).
 - THE HIGHWAY AUTHORITY IS TRANSPORT FOR
LONDON (TfL).
 - THIS PLAN AND PROFILE HAVE BEEN DRAWN
FROM INTERPOLATED 3D MODELS OF THE
VARIOUS BOUNDARIES LOGGED IN TRIAL PITS
AND BOREHOLES. TOPOGRAPHICAL DATA
AND DATA FROM GEOLOGICAL MAPS ETC. IT
IS INTENDED TO PROVIDE A GUIDE AS TO THE
LIKELY GROUND CONDITIONS AND AS SUCH
SHOULD BE REGARDED AS INDICATIVE. IT IS
RECOMMENDED THAT DESIGN DECISIONS
MADE ON THE BASIS OF THIS INFORMATION
ARE CONFIRMED BY INVESTIGATION.
 - THE FORMATION LEVELS HAVE BEEN SET AS
SHOWN IN DRG
A720-EDS-PA-VEC-HW-DR-0001 AND
DRAWING A720-EDS-IW-CCL-EW-DR-0102
AND FURTHER ENGINEERING JUDGEMENTS AS
AGREED WITH CGL.
 - ALL EARTHWORK CALCULATIONS ARE BASED
ON PROPOSED FORMATION LEVELS
PROVIDED BY CGL AND MAKE NO
ALLOWANCE FOR ANY BULKING FACTOR.

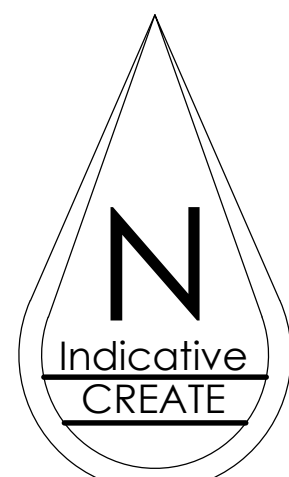
KEY:

— — — — — EXTENT OF SITE

Create Consulting Engineers accept no responsibility for any unauthorised amendments to this drawing. Only signed dimensions are to be worked to. CREATE CONSULTING ENGINEERS LTD			
PS	06.07.17	REVISED VOLUME TO UPDATED INFORMATION	JTF TI
PA	06.07.17	REVISED TO UPDATED INFORMATION	JTF TI
PS	20.07.17	REVISED TO A & B INFORMATION	JTF TI
PS	06.07.17	DRAWING REPLICATED FROM A&B TO CREATE	PS TI
NOTE REVISIONS IDENTIFIED BELOW. INDICATE THE MORGAN TUCKER AMENDMENTS			
REV	DATE	AMENDMENT DETAILS	BY APPR
PROJECT WESTERN ACCESS SOUTHALL			
DRAWING TITLE EARTHWORKS PLAN FORMATION LEVEL TO PROPOSED DESIGN			
CLIENT FM CONWAY			
DATE	06.07.17	DRAWING STATUS	PRELIMINARY
SCALE(S)	1:1000@A0	DESIGNED	MT
		CHECKED	BA
		DRAWN	PR
		APPROVED	TI
DRAWING NO A720-EDS-IW-CCE-EW-DR-0600			
JOB NO P17 - 1298	REVISION P5	 create CONSULTING ENGINEERS LTD	
www.createconsultingengineers.co.uk			



DO NOT SCALE ORIGINAL SHEET SIZE - A0 Landscape



ZONE 1 (4992m²):
CUT - 20,527.0m³
FILL - 0m³
= NET CUT - 20,527.0m³

ZONE 10 (1635m²):
CUT - 6,585.4m³
FILL - 0m³
= NET CUT - 6,585.4m³

ZONE 9 (2812m²):
CUT - 12,965.7m³
FILL - 0m³
= NET CUT - 12,965.7m³

ZONE 8 (2508m²):
CUT - 1,025.1m³
FILL - 449.6m³
= NET CUT - 575.5m³

ZONE 2 (4499m²):
CUT - 3,010.0m³
FILL - 1,083.5m³
= NET CUT - 1,926.5m³

ZONE 4 (5490m²):
CUT - 9,963.6m³
FILL - 0m³
= NET CUT - 9,963.6m³

ZONE 3 (6633m²):
CUT - 1,847.0m³
FILL - 407.0m³
= NET CUT - 1,440.0m³

ZONE 7 (2014m²):
CUT - 1,622.4m³
FILL - 26.0m³
= NET CUT - 1,596.4m³

ZONE 6 (1275m²):
CUT - 912.4m³
FILL - 0m³
= NET CUT - 912.4m³

ZONE 5 (3524m²):
CUT - 1,347.7m³
FILL - 74.8m³
= NET CUT - 1222.9m³

DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
CHECK ON SITE AND REPORT ALL DISCREPANCIES TO
CREATE CONSULTING.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDOUSNESS NORMALLY
ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS
DRAWING, NOTE THE FOLLOWING:

CONSTRUCTION

UNKNOWN BURIED SERVICES - REFER TO SERVICES PLANS AND USE
CABLE AVOIDANCE TOOLS BEFORE DIGGING. HIGH PRESSURE GAS
MANG - EXERCISE EXTREME CAUTION IN THEIR VICINITY.
PRECAUTIONS TO BE TAKEN IN THE PROCESS OF REMEDIATION
CONFIRM THE STATUS OF EACH AREA BEFORE DIGGING AND
PRECAUTIONS TO BE TAKEN AT DIFFERENT LEVELS. IF IN DOUBT
STOP WORK AND ASK. CONTINUED SPACE WORKING - DO NOT
ENTER ANY CONFINED SPACE UNLESS ABSOLUTELY NECESSARY.
DO NOT ENTER WITHOUT A PERMIT AND ALL NECESSARY
EQUIPMENT AND SUPPORT AS REQUIRED.

MAINTENANCE/CLEANING

MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MANG
- CHECK SERVICES PLANS AND HOI UTILITY COMPANIES AND
USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED
BROWN FELD SITE - DO NOT LOCATE BELOW THE WATER TABLE
WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION
IN HAND. IF IN DOUBT STOP WORK AND ASK.

DECOMMISSIONING/DEMOLITION

MULTIPLE BURIED SERVICES INCLUDING HIGH PRESSURE GAS MANG
- CHECK SERVICES PLANS AND HOI UTILITY COMPANIES AND
USE CABLE AVOIDANCE TOOLS BEFORE DIGGING. REMEDIATED
BROWN FELD SITE - DO NOT LOCATE BELOW THE WATER TABLE
WITHOUT A SITE SPECIFIC METHOD STATEMENT FOR THE LOCATION
IN HAND. IF IN DOUBT STOP WORK AND ASK.

IF IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A
COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO:
AN APPROVED METHOD STATEMENT.

GENERAL NOTES:

1. IF THIS DRAWING HAS BEEN RECEIVED
ELECTRONICALLY IT IS THE RECIPIENT'S
RESPONSIBILITY TO PRINT THE DOCUMENT TO
THE CORRECT SCALE.

2. ALL DIMENSIONS ARE IN METRES UNLESS
OTHERWISE STATED. IT IS RECOMMENDED
THAT INFORMATION IS NOT SCALED OFF THIS
DRAWING.

3. REFER TO DRAWING
A720-EDS-IW-CCE-EW-DR-0600 FOR PLAN
SHOWING FORMATION LEVEL TO PROPOSED
DESIGN.

4. DO NOT SCALE FROM THIS DRAWING.

5. ALL LEVELS ARE IN METRES ABOVE
ORDNANCE DATUM (NEWLYN).

6. THE HIGHWAY AUTHORITY IS TRANSPORT FOR
LONDON (TfL).

7. THIS PLAN AND PROFILE HAVE BEEN DRAWN
FROM INTERPOLATED 3D MODELS OF THE
VARIOUS BOUNDARIES LOGGED IN TRIAL PITS
AND BOREHOLES, TOPOGRAPHICAL DATA
AND DATA FROM GEOLOGICAL MAPS ETC. IT
IS INTENDED TO PROVIDE A GUIDE AS TO THE
LIKELY GROUND CONDITIONS AND AS SUCH
SHOULD BE REGARDED AS INDICATIVE. IT IS
RECOMMENDED THAT DESIGN DECISIONS
MADE ON THE BASIS OF THIS INFORMATION
ARE CONFIRMED BY INVESTIGATION.

8. THE FORMATION LEVELS HAVE BEEN SET AS
SHOWN IN DRG
A720-EDS-PA-VEC-HW-DR-0001 AND
DRAWING A720-EDS-IW-CGL-EW-DR-0102
AND FURTHER ENGINEERING JUDGEMENTS AS
AGREED WITH CGL.

9. ALL EARTHWORK CALCULATIONS ARE BASED
ON PROPOSED FORMATION LEVELS
PROVIDED BY CGL AND MAKE NO
ALLOWANCE FOR ANY BULKING FACTORS.

KEY:
- - - - - EXTENT OF SITE

CREATE CONSULTING ENGINEERS LTD
To the drawing, this figure dimensions are to be worked to. (COURTESY OF THE CLIENT)

PN 06.07.17 REVISION VOLUMES TO UPDATE INFORMATION JFF TI

PN 01.08.17 REVISION TO UPDATE INFORMATION JFF TI

PN 21.07.17 (EDS 3.4.3 & 7) UPDATED JFF TI

PN 06.07.17 (EDS 3.4.3 & 7) UPDATED JFF TI

PN 06.07.17 DRAWING REPLICATED FROM A720 TO CREATE PN TI

NOTE

REVISIONS IDENTIFIED BELOW. INDICATE THE
MORGAN TUCKER AMENDMENTS

REV DATE AMENDMENT DETAILS BY APPR

PN 06.07.17 AMENDMENT DETAILS BY APPR

PROJECT

WESTERN ACCESS
SOUTHALL

DRAWING TITLE

EARTHWORKS PLAN - ENABLING WORKS
EXISTING SURFACE TO FORMATION LEVEL

CLIENT

FM CONWAY

DATE

06.07.17

DRAWING STATUS

PRELIMINARY

SCALE(S)

1:1000@A0

DESIGNED

MT

DRAWN

PR

CHECKED

BA

APPROVED

TI

DRAWING NO

A720-EDS-IW-CCE-EW-DR-0610

JOB NO

P17 - 1298

REVISION

P6

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DO NOT SCALE ORIGINAL SHEET SIZE - A0 Landscape

APPENDIX D

DQRA Input Parameter Summary

Table A. Summary of site specific model input parameters for Remedial Target Methodology

Parameter	Typical range	Units	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter
Moisture content	9.6 – 31.0	%	20.16	Average value for Made Ground (i.e. assumed source materials)	Lab testing of site soils	-	High
Porosity	Air filled = 0.169	-	0.169	Based on average moisture content and typical bulk density for source materials above water table)	RTM porosity calculator	-	High
	Water filled = 0.298	-	0.298		RTM porosity calculator	-	High
Infiltration	0.001618	m/d	0.001618	Average rainfall value for 2016	Met office data for Heathrow ¹	-	High

Table B. Summary of site specific model input parameters for Remedial Target Methodology – Made Ground

Parameter	Typical range	Units	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter
Dry bulk density of Made Ground.	1.48 – 1.63	g/cm ³	1.53	Average value for trackbed from .	Lab testing of site soils	-	High
Bulk density of Made Ground	1.94 – 2.05	g/cm ³	1.99	Average value for Made Ground.	Lab testing of site soils	Sensitivity analysis shows that the higher value gives more conservative remedial targets. However, an average value is considered more representative.	High
FOC of Made Ground	0.0035 – 0.064	-	0.025	Arithmetic mean of 24 soil samples collected from the Made Ground.	Laboratory data from site won soils	Sensitivity analysis shows that the lower value gives more conservative remedial targets. However, an average value is considered more representative.	High

¹ <http://www.metoffice.gov.uk/pub/data/weather/uk/climate/stationdata/heathrowdata.txt>

Table C. Summary of site specific model input parameters for Remedial Target Methodology – River Terrace Deposits

Parameter	Typical range	Units	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter
Dry bulk density of RTD.	1.6 – 1.97	g/cm ³	1.76	Average value for RTD.	Lab testing of site soils	Sensitivity analysis shows that the parameter has little effect on the model output.	High
Effective porosity of sandy gravels	0.21-0.33	-	0.21	Lower value considered to be representative of the site.	McWhorter and Sunada (2010). <i>Groundwater Hydrology and Hydraulics</i> .	Sensitivity analysis shows that the parameter has little effect on the model output.	Moderate to high
FOC of RTD	0.0041 – 0.019	-	0.013	Arithmetic mean of 3 soil samples collected from the RTD.	Laboratory data from site won soils	Sensitivity analysis shows that the parameter has little effect on the model output.	High
Saturated thickness of RTD	3.8	m	3.8	Arithmetic mean of saturated thicknesses of RTD recorded during monitoring works.	Groundwater monitoring undertaken by CGL.	Sensitivity analysis shows that the parameter has little effect on the model output.	Moderate to high
Hydraulic gradient	0.009 – 0.044 (RTD)	-	0.028 (RTD)	Calculated from site monitoring data.	Groundwater monitoring undertaken by CGL.	Sensitivity analysis shows that the lower value gives more conservative remedial targets. However, average value used.	Moderate
Hydraulic conductivity of RTD	0.07 – 216	m/d	94.4	Arithmetic mean for gravels considered to be representative of the site.	Particle size distribution data from site samples	Sensitivity analysis shows that the lower value gives more conservative remedial targets. However, average value from PSD test data used.	Moderate to high
Source area, width and length	Area = 100m², Length = 10m, Width = 10m. The site investigation data indicates that the elevated concentrations of contaminants in groundwater occur in a series of discrete source areas and hotspots, which are likely to be associated with the overlying Made Ground.						Moderate

Table D. Summary of contaminant specific model input parameters for Remedial Target Methodology.

Determinant	K _d (ml/g)	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter value
Ammonium	1.2 – 1.7	1.2	Lower value chosen for conservative assessment	Kd values for ammonium reported by the BGS and Environment Agency. Science Report SC020039/4	Sensitivity analysis shows that the parameter does affect the model output. Lower value gives more conservative remedial targets.	High
Cadmium	240	240	-	Based on CONSIM technical reference for Cadmium (unspecified conditions).	-	Moderate
Chromium VI	35	35	-	Based on CONSIM technical reference for Chromium VI (unspecified conditions).	-	Moderate
Free Cyanide	0.1 – 9.9	0.1	Lower value expected to be more conservative.	RIVM ² , US EPA ³	-	Moderate
Lead	4,360 – 23,270	4,360	Lower value chosen for conservative assessment	Based on USEPA report; Understanding Variation in Partition Coefficient, K _d , Values ⁴ .	Sensitivity analysis shows that the parameter does affect the model output. Lower value gives more conservative remedial targets.	High
Mercury	500	500	-	Kd value for inorganic mercury reported by the Environment Agency. SC050021	-	Moderate
Copper	2120	2120		RIVM, (2001) ⁵		Moderate

² RIVM, (2000). *Circular on target values and intervention values for soil remediation.*

³ USEPA, (2005). *Table of toxicological data and physical properties.*

⁴ USEPA (August 1999). *Understanding Variation in Partition Coefficient, K_d, Values. Volume II. Review of Geochemistry and Available K_d Values for Cadmium, Cesium, Chromium, Lead, Plutonium, Radon, Strontium, Thorium, Tritium (3H), and Uranium.*

⁵ RIVM, (2001). *Re-evaluation of Human-toxicological Maximum Permissible Risk Levels.*

Nickel	500	500	Value used in Thorne et al, 2005 ⁶	Thorne et al, 2005.		Moderate
Zinc	0.1 to 8000	2600	Value used in Thorne et al, 2005	ATSDR toxicological profile and Thorne et al, 2005.		Moderate

Table E. Summary of contaminant specific model input parameters for Remedial Target Methodology.

Determinant	K _{oc} (ml/g)	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter value
Benzo(a)pyrene	129,000 - 916,000	129,000	Lower value chosen for conservative assessment.	Environment Agency SR7 and P5-079/TR1	Sensitivity analysis shows that the parameter does affect the model output. Lower value gives more conservative remedial targets.	Moderate to high
Phenol	27 - 83	27	Lower value chosen for conservative assessment	Based on CONSIM technical reference for Phenol and Environment Agency reports SC050021/SR7 and P5-079/TR1	Sensitivity analysis shows that the parameter does affect the model output. Lower value gives more conservative remedial targets.	Moderate to high
Naphthalene	1288	1288	Published data source.	Based on CONSIM technical reference for naphthalene	-	Moderate to high
Benzene	38 - 97	38	Published data source.	Based on CONSIM technical reference for benzene	Sensitivity analysis shows that the parameter does affect the model output. Lower value gives more conservative remedial targets.	Moderate to high

⁶ Thorne M., Walke R., Maul P., (2005). *The PRISM Foodchain Modelling Software: Parameter Values for the Soil/Plant Model*. Document No. QRS-1198A-3, March 2005.

Table F. Summary of contaminant specific model input parameters for Remedial Target Methodology.

Determinant	Half-life (days)	Value chosen	Justification of parameter chosen	Source of parameter	Other information / comment	Confidence in parameter value
	Anaerobic					
Benzo(a)pyrene	228 – 2,120	2,120	Higher half-life rate chosen as a conservative value based on mildly reducing conditions in groundwater.	Howard, Boethling, Jarvis, Meylan, Michalenko. (1991). Environmental degradation rates	Sensitivity analysis shows that the higher value gives more conservative remedial targets.	Moderate
Phenol	8 – 28	28	Higher half-life rate chosen as a conservative value based on mildly reducing conditions in groundwater.	Howard, Boethling, Jarvis, Meylan, Michalenko. (1991). Environmental degradation rates	Sensitivity analysis shows that the higher value gives more conservative remedial targets.	Moderate
Naphthalene	25 to 258	258	Higher half-life rate chosen as a conservative value based on mildly reducing conditions in groundwater.	Howard, Boethling, Jarvis, Meylan, Michalenko. (1991). Environmental degradation rates	Sensitivity analysis shows that the higher value gives more conservative remedial targets.	Moderate
Benzene	112 to 720	720	Higher half-life rate chosen as a conservative value based on mildly reducing conditions in groundwater.	Howard, Boethling, Jarvis, Meylan, Michalenko. (1991). Environmental degradation rates	Sensitivity analysis shows that the higher value gives more conservative remedial targets.	Moderate
Free Cyanide	15	15	Published data source.	WFD-UKTAG - <i>Proposed EQS for Water Framework Directive Annex VIII substances: cyanide (free) (For consultation)</i>	-	High

APPENDIX E

DQRA Model Outputs

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil



Select the method of calculating the soil water
Partition Co-efficient by using the pull down menu
below

Calculate for non-polar organic chemicals

Contaminant	Benzene		
Target concentration	C _T	0.01	mg/l

Input Parameters	Variable	Value	Unit	Source of parameter value
<i>Standard entry</i>				
Water filled soil porosity	θ _w	2.98E-01	fraction	
Air filled soil porosity	θ _a	1.69E-01	fraction	
Bulk density of soil zone material	ρ	2.16E+00	g/cm ³	
Henry's Law constant	H	2.24E-01	dimensionless	
<i>Entry if specify partition coefficient (option)</i>				
Soil water partition coefficient	K _d		l/kg	
<i>Entry for non-polar organic chemicals (option)</i>				
Fraction of organic carbon (in soil)	f _{oc}	2.50E-02	fraction	
Organic carbon partition coefficient	K _{oc}	3.80E+01	l/kg	
<i>Entry for ionic organic chemicals (option)</i>				
Sorption coefficient for neutral species	K _{oc,n}		l/kg	
Sorption coefficient for ionised species	K _{oc,i}		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pK _a			
Fraction of organic carbon (in soil)	f _{oc}		fraction	
Soil water partition coefficient used in Level Assessment	K _d	9.50E-01	l/kg	Calculated value

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	1.11E-02	mg/kg	(for comparison with soil analyses)
	or		
	0.01	mg/l	(for comparison with leachate test results)

Site being assessed: Southall
Completed by: Eoin O'Sullivan
Date: 24-May-17
Version: 0

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note



Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzene		from Level 1
Target Concentration	C _t	0.01	mg/l	from Level 1
Dilution Factor	DF	1.75E+02		from Level 2

Enter method of defining partition co-efficient (using pull down list)
Calculate for non-polar organic chemicals

Soil water partition coefficient	K _d		l/kg
Organic carbon partition coefficient	K _{oc}	1.30E-02	fraction
Sorption coefficient for related species	K _{oc,n}	3.80E+01	l/kg
Sorption coefficient for ionised species	K _{sc,i}		l/kg
pH value	pH		
Acid dissociation constant	pK _a		
Fraction of organic carbon in aquifer	f _{oc}		fraction

Soil water partition coefficient K_d 4.94E-01 l/kg

Define dispersivity (click brown cell and use pull down list)

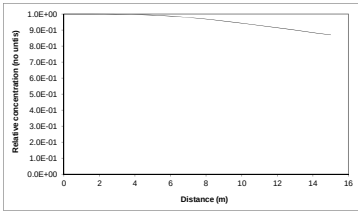
Dispersivities 10%, 1%, 0.1% of pathway length

	Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	ax	0.00E+00	1.50E+00	0.00E+00 m
Transverse dispersivity	az	0.00E+00	1.50E-01	1.25E-01 m
Vertical dispersivity	ay	0.00E+00	1.50E-02	1.25E-02 m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report $\alpha_x = 0.83(\log_{10} \lambda)^{2.414}$; $\alpha_z = \alpha_x/10$, $\alpha_y = \alpha_x/100$ are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentration at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Calculated (relative) concentrations for distance-concentration graph

Distance	Relative concentration	Concentration mg/l
0	1.0E+00	5.17E-03
0.8	1.00E+00	5.17E-03
1.5	1.00E+00	5.17E-03
2.3	1.00E+00	5.17E-03
3.0	9.99E-01	5.17E-03
3.8	9.98E-01	5.16E-03
4.5	9.96E-01	5.15E-03
5.3	9.92E-01	5.13E-03
6.0	9.87E-01	5.11E-03
6.8	9.81E-01	5.07E-03
7.5	9.74E-01	5.04E-03
8.3	9.66E-01	4.99E-03
9.0	9.57E-01	4.95E-03
9.8	9.47E-01	4.90E-03
10.5	9.37E-01	4.85E-03
11.3	9.26E-01	4.79E-03
12.0	9.15E-01	4.73E-03
12.8	9.04E-01	4.68E-03
13.5	8.93E-01	4.62E-03
14.3	8.82E-01	4.56E-03
15.0	8.70E-01	4.50E-03

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	#####
Version:	0

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

Variable	Value	Unit	Source of parameter value
Soil concentration as mg/kg			
Enter soil concentration	1	mg/kg	
Half life for degradation of contaminant in water	1.27E+02	days	
Calculated decay rate	9.63E-04	days ⁻¹	calculated
Width of plume in aquifer at source	1.00E+01	m	from Level 2
Plume thickness in aquifer at source	1.06E+00	m	from Level 2
Bulk density of aquifer materials	1.80E+00	g/cm ³	
Effective porosity of aquifer	2.10E-01	fraction	
Hydraulic gradient	2.82E-02	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	9.44E+01	m/d	from Level 2
Distance (lateral) to compliance point	1.50E+01	m	
Distance (depth) to compliance point perpendicular to flow direction		m	
Time since pollutant entered groundwater	1.00E+99	days	time variant options only
Parameters values determined from options			
Partition coefficient	K _d	4.94E-01	l/kg see options
Longitudinal dispersivity	ax	1.500	m see options
Transverse dispersivity	az	0.150	m see options
Vertical dispersivity	ay	0.015	m see options

Parameter values should be checked against Level 1 and 2

Calculated Parameters Variable

Groundwater flow velocity	v	1.27E+01	m/d
Retardation factor	R _f	5.23E+00	fraction
Decay rate used	λ	1.84E-04	d ⁻¹
Hydraulic gradient used in aquifer flow down-gradient	i	2.82E-02	fraction
Rate of contaminant flow due to retardation	u	2.42E+00	m/d
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.70E-01	fraction
Attenuation factor (C ₀ /C _{cp})	AF	1.15E+00	fraction
Calculated soil leachate concentration	C ₀	9.05E-01	mg/l

Remedial Targets

Level 3 Remedial Target	2.01E+00	mg/l	For comparison with measured pore water concentration.
Ogata Banks	or		This assumes Level 1 Remedial Target is based on Target Concentration.
Distance to compliance point	2.22E+00	mg/kg	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	15	m	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99

Remedial Targets Worksheet , Release 3.2



Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

Calculate for non-polar organic chemicals

Contaminant
Target concentration

Benzo(a)pyrene
0.00002 mg/l

Input Parameters

Standard entry

Variable	Value	Unit
Water filled soil porosity θ_w	2.98E-01	fraction
Air filled soil porosity θ_a	1.69E-01	fraction
Bulk density of soil zone material ρ	2.16E+00	g/cm ³
Henry's Law constant H	1.76E-06	dimensionless

Source of parameter value

Entry if specify partition coefficient (option)

Soil water partition coefficient K_d

Entry for non-polar organic chemicals (option)

Fraction of organic carbon (in soil) f_{oc}	2.50E-02	fraction
Organic carbon partition coefficient K_{oc}	1.29E+05	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for neutral species $K_{oc,n}$		l/kg
Sorption coefficient for ionised species $K_{oc,i}$		l/kg
pH value pH		pH units
Acid dissociation constant pK_a		
Fraction of organic carbon (in soil) f_{oc}		fraction

Soil water partition coefficient used in Level Assessment K_d 3.23E+03 l/kg Calculated value

Level 1 Remedial Target

Level 1 Remedial Target	6.45E-02 mg/kg	(for comparison with soil analyses)
	or	
	0.00002 mg/l	(for comparison with leachate test results)

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	23-May-17
Version:	0

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C _t	0.00002	mg/l	from Level 1
Dilution Factor	DF	1.75E+02		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks	Equations in HRA publication
-------------	------------------------------

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

Variable	Value	Unit	Source of parameter value
Soil concentration as mg/kg			
Enter source concentration			
Enter soil concentration	26	mg/kg	
Half life for degradation of contaminant in water	2.12E+03	days	
Calculated decay rate	3.27E-04	days ⁻¹	calculated
Width of plume in aquifer at source	1.00E+01	m	from Level 2
Plume thickness in aquifer at source	1.06E+00	m	from Level 2
Bulk density of aquifer materials	1.80E+00	g/cm ³	
Effective porosity of aquifer	2.10E-01	fraction	
Hydraulic gradient	2.82E-02		from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	9.44E+01	m/d	from Level 2
Distance (lateral) to compliance point	1.50E+01	m	
Distance (depth) to compliance point perpendicular to flow direction		m	
Time since pollutant entered groundwater	1.00E+99	days	time variant options only
Parameters values determined from options			
Partition coefficient	Kd	1.68E+03	l/kg see options
Longitudinal dispersivity	ax	1.500	m see options
Transverse dispersivity	az	0.150	m see options
Vertical dispersivity	ay	0.015	m see options

Parameter values should be checked against Level 1 and 2

Calculated Parameters

Variable		
Groundwater flow velocity	v	1.27E+01 m/d
Retardation factor	Rf	1.44E+04 fraction
Decay rate used	λ	2.27E-08 d ⁻¹
Hydraulic gradient used in aquifer flow down-gradient	i	2.82E-02 fraction
Rate of contaminant flow due to retardation	u	8.81E-04 m/d
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.71E-01 fraction
Attenuation factor (C ₀ /C _{cp})	AF	1.15E+00 fraction
Calculated soil leachate concentration	Co	8.06E-03 mg/l

Remedial Targets

Level 3 Remedial Target	4.02E-03	mg/l	For comparison with measured pore water concentration.
Ogata Banks	or		This assumes Level 1 Remedial Target is based on Target Concentration.
Distance to compliance point	1.30E+01	mg/kg	For comparison with measured soil concentration. This
	15	m	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.71E-01	fraction Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for non-polar organic chemicals

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd		l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc	1.30E-02	fraction
Organic carbon partition coefficient	Koc	1.29E+05	l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	K _{oc,n}		l/kg
Sorption coefficient for ionised species	K _{oc,i}		l/kg
pH value	pH		
Acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction

Soil water partition coefficient	Kd	1.68E+03	l/kg
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Define dispersivity (click brown cell and use pull down list)

Dispersivities 10%, 1%, 0.1% of pathway length

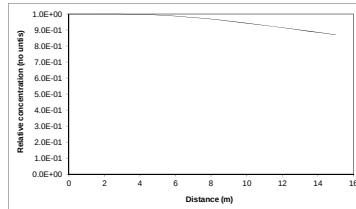
	Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	ax	0.00E+00	1.50E+00	0.00E+00 m
Transverse dispersivity	az	0.00E+00	1.50E-01	1.25E-01 m
Vertical dispersivity	ay	0.00E+00	1.50E-02	1.25E-02 m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report $ax = 0.83(log_{10}x)^{2.414}$; $az = ax/10$, $ay = ax/100$ are assumed

Note

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentration at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Calculated (relative) concentrations for distance-concentration graph

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	4.61E-05
0.8	1.00E+00	4.61E-05
1.5	1.00E+00	4.61E-05
2.3	1.00E+00	4.61E-05
3.0	1.00E+00	4.61E-05
3.8	9.98E-01	4.60E-05
4.5	9.96E-01	4.59E-05
5.3	9.92E-01	4.58E-05
6.0	9.88E-01	4.55E-05
6.8	9.81E-01	4.52E-05
7.5	9.74E-01	4.49E-05
8.3	9.66E-01	4.45E-05
9.0	9.57E-01	4.41E-05
9.8	9.47E-01	4.37E-05
10.5	9.37E-01	4.32E-05
11.3	9.27E-01	4.27E-05
12.0	9.16E-01	4.22E-05
12.8	9.05E-01	4.17E-05
13.5	8.94E-01	4.12E-05
14.3	8.82E-01	4.07E-05
15.0	8.71E-01	4.01E-05

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	#####
Version:	0

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil



Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant	Cadmium
Target concentration	0.00025 mg/l

Input Parameters

Standard entry

Water filled soil porosity	θ_w	2.98E-01	fraction
Air filled soil porosity	θ_a	1.69E-01	fraction
Bulk density of soil zone material	ρ	2.16E+00	g/cm ³
Henry's Law constant	H	0.00E+00	dimensionless

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	2.40E+02	l/kg
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Entry for non-polar organic chemicals (option)

Fraction of organic carbon (in soil)	foc		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for neutral species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		pH units
Acid dissociation constant	pKa		
Fraction of organic carbon (in soil)	foc		fraction

Soil water partition coefficient used in Level Assessment Kd 2.40E+02 l/kg Specified value

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Level 1 Remedial Target

Level 1 Remedial Target	6.00E-02	mg/kg	(for comparison with soil analyses)
	or		
	0.00025	mg/l	(for comparison with leachate test results)

Site being assessed: Southall
Completed by: Eoin O'Sullivan
Date: 22-May-17
Version: 0

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Cadmium		from Level 1
Target Concentration	C _t	0.00025	mg/l	from Level 1
Dilution Factor	DF	1.75E+02		from Level 2

Enter method of defining partition co-efficient (using pull down list)
User specified value for partition coefficient

Soil water partition coefficient	Kd	2.40E+02	l/kg
Organic carbon partition coefficient	Koc		l/kg
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	K _{oc}		l/kg
Sorption coefficient for related species	K _{oc,n}		l/kg
Sorption coefficient for ionised species	K _{oc,i}		l/kg
pH value	pH		
Acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction

Soil water partition coefficient Kd 2.40E+02 l/kg

Define dispersivity (click brown cell and use pull down list)

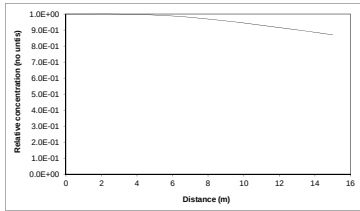
Dispersivities 10%, 1%, 0.1% of pathway length

	Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	ax	1.50E+00	1.50E+00	m
Transverse dispersivity	az	0.00E+00	1.50E-01	m
Vertical dispersivity	ay	0.00E+00	1.50E-02	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report $\alpha_x = 0.83(\log_{10} \lambda)^{2.414}$; $\alpha_z = \alpha_x/10$, $\alpha_y = \alpha_x/100$ are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentration at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Calculated (relative) concentrations for distance-concentration graph

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	2.24E-03
0.8	1.00E+00	2.24E-03
1.5	1.00E+00	2.24E-03
2.3	1.00E+00	2.24E-03
3.0	1.00E+00	2.24E-03
3.8	9.98E-01	2.23E-03
4.5	9.96E-01	2.23E-03
5.3	9.93E-01	2.22E-03
6.0	9.88E-01	2.21E-03
6.8	9.82E-01	2.20E-03
7.5	9.74E-01	2.18E-03
8.3	9.66E-01	2.16E-03
9.0	9.57E-01	2.14E-03
9.8	9.48E-01	2.12E-03
10.5	9.38E-01	2.10E-03
11.3	9.27E-01	2.07E-03
12.0	9.16E-01	2.05E-03
12.8	9.05E-01	2.03E-03
13.5	8.94E-01	2.00E-03
14.3	8.82E-01	1.98E-03
15.0	8.71E-01	1.95E-03

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	#####
Version:	0

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

Variable	Value	Unit	Source of parameter value
Soil concentration as mg/kg			
Enter source concentration			
Enter soil concentration	94	mg/kg	
Half life for degradation of contaminant in water	1.00E+100	days	
Calculated decay rate	6.93E-101	days ⁻¹	calculated
Width of plume in aquifer at source	1.00E+01	m	from Level 2
Plume thickness in aquifer at source	1.06E+00	m	from Level 2
Bulk density of aquifer materials	1.80E+00	g/cm ³	
Effective porosity of aquifer	2.10E-01	fraction	
Hydraulic gradient	2.82E-02	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	9.44E+01	m/d	from Level 2
Distance to compliance point	1.50E+01	m	
Distance (lateral) to compliance point perpendicular to flow direction		m	
Distance (depth) to compliance point perpendicular to flow direction		m	
Time since pollutant entered groundwater	1.00E+99	days	time variant options only
Parameters values determined from options			
Partition coefficient	Kd	2.40E+02	l/kg see options
Longitudinal dispersivity	ax	1.500	m see options
Transverse dispersivity	az	0.150	m see options
Vertical dispersivity	ay	0.015	m see options

Parameter values should be checked against Level 1 and 2

Calculated Parameters Variable

Groundwater flow velocity	v	1.27E+01	m/d
Retardation factor	Rf	2.06E+03	fraction
Decay rate used	λ	3.37E-104	d ⁻¹
Hydraulic gradient used in aquifer flow down-gradient	i	2.82E-02	fraction
Rate of contaminant flow due to retardation	u	6.15E-03	m/d
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.71E-01	fraction
Attenuation factor (C ₀ /C _{cp})	AF	1.15E+00	fraction
Calculated soil leachate concentration	C ₀	3.91E-01	mg/l

Remedial Targets

Level 3 Remedial Target	5.02E-02	mg/l	For comparison with measured pore water concentration.
Ogata Banks	or		This assumes Level 1 Remedial Target is based on Target Concentration.
Distance to compliance point	1.21E+01	mg/kg	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
	15	m	
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.71E-01	fraction Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99



Remedial Targets Worksheet , Release 3.2



Level 1 - Soil

Select the method of calculating the soil water
Partition Co-efficient by using the pull down menu
below

User specified value for partition coefficient

Contaminant	Free Cyanide
Target concentration	0.001 mg/l

Input Parameters

Standard entry

Water filled soil porosity	θ_w	2.98E-01	fraction	
Air filled soil porosity	θ_a	1.69E-01	fraction	
Bulk density of soil zone material	ρ	2.16E+00	g/cm ³	
Henry's Law constant	H	2.09E+00	dimensionless	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	1.00E-01	l/kg	
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Entry for non-polar organic chemicals (option)

Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	

Entry for ionic organic chemicals (option)

Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

Soil water partition coefficient used in Level Assessment Kd 1.00E-01 l/kg Specified value

Level 1 Remedial Target

Level 1 Remedial Target	4.01E-04	mg/kg	(for comparison with soil analyses)
	or		
	0.001	mg/l	(for comparison with leachate test results)

Site being assessed: Southall
Completed by: Eoin O'Sullivan
Date: 22-May-17
Version: 0

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note



Input Parameters	Variable	Value	Unit	Source
Contaminant		Free Cyanide		from Level 1
Target Concentration	C _t	0.001	mg/l	from Level 1
Dilution Factor	DF	1.75E+02		from Level 2

Enter method of defining partition co-efficient (using pull down list)
User specified value for partition coefficient

Entry if specify partition coefficient (option)
Soil water partition coefficient K_d 1.00E-01 l/kg
Entry for non-polar organic chemicals (option)
Fraction of organic carbon in aquifer f_{oc} fraction
Organic carbon partition coefficient K_{oc} fraction
Entry for ionic organic chemicals (option)
Sorption coefficient for related species K_{oc,n} l/kg
Sorption coefficient for ionised species K_{sc,i} l/kg
pH value pH
Acid dissociation constant pK_a fraction
Fraction of organic carbon in aquifer f_{oc} fraction

Soil water partition coefficient K_d 1.00E-01 l/kg

Define dispersivity (click brown cell and use pull down list)

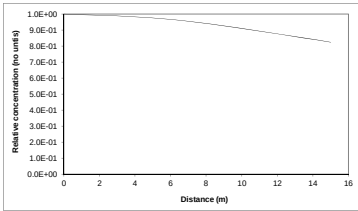
Dispersivities 10%, 1%, 0.1% of pathway length

Enter value Calc value Xu & Eckstein
Longitudinal dispersivity ax 0.00E+00 1.50E+00 0.00E+00 m
Transverse dispersivity az 0.00E+00 1.50E-01 1.25E-01 m
Vertical dispersivity ay 0.00E+00 1.50E-02 1.25E-02 m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = 0.83(log₁₀x)^{2+1/4}; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentration at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Calculated (relative) concentrations for distance-concentration graph

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	0.00E+00
0.8	9.97E-01	0.00E+00
1.5	9.95E-01	0.00E+00
2.3	9.92E-01	0.00E+00
3.0	9.89E-01	0.00E+00
3.8	9.85E-01	0.00E+00
4.5	9.80E-01	0.00E+00
5.3	9.74E-01	0.00E+00
6.0	9.66E-01	0.00E+00
6.8	9.58E-01	0.00E+00
7.5	9.48E-01	0.00E+00
8.3	9.38E-01	0.00E+00
9.0	9.26E-01	0.00E+00
9.8	9.15E-01	0.00E+00
10.5	9.02E-01	0.00E+00
11.3	8.90E-01	0.00E+00
12.0	8.77E-01	0.00E+00
12.8	8.64E-01	0.00E+00
13.5	8.51E-01	0.00E+00
14.3	8.38E-01	0.00E+00
15.0	8.25E-01	0.00E+00

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	#####
Version:	0

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

Variable	Value	Unit	Source of parameter value
Soil concentration as mg/kg			
Enter source concentration			
Enter soil concentration		mg/kg	
Half life for degradation of contaminant in water	t _{1/2}	days	
Calculated decay rate	λ	days ⁻¹	calculated
Width of plume in aquifer at source	Sz	m	from Level 2
Plume thickness in aquifer at source	Sy	m	from Level 2
Bulk density of aquifer materials	ρ	g/cm ³	
Effective porosity of aquifer	n	fraction	
Hydraulic gradient	i	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	m/d	from Level 2
Distance to compliance point	x	m	
Distance (lateral) to compliance point perpendicular to flow direction	z	m	
Distance (depth) to compliance point perpendicular to flow direction	y	m	
Time since pollutant entered groundwater	t	days	time variant options only

Parameters values determined from options

Partition coefficient	K _d	1.00E-01	l/kg	see options
Longitudinal dispersivity	ax	1.500	m	see options
Transverse dispersivity	az	0.150	m	see options
Vertical dispersivity	ay	0.015	m	see options

Parameter values should be checked against Level 1 and 2

Calculated Parameters

Variable	Value	Unit
Groundwater flow velocity	v	1.27E+01 m/d
Retardation factor	Rf	1.86E+00 fraction
Decay rate used	λ	2.49E-02 d ⁻¹
Hydraulic gradient used in aquifer flow down-gradient	i	2.82E-02 fraction
Rate of contaminant flow due to retardation	u	6.82E+00 m/d
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.25E-01 fraction
Attenuation factor (C ₀ /C _{cp})	AF	1.21E+00 fraction
Calculated soil leachate concentration	C ₀	0.00E+00 mg/l

Remedial Targets

Level 3 Remedial Target	2.12E-01	mg/l	For comparison with measured pore water concentration.
Ogata Banks	8.51E-02	mg/kg	This assumes Level 1 Remedial Target is based on Target Concentration.
Distance to compliance point	15	m	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.25E-01	fraction Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil



Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant
Target concentration

Lead
0.0012 mg/l

Input Parameters

Standard entry

Water filled soil porosity θ_w 2.98E-01 fraction
Air filled soil porosity θ_a 1.69E-01 fraction
Bulk density of soil zone material ρ 2.16E+00 g/cm³
Henry's Law constant H 0.00E+00 dimensionless

Entry if specify partition coefficient (option)

Soil water partition coefficient Kd 4.36E+03 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon (in soil) foc
Organic carbon partition coefficient Koc

Entry for ionic organic chemicals (option)

Sorption coefficient for neutral species $K_{oc,n}$ l/kg
Sorption coefficient for ionised species $K_{oc,i}$ l/kg
pH value pH pH units
Acid dissociation constant pKa
Fraction of organic carbon (in soil) foc

Soil water partition coefficient used in Level Assessment Kd 4.36E+03 l/kg Specified value

Level 1 Remedial Target

Level 1 Remedial Target 5.23E+00 mg/kg (for comparison with soil analyses)
or
0.0012 mg/l (for comparison with leachate test results)

Site being assessed: Southall
Completed by: Eoin O'Sullivan
Date: 22-May-17
Version: 0

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note



Input Parameters	Variable	Value	Unit	Source
Contaminant	Lead			from Level 1
Target Concentration	C _t	0.0012	mg/l	from Level 1
Dilution Factor	DF	1.75E+02		from Level 2

Enter method of defining partition co-efficient (using pull down list)
User specified value for partition coefficient

Entry if specify partition coefficient (option)
Soil water partition coefficient K_d 4.36E+03 l/kg
Entry for non-polar organic chemicals (option)
Fraction of organic carbon in aquifer f_{oc} fraction
Organic carbon partition coefficient K_{oc} fraction
Entry for ionic organic chemicals (option)
Sorption coefficient for related species K_{oc,n} l/kg
Sorption coefficient for ionised species K_{sc,i} l/kg
pH value pH
Acid dissociation constant pK_a fraction
Fraction of organic carbon in aquifer f_{oc} fraction

Soil water partition coefficient K_d 4.36E+03 l/kg

Define dispersivity (click brown cell and use pull down list)

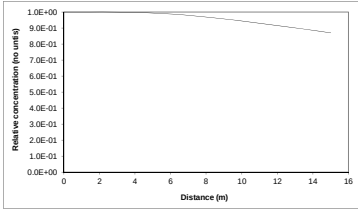
Dispersivities 10%, 1%, 0.1% of pathway length

	Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	ax	1.50E+00	1.50E+00	m
Transverse dispersivity	az	0.00E+00	1.50E-01	1.50E-01 m
Vertical dispersivity	ay	0.00E+00	1.50E-02	1.50E-02 m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report $\alpha_x = 0.83(\log_{10} x)^{2.414}$; $\alpha_z = \alpha_x/10$, $\alpha_y = \alpha_x/100$ are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best described by an electron limited degradation such as oxidation by O₂, NO₃, SO₄ etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentration at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Calculated (relative) concentrations for distance-concentration graph

Distance	Relative concentration	Concentration
	(No units)	mg/l
0	1.0E+00	1.22E-03
0.8	1.00E+00	1.22E-03
1.5	1.00E+00	1.22E-03
2.3	1.00E+00	1.22E-03
3.0	1.00E+00	1.22E-03
3.8	9.98E-01	1.22E-03
4.5	9.96E-01	1.22E-03
5.3	9.93E-01	1.21E-03
6.0	9.88E-01	1.20E-03
6.8	9.82E-01	1.20E-03
7.5	9.74E-01	1.19E-03
8.3	9.66E-01	1.18E-03
9.0	9.57E-01	1.17E-03
9.8	9.48E-01	1.16E-03
10.5	9.38E-01	1.14E-03
11.3	9.27E-01	1.13E-03
12.0	9.16E-01	1.12E-03
12.8	9.05E-01	1.10E-03
13.5	8.94E-01	1.09E-03
14.3	8.82E-01	1.08E-03
15.0	8.71E-01	1.06E-03

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source. Three solution methods are included, the preferred option is Ogata Banks. By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Southall
Completed by:	Eoin O'Sullivan
Date:	#####
Version:	0

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

Variable	Value	Unit	Source of parameter value
Soil concentration as mg/kg			
Enter source concentration	930	mg/kg	
Enter soil concentration	1.00E+100	days	
Half life for degradation of contaminant in water	λ	days ⁻¹	calculated
Calculated decay rate	Sz	m	from Level 2
Width of plume in aquifer at source	Sy	m	from Level 2
Plume thickness in aquifer at source	ρ	g/cm ³	
Bulk density of aquifer materials	n	fraction	
Effective porosity of aquifer	i	fraction	from Level 2 (adjusted)
Hydraulic gradient	K	m/d	from Level 2
Hydraulic conductivity of saturated aquifer	x	m	
Distance (lateral) to compliance point	z	m	
Distance to compliance point perpendicular to flow direction	y	m	
Distance (depth) to compliance point perpendicular to flow direction	t	days	time variant options only
Time since pollutant entered groundwater	Parameters values determined from options		
Partition coefficient	K _d	l/kg	see options
Longitudinal dispersivity	ax	m	see options
Transverse dispersivity	az	m	see options
Vertical dispersivity	ay	m	see options

Parameter values should be checked against Level 1 and 2

Calculated Parameters

Variable	Value	Unit
Groundwater flow velocity	v	m/d
Retardation factor	Rf	fraction
Decay rate used	λ	d ⁻¹
Hydraulic gradient used in aquifer flow down-gradient	i	fraction
Rate of contaminant flow due to retardation	u	m/d
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	fraction
Attenuation factor (C ₀ /C _{cp})	AF	fraction
Calculated soil leachate concentration	Co	mg/l

Remedial Targets

Level 3 Remedial Target	2.41E-01	mg/l	For comparison with measured pore water concentration.
Ogata Banks	or		This assumes Level 1 Remedial Target is based on Target Concentration.
	1.05E+03	mg/kg	For comparison with measured soil concentration. This
Distance to compliance point	15	m	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	C _{cp} /C ₀	8.71E-01	fraction Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target. The recommended value for time when calculating the remedial target is 9.9E+99

Remedial Targets Worksheet , Release 3.2



Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant	Mercury
Target concentration	0.00007 mg/l

Input Parameters

Standard entry

Water filled soil porosity	θ_w	2.98E-01	fraction	
Air filled soil porosity	θ_a	1.69E-01	fraction	
Bulk density of soil zone material	ρ	2.16E+00	g/cm ³	
Henry's Law constant	H	0.00E+00	dimensionless	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	5.00E+02	l/kg	
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Entry for non-polar organic chemicals (option)

Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	

Entry for ionic organic chemicals (option)

Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

Soil water partition coefficient used in Level Assessment Kd 5.00E+02 l/kg Specified value

Level 1 Remedial Target

Level 1 Remedial Target	3.50E-02	mg/kg	(for comparison with soil analyses)
	or		
	0.00007	mg/l	(for comparison with leachate test results)

Site being assessed: Southall
Completed by: Eoin O'Sullivan
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